

U.S. DEPARTMENT OF ENERGY SOLAR DECATHLON 2013

Norwich University

Delta T-90 House

Project Manual Version 4.0

As-Built

August 22, 2013

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Project Narrative

The Norwich University Delta T-90 team recognizes a housing crisis in New England. In 2010, approximately 47% of renters, and 38% of Vermont homeowners paid more than one-third of their income for housing. Close to one third of Vermont's existing housing stock was built prior to 1950 with inadequate insulation, inefficient heating systems, and sub-standard window and door assemblies. Leaky construction combined with severe winter cold and high fuel costs force many Vermonters to pay annual energy costs that approach or equal their existing mortgage costs.

Approximately eighty-two percent of households in Vermont earning under \$41,000 annually direct more than one-third of their income toward mortgage and housing costs. Couple this statistic with the fact that Vermont ranks sixth highest in the United States in terms of annual heating demand and it becomes clear that the challenges of home ownership for lower-income households can be overwhelming. In addition to the lengthy, sometimes severe heating season, approximately eighty-five percent of Vermont's forty-eight billion BTU's for residential heat demand comes from petroleum-based products. Globally influenced price fluctuation of these products is a financial planning wildcard for households operating on thin margins.

The Delta T-90 team believes that high performance, solar powered dwellings should be accessible to all and that good design is not a function of cost. We are confronting the issues related to high performance and affordability for New England by taking an unapologetic design position driven by performance criteria, building science, and time honored architectural maneuvers. Our team is committed to providing a hammer-ready, widely accessible solution for New England's unique challenges.

Norwich University's DeltaT-90 House for Solar Decathlon 2013 is a 991 square foot, two-bedroom home that is tuned for the unique seasons of the northeastern bioregion. The Delta T-90 House explores the interdependency between the economy and the built environment by revealing the hidden values and richness within a conservation-based lifestyle. This high-performance home models the future of affordable, energy efficient living in Vermont.



Summary of Changes

Significant changes to the project manual that have occurred between submissions have been outlined below. The Construction Drawings should also be reviewed for relevant revisions.

November 2, 2012 Revision

The Project Manual has been updated from the previous issue. Revisions include:

Changes to Project Manual

Rules Compliance Checklist - To be updated in accordance to changes with updated construction documents

Energy Analysis and Results - Significantly reformatted to include Tools, Geometry and Systems, Envelope Construction, Internal Gains, and Electricity Usage information.

01 51 13 - Spill containment pan added to this section for spill containment

02 21 13.13 Boundary and Survey Markers - Section added to explain the lot size and solar envelope dimensions at the competition.

05 51 13 Metal Railings - Replaced Section 05 52 13 for exterior railings

06 11 00 Wood Framing - Section added to show framing structure and accessories

06 16 23 Subflooring - Section added to call out subflooring used throughout house

06 16 36 - Sheathing product and manufacturer updated

06 11 13 Engineered Wood Products - Section added to show LVLs, floor joists, and roof rafters as engineered material

07 13 00 - Intello moisture barrier added for sheet waterproofing

07 4 6 23 Wood Siding - Wood Siding changed from hemlock to cedar

07 70 00 - Tescon Profile Vana Tape added for airsealing

08 14 73 - Sliding door accessories were added

08 14 76 Bi-Folding Wood Doors - Section added for mudroom and utility closet doors

08 50 00 - Whole section revised in formatting and content to include further detail of windows

08 60 00 - Section removed, skylight moved to Section 08 61 00

08 83 00 Mirrors - Section added to include mirrors throughout house

09 21 16 - Panel adhesive and drywall screws added, type of gypsum updated, HardieBacker board added



- 09 65 16.23 Vinyl Sheet Flooring** - Section added for flooring used in bathroom
- 09 77 23 Fabric Wrapped Panels** - Section added for closet door fabric
- 09 91 23** - Paint products updated
- 09 93 23.13 Interior Staining** - Section added for stain used throughout interior of house
- 10 18 00 Informational Kiosk**– Changes made to kiosk design
- 10 20 00** - Products added to section
- 10 57 33 Closet and Utility Shelving Hardware**- Section added for shelving hardware
- 11 06 60** - Manufacturer and products updated
- 12 24 00 Window Shades** - Section added to describe shading devices used on south and west elevations.
- 12 35 30.31 Kitchen Casework** - Section added to show casework in bathroom and kitchen
- 12 35 30.23 Bathroom Casework** - Casework updated
- 12 43 13.13 Desk Lamps** - Section added to specify desk lamps used in office
- 12 44 16 Shower Curtain** - Section added for bathroom detailing
- 12 48 43 Floor Mats** - Section added for mats used through house
- 12 52 23 Office Seating** - Section added to show chair used in office
- 12 58 00 Residential Furniture** - Section added to include furniture throughout house
- 12 58 13 Couches and Loveseats** - Section added to include couch furniture in living room
- 12 58 19 Dining Tables and Chairs** - Section added to include chairs and table used in kitchen
- 12 58 26 Entertainment Centers** - Section added to include entertainment center in living room
- 12 58 29 Beds** - Section added to show beds chosen for bedrooms
- 12 58 33 Dressers** - Section added to include dressers in bedrooms
- 12 58 36 Nightstands** - Section added to include nightstands
- 22 05 16** - Section added for expansion fittings and loops for plumbing piping
- 22 11 16 Domestic Water Piping** - Section added for water piping used throughout house
- 22 12 19 Water Storage Tanks** - Quantity on tanks updated
- 22 41 16** - Kitchen and bathroom sinks and manufacturers changed
- 22 41 19 Residential Bathtubs** - Section added to include bathtub
- 22 41 39**-Showerhead changed, manufacturer added for faucets
- 23 09 13 Sensors and Transmitters** - Section added for data loggers and sensors
- 23 09 13.23** - Sensors and transmitters added to section



- 23 81 26** - Sauermann Mini Condensate Heat Pump added to section
- 26 05 19** - Firestop caulking added to conductor and cables accessories
- 26 05 33 Raceway and Boxes for Electrical**- Section added to included raceways and boxes for electrical
- 26 06 20.16** - Section added for panel board schedule
- 26 06 50 Schedules for Lighting** - Section added to include the list of lighting
- 26 24 16 Panel Boards** - Section added to include panel board and electrical equipment
- 26 27 26 Wiring Devices** - Section added for electrical wiring devices
- 26 28 16 Enclosed Switches and Circuit Breakers** - Section added for circuits and breakers
- 26 50 00** - Fixtures updated, Legrand Construction Slides added
- 26 51 13 Interior Lighting** - Section added for interior lighting fixtures, lamps, and ballasts; fixtures updated
- 28 05 13 Conductors and Cables** - Section added for components of electrical safety and security planning
- 28 31 46** - Smoke detector updated
- 41 65 13** - Stationary compressor added
- 41 65 16** - Section added to include mobile generators used on site
- 48 14 00** – Enphase Micro inverter added to power generation equipment

February 14, 2013 Revision

The Project Manual has been updated from the previous issue. Revisions include:

- 32 00 00 Exterior Improvements** – Division added for landscaping
- 32 05 13 Soils for Exterior Improvements** - Section added for potting soil
- 32 05 16 Aggregates for Exterior Improvements** - Section added for gravel in planting beds
- 32 91 13.26 Planting Beds** - Section added for materials to construct planting beds
- 32 93 23 Plants and Bulbs** - Section added to include plants for planting beds
- 32 93 33 Shrubs** - Section added to include shrubs for planting beds
- 09 77 23 Fabric Wrapped Panels** - Section deleted
- 12 35 30.31 Kitchen Casework** – Cabinets and accessories updated



26 51 13 Interior Lighting Fixtures – Yeti Solar added to accommodate for custom lighting designs

06 61 36 Wood Panel Product Sheathing – 7/16” OSB replaced GP plytanium sheathing

08 61 00 Roof Windows – Section updated to correct Fakro skylight

12 58 00 Residential Furniture - Section updated

08 14 73 Wood Sliding Door – Lumber added for custom closet door in master bedroom

48 14 00 Electrical Power Generation – Solar panels, inverter, and mounting system updated

28 31 46 Smoke Detection Sensors – Updated to comply with building inspector requirements

28 30 00 Electronic Detection and Alarm – CO2 Monitor added to comply with building inspector and safety requirements

41 22 00 Cranes and Hoists – Crane updated with proper weight requirement for each module and CA crane company

12 58 83 Custom Residential Furniture – Section added with materials need to construct custom furniture

32 91 13.16 Mulching – Added for landscaping plan

April 5, 2013 Revision

The Project Manual has been updated from the previous issue. Revisions include:

NEC 220 Calculations – Updated to include effluent pump

07 46 23 Wood Siding – Rough sawn cedar for rainscreen changed from 1” x 6” to 5/4” x 6”

10 71 13 Exterior Sun Control Devices – Rough Sawn cedar for water tank shading changed from 1” x 6” to 5/4” x 6”

26 24 16 Panel Boards – Meter Socket updated

26 27 26 Wiring Devices – Receptacles in wet locations updated to weatherproof/weather resistant types

48 14 00 Solar Energy Electrical Power Generation Equipment - Solar panel updated, inverter updated, combiner box added



Construction Documents Update April 5, 2013 Revision

The Construction Documents has been updated from the previous issue. Revisions include:

Upon resubmitting the Construction Documents, the team has made revisions to develop the Delta T-90 drawings to their best potential thus far. Revisions include a large amount of general drawing updates such as line weight adjustments, drawing quality increasing, accumulating detail levels, labeling adjustments as well as relinking to the Project Manual. Structural and electrical drawings have been updated to meet the outstanding issues marked from the February 14th Design Deliverable Submission.

August 22, 2013 Revision

The Project Manual has been updated from the previous issue. Revisions include:

NEC 220 Calculations – Updated with correct values

05 05 23: Metal Fastenings - Updated foundation and deck fasteners

05 51 13: Metal Railings – Railings updated

06 15 13: Exterior Deck and Foundation – Deck framing updated, ABU 44 post base removed

07 60 00 Flashing and Sheet Metal: Eliminated

07 54 23 Thermoplastic Polyolefin Roofing: Products added to section from 07 60 00

07 71 23: Manufacture Gutter and Down Spout – Gutter material updated

08 14 73: Sliding Wood Doors – Cedar boards changed to pine decking boards

09 21 16: Gypsum Board Assemblies – Eliminated hardie backer board

09 62 29: Cork Flooring – Replaced Ceramica vinyl flooring w/ cork flooring

09 93 13.13: Exterior Staining – Exterior stains updated

09 93 13.53: Exterior Finishes - Section deleted and products moved to 09 93 13.13

10 20 00: Interior Specialties – Benjamin Moore Chalkboard Paint and desk hinge added

12 35 30.31: Kitchen Case Work – Changed maple shelving from 1 3/4" to 3/4"



12 52 13: Chairs – Updated throughout the house

12 50 19: Dining Tables and Chairs – Updated with current furniture

12 58 26: Entertainment Centers – Updated

12 24 00: Window Shades – Materials updated

22 33 00: Instantaneous Electric Domestic Water Heaters – Added pressure Tanks, Shallow Well Jet Pump and Adjustable Three Way Thermostatic Mixing Valve.

42 22 00: Cranes and Hoists – Boom Lift added to equipment

48 14 00: Solar Energy Electrical Power Generation Equipment – Added solar panel attachment tapes and raceways.

28 30 00: Electronic Detection and Alarm – Carbon monoxide alarm updated

28 31 46: Smoke Detection Sensors – Smoke detector updated

23 81 26: Split-System Air Conditioners – Heat pump units updated with model numbers and mini-condensate pump deleted

26 05 26: Grounding and Bonding for Electrical Systems – Grounding electrode conductor added and grounding rod information updated

26 05 33: Raceway and Boxes for Electrical – Junction box added

26 06 20.16: Electrical Panelboard Schedule – Main circuit breaker model number updated

26 24 16: Panelboards – Arc fault breaker model number updated

26 28 16: Enclosed Switches and Circuit Breakers – Molded disconnect switch updated

11 31 13: Residential Kitchen Appliances – All appliances updated

10 18 00: Informational Kiosk – All materials updated

06 15 13: Exterior Wood Decking and Foundation – Marriage plate added to foundation materials

06 16 36: Wood Panel Product Sheathing – Added PT underlayment

07 21 13.19: Mineral Board Insulation – Mineral wool types updated with correct location



- 07 46 23: Wood Siding** – Fasteners for rainscreen updated
- 07 70 00: Roof and Wall Specialties and Accessories** – Tape locations updated
- 08 06 50: Window Schedule** – Windows schedule updated
- 08 50 00: Windows** – Safety film for south window updated
- 08 61 00: Roof Windows** – Skylight specifications updated with performance specs
- 09 21 16: Gypsum Board Assemblies** – Joint compound and joint tape added
- 09 62 29: Cork Flooring** – Floor adhesive added and cork thickness updated
- 09 64 23: Wood Flooring** – Flooring fasteners added
- 06 15 13: Exterior Wood Decking and Foundation** – Marriage plate added to foundation materials, deck post connectors and lag bolts added
- 10 20 00: Interior Specialties** – Office storage wall material updated
- 11 52 00: Audio Visual Equipment** – TV model updated to fit in wall mounted cabinet
- 12 48 43: Floor Mats** – Section deleted
- 12 52 13: Chairs** – Dining room chairs updated
- 12 58 00: Residential Furniture** – All furniture for house updated
- 12 58 13: Couches and Loveseats** – Couch updated and living room lounge chair added
- 21 13 13: Wet-Pipe Sprinkler Systems** – Residential fire pump updated
- 23 09 13: Sensors and Transmitters** – Section deleted
- 26 05 26: Grounding and Bonding for Electrical Systems** – Ground changed to 4 AWG Copper Wire
- 11 34 00: Residential Ceiling Fans** – Section added to include living room fan
- 21 30 00: Fire Pumps** – Section added to fire suppression system
- 22 12 19: Facility Ground-Mounted, Potable Water Storage Tanks** – Water tanks updated
- 46 00 00 – Water And Wastewater Equipment** – Water tanks updated



26 51 13: Interior Lighting Fixtures, Lamps, and Ballasts – Lighting updated

Construction Documents Update August 22, 2013 Revision

The Construction Documents has been updated from the previous issue. Revisions include:

The construction documents were entirely updated based on the As-Built product of the Delta T-90 House. Significant updates include the following:

1. Solar array panel layout updated
2. Lighting plan updated to reflect changes in light fixtures and light locations
3. Mechanical plans were updated to reflect changes in heat pump system from two diffusers to one diffuser
4. The flower boxes on the south entry path were updated to reflect competition tour path
5. Exterior door shades on south and west added
6. Exterior window shades were updated on south and west windows
7. North wall electrical component layout updated
8. Rain gutter at the roof edge of the south, east, and west elevation added to direct rain away from siding
9. Custom furniture and purchased furniture location and dimensioning updated
10. Plumbing drawings were updated
11. Rainscreen siding was corrected and updated
12. West and South decks and ramps updated
13. Signage plans updated
14. E-107: Change sheet name from PV Conduit Plan to PV Raceway Plan



Rules Compliance Checklist

RULE	RULE DESCRIPTION	LOCATION DESCRIPTION	LOCATION
Rule 4-2	Construction Equipment	Drawing(s) showing the assembly and disassembly sequences and the movement of heavy machinery on the competition site	O-101, O-102 O-602
Rule 4-2	Construction Equipment	Specifications for heavy machinery	41 22 00 41 62 23
Rule 4-3	Ground Penetration	Drawing(s) showing the locations and depths of all ground penetrations on the competition site	C-101
Rule 4-4	Impact within the Solar Envelope	Drawing(s) showing the location, contact area, and bearing pressure of every component resting directly within the solar envelope	A-101, C-101 S-102, S-103 S-505, S-506
Rule 4-5	Generators	Specifications for generators (including sound rating)	01 51 13 41 65 16
Rule 4-6	Spill Containment	Drawing(s) showing the locations of all equipment, containers, and pipes that will contain liquids at any point during the event	H-101 F-102, P-102, P-101 P-103, P-501, P-603
Rule 4-6	Spill Containment	Specifications for all equipment, containers, and pipes that will contain fluids at any point during the event	22 11 23 22 11 16 21 13 13 01 51 13 41 65 16
Rule 4-7	Lot Conditions	Calculations showing that the structural design remains compliant even if 18 in. (45.7 cm) of vertical elevation change exists	A-311, L-104
Rule 4-7	Lot Conditions	Drawing(s) showing shimming methods and materials to be used if 18 in. (45.7 cm) of vertical elevation change exists on the lot	S-102, S-103 A-311
Rule 5-2	Solar Envelope Dimensions	Drawing(s) showing the location of all house and site components relative to the solar envelope	A-101,G-201 G-202, L-101
Rule 5-2	Solar Envelope Dimensions	List of solar envelope exemption requests accompanied by justifications and drawing references	N/A



Rule 6-1	Structural Design Approval	List of, or marking on, all drawing and project manual sheets that will be stamped by the qualified, licensed design professional in the stamped structural submission; the stamped submission shall consist entirely of sheets that also appear in the drawings and project manual	S-001 through S-506, A-311, C-101 PM Appendix A
Rule 6-2	Finished Square Footage	Drawing(s) showing all information needed by the rules officials to measure the finished square footage electronically	A-111, A-112, G-101
Rule 6-2	Finished Square Footage	Drawing(s) showing all movable components that may increase the finished square footage if operated during contest week	N/A
Rule 6-3	Entrance and Exit Routes	Drawing(s) showing the accessible public tour route	G-103
Rule 7-1	Placement	Drawing(s) showing the location of all vegetation and, if applicable, the movement of vegetation designed as part of an integrated mobile system	L-101 L-401
Rule 7-2	Watering Restrictions	Drawing(s) showing the layout and operation of greywater irrigation systems	N/A
Rule 8-1	PV Technology Limitations	Specifications for photovoltaic components	48 14 00
Rule 8-3	Batteries	Drawing(s) showing the location(s) and quantity of all primary and secondary batteries and stand-alone, PV-powered devices	N/A
Rule 8-3	Batteries	Specifications for all primary and secondary batteries and stand-alone, PV-powered devices	N/A
Rule 8-4	Desiccant Systems	Drawing(s) describing the operation of the desiccant system	N/A
Rule 8-4	Desiccant Systems	Specifications for desiccant system components	N/A
Rule 8-5	Village Grid	Completed interconnection application form	PM 19
Rule 8-5	Village Grid	Drawing(s) showing the locations of the photovoltaic, inverter(s), terminal box, meter housing, service equipment, and grounding means	E-001 – E-604 C-103, A-212
Rule 8-5	Village Grid	Specifications for the photovoltaic, inverter(s), terminal box, meter housing, service equipment, and grounding means	26 05 26 26 05 33 48 14 00 E-601, E-603
Rule 8-5	Village Grid	One-line electrical diagram	E-602
Rule 8-5	Village Grid	Calculation of service/feeder net computed load per NEC 220	PM 15
Rule 8-5	Village Grid	Site plan showing the house, decks, ramps, tour paths, and terminal box	A-101, G-102 L-101, E-101
Rule 8-5	Village Grid	Elevation(s) showing the meter housing, main utility disconnect, and other service equipment	A-212



Rule 9-1	Container Locations	Drawing(s) showing the location of all liquid containers relative to the finished square footage	P-101, O-109, H-101
Rule 9-1	Container Locations	Drawing(s) demonstrating that the primary supply water tank(s) is fully shaded from direct solar radiation between 9 a.m. and 5 p.m. PDT or between 8 a.m. and 4 p.m. solar time on October 1	A-501
Rule 9-2	Team-Provided Liquids	Quantity, specifications, and delivery date(s) of all team-provided liquids for irrigation, thermal mass, hydronic system pressure testing, and thermodynamic system operation	N/A
Rule 9-3	Greywater Reuse	Drawing(s) showing the layout and operation of greywater reuse systems	N/A
Rule 9-4	Rainwater Collection	Drawing(s) showing the layout and operation of rainwater collection systems	N/A
Rule 9-6	Thermal Mass	Drawing(s) showing the locations of liquid-based thermal mass systems	N/A
Rule 9-6	Thermal Mass	Specifications for components of liquid-based thermal mass systems	N/A
Rule 9-7	Greywater Heat Recovery	Drawing(s) showing the layout and operation of greywater heat recovery systems	N/A
Rule 9-8	Water Delivery	Drawing(s) showing the complete sequence of water delivery and distribution events	P-102, P-603, O-109
Rule 9-8	Water Delivery	Specifications for the containers to which water will be delivered	46 00 00
Rule 9-9	Water Removal	Drawing(s) showing the complete sequence of water consolidation and removal events	O-109
Rule 9-9	Water Removal	Specifications for the containers from which water will be removed	46 00 00
Rule 11-4	Public Exhibit	Interior and exterior plans showing entire accessible tour route	G-102, G-103



NEC220 Calculations

Service/Feeder Net Computed Load and Neutral Load		
Appliance	Total Connected Load	
General Lighting *	2925	Per NEC 220.12 - 3VA per sq. ft. x 975 sq. ft. of house = 2925 VA, includes HRVs and receptacle loads
Small Appliances	3000	2 x 1500 VA
Laundry	1380	12A x 115 V = 1380 W per appliance specification
Total	7305	
3000 VA at 100%	3000	
7305 - 3000 = 4305 VA at 35%	1507	
Net Load	4507	
Range	8000	40A x 240V = 9600 W, use 8kW per Table 220.55
Heat Pump	1750	
Range Hood	250	
Dishwasher	1200	
Refrigerator	1800	
Water Heater	19200	
HRV Lunos (3)	9	
Fire pump	2300	1.5HP, 240 V
Effluent	876	
Water pump	1296	1/2HP, 120 V
Net Calculated Load (VA)	41188	
Net Calculated Netrual Load (VA)	38788	NEC 220.61
Neutral Ampacity (A)	162	
Service/Feeder Ampacity (A)	172	

Optional Calculation per NEC 220.82(A)		
Service/Feeder Net Computed Load and Neutral Load		
Appliance	Total Connected Load	
General Lighting *	2925	Per NEC 220.12 - 3VA per sq. ft. x 975 sq. ft. of house = 2925 VA, includes HRVs and receptacle loads
Small Appliances	3000	2 x 1500 VA
Laundry	1380	12A x 115 V = 1380 W per appliance specification
Range	9600	40A x 240V = 9600 W, use nameplate rating per NEC 220.82(A)
Heat Pump	1750	
Dishwasher	1200	
Refrigerator	1800	
Water Heater	19200	
HRV Lunos (3)	9	
Fire pump	2300	1.5HP, 240 V
Water pump	1296	1/2HP, 120 V
Net Calculated Load (VA)	44460	
Calculated Load for Service Size (VA)	23784	NEC 220.61
Service/Feeder Ampacity (A)	99	



Detailed Water Budget

FUNCTION	Water Use(gallons)	Calculations		Notes:
		Gal	Events	
Hot water draws	45	15	3	
Water Vaporization	2.4	0.6	4	
Dish Washer	105	15	7	Dinner party and comp. events
Clothes Washer	64	4	16	3gal/wash cycle and test runs
Vegetation	280	20	14	20 gallons per day for 20 days of set up and display week
Fire Protection	300	300	1	10 min flow @ 15GPM ant 2 heads. Drawn from common supply
Testing	20	20	1	Ensure all connections are sealed and plumbing is working
Initial Systems Fill	20	20	1	Plumbing, spillage
Aesthetic Purpose	20	5	4	General cleaning, dinner party usage
Safety Factor	128.46			Additional 10%
Water required	984.86			



Summary of Unlisted Electrical Components

The Delta T-90 House is not using any unlisted electrical components.
All electrical components have been listed in accordance with the rules.



Summary of Reconfigurable Features

All reconfigurable features in the Delta T-90 House pertain to nonstructural yet integrated building components, such as shelving, furniture and exterior shading device.

Window Shutters

The window shutters have been designed to be manually operable and removable to accommodate seasonal needs. To minimize material and cost, all elements are specific to the windows that they shade. Using traditional Vermont shutters as a precedent, a track system allows the shading devices to close to block direct heat gain, but allow indirect daylight. This deployable system can be opened and closed depending on heat gain requirements. The hinges allow the components to fold smoothly, giving all parts a floating illusion. Window shutters are specifically sized, metal framed panels with cedar slats over the frame. All components can be taken off the hinges for storage during winter months.



Interconnection Application Form

Norwich University Lot 105

PV Systems

Module Manufacturer	Short Description of Array	DC Rating of Array (sum of the DC ratings)
Solo Power SP1	(6) 95W Thin Film Amorphous, mounted directly to thermoplastic roof	570
	(19) 90W Thin Film Amorphous	1710
	(6) 85W Thin Film Amorphous	510
	(20) 80W Thin Film Amorphous	1600
	(21) 75W Thin Film Amorphous	1575

Total DC power of all arrays 5965 kW (in tenths)

INVERTERS

Inverter Manufacturer	Model Number	Voltage	Rating (kVA or KW)	Quantity
Solectria	PVI-6500	600VDC max	6 kW	1

Total AC power of all inverters is 6kW kVA or kW (in whole numbers).

The University reserves the right to substitute inverter at a later date for favorable terms and conditions of performance.

REQUIRED INFORMATION

The following information must be included in the project manual or construction documents. If located in the construction documents, list the drawing locations in this section of the project manual. (Example: B3/E-201)

	Location
One-Line Electrical Schematic	<i>E-602</i>
Calculations of service/feeder net computed load and neutral load (NEC 220)	<i>Page 15</i>
Plan view of the lot showing the house, decks, ramps, tour paths, the service point, and the distribution panel or load center	Construction Documents Page E-101

Provide the Team's "Electrical Engineer" contact in the "Team Officer Contact Info" database on the Yahoo Group as required per Rule 3-2.



Energy Analysis and Results

1.0 Introduction

1.1 Background Discussion

ΔT_{90} = change in temperature / 70°F interior to -20°F exterior

As one of twenty competitors in Solar Decathlon 2013, the Norwich University Delta T-90 Team has taken the position that high-performance solar-powered dwellings must become more widely available to households earning twenty percent below the median state income in Vermont. Toward this end, the Delta T-90 House streamlines mechanical, electrical, and building envelope systems in an effort to increase affordability, reduce primary energy demand, and reveal the poetic breath of high performance modern architecture.

Simplify, Simplify, Simplify

Today, in the building arts, we see a curious underlying contradiction in the term *Passive House*. While it implies a reliance on natural heating and cooling through ambient earthy systems, we also find that in actuality, dwellings constructed to Passive House U.S. Standards cannot effectively survive without some active systems running continuously. In addition to this, we find that the active systems can occupy a significant amount of floor area and become an overt physical presence within the home. The contradiction between dependence on active systems and aspirations for complete passive integration illustrate the core energy issue that the Delta T-90 House works to solve.

While the Delta T-90 House cannot eliminate the use of mechanical systems for its heat demands, it has effectively and significantly minimized the need for mechanical equipment to occupy floor area within the conditioned space of the house.

Using the six basic Passive House performance characteristics as targets for energy performance, and designing an envelope system that corresponds to factory-based modular housing assembly line conventions, the Delta T-90 focuses on simplifying and reducing the size of mechanical equipment so that the cost, demand, and physical presence of mechanical equipment within the house can be minimized. Taking an unapologetic, conservation-based approach to building envelope design allows mechanical systems to be smaller and run less frequently, which extends service life. These smaller systems can be hidden within wall cavities, above head height, or outside the building envelope. This approach has allowed one hundred percent of the conditioned floor area within the Delta T-90 house to be dedicated to habitable space for the homeowner. From a usability position, this makes good sense; from a cost-per-square-foot position it makes even more. If we add up the floor area within a dwelling that is dedicated to space heating and cooling, hot water, and ventilation, and multiply that area by the cost-per-square-foot of the dwelling, we see the potential for savings. More importantly perhaps are the architectural implications of reducing the 'mechanical tackle' within the home; the home becomes a little less of a machine, and a little more of a temple.



Heat Recovery Ventilation: The Delta T-90 house uses a multi-unit system of synchronized, decentralized, through-wall, ductless units that use small fans and ceramic cores. Three pairs of these units are distributed throughout the house. One pair is dedicated to the kitchen and living room, one pair is dedicated to the bathroom, and a third pair is dedicated to the bedrooms. These units have a 90.6% heat recovery capacity and a 20% to 30% humidity recovery. As a pair, one unit will bring in fresh air while the other unit is exhausting stale air. The warm air being exhausted charges the ceramic core with heat. The fan in this unit then changes direction and fresh incoming air is pre-warmed. The corresponding unit that was formerly in intake mode switches to exhaust stale air. This 70-second cycle then repeats itself. The total of all three units working simultaneously is 75CFM.

Space Heating and Cooling: An air-source mini-split heat pump is the sole source of active heating and cooling in the Delta T-90 house. The annual total space heating demand is 11.081 BTU's. A single indoor unit, centrally located in the house, and one outdoor unit work to heat and cool air to distribute throughout the house to be utilized for space conditioning.

Hot Water: Heat-delivery equipment within the 996 square foot envelope occurs within a single twelve foot wall, reducing transmission losses. An on-demand water heater reduces stand-by in hot water delivery. These combined efforts reduce overall energy demand required for water heating by 15% annually. The Stiebel Eltron Tempra 20+ provides continuous water heating to arrive instantaneously when needed. The Tempra entirely replaces a water tank and automatically adjusts the flow of water to eliminate any temperature fluctuations.

Advanced Framing: The Delta T-90 team chose to use advanced double stud wall framing to take advantage of its three key benefits: less material waste, simpler and quicker construction processes, and improved insulation performance. By aligning the window and door openings with the framing members there is an insulation gain with a reduction in thermal bridging throughout the wall envelope. The roof joists, floor joists, and wall studs are vertically in line at 24 inches on center, which creates a simple, yet direct load path to distribute the roof live loads and dead loads uniformly to the ground. The roof construction is more than sufficient to support the average snow load of 60 pounds per square foot (psf), and accommodates for the live loads of our bio-region.

Because the Delta T-90 Team is committed to creating a solar-powered design for Vermont, climate played a significant role in the design of our building systems. The structural system in the Delta T-90 House is unique for our traditional built environment. The double stud wall section allows us to have almost 12" of dense pack insulation. This system allows us to nearly eliminate thermal bridging and maximize R-Value for construction in our cold climate. By using



engineered lumber, the Delta T-90 House is framed on continuous beams. This technology accommodates for our two structural modules and for transportation to Irvine, California from Vermont.

Air-Tightness: The Delta T-90 expects an air tightness benchmark of .3CFM@50Pa. This is achieved through multiple air barrier layers on the interior and exterior layers. An air sealing strategy that optimizes factory based construction techniques allows for construction of the wall to occur from the interior outward, rather than from the exterior inward helps achieve maximum air tightness.

Vapor Permeability: In 2013, many regard the historic Vermont farm house with deep respect, admiration, and sentimentality. Thousands of examples still exist from the 1800's and an industry surrounds their maintenance and survival. Many builders and architects cite the historic Vermont farmhouse's survival due in part to a loose building envelope that allows moisture to breathe from interior to exterior, as well as exterior to interior. The drawback, of course, is lack of air tightness, severe heat-loss, and sometimes severely drafty interiors. Like the historic Vermont farmhouse, the Delta-T90 House maintains a vapor permeable wall section from interior to exterior, as well as exterior to interior. With modern house wraps and high performance tapes however, the Delta-T90 remains relatively air-tight.

2.0 Tools

The Delta T-90 Team has utilized several digital energy modeling tools to analyze and adjust the qualities of our house to reach maximum efficiency.

2.1 Therm 6.3

A Windows-based program used for modeling and calculating heat flow through framing systems.

2.2 WUFI 5.0

A Hygrothermic modeling software used for assessing long-term moisture behavior in wall assemblies. A wall assembly / material optimization tool relative to building moisture management.

2.3 Passive House Planning Package 2007

The backbone of the Delta T-90 energy behavior model is the Passive House Planning Package. This software allows the designer faculty and students to make informed, deliberate decisions based on a holistic view of building performance in a given climate. Fine-tuning and balancing of the building envelope relative to cost and architectural value are the strengths of PHPP.

2.4 Sketchup



A user-friendly 3D visualization software with integrated heliodon used for preliminary solar shading studies.

2.5 REVIT

A Building Information Modeling tool used for the construction documents. Revit is designed to streamline the design, engineering, and construction processes.

2.6 PV WATTS

A calculation device used to determine the energy production of our PV array system based on our climate and latitude. This allows us to develop an estimate of the performance of our system.

3.0 Geometry

3.1 Geometry

The Delta T-90 House consists of two modules, connected along the north-south central axis. The east module consists of the entry space, kitchen, bathroom and bedroom. The west module includes the living space, office space, and master bedroom. The public and private divide occurs in the east-west direction; the southern half of the house remaining public while the northern half is private spaces. The east module consists of one wet wall that separates the bathroom and kitchen. This singular wet wall houses all of the pipe runs for the kitchen and bathroom fixtures, minimizing costs for plumbing runs and connections.

The rectilinear form of the Delta T-90 House is placed broad side on the east and west. The south face features a large triple pane window to allow for a connection to the outdoors, maximum day lighting into the living space, and maximum heat gain potential during the heating season. The windows along the south and west are shaded by a unique sliding system that contributes to the elegance of the horizontal wood rain screen.

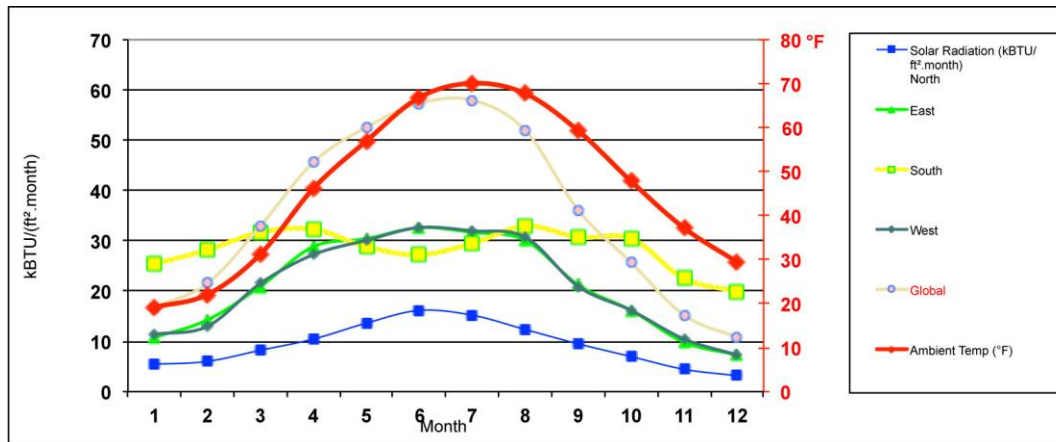
The east and west modules of the house come together to create a formally modern, tight form. The flat roof creates a place for a building integrated solar panel system that, like the interior, eliminates the normally strong visual presence of mechanical systems in the design. Exterior detailing that connects expresses the two independent modules.

4.0 Envelope Construction

Because the Delta T-90 Team is committed to creating a solar-powered design for Vermont, climate played a significant role in the design of our building systems. The 14" wall thickness, choice of materials, and HVAC/HRV systems contribute to the maintenance of the comfort zone in our northern environment.

4.1 Weather Data

PHIUS Burlington, VT Weather



4.2 Envelope Construction

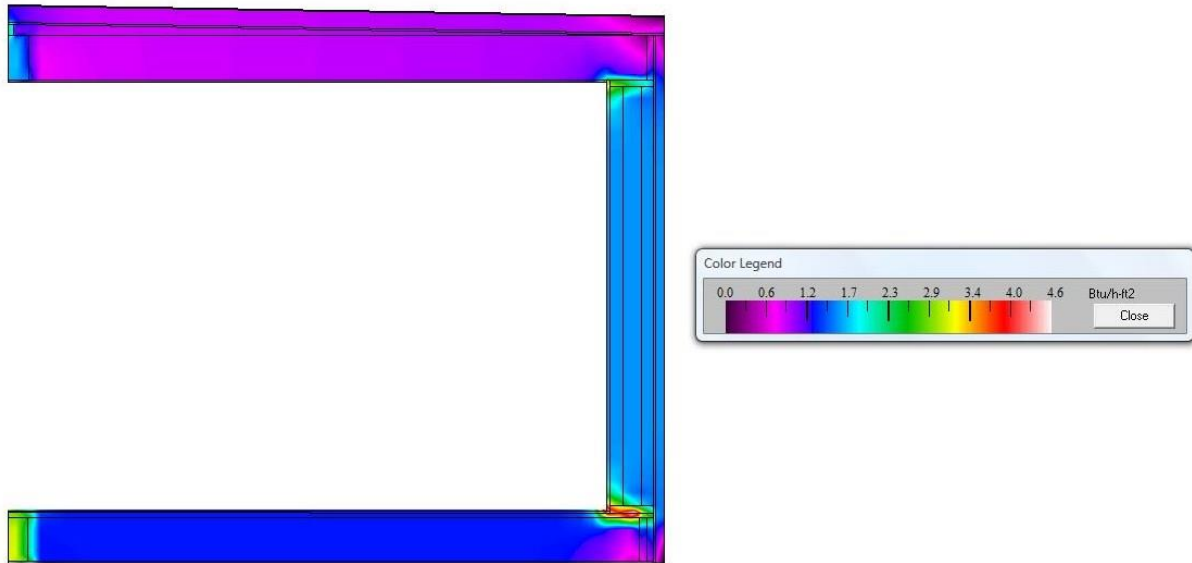
The wall section construction is constant around the entire perimeter of the Delta T-90 House in order to create air-tightness, and maximum R-Value characteristics. Assembly described from inside to outside.

- A. Wall Assembly: 5/8" gypsum wall board, Double 2x4 stud wall, 11 1/4" dense pack insulation, 5/8" plywood sheathing, 2" Roxul comfort board, moisture barrier with taped joints, 1 x 6 rain screen
- B. Floor Assembly: 1 1/8" OSB subfloor, 2 x 12 Framers Series Floor Joists, dense pack cellulose, 1/2" PT plywood under floor
- C. Roof Assembly: 5/8" gypsum wall board, 2 x 12 Framers Series Rafters, dense pack cellulose, 3/4" plywood sheathing, 4" Roxul Toprock, 1/4" Densedeck underlayment, 1/8" roof membrane
- D. Fenestration Assembly: Intus Eforte windows used in the Delta T-90 House are..."Passive House suitable for all climate zones. High performance frames and triple glazing with two Low-E coatings for energy savings and comfort. Trip seal for super air tightness and improved thermal values. Warm edge spacers for increased glass surface temperatures and reduced condensation on the glass. Steel reinforced frames for increased stability. Many different colors and laminates. Exceptional sound insulation and comfort. Suitable for use in urban, commercial, office and residential buildings." <http://intuswindows.com/products/u-pvc.html>

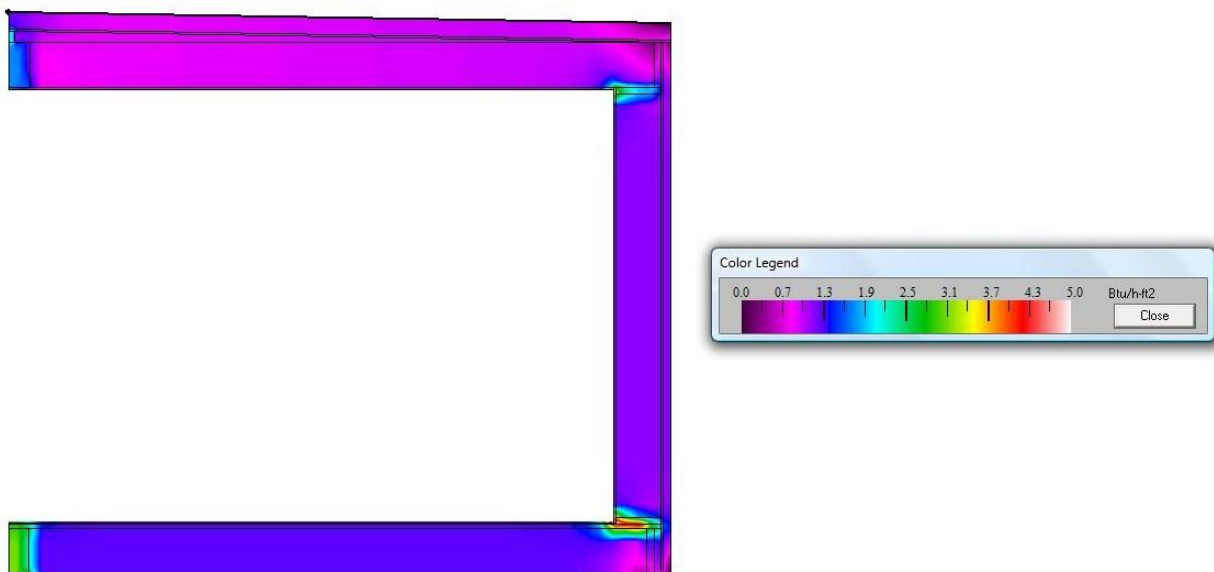


4.3 Results of Envelope Construction

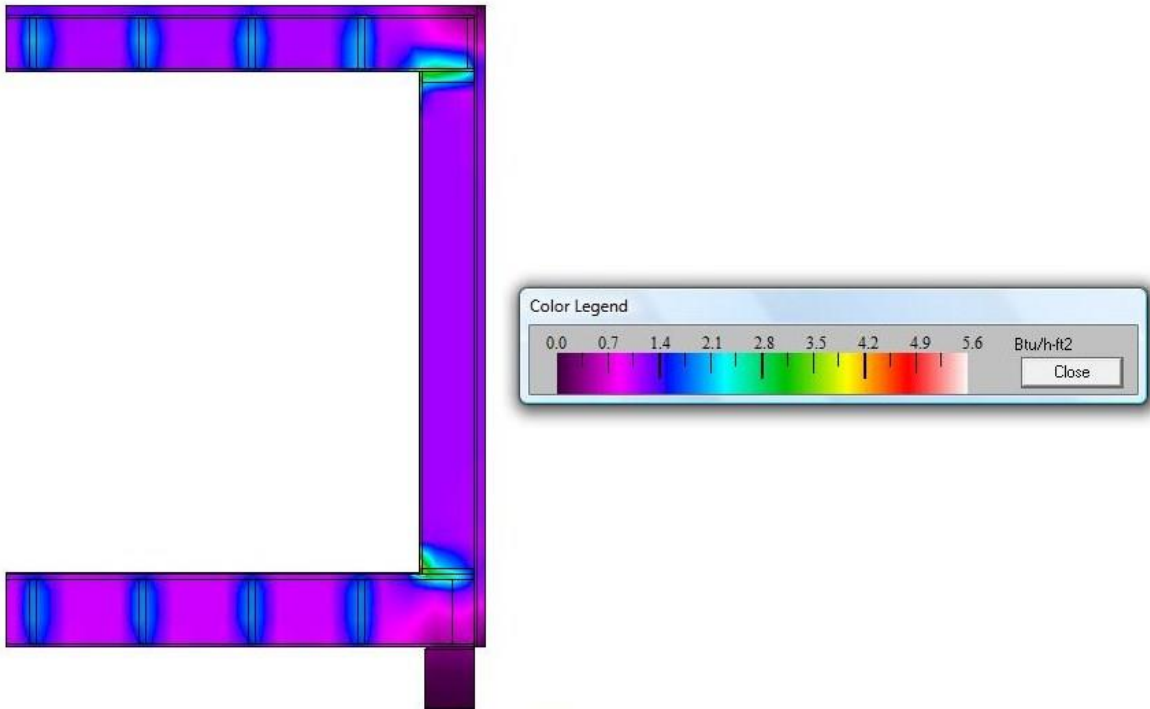
A. Therm Analysis: Color Flux Magnitude of Wall Section through Double Stud



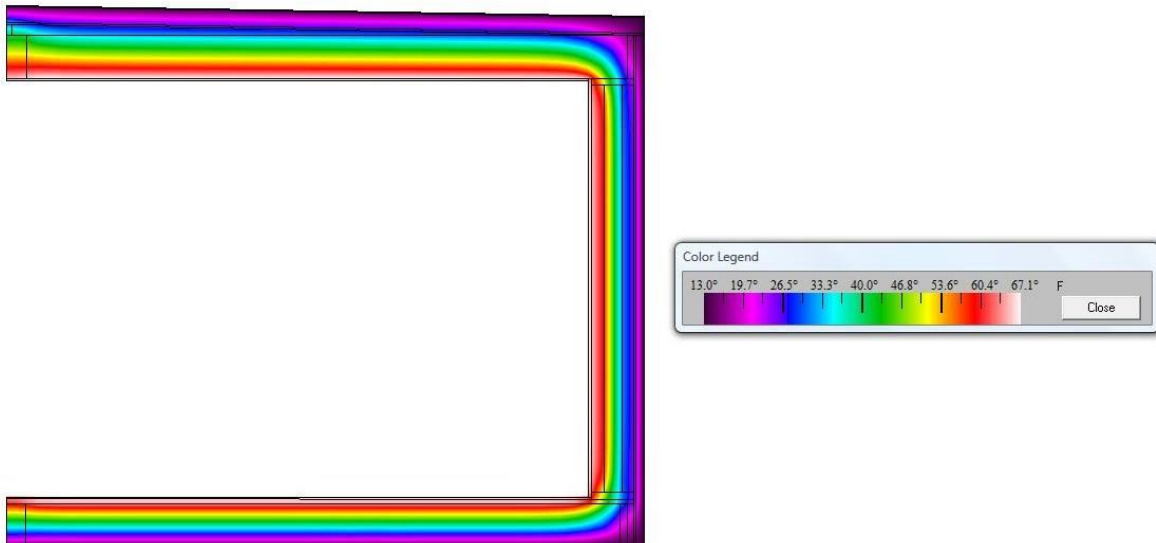
B. Therm Analysis: Color Flux Magnitude of Wall Section through Insulation



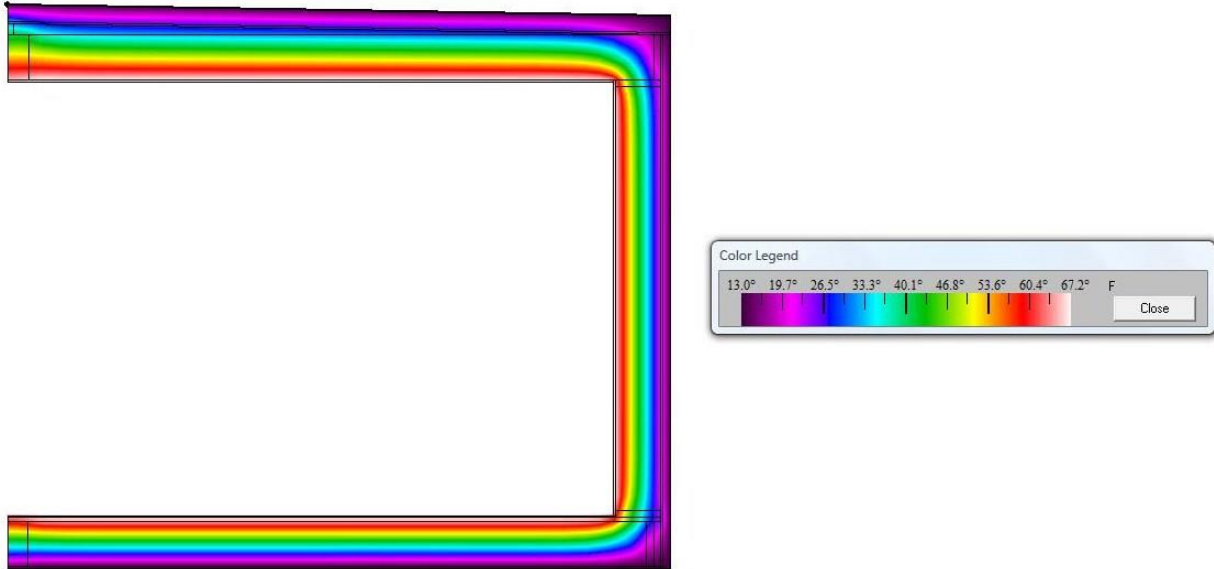
C. Therm Analysis: Color Flux Magnitude at Section through Joists



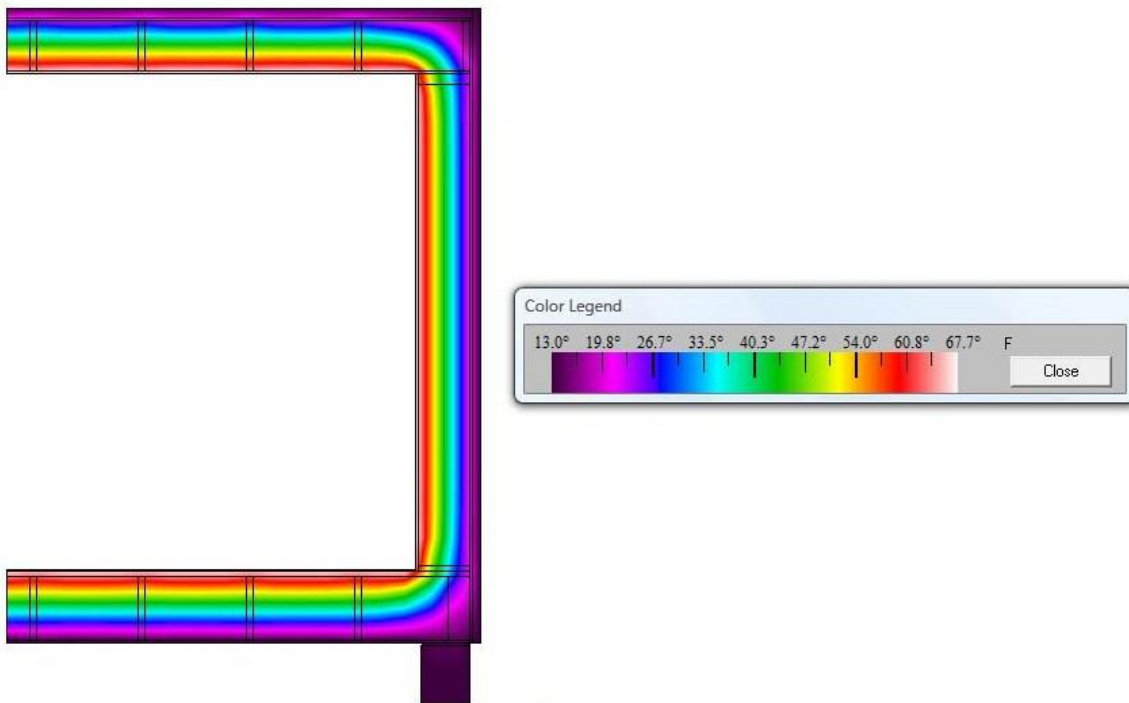
D. Therm Analysis: Color Infrared of Wall Section through Double Stud



E. Therm Analysis: Color Infrared of Wall Section through Insulation



F. Therm Analysis: Color Infrared of at Section through Joists





5.0 Internal Gains

Internal gains are considered as an energy creation source that occurs within the house. These loads include lighting loads, electrical equipment loads, and occupancy loads.

5.1 Electrical Equipment Loads

	Assumed Hour Usage Daily	kW	kW*h/day	kW*h/YR	Price per year (CA)	Price per year (VT)	\$*kWh (CA)	\$*kWh (VT)	days per year
Appliance Package							0.1301	0.1324	365
washer/dryer combo	0.43	1.38	0.59	216.09	28.11	28.61			
Elec. Stove/ oven	1.00	2.60	2.60	949.00	123.46	125.65			
microwave	0.50	0.70	0.35	127.75	16.62	16.91			
refridgorator/ freezer	assuming optimal conditions outlined by specs			383.00	49.83	50.71			
dish washer	assuming optimal conditions outlined by specs			266.00	34.61	35.22			
Mechanical									
Mitsubishi mr. slim mini-split (heating/cooling)	assuming 9,000,000 Btu/YR as outlined by project description			2637.64	343.16	349.22			
Stiebel Tankless Instant Water Heater			9.45	3449.25	448.75	456.68			
HRV - Lunos E2 ventilation system (each)	24.00	0.01	0.20	72.97	9.49	9.66			
HRV - Lunos E2 ventilation system (each)	24.00	0.01	0.20	72.97	9.49	9.66			
HRV - Lunos E2 ventilation system (each)	24.00	0.01	0.20	72.97	9.49	9.66			
TOTAL		4.70	13.59	7598.64	988.58	1006.06			
<p>* assuming 9,000,000 Btu/YR usage for the Mitsubishi mr. slim mini-split (heating/cooling) runs at 9,000,000Btu/h **1 kilowatt hour / year = 3412.14163 btu / year ***1 kW = 8,765.81277 kW*h/YR ==> 0.264 kW = 2,314.17 kW*h/YR * Plan for 40 Gallons of Hot water demand per day on average (Total) for the Stiebel Tankless Instant Water Heater * washer/dryer assume usage of 3 hours a week therefore divide by seven for per dayfigure * assuming national average for electrical cost to calculate price based off 2010: http://www.neo.ne.gov/statsthtml/204.htm</p>									

5.2 Occupancy Loads

The internal heat gains of the Delta T-90 House are based on a three-person occupant load and calculated in PHPP 2007. These loads affect all internal heat gains. The table below conveys all internal heat gains produced by three occupants, electrical equipment, and solar gain.



Passive House Planning
INTERNAL HEAT GAINS

Building:

Utilization Pattern: x BTU/hr.ft²

Type of Values Used: x

No Input Required BTU/hr.ft²

Calculation Internal Heat Household Column Nr.	Persons		Living Area		Annual Heat Demand		Heating Period		Internal Heat Source (BTU/hr)	
	1	2	3	4	5	6	7	8	9	10
Application	Existing (1/0), or number of people	In the Thermal Envelope (1/0)	Norm Consumption	Utilization Factor	Frequency	Useful Energy (kBTU/yr)	Included in Electricity Balance?	Availability	Used During Time Period (khr/yr)	Internal Heat Source (BTU/hr)
Dishwashing	1	1	1.0 kWh/Use	1.00	65 / (P*yr)	465 *		0.30 /	8.76 =	16
Clothes Washing	1	1	0.5 kWh/Use	1.00	57 / (P*yr)	204 *		0.30 /	8.76 =	7
Clothes Drying with: Condensation Dryer	1	1	3.5 kWh/Use	0.88	57 / (P*yr)	1250 *		0.70 /	8.76 =	100
Energy Consumed by Evaporation	0	1	0.0	1.00	365 day/yr	0	0.80	1.00 /	8.76 =	0
Refrigerating	0	1	-3.1 kWh/Use	0.60	57 / (P*yr)	0	* (- 0) *	0.00 /	8.76 =	0
Freezing	0	1	0.8 kWh/Use	1.00	365 day/yr	0		1.00 /	8.76 =	0
or Combination	1	1	1.0 kWh/Use	1.00	365 day/yr	1245 *		1.00 /	8.76 =	142
Cooking	1	1	0.2 kWh/Use	1.00	500 / (P*yr)	787 *		0.50 /	8.76 =	45
Lighting	1	1	9.0 W	1.00	2.9 khr/(P*yr)	188 *		1.00 /	8.76 =	21
Consumer Electronics	1	1	150.0 W	1.00	0.55 khr/(P*yr)	591 *		1.00 /	8.76 =	67
Household Appliances/Other	1	1	50.0 kWh	1.00	1.0 / (P*yr)	358 *		1.00 /	8.76 =	41
Auxiliary Appliances (cf. Aux Electricity Sheet)										288
Other Applications (cf. Electricity Sheet)	1	1				17 *		0 /	8.76 =	0
Persons	2	1	80.0 WIP	1.00	8.76 khr/(P*yr)	5017 *		0.55 /	8.76 =	315
Cold Water	2	1	-5.0 WIP	1.00	8.76 khr/(P*yr)					-36
Evaporation	2	1	-25.0 WIP	1.00	8.76 khr/(P*yr)	-1568 *		1.00 /	8.76 =	-179
Total									BTU/hr	838
Specific Demand									BTU/hr.ft²	1.06
Heat Available From Internal Sources								<input type="text" value="205"/> day/yr	kBTU/(ft²*yr)	5.21




6.0 Annual Predicted Electricity Usage

Passive House Planning PRIMARY ENERGY VALUE

Building: Norwich University_AT90_SOLAR DECATLON 2013		Building Type/Use: Single Family Affordable Resid	
Location: Northfield, Vermont		Treated Floor Area A _{TA} : 790 ft ²	
		Space Heat Demand incl. Distribution: 10.9 kBtu/(ft ² yr)	
		Useful Cooling Demand: 0.1 kBtu/(ft ² yr)	
CHOOSE UNITS:		Final Energy: kBtu/(ft²yr)	Primary Energy: kBtu/(ft²yr)
			Emissions: lb/(ft²yr)
			CO ₂ -Emission Factor (CO ₂ -Equivalent)
Electricity Demand (without Heat Pump)		PE Value	CO ₂ -Emission Factor (CO ₂ -Equivalent)
Covered Fraction of Space Heat Demand	(Project)	kBtu/kBtu	kBtu
Covered Fraction of DHW Demand	(Project)	2.7	0.44
Direct Electric Heating	Q _{HE}	0.0	0.00
DHW Production, Direct Electric (without Wash&Dish)	Q _{DHW,elec} (DHW-Distribution, SolarDHW)	5.3	2.35
Electric Postheating DHW Wash&Dish	(Electricity, SolarDHW)	0.5	0.22
Electricity Demand Household Appliances	Q _{HA} (Electricity worksheet)	6.1	2.68
Electricity Demand - Auxiliary Electricity		2.7	1.20
Total Electricity Demand (without Heat Pump)		14.7	6.45
		kBtu/(ft ² yr)	lb/(ft ² yr)
Heat Pump		PE Value	CO ₂ -Emission Factor (CO ₂ -Equivalent)
Covered Fraction of Space Heat Demand	(Project)	100%	kBtu
Covered Fraction of DHW Demand	(Project)	0%	0.44
Energy Carrier - Supplementary Heating		Electricity	2.7
Annual Coefficient of Performance - Heat Pump		3.20	1.50
Total System Performance Ratio of Heat Generator	Separate Calculation	0.35	
Electricity Demand Heat Pump (without DHW Wash&Dish)	Q _{HP}	3.8	1.68
Non-Electric Demand, DHW Wash&Dish	(Electricity worksheet)	0.0	0.00
Total Electricity Demand Heat Pump		3.8	1.68
		kBtu/(ft ² yr)	lb/(ft ² yr)
Compact Heat Pump Unit		PE Value	CO ₂ -Emission Factor (CO ₂ -Equivalent)
Covered Fraction of Space Heat Demand	(Project)		kBtu
Covered Fraction of DHW Demand	(Project)	2.7	0.44
Energy Carrier - Supplementary Heating		Electricity	2.7
COP Heat Pump Heating	(Compact worksheet)	0.0	
COP Heat Pump DHW	(Compact worksheet)	0.0	
Performance Ratio of Heat Generator (Verification)	(Compact worksheet)		
Performance Ratio of Heat Generator (Planning)	(Compact worksheet)		
Electricity Demand Heat Pump (without DHW Wash&Dish)	Q _{HP}	0.0	0.00
Non-Electric Demand, DHW Wash&Dish	(Compact worksheet)	0.0	0.00
Total Compact Unit		0.0	0.00
		kBtu/(ft ² yr)	lb/(ft ² yr)
Boiler		PE Value	CO ₂ -Emission Factor (CO ₂ -Equivalent)
Covered Fraction of Space Heat Demand	(Project)		kBtu
Covered Fraction of DHW Demand	(Project)	1.1	0.16
Boiler Type	(Boiler worksheet)		
Utilization Factor Heat Generator	(Boiler worksheet)	0%	
Annual Energy Demand (without DHW Wash&Dish)	(Boiler worksheet)	0.0	0.00
Non-Electric Demand, DHW Wash&Dish	(Electricity worksheet)	0.0	0.00
Total Heating Oil/Gas/Wood		0.0	0.00
		kBtu/(ft ² yr)	lb/(ft ² yr)
District Heat		PE Value	CO ₂ -Emission Factor (CO ₂ -Equivalent)
Covered Fraction of Space Heat Demand	(Project)		kBtu
Covered Fraction of DHW Demand	(Project)	0.7	-0.05
Heat Source	(District Heat worksheet)		
Utilization Factor Heat Generator	(District Heat worksheet)	0%	
Heat Demand District Heat (without DHW Wash&Dish)	(District Heat worksheet)	0.0	0.00
Non-Electric Demand, DHW Wash&Dish	(Electricity worksheet)	0.0	0.00
Total District Heat		0.0	0.00
		kBtu/(ft ² yr)	lb/(ft ² yr)
Other		PE Value	CO ₂ -Emission Factor (CO ₂ -Equivalent)
Covered Fraction of Space Heat Demand	(Project)		kBtu
Covered Fraction of DHW Demand	(Project)		0.44
Heat Source	(Project)	1.0 Wood	
Utilization Factor Heat Generator	(Project)		
Annual Energy Demand, Space Heating	(Project)	0.0	0.00
Annual Energy Demand, DHW (without DHW Wash&Dish)	(Project)	0.0	0.00
Non-Electric Demand, DHW Wash&Dish	(Electricity worksheet)	0.0	0.00
Non-Electric Demand Cooking/Drying (Gas)	(Blat Sheet)	0.0	0.00
Total - Other		0.0	0.00
		kBtu/(ft ² yr)	lb/(ft ² yr)
Cooling with Electric Heat Pump		PE Value	CO ₂ -Emission Factor (CO ₂ -Equivalent)
Covered Fraction of Cooling Demand	(Project)	100%	kBtu
Heat Source		Electricity	0.1
Annual Cooling COP		3.2	0.01
Energy Demand Space Cooling		0.0	0.01
		kBtu/(ft ² yr)	lb/(ft ² yr)
Heating, Cooling, DHW, Auxiliary and Household Electricity		18.5	50.1
		kBtu/(ft ² yr)	lb/(ft ² yr)
Total Primary Energy Use Intensity		50.1	
Total Emissions, CO₂-Equivalent		8.1	
Primary Energy Requirement		38.0	No
Heating, DHW, Auxiliary Electricity (No Household Applications)		11.9	32.1
		kBtu/(ft ² yr)	lb/(ft ² yr)
Specific PE Demand - Mechanical System		32.1	
Total Emissions CO₂-Equivalent		5.2	
Solar Electricity		kWh/yr	PE Value (Savings)
Planned Annual Electricity Generation	Separate Calculation	4300	kBtu/kBtu
			0.7
Specific Supply		18.6	13.0
		kBtu/(ft ² yr)	lb/(ft ² yr)
PE Value: Conservation by Solar Electricity		37.1	
CO ₂ -Emissions Avoided Due to Solar Electricity		5.2	



Passive House Planning Package Analysis

Passive House Verification					
					
Building:	Norwich University_AT90_SOLAR DECATHLON 2013				
Location and Climate:	Northfield, Vermont	PHIUS Burlington Data			No Standard Climate
Street Address:	158 Harmon Dr.				
City, State, Zip:	Northfield, Vermont 05663				
Country:	United States of America				
Building Type:	Single Family Affordable Residence				
Home Owner(s) / Client(s):					
Street Address:					
City, State, Zip:					
Architect:					
Street:					
City, State, Zip:					
Mechanical System:					
Street Address:					
City, State, Zip:					
Year of Construction:	2012-2013				
Number of Dwelling Units:	1	Interior Temperature:	68.0	°F	
Gross Enclosed Volume V _i :	11374	ft ³	Internal Heat Gains:	0.7	BTU/hr.ft ³
Number of Occupants:	2.1				
Energy Demands with Reference to the Treated Floor Area					
Treated Floor Area:	790	ft ²			
Applied:	Monthly Method	PH Certificate:	Fulfilled?		
Specific Space Heat Demand:	10.67	kBTU/(ft ² ·yr)	4.75	kBTU/(ft ² ·yr)	No
Pressurization Test Result:	0.30	ACH ₅₀	0.6	ACH ₅₀	Yes
Specific Primary Energy Demand (DHW, Heating, Cooling, Auxiliary and Household Electricity):	50.1	kBTU/(ft ² ·yr)	38.0	kBTU/(ft ² ·yr)	No
Specific Primary Energy Demand (DHW, Heating and Auxiliary Electricity):	32.1	kBTU/(ft ² ·yr)			
Specific Primary Energy Demand Energy Conservation by Solar Electricity:	37.1	kBTU/(ft ² ·yr)			
Heating Load:	6.68	BTU/(ft ² ·hr)			
Frequency of Overheating:	%	over	77.0	°F	
Specific Useful Cooling Energy Demand:	0.09	kBTU/(ft ² ·yr)	4.75	kBTU/(ft ² ·yr)	Yes
Cooling Load:	2.07	BTU/(ft ² ·hr)			
We confirm that the values given herein have been determined following the PHPP methodology and based on the characteristic values of the building. The calculations with PHPP are attached to this application.					
				Issued on:	
				Signed:	



Passive House Planning CALCULATING SUMMER SHADING FACTORS

Climate: PH105_Burlington_Data

Building: Norwich_University_DT90_SOLAR_DECATLON_2013
Latitude: 44.5

Orientation	Glazing Area ft ²	Summer Shading Factor f _s
North	7.1	0%
East	22.6	0%
South	72.7	0%
West	42.4	0%
Horizontal	0.0	100%

Summer!

Results from the Summer worksheet:
Frequency of Overheating $h_{o, \text{max}}$ 0.5%

Description	Qty	Window Unit Label	Deviation from North Degrees	Angle of Inclination from the Horizontal Degrees	Orientation	Glazing Width in	Glazing Height in	Glazing Area ft ²	Height of the Shading Object ft	Horizontal Distance ft	Reveal Depth in	Distance from Glazing Edge to Reveal in	Overhang Depth in	Distance from Upper Glazing Edge to Overhang in	Additional Shading Reduction Factor (Summer) %	Temporary Shading Reduction Factor, z %	Summer				Total Summer Shading Reduction Factor
																	Horizontal Shading Reduction Factor	Reveal Shading Reduction Factor	Overhang Shading Reduction Factor	f _s	
N. Wall 1 - WRI_01	1	Window 1 tilt & fix	0	90	North	27	39	7	7	0	9	2	9	2	100%	0%	100%	85%	94%	0%	
E. Wall 1 - WEL_01	1	Window 1 tilt & fix	90	90	East	27	39	7	7	0	9	2	9	2	100%	0%	100%	92%	94%	0%	
E. Wall 1 - WEL_02	1	Window 2 bath avni	90	90	East	58	15	6	6	0	5	2	9	2	100%	0%	100%	98%	76%	0%	
E. Wall 1 - WEL_03	1	Window 3 kitchen e	90	90	East	89	16	10	10	0	5	2	9	2	100%	0%	100%	99%	77%	0%	
S. Wall 1 - SWL_01	1	Door	180	90	South	30	78	17	17	0	5	2	9	2	100%	0%	100%	92%	95%	0%	
S. Wall 1 - SWL_02	1	Window 5 big fixoc	180	90	South	111	72	56	56	0	5	2	9	2	100%	0%	100%	98%	100%	0%	
W. Wall 1 - WRI_01	1	Window 1 tilt & fix	270	90	West	30	42	9	9	0	5	2	9	2	100%	0%	100%	96%	95%	0%	
W. Wall 1 - WRI_02	1	Window 6 living av	270	90	West	56	42	20	20	0	9	2	9	2	100%	0%	100%	97%	100%	0%	
W. Wall 1 - WRI_03	1	Door	270	90	West	27	75	14	14	0	9	2	9	2	100%	0%	100%	92%	98%	0%	
R. Roof 1 - WRI_01	0	SKYLIGHT	0	0	Horizontal	12	49	0	0	0	9	2	9	2	100%	0%	100%	78%	95%	0%	



Building:	Norwich University_AT90_SOLAR DECATHLON 2013				Heating Degree Days:	
Climate:	PHIUS Burlington Data					7237
Window Area Orientation	Global Radiation (Cardinal Points)	Shading	Dirt	Non-Perpendicular Incident Radiation	Transmission Losses	Heat Gains Solar Radiation
maximum:	kBTU/ft ² yr	0.75	0.95	0.85	kBTU/yr	kBTU/yr
North	41	0.76	0.95	0.85	350	66
East	99	0.72	0.95	0.85	1182	482
South	180	0.96	0.95	0.85	1975	4277
West	98	0.82	0.95	0.85	1568	1230
Horizontal	154	0.75	0.95	0.85	0	0

Passive House Planning HEAT DISTRIBUTION AND DHW SYSTEM

Building: Norwich University_AT90_SOLAR DECATHLON 2013			
Location: 68 °F			
Building Type: Single Family Affordable Residence			
Treated Floor Area A _{ft} : 390 ft ²			
Occupancy: 2.3 PERS			
Number of Residences: 1.0 PERS			
Annual Heat Demand Q _{dem} : 7968 kBTU/yr			
Length of Heating Period: 395 d			
Average Heat Load P _{dem} : 2 kBTU/hr			
Marginal Utility of Additional Heat Gains: 0.51			
Space Heat Distribution		Warm Region	Cold Region
Length of Distribution Pipes	L _d (Project)	20.00	
Heat Loss Coefficient per m Pipe	Ψ (Project)	0.660	
Temperature of the Room Through Which the Pipes Pass	θ _r Mechanical Room	68	
Design Flow Temperature	θ _{fm} Flow Design Value	110	
Design System Heat Load	P _{dem} (heat,rate)		
Flow Temperature Control (check)			
Design Return Temperature	θ _r	98.0	42.3
Annual Heat Emission per foot of Plumbing	Q _r = -1/4 * (θ _r - θ _{fm}) * L _d * 365	116.6	0.0
Possible Utilization Factor of Released Heat	η _{pl} = 1 - (θ _r - θ _{in}) / (θ _{fm} - θ _{in})	85%	0%
Annual Losses	Q _{pl}	355	0
Specific Losses	Q _{pl} / A _{ft}		
Utilization Factor of Space Heat Distribution	η _{pl} = Q _{pl} / (Q _{pl} + Q _{dem})		96%
DHW: Standard Useful Heat			
DHW Consumption per Person and Day (60 °C)	V _{dem} (Project or Average Value 25 Liters/Day)		6.6 Gal/Person/Day
Average Cold Water Temperature of the Supply	θ _{in} Temperature of Drinking Water (57°)		50.0 °F
DHW Non-Electric Water and Dish	Q _{dem} (Electricity worked)		238 kBTU/yr
Useful Heat - DHW	Q _{dem} = V _{dem} * ρ _w * c _p * ΔT		4185 kBTU/yr
Specif. Useful Heat - DHW	Q _{dem} / A _{ft}		5.3
DHW Distribution and Storage		Warm Region	Cold Region
Length of Circulation Pipes (Flow + Return)	L _d (Project)	0.066	
Heat Loss Coefficient per m Pipe	Ψ (Project)	0.68	
Temperature of the Room Through Which the Pipes Pass	θ _r Mechanical Room	110.0	
Design Flow Temperature	θ _{fm} Flow Design Value	18.0	
Daily circulation period of operation	t _{op} (Project)	105	37
Design Return Temperature	θ _r	6570	0
Circulation period of operation per year	t _{op}	17.1	0.0
Annual Heat Released per foot of Pipe	Q _r = -Ψ * (θ _r - θ _{fm}) * L _d	47%	0%
Possible Utilization Factor of Released Heat	η _{pl} = 1 - (θ _r - θ _{in}) / (θ _{fm} - θ _{in})	47%	0%
Annual Heat Loss from Circulation Lines	Q _{pl} = Ψ * L _d * (θ _r - θ _{in})	0	0
Total Length of Individual Pipes	L _d (Project)	93.00	
Exterior Pipe Diameter	φ _{ext} (Project)	0.4	
Heat Loss Per Tap Opening	Q _{tap} = 365 * η _{pl} * Q _{pl} / A _{ft}	2297	2297
Occupancy Coefficient	n _{occ} = 365 / t _{op}	47%	0%
Annual Heat Loss	Q _{pl}	466	0
Possible Utilization Factor of Released Heat	η _{pl} = Q _{pl} / (Q _{pl} + Q _{dem})		
Annual Heat Loss of Individual Pipes	Q _{pl}	466	0
Average Heat Released From Storage	P _{pl}	0.0	
Possible Utilization Factor of Released Heat	η _{pl} = P _{pl} / (P _{pl} + P _{dem})	47%	0%
Annual Heat Losses from Storage	Q _{pl}	0	0
Total Heat Losses of the DHW System	Q _{pl}	466	
Specific Losses of the DHW System	Q _{pl} / A _{ft}		0.6
Utilization Factor DHW Distrib and Storage	η _{pl} = Q _{pl} / (Q _{pl} + Q _{dem})		90.0%
Total Heat Demand of DHW system	Q _{dem}	4652	
Total Spec. Heat Demand of DHW System	Q _{dem} / A _{ft}		5.9

Secondary Calculation: Ψ-Values of Plumbing

Normal Width	1 in
Insulation Thickness:	1 in
Reflective? Please mark with an "x"	
Yes	
No	
Thermal Resistance	7 R/in
Interior Pipe Diameter	54 °F
Exterior Pipe Diameter	1.009 in
Exterior Pipe Diameter	1.089 in
Exterior Pipe Diameter	3.089 in
Ψ-Surface	1.092 BTU/hr.ft ² .°F
Ψ-Value	0.066 BTU/hr.ft ² .°F
Surface Temperature Difference	0 °F

Secondary Calculation Storage Losses	
Specific Heat Losses Storage (total)	0.0 BTU/hr.ft ²
Typical Temperature DHW	110 °F
Room Temperature	68 °F
Total Storage Heat Losses	0 BTU/hr



Passive House Planning SPECIFIC SPACE HEATING LOAD

Building: Norwich University ΔT90 SOLAR DECATHLON 2013

Building Type/Use: Single Family Affordable Residence

Location: _____

Treated Floor Area A_{TFA} : 790 ft² Interior Temperature: 68 °F

Climate (HL): PHIUS Burlington Data

Building Element	Temperature Zone	Area ft ²	Radiation: North East South West Horizontal					TempDiff 1 °F	TempDiff 2 °F	P _T 1 BTU/hr	P _T 2 BTU/hr
			9	22	53	22	31				
1 Exterior Wall - Ambient	A	1276	46.4				69	66	1903	1816	
2 Exterior Wall - Ground	B					28	28				
3 Roof/Ceiling - Ambient	A	975	55.2			69	66	1222	1166		
4 Ground 1	B	975	38.9			28	28	690	690		
5 Ground 2	B					28	28				
6 Ground 3	B					28	28				
7	A					69	66				
8	A					69	66				
9	A					69	66				
10	A					69	66				
11	X					69	66				
12	Y					69	66				
13	Z					69	66				
Windows	A	194	5.0			69	66	2678	2555		
14 Exterior Door	A					69	66				
15 Exterior TB (length/m)	A					69	66				
16 Perimeter TB (length/m)	P					28	28				
17 Ground TB (length/m)	B					28	28				
18 House/DU Partition Wall	I					5	5				

Transmission Heat Losses P_T

Total = **6493** or **6226** BTU/hr

Ventilation System:

Effective Air Volume, V_v = $\frac{A_{TFA}}{Clear Room Height}$ = $\frac{790}{8.2} = 6482$ ft³

Efficiency of Heat Recovery of the Heat Exchanger η_{HE} = **80%** Heat Recovery Efficiency SHX = **0%** Efficiency SHX = **0%**

Energetically Effective Air Exchange n_e = $n_{v,Res} + n_{v,Supply} \cdot (1 - \eta_{HE})$ = $0.060 + 0.302 \cdot (1 - 0.80) = 0.120$ or 0.120 1/h

Ventilation Heating Load P_V

$V_v \cdot n_e \cdot C_{p,air} \cdot \Delta T_{diff}$ = $6482 \cdot 0.120 \cdot 0.018 \cdot 69.2 = 950$ or 906 BTU/hr

Total Heating Load P_L

P_T + P_V = **7442** or **7133** BTU/hr

Orientation the Area	Area ft ²	SHGC (perp. radiation)	Reduction Factor (see Windows worksheet)	Radiation 1 BTU/hr.ft ²	Radiation 2 BTU/hr.ft ²	P _S 1 BTU/hr	P _S 2 BTU/hr
1 North	12	0.6	0.4	9	7	22	19
2 East	40	0.6	0.3	22	9	175	72
3 South	84	0.6	0.7	53	22	1773	735
4 West	57	0.6	0.5	22	13	379	217
5 Horizontal	0	0.0	0.4	31	17	0	0

Solar Heat Gain, P_S

Total = **2350** or **1042** BTU/hr

Internal Heat Gains P_I

Spec. Power BTU/hr.ft² * A_{TFA} ft² = $0.51 \cdot 790 = 401$ or 401 BTU/hr

Heat Gains P_G

P_G + P_I = **2750** or **1443** BTU/hr

P_L - P_G = **4692** or **5690** BTU/hr

Heating Load P_H

= **5690** BTU/hr

Specific Heating Load P_H / A_{TFA}

= **7.2** BTU/hr.ft²

Input Max. Supply Air Temperature 126 °F
Max. Supply Air Temperature $\dot{\theta}_{Supply,Max}$ 126 °F
Supply Air Temperature Without Heating $\dot{\theta}_{Supply,Min}$ 54 °F

For Comparison: Heating Load Transportable by Supply Air, P

= **2449** BTU/hr specific: **3.1** BTU/hr.ft²

Supply Air Heating Sufficient? **No**



Passive House Planning SPECIFIC ANNUAL HEAT DEMAND

Climate: PHius Burlington Data
 Building: Norwich University_AT90_SOLAR DECATHLON 2013
 Location:
 Interior Temperature: 68.0 °F
 Building Type/Use: Single Family Affordable Residence
 Treated Floor Area A_{TFA}: 790 ft²

Building Element	Temperature Zone	Area ft ²	R-Value hr·ft ² ·F/BTU	Temp. Factor f _t	G _i (Heating Degree Day) °F·day/yr	per ft ² Treated Floor Area	
1. Exterior Wall - Ambient	A	1276	46.4	1.00	7237	4777	
2. Exterior Wall - Ground	B			0.59			
3. Roof/Ceiling - Ambient	A	975	55.2	1.00	7237	3067	
4. Ground 1	B	975	38.9	0.59	7237	2583	
5. Ground 2	B			0.59			
6. Ground 3	B			0.59			
7.	A			1.00			
8.	A			1.00			
9.	A			1.00			
10.	A			1.00			
11.	X			0.75			
12.	Y			0.85			
13.	Z			0.95			
14. Windows	A	194	5.0	1.00	7237	6721	
15. Exterior Door	A			1.00			
16. Exterior TB (length/m)	A			1.00			
17. Perimeter TB (length/m)	P			0.59			
18. Ground TB (length/m)	B			0.59			
Total of All Building Envelope Areas		3420					
Transmission Heat Losses Q_T						17148	21.69

Ventilation System:

Effective Heat Recovery Efficiency of Heat Recovery: $\eta_{\text{eff}} = 80\%$

Efficiency of Subsoil Heat Exchanger: $\eta_{\text{SHX}} = 0\%$

Clear Room Height: $A_{\text{TFA}} = 790 \text{ ft}^2 \cdot 8.20 \text{ ft} = 6482 \text{ ft}^3$

System Air Change: $n_{\text{system}} = 0.302 \text{ 1/h}$

Reduction Factor: $\phi_{\text{HR}} = 0.80$

Subsoil Heat Exchanger: $n_{\text{SHX}} = 0.024 \text{ 1/h}$

Energetically Effective Air Exchange n_v = 0.08

Ventilation Heat Losses Q_V

$V_v = 6482 \text{ ft}^3$

$n_v = 0.084 \text{ 1/h}$

$C_{\text{air}} = 0.018 \text{ BTU/(ft}^3\text{F)}$

$G_i = 7237 \text{ °F}\cdot\text{day/yr}$

Q_V = 1669 kBTU/yr

2.11 kBTU/(ft²yr)

Total Heat Losses Q_L

$Q_T = 17148 \text{ kBTU/yr}$

$Q_V = 1669 \text{ kBTU/yr}$

Reduction Factor Night/Weekend Saving: 1.0

Q_L = 18817 kBTU/yr

23.81 kBTU/(ft²yr)

Orientation of the Area	Reduction Factor	SHGC (perp. radiation)	Area (ft ²)	Radiation HP (kBTU/(ft ² yr))	Q _S (kBTU/yr)
1. North	0.36	0.60	12.00	41	108
2. East	0.33	0.60	40.35	99	782
3. South	0.67	0.60	84.38	180	6073
4. West	0.49	0.60	57.00	98	1660
5. Horizontal	0.40	0.00	0.00	154	0
Total					8622

Available Solar Heat Gains Q_S

8622 kBTU/yr

10.91 kBTU/(ft²yr)

Internal Heat Gains Q_I

kh/d: 0.024

Length d/a: 205

Spec. Power q_i: 0.67

A_{TFA}: 790

Q_I = 2583 kBTU/yr

3.27 kBTU/(ft²yr)

Free Heat Q_F

$Q_S + Q_I = 11205 \text{ kBTU/yr}$

14.18 kBTU/(ft²yr)

Ratio of Free Heat to Losses

$Q_F / Q_L = 0.60$

Utilization Factor Heat Gains η_G

$(1 - (Q_F / Q_L)^5) / (1 - (Q_F / Q_L)^6) = 97\%$

Heat Gains Q_G

$\eta_G \cdot Q_F = 10850 \text{ kBTU/yr}$

13.73 kBTU/(ft²yr)

Annual Heat Demand Q_H

$Q_L - Q_G = 7968 \text{ kBTU/yr}$

10.08 kBTU/(ft²yr)

Limiting Value: **4.75 kBTU/(ft²yr)**

Requirement met? **No**



Passive House Planning VENTILATION DATA

Building: Norwich University ΔT90 SOLAR DECATHLON 2013

Treated Floor Area A_{TFA} ft² 790 (Annual worksheet)
 Room Height h ft 8.20 (Annual Heat Demand worksheet)
 Room Ventilation Volume ($A_{TFA} \cdot h$) = V_R ft³ 6482 (Annual Heat Demand worksheet)

Ventilation System Design - Standard Operation

Occupancy #/P 377
 Number of Occupants P 2.1
 Supply Air per Person cfm/P 18.00
 Supply Air Requirement cfm 38
 Extract Air Rooms
 Quantity Kitchen 1 Bathroom 1 Half Bath 1
 Extract Air Requirement per Room cfm Kitchen 35 Bathroom 24 Half Bath 12
 Total Extract Air Requirement cfm 59
 Design Air Flow Rate (Maximum) cfm 59

Average Air Change Rate Calculation

Type of Operation	Daily Operation Duration	Factors Referenced to Maximum	Air Flow Rate cfm	Air Change Rate 1/hr
Maximum	0.0	1.00	59	0.54
Standard	10.0	0.77	45	0.42
Basic		0.54	32	0.29
Minimum	14.0	0.40	24	0.22
<input checked="" type="checkbox"/> Residential Building		Average value	33	0.30

Infiltration Air Change Rate according to EN 13790

Wind Protection Coefficients According to EN 13790		
Coefficient e for Screening Class	Several Sides Exposed	One Side Exposed
No Screening	0.10	0.03
Moderate Screening	0.07	0.02
High Screening	0.04	0.01
Coefficient f	15	20

Wind Protection Coefficient, e for Annual Demand: 0.07 for Heat Load: 0.18
 Wind Protection Coefficient, f for Annual Demand: 15 for Heat Load: 15.00
 Air Change Rate at Press. Test n_{50} 1/hr 0.30 0.30
 Net Air Volume for Press. Test V_{005} ft³ 7376
 Air Permeability q_{50} cfm/ft² 0.011

Type of Ventilation System
 Balanced PH Ventilation Please Check
 Pure Extract Air
 Excess Extract Air
 Infiltration Air Change Rate n_{infil} 1/hr 0.00 0.00
 Infiltration Air Change Rate for Annual Demand: 0.024 for Heat Load: 0.060

Effective Heat Recovery Efficiency of the Ventilation System with Heat Recovery

Central unit within the thermal envelope.
 Central unit outside of the thermal envelope.

Efficiency of Heat Recovery η_{HE} 0.83 Ultimate Air Recouperator
 Transmittance Ambient Air Duct Ψ , BTU/hr.ft².°F 0.144
 Length Ambient Air Duct ft 6
 Transmittance Exhaust Air Duct Ψ , BTU/hr.ft².°F 0.144
 Length Exhaust Air Duct ft 2
 Temperature of Mechanical Services Room °F 68
 Av. Ambient Temp. Heating P. (°F) 33
 Av. Ground Temp (°F) 46

Effective Heat Recovery Efficiency $\eta_{HE,eff}$ 80.2%

Effective Heat Recovery Efficiency Subsoil Heat Exchanger

SHX Efficiency η_{SHX} 0%
 Heat Recovery Efficiency SHX η_{SHX} 0%

CERTIFIED HEAT RECOVERY UNITS

No.	Heat Recovery Unit	Heat Recovery Efficiency %	Electric Efficiency W/cfm
1	Ultimate Air Recouperator	83%	0.72
2			
3			
4			
5			
6	Compact unit as selected in Compact worksheet	kg/a	
7	Reco-Boxx COMFORT - AEREX	85%	0.59
8	Comfoair 500 - StorkAir	88%	0.71
9	aeronom WS 250 - MAICO	85%	0.59
10	thermos 200 DC - Paul	92%	0.61
11	atmos 175 DC - Paul	88%	0.51
12	multi 100 DC - Paul	79%	0.61
13	multi 150 DC - Paul	79%	0.61
14	climos 100 DC - Paul	82%	0.70
15	climos 150 DC - Paul	82%	0.70
16	campus 500 DC - Paul	83%	0.48
17	INNOAIR 255 DC - Sachsenland Bauelemente	88%	0.51
18	Recovery Deluxe 250P - Schrag	83%	0.49
19	TSL 150 G / DC - Schmeißer	84%	0.53
20	Comfoair flat 150 - Zehnder	82%	0.70
21	WRA 400 PH2 - Ned Air	77%	0.66

Secondary Calculation:

Ψ-value Supply Air Duct

Nominal Width 6 in
 Insul. Thickness: 4 in

Reflective? Please mark with an "x"
 Yes
 No
 Thermal Resistance 3.5 R/in
 Nominal Air Flow Rate 33 cfm
 $\Delta\theta$ 35 °F
 Interior Duct Diameter 6,000 in
 Interior Diameter 6,000 in
 Exterior Diameter 14,000 in
 R-Interior 1.16 hr.ft².F/BTU
 R-Surface 1.92 hr.ft².F/BTU
Ψ-value 0.144 BTU/hr.ft².°F
 Surface Temperature Difference 6.446 °F

Secondary Calculation:

Ψ-value Exhaust Air Duct

Nominal Width 6 in
 Insul. Thickness: 4 in

Reflective? Please mark with an "x"
 Yes
 No
 Thermal Resistance 3.5 R/in
 Nominal Air Flow Rate 0 cfm
 $\Delta\theta$ 35 °F
 Interior Duct Diameter 6,000 in
 Interior Diameter 6,000 in
 Exterior Diameter 14,000 in
 R-Interior 1.16 hr.ft².F/BTU
 R-Surface 1.92 hr.ft².F/BTU
Ψ-value 0.144 BTU/hr.ft².°F
 Surface Temperature Difference 6.446 °F



Passive House Planning
SPECIFIC ANNUAL HEAT DEMAND
MONTHLY METHOD

(This page displays the sums of the monthly method over the heating period)

Climate: PH100 Burlington Data
Building: Norwich University_0190_ROLAR_DEC42010 2013
Location: Building Type/Use: Single Family Affordable Residence
Treated Floor Area: 790 m²
Interior Temperature: 66 °F
Building Type/Use: Single Family Affordable Residence
Treated Floor Area: 790 m²
Spec. Capacity: 11 BTU/(F°F) (Enter in "Summer" worksheet)

Building Element	Temperature Zone	Area	R-Value	Month	Req. Fac.	Q (Heating Degree Days)	per m ² Treated Floor Area
* Exterior Wall - Ambient	A	1276	46.4	1.00	0.00	3295	4.16
* Exterior Wall - Ground	B			1.00	0.00	0.00	0.00
* Roof/Ceiling - Ambient	A	975	55.2	1.00	0.00	6168	7.76
* Ground 1	B	975	39.9	1.00	0.00	5457	6.91
* Ground 2	B			1.00	0.00	0.00	0.00
* Ground 3	B			1.00	0.00	0.00	0.00
* Windows	A			1.00	0.00	0.00	0.00
* Windows	A			1.00	0.00	0.00	0.00
* Windows	A			1.00	0.00	0.00	0.00
* Windows	A			1.00	0.00	0.00	0.00
* Windows	A	194	5.0	1.00	0.00	8166	10.34
* Exterior Door	A			1.00	0.00	0.00	0.00
* Exterior 78 (Length/In)	A			1.00	0.00	0.00	0.00
* Exterior 78 (Length/In)	A			1.00	0.00	0.00	0.00
* Uninsulated 78 (Length/In)	P			1.00	0.00	0.00	0.00
* Ground 78 (Length/In)	B			1.00	0.00	0.00	0.00

Transmission Heat Losses Q_t = 19719 W (4.75 MBTU/hr)

Effective Air Volume V_{eff} = 790 m³ (28.26 MBTU/hr)

Effective Air Change Rate Ambient A_{eff} = 0.360 1/hr (0.99 MBTU/hr)

Effective Air Change Rate Ground G_{eff} = 0.360 1/hr (0.99 MBTU/hr)

Ventilation Losses Ambient Q_v = 1893 W (4.29 MBTU/hr)

Ventilation Losses Ground Q_{vg} = 0.00 W (0.00 MBTU/hr)

Total Heat Losses Q_t = 21613 W (4.99 MBTU/hr)

Orientation of the Area

Orientation	Reduction Factor	SHGC (area-weighted)	Area	Global Radiation	Q _g (W)	Q _g (MBTU/hr)
* North	0.33	0.60	40.4	140	577	0.73
* East	0.67	0.60	84.4	250	847	1.07
* West	0.67	0.60	84.4	250	847	1.07
* Horizontal	0.60	0.60	0.0	0.0	0.0	0.00
* Slope (Opposite Area)						

Available Solar Heat Gains Q_g = 13343 W (3.04 MBTU/hr)

Internal Heat Gains Q_i = 1448 W (3.24 MBTU/hr)

Free Heat Q_f = 0.00 W (0.00 MBTU/hr)

Ratio Free Heat to Losses Q_f / Q_t = 0.00

Utilization Factor Heat Gains η_u = 0.95

Heat Gains Q_g = 13413 W (3.07 MBTU/hr)

Annual Heat Demand Q_d = 1188 W (2.66 MBTU/hr)

Limiting Value = 4.75

Requirement met? **No**

Passive House Planning
SPECIFIC ANNUAL HEAT DEMAND
MONTHLY METHOD

Climate: PH100 Burlington Data
Building: Norwich University_0190_ROLAR_DEC42010 2013
Location: Building Type/Use: Single Family Affordable Residence
Treated Floor Area: 790 m²
Interior Temperature: 66 °F
Building Type/Use: Single Family Affordable Residence
Treated Floor Area: 790 m²

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Heating Degree Days - Exterior	1583	1313	1166	883	369	54	-45	27	219	649	948	1220	8202
Heating Degree Days - Ground	699	727	853	822	760	604	674	807	701	344	219	343	6881
Losses - Exterior	3441	2945	2416	1533	821	122	-100	60	627	1454	2126	2737	18400
Losses - Ground	421	439	513	489	440	358	385	450	389	207	130	210	4146
Sum Spec. Losses	4151	4129	3786	2656	1400	650	273	270	1123	2159	3121	3189	28512
Solar Gains - North	14	16	21	27	36	42	40	32	25	18	12	9	291
Solar Gains - East	85	113	146	228	241	259	251	238	168	128	79	58	2013
Solar Gains - South	885	902	1069	1093	979	805	944	1112	1037	1027	759	474	11463
Solar Gains - West	193	219	364	460	508	551	518	353	273	177	113	123	4282
Solar Gains - Horiz	0	0	0	0	0	0	0	0	0	0	0	0	0
Solar Gains - Change	42	73	124	129	137	148	144	140	104	85	64	43	1224
Internal Heat Gains	391	354	391	379	391	379	391	391	379	391	379	391	4603
Sum Spec. Gains Solar + Internal	2100	2128	2248	2093	2093	2093	2093	2093	2093	2143	1995	1964	30251
Utilization Factor	100%	99%	94%	78%	54%	21%	8%	12%	33%	78%	97%	100%	60%
Annual Heat Demand	2288	1476	1097	261	21	0	0	0	3	162	957	1785	8188
Spec. Heat Demand	2.89	1.87	1.39	0.28	0.03	0.00	0.00	0.00	0.00	0.21	1.21	2.26	10.36

Specific Losses, Gains, Heating Demand (MBTU/(m²·month))

Annual Heat Demand Comparison

Method	Value	Reference
PH100 Monthly Method	8188 MBTU/yr	Reference to hubtable area
PH100 Heating Period Method	7965 MBTU/yr	Reference to hubtable area
PH100/yr Reference to hubtable area	10.4 MBTU/(m ² ·yr)	Reference to hubtable area
PH100/yr Reference to hubtable area	10.1 MBTU/(m ² ·yr)	Reference to hubtable area

Month	1	2	3	4	5	6	7	8	9	10	11	12	Annual Total	Heating Period Method
Days	31	28	31	30	31	30	31	30	31	30	31	29	365	295
Ambient Temp. (°F)	19	22	31	48	57	67	70	68	59	48	37	20	49	45
North Radiation (MBTU/(m ² ·month))	5.4	6.0	8.2	10.5	13.8	16.2	15.2	12.4	9.5	7.0	4.4	2.3	112	31
East Radiation	18.8	14.9	20.8	28.8	30.4	28.7	21.7	20.1	21.2	16.2	8.8	2.3	244	98
South Radiation	25.4	28.2	31.7	32.3	28.9	27.3	28.5	33.0	30.7	30.4	22.5	20.0	346	189
West Radiation	14.4	13.0	21.6	37.3	30.1	28.7	32.0	38.7	29.9	18.2	10.5	7.2	246	96
Horiz. Radiation	18.8	21.8	33.0	45.8	52.8	57.4	54.0	52.0	36.1	28.7	18.2	11.8	425	194
Net (°F)	-15	-9	0	15	31	44	48	46	38	24	11	3	20	32
Element Temp. (°F)	48	42	40	41	44	48	51	56	59	57	54	49	49	47



Passive House Planning
ELECTRICITY DEMAND

Building: Norwich University_T90_SOLAR DECATELON 2013

Column Nr.	1	2	3	4	5	6	7	8	8a	9	10	11	12	13	14
Application	Used (1/0)	Within the Thermal Envelope? (1/0)	Norm. Demand	Utilization Factor	Frequency	Reference Quantity	Useful Energy (kWh/yr)	Electric Fraction	Non- Electric Fraction	Electricity Demand (kWh/yr)	Additional Demand	Marginal Performance Ratio	Solar Fraction	Non- Electric Demand (kWh/yr)	Primary Energy Demand (kWh/yr)
Dishwashing	1	1	1.00 kWh/Use	1.00	65 (P/yr)	2.1 P	136	50%	50%	68					184
DHW Connection															239
Clothes Washing	1	1	0.50 kWh/Use	1.00	57 (P/yr)	2.1 P	60	55%	45%	33				89	
DHW Connection														76	
Clothes Drying with: Condensation Dryer	1	1	3.50 kWh/Use	0.88	57 (P/yr)	2.1 P	366	100%	0%	366				989	
Energy Consumed by Evaporation	0	1	3.13 kWh/Use	0.60	57 (P/yr)	2.1 P	0	0%	100%	0				0	
Refrigerating	0	1	0.78 kWh/day	1.00	365 day/yr	1 HH	0	100%	0%	0				0	
Freezing	0	1	0.88 kWh/day	1.00	365 day/yr	1 HH	0	100%	0%	0				0	
or Combined Unit	1	1	1.00 kWh/day	1.00	365 day/yr	1 HH	365	100%	0%	365				986	
Cooking with: Electricity	1	1	0.22 kWh/Use	1.00	500 (P/yr)	2.1 P	231	100%	0%	231				623	
Lighting	1	1	9 W	1.00	2.90 kWh(P/yr)	2.1 P	55	100%	0%	55				149	
Consumer Electronics	1	1	80 W	1.00	0.55 kWh(P/yr)	2.1 P	92	100%	0%	92				249	
Small Appliances, etc.	1	1	50 kWh	1.00	1.00 (P/yr)	2.1 P	105	100%	0%	105				283	
Total Aux. Electricity							596			596				1609	
Other:															
desktop computer	1	1	1				1			1				3	
television	1	1	1				1			1				3	
							0			0				0	
							0			0				0	
							0			0				0	
							0			0				0	
							0			0				0	
Total							2008 kWh			1913 kWh				117 kWh	5481 kWh
Specific Demand										2.4 kWh/(ft ² yr)				0.15 kWh/(ft ² yr)	6.9 kWh/(ft ² yr)
										8.3 kBTU/(ft ² yr)				0.5 kBTU/(ft ² yr)	23.7 kBTU/(ft ² yr)
Recommended Maximum Value										5.71 kBTU/(ft ² yr)				15.85 kBTU/(ft ² yr)	

Primary Energy Factors: Electricity 2.7 kWh/kWh, Natural Gas 1.1 kBtu/kBtu

Energy Carrier for Space Heating/DHW: Electricity 1.1, Natural Gas 1.1

Residual Impacts: 0.60

Percentage CPU: 104%

DHW Non-Electric - Wash&Dish: 117 kWh

Non-Renewable Non-Electric DHW Wash&Dish: 0.15 kWh/(ft²yr)

Non-Renewable Non-Electric DHW Wash&Dish: 0.50 kBtu/(ft²yr)



Passive House Planning PRIMARY ENERGY VALUE

Building: Norwich University_AT90_SOLAR DECATHLON 2013
Location: _____

Building Type/Use: Single Family Affordable Residence

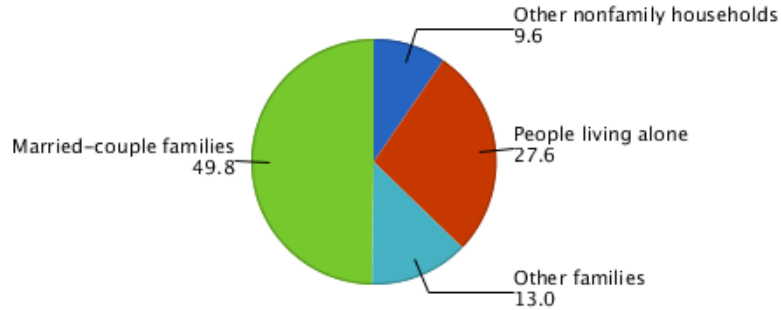
Treated Floor Area A_{TFA}: 790 ft²
Space Heat Demand incl. Distribution: 3.1 kWh/(ft²yr)
Useful Cooling Demand: 0.0 kWh/(ft²yr)

		Final Energy	Primary Energy	Emissions
		kWh/(ft ² yr)	kWh/(ft ² yr)	CO ₂ -Equivalent
		CHOOSE UNITS:		
Electricity Demand (without Heat Pump)			PE Value	CO ₂ -Emission Factor (CO ₂ -Equivalent)
Covered Fraction of Space Heat Demand	(Project)	0%	kWh/kWh	lb/kWh
Covered Fraction of DHW Demand	(Project)	100%	2.7	1.50
Direct Electric Heating	Q _{de}	0.0	0.0	0.00
DHW Production, Direct Electric (without Wash&Dish)	Q _{DH,de} (DHW+Distribution, SolarDHW)	1.6	4.3	2.36
Electric Postheating DHW Wash&Dish	(Electricity, SolarDHW)	0.1	0.4	0.22
Electricity Demand Household Appliances	Q _{EH} (Electricity worksheet)	1.7	4.5	2.50
Electricity Demand - Auxiliary Electricity		0.8	2.0	1.13
Total Electricity Demand (without Heat Pump)		4.1	11.2	6.21
		kWh/(ft ² yr)	kWh/(ft ² yr)	lb/(ft ² yr)
Heat Pump			PE Value	CO ₂ -Emission Factor (CO ₂ -Equivalent)
Covered Fraction of Space Heat Demand	(Project)	100%	kWh/kWh	lb/kWh
Covered Fraction of DHW Demand	(Project)	0%	2.7	1.50
Energy Carrier - Supplementary Heating		Electricity	2.7	1.50
Annual Coefficient of Performance - Heat Pump	Separate Calculation	3.20		
Total System Performance Ratio of Heat Generator	Separate Calculation	0.35		
Electricity Demand Heat Pump (without DHW Wash&Dish)	Q _{HP} (Electricity worksheet)	1.1	2.9	1.62
Non-Electric Demand, DHW Wash&Dish		0.0	0.0	0.00
Total Electricity Demand Heat Pump		1.1	2.9	1.62
		kWh/(ft ² yr)	kWh/(ft ² yr)	lb/(ft ² yr)
Compact Heat Pump Unit			PE Value	CO ₂ -Emission Factor (CO ₂ -Equivalent)
Covered Fraction of Space Heat Demand	(Project)		kWh/kWh	lb/kWh
Covered Fraction of DHW Demand	(Project)		2.7	1.50
Energy Carrier - Supplementary Heating		Electricity	2.7	1.50
COP Heat Pump Heating	(Compact worksheet)	0.0		
COP Heat Pump DHW	(Compact worksheet)	0.0		
Performance Ratio of Heat Generator (Verification)	(Compact worksheet)			
Performance Ratio of Heat Generator (Planning)	(Compact worksheet)			
Electricity Demand Heat Pump (without DHW Wash&Dish)	Q _{HP} (Compact worksheet)	0.0	0.0	0.00
Non-Electric Demand, DHW Wash&Dish		0.0	0.0	0.00
Total Compact Unit	(Compact worksheet)	0.0	0.0	0.00
		kWh/(ft ² yr)	kWh/(ft ² yr)	lb/(ft ² yr)
Boiler			PE Value	CO ₂ -Emission Factor (CO ₂ -Equivalent)
Covered Fraction of Space Heat Demand	(Project)		kWh/kWh	lb/kWh
Covered Fraction of DHW Demand	(Project)		1.1	0.55
Boiler Type	(Boiler worksheet)			
Utilization Factor Heat Generator	(Boiler worksheet)	0%		
Annual Energy Demand (without DHW Wash&Dish)	(Boiler worksheet)	0.0	0.0	0.00
Non-Electric Demand, DHW Wash&Dish	(Electricity worksheet)	0.0	0.0	0.00
Total Heating Oil/Gas/Wood		0.0	0.0	0.00
		kWh/(ft ² yr)	kWh/(ft ² yr)	lb/(ft ² yr)
District Heat			PE Value	CO ₂ -Emission Factor (CO ₂ -Equivalent)
Covered Fraction of Space Heat Demand	(Project)		kWh/kWh	lb/kWh
Covered Fraction of DHW Demand	(Project)		0.7	-0.15
Heat Source	(District Heat worksheet)			
Utilization Factor Heat Generator	(District Heat worksheet)	0%		
Heat Demand District Heat (without DHW Wash&Dish)	(District Heat worksheet)	0.0	0.0	0.00
Non-Electric Demand, DHW Wash&Dish	(Electricity worksheet)	0.0	0.0	0.00
Total District Heat		0.0	0.0	0.00
		kWh/(ft ² yr)	kWh/(ft ² yr)	lb/(ft ² yr)
Other			PE Value	CO ₂ -Emission Factor (CO ₂ -Equivalent)
Covered Fraction of Space Heat Demand	(Project)		kWh/kWh	lb/kWh
Covered Fraction of DHW Demand	(Project)			
Heat Source	(Project)	i. e. Wood		
Utilization Factor Heat Generator	(Project)			
Annual Energy Demand, Space Heating		0.0	0.0	0.00
Annual Energy Demand, DHW (without DHW Wash&Dish)		0.0	0.0	0.00
Non-Electric Demand, DHW Wash&Dish	(Electricity worksheet)	0.0	0.0	0.00
Non-Electric Demand Cooking/Drying (Gas)	(Blatt Strom)	0.0	0.0	0.00
Total - Other		0.0	0.0	0.00
		kWh/(ft ² yr)	kWh/(ft ² yr)	lb/(ft ² yr)

Marketing the Delta T-90 House

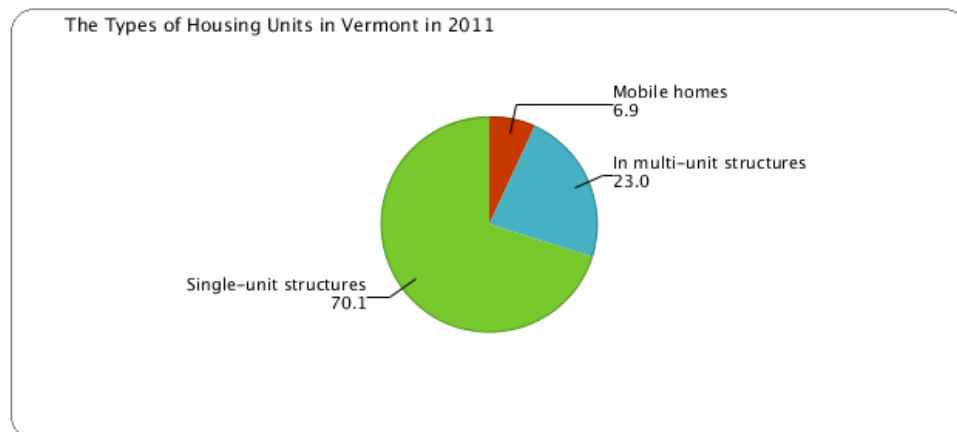
Initial Statistical Research

Housing Lifestyle of Vermonters (%)



Housing Characteristics

In 2011, Vermont had a total of 324,000 housing units, 21 percent of which were vacant. Of the total housing units, 70 percent were in single-unit structures, 23 percent were in multi-unit structures, and 7 percent were mobile homes. Twenty-three percent of the housing units were built since 1990.

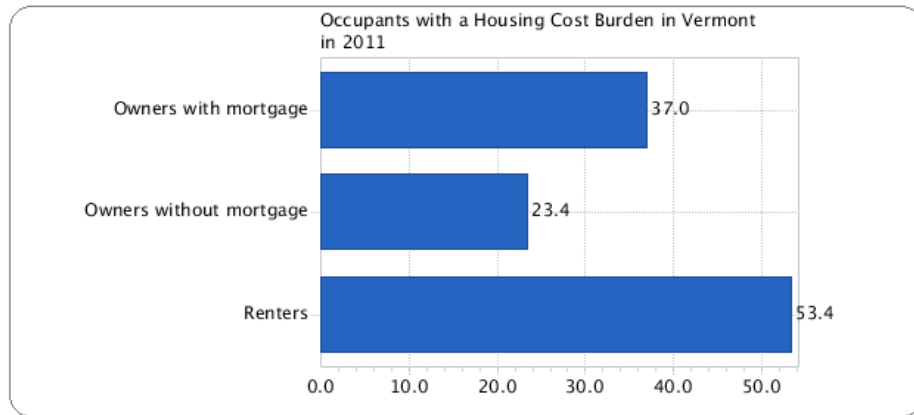


The median number of rooms in all housing units in Vermont is 6. Of these housing units, 59 percent have three or more bedrooms.



Housing Costs

The median monthly housing costs for mortgaged owners is \$1,487, while non-mortgaged owners pay \$604 on average, and renters pay \$849 on average. Thirty-seven percent of owners with mortgages, 23 percent of owners without mortgages, and 53 percent of renters in Vermont spend 30 percent or more of household income on housing.



Source: U.S. Census Bureau, 2011 American Community Survey

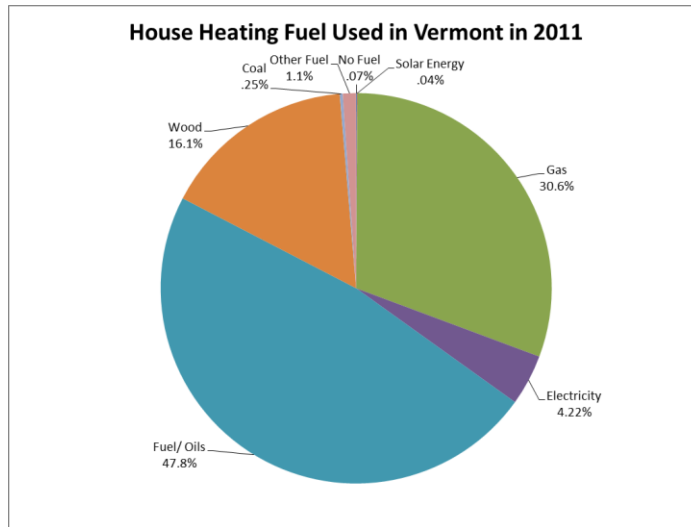
Monthly Housing Costs as a Percentage of Household Income in 2011

Less than \$20,000	15.1%	+/-1.0
Less than 20 percent	0.6%	+/-0.2
20 to 29 percent	1.5%	+/-0.3
30 percent or more	13.1%	+/-0.9
\$20,000 to \$34,999	15.9%	+/-1.0
Less than 20 percent	1.5%	+/-0.3
20 to 29 percent	3.7%	+/-0.6
30 percent or more	10.7%	+/-0.8
\$35,000 to \$49,999	14.5%	+/-0.9
Less than 20 percent	3.8%	+/-0.5
20 to 29 percent	4.8%	+/-0.6
30 percent or more	5.9%	+/-0.6
\$50,000 to \$74,999	19.5%	+/-1.1
Less than 20 percent	8.0%	+/-0.7
20 to 29 percent	6.3%	+/-0.5
30 percent or more	5.1%	+/-0.6
\$75,000 or more	32.5%	+/-1.0
Less than 20 percent	20.3%	+/-0.9
20 to 29 percent	9.7%	+/-0.8
30 percent or more	2.4%	+/-0.5
Zero or negative income	0.6%	+/-0.1
No cash rent	2.0%	+/-0.3
PERCENT IMPUTED		
Tenure	0.8%	(X)
Monthly housing costs	(X)	(X)
Gross rent	(X)	(X)

Source: U.S. Census Bureau, 2011 American Community Survey



Utility Costs for Vermonters



Total monthly owner costs for all mobile home owners in Vermont- \$10,404,200

With mortgage- \$7,958,900

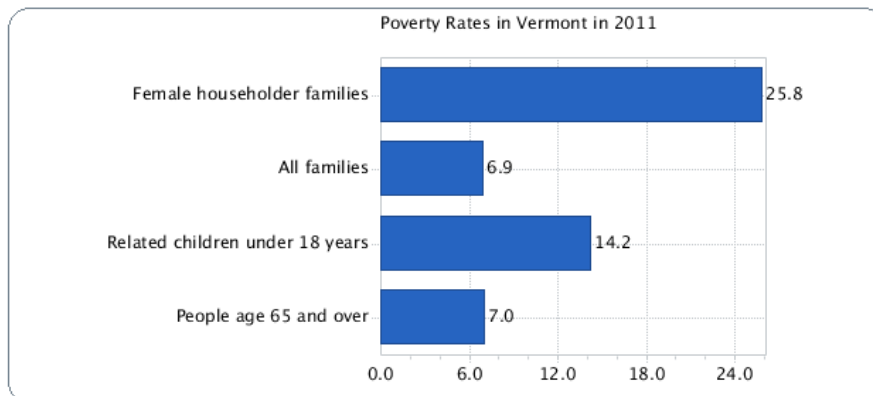
Without mortgage- \$2,445,300

Number of people who own a mobile home- 22,318

Average costs ($\$10,404,200 / 22,318$) = \$466.18 / month

Poverty and Participation in Government Programs

In 2011, 12 percent of people were in poverty. Fourteen percent of related children under 18 were below the poverty level, compared with 7 percent of people 65 years old and over. Seven percent of all families and 26 percent of families with a female householder and no husband present had incomes below the poverty level.



Source for graphs and charts:
<http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t>
For more information, visit the above mentioned website and:
<http://www.census.gov/prod/2011pubs/h150-09.pdf>



THE MARKET IS GROWING!

- Over the last 20, years the cost of solar energy systems has come down seven fold. As the demand for systems rises and manufacturing volume increases, costs will decrease and the economic payback time will also decrease.
- In 2009, the United States was the third largest solar photovoltaic market in the world, after Germany and Italy. Despite a challenging domestic economic environment, the US market still delivered a growth rate of 36%, strong but not nearly as strong as the 62% growth in 2008.
- The U.S. solar industry grew by 125% from Q2 2011 to Q2 2012, making it one of the fastest growing sectors in the U.S. economy. The industry installed 772 MW of solar electric capacity in Q2 2012. The Solar Energy Industries Association (SEIA) forecasts the solar industry will maintain its rapid growth with 2,100 MW of solar electric projected to be installed during the second half of 2012.

VERMONT BUYBACK AND INCENTIVE PROGRAMS

- Money back from solar energy creation
- Green Mountain Power, one of Vermont's utility providers, will pay customers who install photovoltaic (PV) solar energy systems a credit of \$0.06 per kWh in addition to the net-metered base rate (usually \$0.12 to \$0.13 cents per kWh)
- The Vermont sales tax exemption for renewable energy systems allows for a 100% sales tax exemption on solar purchases and system installations, grid-tied and off-grid systems alike.
- The Vermont Clean Energy Development Fund (CEDF) Program offers low-interest loans for the purchase and installation of solar technology to businesses, homeowners, nonprofits, and local governments
- **Sources:**
 - o Database for State Incentives for Renewables and Efficiency:
<http://www.dsireusa.org/incentives/index.cfm?re=0&ee=0&spv=0&st=0&srp=1&state=VT>
 - o Green Mountain Power: <http://www.greenmountainpower.com/renewable/solar/>
 - o Solar Energy USA of Vermont : <http://solar-installers-locations.solarenergy-usa.com/vermont/vermont/>

SOLAR PANELS

- Maintenance
 - o Solar panels must be weatherproofed against the elements and installed properly to insure projected lifetime
 - o A periodic cleaning of debris, weather, dust, and pollution is required for maximum efficiency.
 - o Estimated 8-16 hours per year will be dedicated to maintenance of the system
- Estimated Life span



- Most inverters will need to be replaced every 10 years, although it is typically included in many warranties that will normally cover 20 years.
- Solar panels have an estimated life span of 20-30 years.

LIFETIME VERSUS INTIAL COSTS

- PV Array will create a \$136/month savings in costs for the Delta T-90 House.
- Mobile home owners pay an average of \$466 per month in housing costs.

	Mobile home (new)	Delta90 House	Difference
Upfront costs	\$40,000	\$145,000	\$85,000
Utilities (per year)	\$5,592	0	\$5,592

- In 15 years, the upfront cost for the Delta T-90 house would pay back the difference in cost of a mobile home. This calculation does not include buyback program, incentives, etc.

HUNTINGTON HOMES-LOCATION OF MANUFACTURE

- Average modular homes from Huntington Homes range from less than 1,000 square feet to over 2,500 square feet, depending on the customer's program.
- ModularToday.com shows that average costs per square foot of a Huntington Homes modular homes range from \$80-\$110*
 - *Please note, this number is much lower than our \$145/SF cost due to less material in the wall and no PV arrays, which will work to decrease our utility and energy costs, allowing our initial budget to be higher than an average Huntington Homes design.
- <http://www.modulartoday.com/Huntington-Homes.html>

MAXIMIZE THE MARKETABILITY

- Full Range of Features
- How does our house accommodate and adapt?
 - As of now, we are focusing on the Solar Decathlon version of the house. However, in the coming months we will be examining alternative designs using the same modular concept. This future design process will create a wide range of design features to offer to customers.
- Feasibility range of our design features
 - Sustainability design features
 - Bedrooms, square footage, number of bedrooms
 - Energy saving aspect



VERMONT MARKET POTENTIAL

- Wind Turbines and Geothermal energy have not been considered for this project based on the Solar Decathlon competition requirements, but if the market has a demand for these renewable resources the house systems could be adapted for use of these resources.
- Solar Energy is currently the renewable energy source paired with the house.
- Our designated market is a family of three: two parents and one child as the average Vermont household is 2.3. *
 - o The Delta T-90 House could accommodate a married couple with an extra office, two housemates, etc. in order to appeal to the Vermont market.
 - o *This is our chosen market for the Solar Decathlon competition and therefore will be the main focus.
- In regards to home specifications, there are: two bedrooms, one bathroom, kitchen, living/dining room, office area, two closets, extra storage area.

Vermont Design Characteristics	Solar Decathlon Design Characteristics	Key Unique Features
Solar Panels/Renewable Resources Ultra high-performance to lower housing costs 14" Thickness of Wall Section Two bedrooms for family No dependency on fuel	Solar Panels Ultra High-Performance 1,000 Square Feet = Maximum allowed for competition Strong day lighting design No dependency on fuel	Only one wet wall NO mechanical room Affordability for Vermont residents



SITE SPECIFIC COSTS FOR LOCAL VERMONT BUILDING SITES

SITE #1: Barre, Vermont

53 Brooklyn Street, Barre, VT					
		Cost (\$)	Quantity	Total	Source
Cost for House and Placement					
	Property	4,900	1	4900	Century 21 Jack Associates
<u>Foundation</u>					
	Concrete Piers	320	12	3840	Professor Lutz
	Replace rusted water and sewage pipes	3,000	1	3000	Barre City Engineer
	Electricity (\$ per ft2 of line)	11.6	20	232	R.S. Means
<u>Site Work</u>					
	Asphalt Driveway (\$ per ft2)	1.32	600	792	R.S. Means
	Transportation to site		1200	1200	Huntington Homes
			TOTAL FOR SITEWORK	13964	

SITE #1: Northfield, Vermont

44 Hallstrom Road, Northfield, VT,05663			
Categories of cost	Breakdown	Cost	Source
<u>Foundation Cost</u>			
	Land	\$ 37,000.00	Century 21 Jack Realtors
	Land tax	\$ 436.00	Century 21 Jack Realtors
	Well	\$ 4,140.00	Well drilling Company
	Septic tank	TBD	TBD
	Electric	\$ 371.20	Hardwick Electric
	TOTAL	\$ 41,947.20	
<u>Site work Costs</u>			
	12 Concrete Piers	\$ 3,840.00	Prof. Lutz
	Earth stripping and stockpiling of land	\$ 3020.00	RS Means
	Asphalt driveway	\$ 11077.50	RS Means
	Transportation to site	\$ 666.00	Delta T-90 cost analysis sheet
	TOTAL	\$ 18,603.50	
	OVERALL COST	\$ 60,550.70	



Marketing the Delta T-90 House

Market Viability Justification

The Norwich University Delta T-90 House creates an alternative to conventional modular construction in the state of Vermont. Our innovative approach to affordable, sustainable dwellings reflects the interdependency of the economy and the built environment. The flexible design allows for two bedrooms as well as an office space connected to the living room. Based on the lifetime energy savings and Vermont Buyback and Incentive programs, the Delta T-90 House offers Vermont residents a truly affordable path toward sustainable, high-performance, solar-powered living.

Target Market

Characteristics	Delta T-90 House
Location of Permanent Site	Vermont
Housing Type	Single family residence
# of Occupants	3
Client Demographic	Two parents, one child
Client Annual Income	\$41,000
# of Bedrooms	2

The Delta T-90 House is an affordable option to the growing solar-powered residential Vermont housing market. Our focus is on designing an environment for a family of three that maximizes value and minimizes cost. The Delta T-90 house would be ultra-energy efficient due to the 5.9kW building integrated PV Array and high performance building insulation. In comparison, the average cost for utilities and heating in Vermont is \$466 per month and the performance of a conventional wall system is less than half of our house.

The occupants of the Delta T-90 House will enjoy near zero utility costs from heating, cooling, and household electricity thanks to energy produced by the 5.9kW solar array. Vermont's Incentive Programs encourage the use of renewable energy to promote a changing time for the built environment. This savings can contribute to family recreation, community building, or future financial planning, promoting economic confidence.

A typical Vermont household has two wage earners that occupy a position in the workforce. The Bureau of Labor Statistics show that these positions most often relate to education, healthcare, and social assistance. During the week, the house will typically be unoccupied during the day. The adults will go to work and the children will go to school, therefore decreasing the power used throughout the daytime hours. In the evening, the household can appreciate the open living space where cooking, gathering, and lounging occurs. The office space can be utilized for a social working environment or a quiet corner for studying. A strong connection to the outdoors through visual and day-lighting



techniques connects occupants to the beautiful Vermont backdrop. The bright, spacious home creates a healthy and comfortable environment for a family to dwell.

On the technical side, the building integrated 6kW photovoltaic array is appropriately sized to meet an annual energy balance for the house, and take maximum advantage of Vermont's Utility Incentives program. The mechanical systems are compact, ultra efficient, and discreet. Because of the high-performance building envelope, and Passive House air sealing strategies, only a small heat pump is required to heat or cool the house. This system allows the occupant to find their comfort zone. A series of small, ductless heat recovery ventilation systems exchange stale air for fresh air to keep the space fresh. A tankless water heater that's 99% efficient instantly provides hot water to the user. These energy efficient systems will allow the house to function on minimal energy costs.

The Delta T-90 House reflects the interdependency between the economy and the built environment through its innovative approach to solar-powered, residential design. This notion models the future of affordable, energy efficient living in Vermont. This groundbreaking concept will provide an attainable connection between tradition archetypes and developing solar technologies for Vermont residents.



Quantity Takeoff of Competition Prototype House

Specification Number	Brief Description	Detailed Description	Unit	Qty
DIVISION 6				
6 11 00	WOOD FRAMING	2x12 CEILING JOIST (DL) 24" OC	SF	940
6 11 00	WOOD FRAMING	2x12 FLOOR JOIST (DL) 24" OC	SF	940
6 11 00	WOOD FRAMING	DOUBLE 2x4 ADV. WALL FRAMING 24" OC	SF	1400
6 11 00	WOOD FRAMING	2x4 PARTITIONS 16" OC	SF	478
6 11 00	WOOD FRAMING	2x6 WET WALL PARTITION 16" OC	SF	299
6 15 13	WOOD FLOOR DECKING	1 1/8" PLYWOOD SUB-FLOOR	SF	1000
06 16 36	SHEATHING	3/4" FINISHED PLYWOOD	SF	980
6 16 00	SHEATHING	1/2" TREATED PLYWOOD	SF	980
06 16 23	SHEATHING	7/16" OSB SHEATHING	SF	980
6 41 00	ARCHITECTURAL WOOD CASEWORK	BASE CABINETS	SF	980
6 41 00	ARCHITECTURAL WOOD CASEWORK	WALL CABINETS	LF	470
06 11 13	LAMINATED VENEER LUMBER	LVL CENTER BEAMS	LF	210
6 17 43	RIM BOARDS	DOUBLE 2x12 RIM JOIST	LF	1560
06 16 36	WOOD ROOF DECKING	3/4" CDX PLYWOOD SHEATHING	SF	980
DIVISION 7				
07 13 00	SHEET WATERPROOFING	SOLITEX MENTOS MOISTURE BARRIER	SF	1535
07 21 13.19	MINERAL BOARD INSULATION	4" ROXUL TOPROCK DD	SF	980
07 21 13.19	MINERAL BOARD INSULATION	2" ROXUL COMFORT BOARD IS	LF	1535
07 21 26	BLOWN INSULATION	12" DENSE PACK INSULATION	SF	3500
07 21 26	BLOWN INSULATION	11.25" DENSE PACK INSULATION	SF	1960
07 46 23	WOOD SIDING	5/4x6 CEDER RAINSCREEN	SF	1500
07 46 23	WOOD SIDING	1x3 WOOD FURRING STRIPS	SF	1083
07 53 23	EPDM ROOFING	ECO-WHITE FIRESTONE EPDM MEMBRANE	SF	996
07 65 00	FLEXIBLE FLASHING	TESCON VANA EXTERIOR TAPE	LF	3000
07 65 00	FLEXIBLE FLASHING	TESCON DOUBLE SPLIT WINDOW TAPE	SF	500
07 71 00	ROOF SPECIALTIES	ALUMINUM CUSTOM GUTTER	SF	1083
DIVISION 8				
08 50 00	WINDOWS	UPVC TRIPPLE GLAZED DOORS & WINDOWS	SF	2,466
08 61 16	WOOD ROOF WINDOW	FTT-U6 TRIPPLE GLAZED SKYLIGHT	SF	8
08 20 00	CUSTOM DOORS	SECONDARY RM WOOD BI-FOLD DOOR	SF	28
08 20 00	CUSTOM DOORS	MASTER BED RM WOOD SLIDING BARN DOOR	SF	35
8 20 00	CUSTOM DOORS	LUANDRY RM WOOD BIFOLD DOOR	SF	28
8 20 00	CUSTOM DOORS	BATHROOM WOOD SLIDING BARN DOOR	SF	35
08 20 00	CUSTOM DOORS	MASTER RM CLOSET DOORS	SF	56
DIVISION 9				
09 29 00	GYPSON BOARD	5/8" GYPSON WALL BOARD	SF	777
09 91 23	INTERIOR PAINTING	FINISHED INTERIOR PAINTING	SF	777
09 91 23	INTERIOR PAINTING	FINISHED PAINTING	SF	1098
DIVISION 11				
11 31 13	RESIDENTIAL KITCHEN APPLIANCE	ELEC. STOVE/OVEN	EA	1
11 31 13	RESIDENTIAL KITCHEN APPLIANCE	MICROWAVE	EA	1
11 31 13	RESIDENTIAL KITCHEN APPLIANCE	REFRIDGERATOR/FREEZER	EA	1
11 31 13	RESIDENTIAL KITCHEN APPLIANCE	DISHWASHER	EA	1
11 31 23	RESIDENTIAL LAUNDRY APPLIANCE	WASHER/DRYER COMBO	EA	1
DIVISION 12				
12 24 00	CUSTOM SHADING/WINDOW SHADES	WOOD AND STEEL SOLAR SHADING	SF	200
12 35 30.13	KITCHEN CASEWORK	CUSTOM BOTTOM AND SHELFING UNITS	EA	1
12 35 30.23	BATHROOM CASEWORK	CUSTOM BATHRM SINK AND TOWEL VANITY	EA	2
12 36 19	WOOD COUNTERTOPS	WOOD COUNTER TOP	EA	1



DIVISION 21				
21 10 00	WATER BASED FIRE SUPPRESSION SYSTEMS	FIRE EXTINGUISHER	EA	2
21 13 13	WET-PIPE SPRINKLER SYSTEM	SPRINKLER SYSTEM	SF	89
22 11 13	FACILITY WATER DISTRIBUTION PIPING	EPDM PIPING	LF	150
22 11 23	DOMESTIC WATER PUMPS	ELECTRIC WATER PUMP	EA	1
22 11 23	DOMESTIC WATER PUMPS	EFFLUENT PUMP UNDER HOUSE	EA	1
22 12 19	FACILITY GROUND MOUNTED, POTABLE-WATER STORAGE TANKS	WATER TANKS x 3 @ 500 GAL. EA.	EA	3
22 33 00	RESIDENTIAL, ELECTRIC DOMESTIC WATER HEATERS	TANKLESS INSTANT WATER HEATER	EA	1
22 41 13	RESIDENTIAL WATER CLOSETS, URNIALS, AND BIDETS	TOILET	EA	1
22 41 16	RESIDENTIAL LAVATORIES AND SINKS	BATHROOM SINK	EA	1
22 41 16	RESIDENTIAL LAVATORIES AND SINKS	KITCHEN SINK	EA	1
22 41 23	RESIDENTIAL SHOWERS	BATH TUB	EA	1
22 41 39	RESIDENTIAL FAUCETS, SUPPLIES, AND TRIM	BATHROOM FACUET	EA	1
22 41 39	RESIDENTIAL FAUCETS, SUPPLIES, AND TRIM	KITCHEN FUCET	EA	1
22 41 39	RESIDENTIAL FAUCETS, SUPPLIES, AND TRIM	TUB & SHOWER FAUCET	EA	1
DIVISION 23				
23 72 23	HVAC FAN	HRV- LUNOS E2 VENTILATION SYSTEM	EA	3
23 81 26	SPLIT-SYSTEM AIR-CONDITIONERS	MITSUBISHI HEAT PUMP	EA	1
23 81 26	INDOOR UNIT EVAPORATOR	MINI-SPLIT WALL MOUNTED DIFUSER	EA	1
DIVISION 26				
26 24 16	PANELBOARDS	200 AMP PANEL	EA	1
26 27 26	WIRING	#2 THHN BLK	LF	720
DIVISION 48				
48 14 00	PHOTOVOLTAIC ARRAY	ROOF MOUNTED DC PV ARRAY	EA	72



CONSTRUCTION SPECIFICATIONS



DIVISION 01: GENERAL REQUIREMENTS



SECTION 01 11 00: SUMMARY OF WORK

PART 1 – GENERAL

1.1 SUMMARY

- A. Project: The Delta T-90 House, Norwich University 2013 Solar Decathlon
- B. Owner: Norwich University
- C. Architect: Norwich University Solar Decathlon Team
- D. Summary of Work: To design, construct, transport and assemble the 996 square foot Delta T-90 House.
- E. Mission: The Delta T-90 House explores the interdependency of between the economy and the built environment by revealing the hidden values and richness within the conservation-based lifestyle. This high performance home models the future of affordable, energy efficient living for Vermont.

END OF SECTION 01 11 00



SECTION 01 14 00: WORK RESTRICTIONS

PART 1 – ACCESS TO THE SITE

1.1 NORWICH UNIVERSITY SOLAR DECATHLON

- A. Requirements: Only authorized construction personnel, subcontractors, and Norwich University Solar Decathlon team members and faculty are allowed on site during construction unless otherwise authorized by the Norwich University Solar Decathlon team.
- B. Unauthorized Access: Any persons attempting to access the site without authorization are to be asked to leave in a polite manner. Failure to leave will result in their expulsion. (See Criminal Entry).
- C. Criminal Entry: If unauthorized personnel refuse to leave, or if there are visible signs of theft and/ or criminal entry, the police and local police and Solar Decathlon security shall be notified immediately.

1.2 REFERENCES

- A. Construction Documents C-105

PART 2 - COORDINATION WITH OCCUPANTS

2.1 NORWICH UNIVERSITY SOLAR DECATHLON

- A. Requirements: Norwich University Solar Decathlon team members and construction personnel are to comply with the requests made by Norwich University. All products provided by the Norwich University team (rented and/or purchased) to the job site remains the property of Norwich University at all times during construction and is to be treated as such.

PART 3 – USE OF SITE

3.1 NORWICH UNIVERSITY SOLAR DECATHLON

- A. Requirements: The site is to be used only for construction of the Delta T-90 House and storage of related materials unless otherwise authorized. Construction personnel may not sleep overnight in, dwell in or otherwise occupy the job site without authorization.
- B. Special Events: The site will be used several times during construction and/ or to house special events, which showcase the Delta T-90 House. Construction may be halted during these events. Notification will be given by project management as to the date of such events and their impact on construction.

END OF SECTION 01 14 00



SECTION 01 25 13: PRODUCT SUBMISSION PROCEDURES

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes all requirements for the product submission for the Delta T-90 House.

1.2 GENERAL PRODUCT REQUIREMENTS

- A. Packaging and Labels: Deliver items in original, undamaged, factory packaging with the complete manufacturer's labels.
- B. Permanent Labels, Trade Marks, and Trade Names: Locate in inconspicuous locations acceptable to the Delta T-90 Team.
- C. VOC Content: Use VOC-free items to the greatest extent possible. When VOC-free is not available or impractical, use items with lowest VOCs.
- D. Formaldehyde Content: Use formaldehyde-free items to the greatest extent possible. When formaldehyde-free are not available or impractical, use items with lowest formaldehyde content.
- E. Adhesives: Use nonflammable, water resistant adhesives.
- F. Odors: Use odor-free item to the greatest extent possible. When odor is unavoidable, submit sample and obtain preapproval prior to purchase in quantity.

1.3 SUBSTITUTION REQUIREMENTS

- A. Substitution Conditions: Substitutions are discouraged, except under the following conditions.
 - 1. Specified item is no longer available.
 - 2. Specified item is incorrect, inappropriate, or incompatible.
 - 3. Substitution offers substantial advantage in quality, time, cost, or efficiency.
 - 4. Submittal is related to an "or equal" clause specifications.
- B. Substitution Requirements Apply To:
 - 1. Proprietary "named" specification when submitted item is not listed in the specifications.
 - 2. All deviations from contract documents.
- C. Substitution Procedure Requirements:
 - 1. Identify the substitution condition [listed above in "A"]
 - 2. Refer to specification section, article, paragraph numbers, product names and models.
 - 3. Certify that proposed substitution is coordinated with all related and adjacent work.
 - 4. Provide complete and total cost change information related to the proposed substitution.
- D. Appearance characteristics: For items visible in the completed work, appearance is an important evaluation factor. The Delta T-90 Team will decide if a proposed substitution has acceptable appearance. Proposed substitutions may be rejected for appearance alone.

END OF SECTION 01 25 13



SECTION 01 50 00: TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

- A. These are temporary facilities and controls that are only used for the purposes of the competition in Irvine, CA and do not apply to the affordability contest of the Delta T-90 House.
- B. This section includes the temporary facilities and controls that are used for the purposes of the competition in Irvine, CA. Examples (not limited to) are seen below in Part 2 - Products.

1.2 SECTION REQUIREMENTS

- A. Accessible Temporary Egress: Comply with applicable provisions in ICC/ANSI A117.1

1.3 RELATED SECTIONS

- A. Section 01 51 13 - Temporary Electricity

PART 2 - PRODUCTS

2.1 TEMPORARY FACILITIES

- A. Provide tool trailer, storage, and fabrication sheds, and other support facilities as necessary for construction operations. Store combustible materials apart from building.
- B. Provide temporary floor cover and allow for Solar Decathlon organizer- supplied walkway during construction.

2.2 EQUIPMENT

- A. Fire Extinguishers per the Delta T-90's Health and Safety Plan: Portable, UL rated with class and agent as required by locations and classes of fire exposures.
- B. Generator: Refer to Section 01 51 13- Temporary Electricity

PART 3 - EXECUTION

3.1 GENERAL

- A. Install temporary service or connect to electrical service.
 - 1. Arrange with event organizers for the time when service can be interrupted for the period of grid-tie assembly to connect the Delta T-90 House to the village grid on the assigned day of the competition.
- B. Provide temporary lighting with local switching that provides adequate illumination for constructions operations, observations, inspections, and traffic conditions.
- C. Comply with the Delta T-90's Health and Safety Plan.

3.2 SUPPORT FACILITIES INSTALLATION

- A. Waste Disposal Facilities: Provide waste-collection container in sizes adequate to handle waste from construction operations. Comply with requirements if authorities having jurisdiction.

3.3 SECURITY AND PROTECTION FACILITIES INSTALLATION



- A. Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, water way, and subsoil contamination, pollution or other undesirable effects.
- B. Maximum pressure on pavement to be less than 6000 psf for Solar Decathlon competition.
- C. Provide Temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weather-tight enclosure for building exterior.

3.4 OPERATION, TERMINATION, AND REMOVAL

- A. Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility.

END OF SECTION 01 50 00



SECTION 01 51 13: TEMPORARY ELECTRICITY

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes the temporary electricity that is used only for the purposes of the competition in Irvine, CA and does not apply to the affordability contest of the Delta T-90 House.

1.2 SYSTEM DESCRIPTION

- A. Supply a mobile generator to be used for power tools and construction lights during standalone assembly and standalone disassemble as well as times permitted by the DOE.
- B. Provide a spill containment pan to be used with the generator.

1.3 SUBMITTALS

- A. Product data information. Maximum 60 dB at 15 feet under full load.

1.4 REFERENCES

- A. Appendix B: Page 3-6

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Honda Power Equipment
4900 Marconi Drive
Alphretta, GA 30005-8847
Phone: (770)-497-6400
www.hondaequipment.com
 - 1. Available: Parkway Lawnmower Shop, Irvine CA
- B. UltraTech International, Inc.
11542 Davis Creek Court
Jacksonville, Florida 32256
Phone: (904)-292-9 019

2.2 PRODUCTS

- A. Honda Generator
 - 1. Model Number: EU6500Is or equal
 - 2. Location: Construction Staging Area
 - 3. Dimensions:
 - Height: 27.5"
 - Length: 33.5"
 - Width: 26.4"
 - 4. Electrical:
 - 5. Wattage: 6500 Watts
 - 6. Voltage: 120/240 Single-Phrase



- B. Ultra Tech Containment Pan
1. Model Number: 2352
 2. Dimensions:
 3. Length: 54"
 4. Width: 29 3/4"
 5. Height: 3 1/2"
 6. Weight: 34 lbs.
 7. Containment capacity: 14 gallons
 - a. Available: UltraTech International

END OF SECTION 01 51 13



DIVISION 02: EXISTING CONDITIONS



SECTION 02 21 13: SITE SURVEYS

PART 1 - GENERAL

1.1 SUMMARY

- A. Site 105, Delta T-90 is located in the fourth row of houses in the southeastern corner.

1.2 REFERENCES

- A. Construction Documents C-105, O-101, O-109

END OF SECTION 02 21 13



SECTION 02 21 13.13: BOUNDARY AND SURVEY MARKERS

PART 1 - GENERAL

1.1 SUMMARY

- A. The Solar Decathlon assigns a specific lot size of 78 feet east to west by 60 feet north to south. Teams must abide by the dimension of the solar envelope which states that the house and other site components must stay within 18 feet in height. The east and west planes have slope of 52 degrees of horizontal. Structures must not exceed the height of this slope.

1.2 REFERENCES

- A. Construction Documents A-101, O-602

END OF SECTION 02 21 13.13



SECTION 02 43 13.13 BUILDING RELOCATION

PART 1 - GENERAL

1.1 SUMMARY

- A. This section contains the methods, equipment and schedules for the transportation of the Delta T-90 House from Northfield, VT to Irvine, CA and back.

1.2 SYSTEM DESCRIPTION

- A. We will be using two stretch drop, low boy trailers for the building modules.
- B. The two trailers will be pulled by semi -trucks.
- C. The limits established by the DOT include: 14 feet wide and 14 feet tall with required permit and pilot car(s) as needed.
- D. Design Requirements
 - 1. The Delta T-90 House is designed as a group of connectable parts, each of which shall not exceed the allowable dimensions of a flatbed truck, nor shall it exceed the allowable dimensions for the highway transportation under federal highway laws. All components shall not exceed 13 feet 9 inches in height from the ground when resting on the bed of the truck[s].
 - 2. All components of the trailer shall not exceed the allowable dimensions for highway transportation under federal highway laws.

1.3 SUBMITTALS

- A. Site Operations and Transportation Plan Solar Decathlon 2013: Include trailer specifications, route information, delivery information and site operations.

1.4 PERFORMANCE REQUIREMENTS

- A. The Delta T-90 House as a whole must perform identically before and after transportation and re-construction.
- B. The Delta T-90 House as a series of parts shall be transported using specified packing and securing methods and no components shall be damaged during transportation.

1.5 REFERENCES

- A. Construction Documents: O-602, O-102, O-101

PART 2 - EXECUTION

2.1 QUALITY ASSURANCE

- A. Ensure that product is in proper and good working order before accepting delivery of the product.

2.2 DELIVERY, STORAGE AND HANDLING

- A. The exact time of delivery to Irvine, CA shall be coordinated with the team's and the organizer's schedule.
- B. Additional transportation:
 - 1. Trailer for tools
 - 2. Moving truck for furnishings



3. Delivery truck for boom lift

- C. All trailers shall be wrapped with waterproof wrapping to protect the roof, PV array, and finished surfaces from debris. For the two modules, a temporary wall structure shall be constructed at marriage lines to protect the interior of the modules.

2.3 INSTALLATION

- A. The Delta T-90 House and all of its components shall be disassembled, reassembled, packed, secured and shipped by designated individual in accordance with the specified instructions.

END OF SECTION 02 43 13.13



DIVISION 05: METALS



SECTION 05 05 23: METAL FASTENINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes information about structural fasteners used to construct the Delta T-90 House.

1.2 REFERENCES

- A. ANSI/ AWS D 11-92 'Structural Welding Code-Steel.'
B. ANSI/AWS D13-89 'Structural Welding Code- Sheet Steel.'
C. ASTM A 36-00 ' Standard Specification for Carbon Structural Steel.'
D. ASTM A 37-00 'Standard Specification for Carbon Steel Bolts and Studs 60000 psi Tensile Strength.'

1.3 PRODUCT REQUIREMENTS

- A. Fasteners: "Fasteners" includes nails, screws, bolts, wedge bolts, expansion bolts, epoxy anchors, pins, power actuated devices, and all other types of mechanical connections.
1. Completely Specified Fasteners: where fasteners are completely specified in the contract documents, provide the specified fasteners. "Completely specified" means the fastener type, material, finish, size, diameter, length and spacing are specified.
 2. Fasteners Not Completely Specified: Fasteners may not be completely specified in the contract documents to provide options and allow different means, methods, and techniques of construction. In all cases where the fasteners are not completely specified in the contract documents:
 - a. Select fasteners appropriate for each condition, substrate, load and exposure
 - b. Use fastener manufacturer's published load table to determine fastener size and spacing.
 - c. Provide a factor of safety of four or higher.
 - d. Obtain architect's approval of each fastener prior to use.
 - e. Install fasteners in compliance with the fastener manufacturer's recommendations.
 3. Fasteners Related to Assemblies: For construction and assemblies required to be engineered, provide fasteners indicated on the approved, engineered shop drawings.

1.4 REFERENCES

- A. Appendix B: Page 8-27

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Simpson
Simpson Strong-Tie
2600 International Street, Columbus, OH 43228
Phone: (614) 876-8060
1. Available at the national chain hardware stores, such as Lowes



- B. Northeast Wholesale
980 Turnpike Street
Canton, MA 02021
(781) 767-1019
- C. Camo Fasteners
5985 Tarbell Road
Syracuse, NY 13206
(800) 521-1115
- D. Trufast Construction Fastening
02105 Williams County Road 12-C
Bryan, OH 43506
(800) 443-9602

2.2 PRODUCTS

- A. 3 1/2" 16D Nail
 - 1. Location: Deck, Roof Joists, Floor Joists.
- B. 3" 16D Nail
 - 1. Location: Foundation
- C. 4" Torque Screws
 - 1. Location: Deck connection to ramp
- D. 2 1/2" Torque Screws
 - 1. Location: Decking, furniture
- E. 2 1/4" Finish Screws:
 - 1. Location: Flooring, furniture
- D. 5/16 x 6" Multipurpose Screws
 - 1. Location: Connection of decks to house
- E. 1" Steel Rod
 - 1. Location: Foundation/house anchor to ground
- F. Trufast #12 6" DP Fastener
 - 1. Model Number: DP-6000
 - 2. Location: Roof to attach densdeck
- G. Trufast Heavy Duty Drill Point Fasteners
 - 1. Model Number: HD-HV8000
 - 2. Location: TPO roofing with metal plates
- H. Misc. Bolts and Threaded Fasteners
 - 1. Bolts conform to requirements of ASTM A 307, Grade A.

PART 3 - EXECUTION



3.1 INSTALLATION

- A. Installation of bolts shall meet AISC requirements.

END OF SECTION 05 05 23



SECTION 05 52 00: METAL RAILINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes information about the railings of the south and west deck.

1.2 REFERENCES

- A. Appendix B: Page 28-43
- B. Construction Documents: S-505, S-506

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Railing Dynamics, Inc.
135 Steelmanville Road
Egg Harbor Township, NJ 08234
(877) 420-7245
- B. Amerock
3 Glenlake Parkway
Atlanta, GA 30328
(802) 752-9677
- C. Capitol Steel and Supply Co.
115 Junction Road
Berlin, VT 05602

2.2 PRODUCTS

- A. Handrail
 - 1. Model Number: HR120W
 - 2. Color: White
 - 3. Diameter: 1 1/2"
 - 4. Length: 10'
 - 5. Quantity: 12
- B. 180 Degree Loop
 - 1. Model Number: HRHLW
 - 2. Color: White
 - 3. Quantity: 4
- C. 90 Degree Corner
 - 1. Model Number: HRCN
 - 2. Color: White
 - 3. Quantity: 4
- D. Straight Return



1. Model Number: HRSR
 2. Color: White
 3. Quantity: 4
- E. Adjustable Joiners
1. Model Number: HRAJ
 2. Color: White
 3. Quantity: 8
- F. Straight Joiner:
1. Model Number: HRSJ
 2. Color: White
 3. Quantity: 8
- F. Mounting Brackets
1. Model Number: HRB
 2. Location: South and west ramps
 3. Color: Color
 4. Quantity: 70
- G. Aluminum Corner
1. Dimensions: 4" x 4" x 3/8"
 2. Location: Structural support for railings
 3. Available: Capitol Steel
- H. A36 Steel Plate
1. Thickness: 1/4"
 2. Location: Transition between the end of the ramp and the ground
 3. Available: Capitol Steel

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install according to manufacturer's specifications.

END OF SECTION 05 52 00



DIVISION 06: WOOD, PLASTICS, AND COMPOSITES



SECTION 06 11 00: WOOD FRAMING

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes all materials used in the framing of the Delta T-90 House.

1.2 RELATED SECTIONS

- A. Section 06 11 13 – Engineered Wood Products
- B. Section 09 64 23 – Wood Flooring

1.3 REFERENCES

- A. Appendix B: Page 45-68
- B. Construction Documents A-111, A-311, A-541, Z-503, S-111, S-102, S-103, S-104, S-105, S-106, S-110, S-112, S-113
- C. Refer to Appendix A: Structural Calculations

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Weyerhaeuser
360 Route 101, Suite 2
Bedford, NH 03110
Phone: (603)-472-6730
- B. Allen Lumber
707 Stone Cutters Way
Montpelier, VT 05602
(802)-223-2335
- C. Stanley Bostitch
East Greenwich, RI
 - 1. Available at Allen Lumber
- D. Simpson Strong-Tie
2600 International Street
Columbus, OH 43228
Phone: (614) 876-8060
 - 1. Available at East Montpelier Home Center
- E. Tamlyn
13623 Pike Road
Stafford, TX 77477
Phone (800) 334-1676



2.2 SUPPLIERS

- A. Allen Lumber
707 Stone Cutters Way
Montpelier, VT 05602
Phone (802) 223-2335
- B. East Montpelier Home Center
Route 2
East Montpelier, VT 05651
Phone (802) 223-4131

2.3 PRODUCTS

- A. Floor Joist and Rafters
 - 1. Model: Framers Series by Weyerhaeuser
 - 2. Location: In line floor framing and roof framing
 - 3. Dimensions: 1 3/4" x 11 1/4" x 14'
- B. Sill Plates and Top Plates
 - 1. Model: Framers Series by Weyerhaeuser
 - 2. Location: Above and below the wall studs
 - 3. Dimensions: 1 3/4" x 11 1/4" x 14'
- C. 2x4 Wall Studs
 - 1. Model: Framers Series M-12 by Weyerhaeuser
 - 2. Location: Walls throughout house
 - 3. Dimensions: 1 3/4" x 3 1/2" x 10'
- D. 2 x 6 Wall Studs
 - 1. Model: Framers Series M-12 by Weyerhaeuser
 - 2. Location: Partition wall between kitchen and bathroom
 - 3. Dimensions: 1 3/4" x 5 1/2" x 10'

2.4 ACCESSORIES

- A. Bostitch-HQG-Hurricane- 2 1/2" X .113 HQ
 - 1. Model: Rh-S8dr113-HQG or equal
 - 2. Location: Floor System Fasteners
 - 3. Plastic Collated Galvanized Sheathing Nails
 - 4. Dimensions: 2 1/2" X .113"
 - 5. Available: Bostitch
- B. Framing Nails
 - 1. Model: S16D131-FH or equal
 - 2. Location: Walls throughout house



3. Size: 3 1/2" x .131"
- C. Wide Crown Packaging Staples
 1. Model: SW90403 or equal
 2. Location: Window frames throughout house
 3. Size: 1 3/8" crown (9mm)
 4. Galvanized
 5. Available: Bostitch
- D. 2 x 8 Single Joist Hangers
 1. Model: SJQ28 ESR 1347 or equal
 2. Location: Fastening floor joists to rim boards
- E. 2 x 8 Double Joist Hangers
 1. Model: DJ48Z or equal
 2. Location: Flooring System
- F. Bostitch Strapshot Paper Collated Metal Connector Nails
 1. Model: MC 131 x 1.5" (.131) or equal
 2. Location: Attaching joist hangers to joists
 3. Dimensions: 1 1/2" x .131 diameter
 4. Finish: Bright, Heat treated
 5. Location: Attaching joist hangers to joists

PART 3 – EXECUTION

3.1 INSTALLATION

1. Install according to construction documents and manufacturer's specifications.

END OF SECTION 06 11 00



SECTION 06 16 23: SUBFLOORING

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes the subflooring used throughout the Delta T-90 House.

1.2 RELATED SECTIONS

- A. Section 09 64 23 - Wood Flooring

1.3 REFERENCES

- A. Appendix B: Page 69-84
- B. Construction Documents A-311, S-105
- C. Refer to Appendix A: Structural Calculations

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Weyerhaeuser
360 Route 101, Suite 2
Bedford, NH 03110
Phone: (603)-472-6730

2.2 PRODUCTS

- A. 1 1/8" OSB (Oriented Strand Board): Tongue and Groove Sub-Floor
 - 1. Model: EDGE (Weyerhaeuser)
 - 2. Location: Subfloor throughout
 - 3. Dimensions: 4' x 8'

2.3 ACCESSORIES

- A. Bostitch Welded Wire Coil Nails
 - 1. Location: Floor system fasteners
 - 2. Size: 2 1/2" x .113"

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Install according to manufacturer's recommendations.
- B. Subfloor should be glued and nailed to floor framing.

END OF SECTION 06 16 23



SECTION 06 11 13: ENGINEERED WOOD PRODUCTS

PART 1- GENERAL

1.1 SUMMARY

- A. This section includes all engineered lumber used in the Delta T-90 House.

1.2 RELATED SECTIONS

- A. Section 09 64 23 - Wood Flooring
- B. Section 06 11 00 – Wood Framing

1.3 REFERENCES

- A. Appendix B: Page 45-46, 85-88
- B. Construction Documents S-104, S-105, S-110, S-111
- C. Refer to Appendix A: Structural Calculations

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Weyerhaeuser
360 Route 101, Suite 2
Bedford, NH 03110
Phone: (603)-472-6730

2.2 PRODUCTS

- A. LVL (Laminated Veneer Lumber) Rim Joist and Central Beams
 - 1. Model Number: None
 - 2. Location: Central and perimeter beams in the floor and roof framing
 - 3. Dimensions: 1 3/4" x 11 1/4" x 36'
- D. Floor Joists and Roof Rafters
 - 1. Model Number: Framer's Series M-12 by Weyerhaeuser
 - 2. Location: Floor and roof framing
 - 3. Dimensions: 1 3/4" x 11 1/4" x 14'

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's recommendations and construction drawings.

END OF SECTION 06 11 13



SECTION 06 15 13: EXTERIOR WOOD DECKING AND FOUNDATION

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes the exterior deck with the framing and supports as well as the blocking for the foundation of the house.

1.2 RELATED SECTIONS

- A. Sections 06 11 00 - Wood Framing

1.3 REFERENCES

- A. Appendix B: Page 89-119
- B. Construction Documents C-101, S-505, S-506, A-114, A-211, A-212, A-301, A-302, A-303, A-311, S-102, S-103

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Simpson- Strong Ties
Northeast Warehouse and Training Center
7 Pearson Way
Enfield, CT 06082
(800)-999-5099
www.strongtie.com
- B. Fontaine Forestry and Millworks
East Montpelier, Vermont
United States
Phone: (802)-223-7719
www.fontainemillworks.com
- C. DekBrands
P.O. Box 14804
Minneapolis, MN 55414
Phone: (800) 664-2705
www.deckplans.com
- D. Camo Fasteners
5985 Tarbell Road
Syracuse, NY 13206
(800) 521-1115

2.2 PRODUCTS



- A. 2" x 8" x 16' Spruce Pine Fir (SPF)
 - 1. Location: Deck framing
 - 2. Dimensions: 1 1/2" x 7 1/4" x 16' (cut to length)
 - 3. Finish: Kiln-dried
- B. 6" x 6" Blocking
 - 1. Model Number: N/A
 - 2. Location: Foundation of House
 - 3. Dimensions: 5 1/2" x 5 1/2" x 2'
 - 4. Finish: pressure treated lumber
- C. Dek- Block Piers Floating Foundation System
 - 1. Location: Deck supports
 - 2. Dimensions: 7 3/4" x 8" x 11"
 - 3. Capacity: 42 lb per block
 - 4. Material: Pre-formed Concrete
- D. Cedar Decking
 - 1. Location: South and west exterior deck surface
 - 2. Dimensions: 5/4" x 6"
 - 3. Finish: Benjamin Moore Oil based stain
 - 4. Kiln Dried to 12%
 - 5. Available: Fontaine Forestry and Millwork
- E. 1/2" Plywood
 - 1. Location: under foundation blocking
 - 2. Dimensions: 17 1/2" x 2'
- F. A 36 Steel Rod
 - 1. Diameter: 1"
 - 2. Note: Anchor with nut and washer
 - 3. Location: Foundation
- G. 12 Gauge Strap
 - 1. Dimensions: 6" x 12"
 - 2. Connected with 5/8" Lag Bolts into 6 x 6
 - 3. Location: Foundation
- H. MSTD Marriage Strap
 - 1. Model Number: MSTD4
 - 2. Location: Foundation
 - 3. Total Length: 18"
 - 4. Material Gauge: 16



5. Finish: Galvanized
6. Allowable Tension Loads: 3100

2.3 ACCESSORIES

- A. 2 1/2" Tan Torque Screws
 1. Model Number: T20 or equal
 2. Location: Deck fasteners
 3. Dimensions: 2 1/2"
 4. Finish: Tan
- B. Simpson LUS 210 Joist Hanger
 1. Model Number: LUS Series LU 210 or equal
 2. Location: Deck Framing
 3. Dimensions: 1 9/16" x 1 1/2" x 7 13/16"
 4. Finish: Galvanized
- C. Deck Post Connectors
 1. Model Number: DTT2Z
 2. Location: South and West deck rail posts
 3. Anchor Diameter: 1/2"
 4. Fasteners: 8-SDS 1/4" x 2 1/2"
 5. Dimensions: 3 1/4" x 6 15/16" x 1 5/8"
- D. Carriage Bolts
 1. Dimensions: 1/2" x 6"
 2. Location: South and West deck rail posts
 3. Finish: Zinc

2.4 SUPPLIERS

- | | | | |
|----|-----------------------------|----|-----------------------|
| A. | East Montpelier Home Center | or | Allen Lumber |
| | Route 2 | | 707 Stone Cutters Way |
| | East Montpelier, VT 05651 | | Montpelier, VT 05602 |
| | (802)-223-4131 | | (802)-223-2335 |

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's recommendations and construction drawings.

END OF SECTION 06 15 13



SECTION 06 16 36: WOOD PANEL PRODUCT SHEATHING

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes the wood sheathing used in the Delta T-90 House.

1.2 SUBMITTALS

- A. Product Data

1.3 REFERENCES

- A. Appendix B: Page 120-133
- B. Construction Documents A-541, A-301, A-311, S-104, S-110

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Atlantic Plywood
5319 Vermont 14
South Royalton, VT 05068
(802) 763-9997

2.2 PRODUCTS

- A. Plywood Sheathing
 - 1. Location: Exterior of framing
 - 2. Dimensions (L x W): 4' x 8'
 - 3. Thickness: 5/8"
 - 4. Available: Allen Lumber
- B. 1/2" Pressure Treated Plywood
 - 1. Location: Under-floor of floor system
 - 2. Dimensions: 1/2" x 4' x 8'
 - 3. Available: Allen Lumber
- C. 3/4" Medium Density Fiberboard
 - 1. Location: Skylight frame return
 - 2. Dimensions: 3/4" x 4' x 8'

PART 3 - EXECUTION

1.1 INSTALLATION

- A. Install in accordance with manufacturer's recommendations.

END OF SECTION 06 16 36



SECTION 06 43 16: WOOD RAILINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes the wood railings used on the south and west ramp of the Delta T-90 House.

1.2 SUBMITTALS

- A. Product Data

1.3 REFERENCES

- A. Appendix B: Page 116-119 , 346-347
- B. Construction Documents: S-506, S-505

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Allen Lumber
707 Stone Cutters Way
Montpelier, VT 05602
Phone: (802)-223-2335
www.allenlumbercompany.com
- B. Simpson- Strong Ties
Northeast Warehouse and Training Center
7 Pearson Way
Enfield, CT 06082
(800)-999-5099
www.strongtie.com

2.2 PRODUCTS

- A. 4x4 Wood Post
 - 1. Location: West and South deck rail posts
 - 2. Dimensions: 3 1/2" x 3 1/2" x 49"
- B. Deck Post Connectors
 - 1. Model Number: DTT2Z
 - 2. Location: South and West deck rail posts
 - 3. Anchor Diameter: 1/2"
 - 4. Fasteners: 8-SDS 1/4" x 2 1/2"
 - 5. Dimensions: 3 1/4" x 6 15/16" x 1 5/8"
- C. Carriage Bolts
 - 1. Dimensions: 1/2" x 6"



2. Location: South and West deck rail posts
3. Finish: Zinc

PART 3 - EXECUTION

1.1 INSTALLATION

- A. Install in accordance with manufacturer's recommendations.

END OF SECTION 06 43 16



DIVISION 07: THERMAL AND MOISTURE PROTECTION



SECTION 07 13 00: SHEET WATERPROOFING

1.1 SUMMARY

- A. In this section, the moisture barrier of the house will be specified.

1.2 REFERENCES

- A. More Information can be found at:
http://www.foursevenfive.com/index.php?main_page=product_info&products_id=221

1.3 SYSTEM DESCRIPTION

- A. The Solitex Mento Moisture Barrier is composed of polypropylene in two layers and a monolithic TEEE film composes the membrane. This will be utilized as the moisture barrier for the rainscreen walls.

1.4 REFERENCES

- A. Appendix B: Page 135-138
- B. Construction Documents A-541, S-102, S-112, A-311

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Pro Clima
Rheintalstrabe 35 – 43
68723 Schwetzingen
Germany
Phone: +49 (0) 62 02 – 27 82.0
www.proclima.com

2.2 SUPPLIER

- A. Four Seven Five
131 Union Street
Brooklyn, NY, 11231
Phone: (800)-995-6329

2.3 PRODUCT

- A. Solitex Mento Vapor Barrier
 1. Model Number: Pro Clima
 2. Location: Exterior Wall of Delta T-90 House, behind the rainscreen
 3. Dimensions per roll (Length x Width): 164' x 59"
 4. Total per roll: 807 square feet
 5. Total required for house: 1083 square feet
- B. Intello Plus Moisture Barrier
 1. Location: Walls
 2. Dimensions:
Length: 164' 1/2"



Width: 59' 1/16"

3. Weight: 0.36 oz/sf
4. Thickness: 8 mils
5. Thermal Conductivity: 0.85 hr.ft²°F/BTU.in
3. Available: Four Seven Five

PART 3 - EXECUTION

3.1 QUALITY ASSURANCE

- A. Verify that the roll is undamaged prior to installation because any punctures will decrease the moisture barrier effectiveness.

3.2 SCHEDULE

- A. The moisture barrier sheets should be kept dry during delivery and storage. Once ready, apply the Intello Moisture Barrier on top of the 2 inches mineral wool layer using fasteners. Refer to the manufacturer's instruction for proper installation technique (if product is damaged, proper measure should be taken to adhere or repair the barrier).

END OF SECTION 07 13 00



SECTION 07 21 00: THERMAL INSULATION

1.1 SUMMARY

- A. Dense packed cellulose fiber will be applied to the walls, roof, and floor to create a thick layer of insulation and high R-Value.

1.2 REFERENCES

- A. More information can be found at:
<http://www.buildingenergyvt.com/insulation-and-weatherization/dense-pack-cellulose-insulation/>
<http://www.advancedhomeenergy.com/insulation-cellulose.php>
<http://www.cellulose.org/CIMA/ProducerMembers.php>
<http://www.nationalfiber.com/>

1.3 DESCRIPTION

- A. Dense packed cellulose fiber insulation will be placed in the stud wall, between the 5/8 inch Gypsum wall board (interior) and the 5/8 inch plywood sheathing (exterior). The Dense Pack Cellulose insulation will be applied to the roof, floor and walls in order to create the thermal envelope.

1.4 REFERENCES

- A. Appendix B: Page 139-155
- B. Construction Documents A-541, S-102, S-103, S-112, A-311

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. National Fiber
50 Depot Street
Belchertown, Massachusetts
01007 - 9619

2.2 SUPPLIER

- A. Huntington Homes
PO Box 99 344 Fassett Road
East Montpelier, VT 05651
Phone: 802-479-3625

2.3 PRODUCTS

- A. Dense Pack Cellulose
 1. Model Number: Cel-Pak
 2. Location: roof, floor and walls
 3. Dimension of the Roof: 35'- 0 1/ 2" x 26"- 9"
 4. Total Walls: 11 1/4" thick insulation with an overall value of 1080 square feet
 5. Total Roof: 12" thick insulation with an overall value of 933 square feet



6. Total Floor: 14" thick insulation with an overall value of 933 square feet
7. Composition: 82% is local recycled content
8. R-Value: 3.8 per inch

2.4 ACCESSORIES

- A. Insulweb Netting
 1. Model Number: IW-1125 or equal
 2. Dimensions: 10' x 375'

PART 3 - EXECUTION

3.1 QUALITY ASSURANCE

- A. Manufacturer shall provide evidence of cooperation with Safety Standard. Evidence shall also be provided for the proper training and experience of manufacturer to produce cellulose insulation. Product shall contain the proper recycled content value.

3.2 SCHEDULE

- A. The Cellulose Insulation will be installed using the Dense Pack technique. It should be kept in its packaging until the time of application in order to protect it from moisture and inadequate temperatures. Once installation is ready, refer to the manufacturer's recommendations for the proper temperature and humidity to avoid damage to the insulation. If the cellulose is damaged, it shall be removed. Next, the cellulose will be blown in to a minimum of 3.5 165 per cubic foot. This type of insulation and process will be applied to the roof, the walls and the floor.

END OF SECTION 07 21 00



SECTION 07 21 13.19 MINERAL BOARD INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Roxul Comfortboard is a mineral wool board that will be utilized in 2 inch thick sheets in order to provide a layer of insulation and a moisture barrier.

1.2 REFERENCES

- A. More information can be found at:
<http://www.roxul.com/building+envelope/products/roxul+toprock%C2%AE+dd>

1.3 SYSTEM DESCRIPTION

- A. The comfort board provides an R-value of 4 per inch, creating an effective insulation barrier to reduce the thermal bridging at framing connections. A layer of moisture barrier is placed over this in order to prevent excess moisture from entering the thermal envelope and causing moisture related problems like mold and deterioration of the structure. Likewise, 4inches of Roxul TopRock DD mineral wool will be utilized for the roof.

1.4 SUBMITTALS

- A. Material Safety Data Sheet

1.5 REFERENCES

- A. Appendix B: Page 156-168
- B. Construction: S-102, S-103, S-112, A-311, A-541

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Roxul Inc.
420 Bronte St. S., Suite 105
Milton, Ontario
Phone: (905)-878-8474

2.2 INSTALLER

- A. Huntington Homes
PO Box 99 344 Fassett Road
East Montpelier, VT 05651
Phone: (802) 479-3625

2.3 PRODUCTS

- A. Roxul TopRock DD
 1. Model Number: DD Plus
 2. Location: Roof
 3. Thickness: 2 layers at 2" each = 4" total thickness
 4. Total Required for Construction: 2" thick board and an overall amount of 980 square feet



5. Dimension of Board (length x width): 4' x 4'
 6. Moisture Sorption: 0.15%
 7. Compressive Strength (at 25%): 15 psi
- B. Roxul Comfort Board IS
1. Location: exterior walls
 2. Thickness: 2"
 3. Total: a total of 1083 square feet will be required to insulate the walls
 4. Manufacturer Dimension: 4' x 8'
 5. Moisture Sorption: 0.3%
 6. Compressive Strength (at 25%): 1269 psf

PART 3 - EXECUTION

3.1 QUALITY ASSURANCE

- A. Check for punctures and fragmentation that could breach the quality of the thermal barrier. If these problems are found, replacement will be necessary.

3.2 SCHEDULE

- A. The mineral wool should be kept in a dry place on a solid flat surface. Once ready to install, put the sheets in place and refer to the manufacturer for the proper adherence. Placement of the mineral wool board will occur at the walls and on the roof.

3.3 MAINTENANCE

- A. For proper maintenance, refer to the manufacturer's specifications.

END OF SECTION 07 21 13.19



SECTION 07 46 23: WOOD SIDING

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes wood that will be used in the rainscreen of the Delta T-90 House.

1.2 SYSTEM DESCRIPTION

- A. The Vermont Harvested Cedar rainscreen will be attached to furring strips attached to the house. This will provide a 3/4 inch air space between the wall system and bulkwater and wind barrier. This air space allows moisture to ventilate moisture outward from the wall system and drain water away that has past the exterior wood siding, directing moisture away from the wall.

1.3 RELATED SECTIONS

- A. Section 09 93 13.13- Exterior Staining

1.4 SUBMITTALS

- A. Product Data

1.5 REFERENCES

- A. Appendix B: Page 169-175
- B. Construction Documents: A-211, A-212, A-301, A-302, A-303 , A-311

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Fontaine Forestry and Millworks
East Montpelier, Vermont
United States
Phone: (802)-223-7719
www.fontainemillworks.com
- B. Currier Forest Products
621 Harveys Hollow Road
Danville, VT 05828
(802) 684-8128

2.2 PRODUCTS

- A. Horizontal Rough Sawn Cedar
 1. Location: Exterior walls
 2. Dimension (Depth x Width): 5/4" x 6"
 3. Finish: Benjamin Moore Exterior Finish Alkyd Translucent
 4. Air Gap: 1/4"
 5. Species: Cedar
 6. Grade: #3 or better
 7. Moisture Content: 12%



8. Corner Type: Weaved
9. Approximately 2,200 total board feet
- B. Pressure Treated Furring Strips
 1. Location: Exterior of wall envelope
 2. Dimensions (Depth x Width): 3/4" x 2-1/2"
 3. Species: Spruce/Pine/Fir
 4. Grade: #3
 5. Spacing: 24" O.C.
 6. Moisture Content: 12%
- C. Ringshank Nail
 1. Model: Porter Cable FR350A or equal
 2. Location: Rainscreen
 3. Dimensions:
Length: 2 1/2"
 4. Stainless Steel
 5. Available: Home Depot

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install furring strips vertically with 6" screws
- B. Windows will be wrapped with furring strips.
- C. Attach end boards first.
- D. Rain Screen Boards will be attached horizontally across furring strips with 1/4" gap between boards.

END OF SECTION 07 46 23



SECTION 07 54 23: THERMOPLASTIC-POLYOLEFIN ROOFING

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes the thermoplastic-polyolefin roofing for the Delta T-90 House.

1.2 SYSTEM DESCRIPTION

- A. Apply the Firestone UltraPly thermoplastic-polyolefin roofing to the 1/4" thick underlayment on the roof.

1.3 SUBMITTALS

- A. Product Data

- 1. <http://www.firestonebpco.com/templateFiles/includes/common/displayFile.ashx?fileId=2314>

1.4 REFERENCES

- A. Appendix B: Page 176-205
- B. Construction Documents: S-111, S-112, A-301

PART 2 - PRODUCT

2.1 MANUFACTURER

- A. Firestone Building Products
250 West 96th Street
Indianapolis, IN 46260
Phone: (800) 428-4442 or (317) 575-7000
<http://www.firestonebpco.com/>

- B. Georgia-Pacific Gypsum LLC
133 Peachtree Street
Atlanta, GA 30303
Technical Service Hotline: 1-800-225-6119
www.densdeck.com

- 1. Georgia-Pacific Canada LP
2180 Meadowvale Boulevard, Suite 200
Mississauga, ON L5N 5S3

2.2 PRODUCTS

- A. Firestone Thermoplastic Polyolefin [TPO] Membrane
 - 1. Model Number: UltraPly TPO
 - 2. Thickness: 0.060"
 - 3. Color: white
 - 4. Dimensions: 10' roll
- B. DensDeck Roof Board
 - 1. Nominal Thickness: 1/2"



2. Width (Standard): 4' ± 1/8"
3. Length (Standard): 8' ± 1/4"
4. Weight: 1.2lbs/sq. ft.
5. R-value: .28 ft² • °F • hr/BTU
6. Refer to Submittal Form [http://www.gp.com/build/roofboard_densdeck]

2.3 ACCESSORIES

- A. UltraPly Bonding Adhesive
 1. Item Number: W56TPO3005
 2. Coverage: coverage rate of 45-60 square feet per gallon
 3. Color: Yellow
 4. Refer to Technical Information Sheet
<http://www.firestonebpco.com/templateFiles/includes/common/displayFile.ashx?fileId=2401>
- B. UltraPly™ TPO Universal Pipe Flashing
 1. Item Number: White W56TPO301U
 2. Clamp: Stainless steel – worm gear type
 3. Pipe Flange: 13" diameter
 4. Thickness: 0.055"-0.075"
 5. Refer to Technical Information Sheet
<http://www.firestonebpco.com/templateFiles/includes/common/displayFile.ashx?fileId=15560>
- C. UNA-Edge™ Metal Edge System [Drip Flashing]
 1. Heat Welded to TPO
 2. Galvanized (G-90) Steel
 3. Shipped as full system: cleats, splices and fasteners included
 4. Refer to <http://www.firestonebpco.com/search/?query=drip%20edge>
- D. Aluminum Drip Edge Flashing
 1. Model Number: 68020
 2. Location: Doors above Comfort-board Insulation
 3. Dimension (Length x Width): 50' x 20"
 4. Finish: Aluminum
- E. Pre-assembled HD Fasteners with HD Seam Plates
 1. Model Number: TPO3103
 2. Dimensions: 3" round plate

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's specification.

END OF SECTION 07 54 23



SECTION 07 70 00: ROOF AND WALL SPECIALTIES AND ACCESSORIES (TAPES)

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes the tapes used to seal the exterior gaps of the house.
- B. References:
<http://www.foursevenfive.com>

1.2 SUBMITTALS

- A. Product Data

1.3 REFERENCES

- A. Appendix B: Page 206-212
- B. Construction Documents: A-311, A-541

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Pro Clima
Rheintalstrabe 35 – 43
68723 Schwetzingen
Germany
Phone: +49 (0) 62 02 – 27 82.0
www.proclima.com

2.2 SUPPLIER

- A. Four Seven Five
131 Union Street
Brooklyn, NY, 11231
Phone: 800-995-6329

2.3 PRODUCTS

- A. Tescon Profile - Double Split Window Tape
 1. Model Number: roll
 2. Location: Between window jambs, header, sill, and wood frames
 3. Dimensions (Length x Width): 98' 5" x 2 3/8"
- B. Tescon Vana Tape
 1. Location: Plywood joints, any joint between dissimilar materials, sealing joints in Solitex Mento
 2. Dimensions:
Length: 98' 5"
Width: 2 3/8"
 3. Available: Four Seven Five



4. Price: \$42 a roll

PART 3 - EXECUTION

3.1 INSTALLATION

A. Use product recommendations to install.

END OF SECTION 07 70 00



SECTION 07 71 23: MANUFACTURED GUTTERS AND DOWNSPOUTS

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes the materials necessary for the downspouts and gutters.

1.3 SUBMITTALS

- A. Product Data

1.4 REFERENCES

- A. Appendix B: Page 12-13, 213-215
- B. Construction Documents: A-211, A-212, A-311

PART 2- PRODUCTS

2.1 MANUFACTURER

- A. Capitol Steel and Supply Co.
115 Junction Road
Berlin, VT 05602

2.2 PRODUCTS

- A. L 4 X 3 X 1/4 Aluminum
 - 1. Location: Perimeter of roof edge on South, East, and West sides
 - 2. Dimensions:
 - Length: 20'
 - Thickness: 1/4"
 - Height: 4"
 - Width: 3"
 - 3. Available: Capitol Steel

2.3 ACCESSORIES

- A. 4" Torque Screws
 - 1. Location: Perimeter of roof edge on South, East, and West sides
 - 2. Purpose: Attaching aluminum gutter to wood blocking below roof drip edge
 - 3. Available: East Montpelier Home

PART 3- EXECUTION

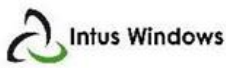
3.1 INSTALLATION

- A. Install in accordance to the construction documents.

END OF SECTION 41 62 23



DIVISION 08: OPENINGS



probably **The most energy efficient windows and doors**

1042 Wisconsin Avenue, NW, 2nd Floor
Washington DC, 20007
Office: 1-888-380-9940
Fax: 202-449-8637
Email: info@intuswindows.com
Web: www.intuswindows.com

1. **Door sizes in the quote: ALL DOOR SIZES IN THE QUOTE ARE NET CLEAR OPENING NEEDED PLUS FRAME SIZE. Example: if 36"x80" clear opening needed, add 6 11/16" (170mm) to the width and 4 1/16" (104mm) to the height for overall size of 42 11/16"(1084mm) x 84 1/16"(2136mm) The same applies to the all net clear opening doors needed.**
2. Delivery time: around 10 weeks
3. Delivery: to commercial location
4. Glazing options:
Glazing Low SHGC: SHGC=0.37, Ug=0.088, VT=55.2
Glazing High SHGC: SHGC=0.62, Ug=0.106, VT=73
Glazing High SHGC: SHGC=0.494, Ug= 0.106, VT=70.3
Others available
5. System: Eforte
6. For lamination or painting on one side add 15 % for lamination or painting on both sides, add 25% to price of standard white color.
7. Grids: available (inside, outside, between glass)
8. View from the inside triangle arrow points to handle and/or operable side.
9. All windows tilt/turn, fixed or just tilt.
10. Opening and tilting to the inside.
11. All import taxes, shipping and delivery to closest commercial location in your area included in the total price.
12. DC buyers will be charged sales tax. For other state please check your local state or municipality if any sales or use tax is due.
13. Please review and verify each window and door position with measurements.
14. All orders are custom made and cannot be changed.
15. While Intus Windows goal is to always make delivery on time, sometimes due to acts of god, transportation, customs and other events out of Intus Windows control can cause a delay in delivery.
Intus Windows shall not be responsible for such delays. Please inspect each item upon delivery before signing acceptance documents and releasing the truck.



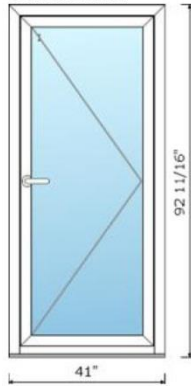
SECTION 08 06 10.13: DOOR TYPE SCHEDULE

1.4 REFERENCES

- A. Appendix B: Page 217-218
- B. Construction Document A-531, A-532, A-604

8 WS1-01

Outside view



System: PRESTIGE FRONT DOORS OUT

Color (inside/outside): White/White

Filler:

1: GrudSel4+16H+Grud4+14H+GrudSel4, Triple glazed unit with 1 tempered glass and 2 tempered-low-emissivity Ug = 0.106

Sash: 1: Doorstep: ALIUMINUM

Lock: 3-point key-operated lock with latch

Handle: Door handle 35/2200, white

Accessories:

- Lock cylinder 50/50 - 1.00 unit

Dimension	Area	Price, USD	Quantity, Qnt	Total
1041 x 2354	2.5 m2	1888.85	1	1888.85

Model number: WS 1-01

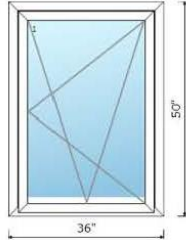
Location: Master bedroom and entry door

END OF SECTION 08 06 10

SECTION 08 06 50: WINDOW SCHEDULE

1 WN1-01 Window

Inside view



System: EFORTE

Fittings: MACO

Frame: INOUTIC passive house window profile

Color (inside/outside): White/White

Filler:

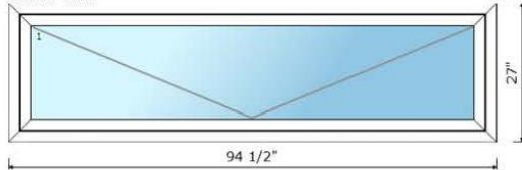
1: CG4x16HxF4x16HxCG4, Triple glazed unit with 2 low-emissivity 1.0 glass, Ug = 0.088

Sash: 1: Tilt & turn

Dimension	Area			Price, USD	Quantity, Qnt	Total
914 x 1270	1.2 m2			463.57	1	463.57

2 WE1-03 Window

Inside view



System: EFORTE

Fittings: MACO

Frame: INOUTIC passive house window profile

Color (inside/outside): White/White

Filler:

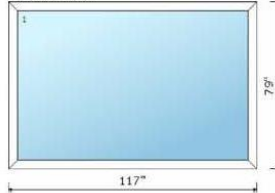
1: CG4x16HxF4x16HxCG4, Triple glazed unit with 2 low-emissivity 1.0 glass, Ug = 0.088

Sash: 1: Tilt

Dimension	Area			Price, USD	Quantity, Qnt	Total
2400 x 686	1.7 m2			621.35	1	621.35

3 WS1-03 Window

Inside view



System: EFORTE

Fittings: MACO

Frame: INOUTIC passive house window profile

Color (inside/outside): White/White

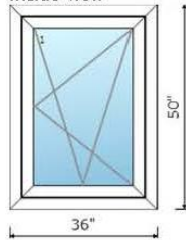
Filler:

1: Sel6x18HxF4x16HxSel6, Triple glazed unit with 2 low-emissivity glass, Ug = 0.088

Dimension	Area			Price, USD	Quantity, Qnt	Total
2972 x 2007	6.0 m2			1650.60	1	1650.60

4 WW1-01 Window

Inside view



System: EFORTE

Fittings: MACO

Frame: INOUTIC passive house window profile

Color (inside/outside): White/White

Filler:

1: CG4x16HxF4x16HxCG4, Triple glazed unit with 2 low-emissivity 1.0 glass, Ug = 0.088

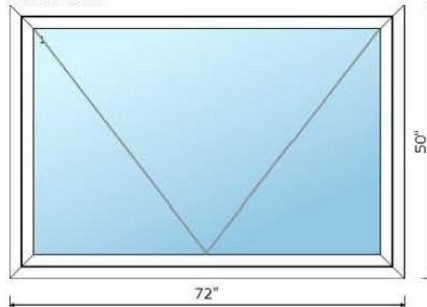
Sash: 1: Tilt & turn

Dimension	Area				Price, USD	Quantity, Qnt	Total
914 x 1270	1.2 m2				463.57	1	463.57

5 WW1-02 Window

Window

Inside view



System: EFORTE

Fittings: MACO

Frame: INOUTIC passive house window profile

Color (inside/outside): White/White

Filler:

1: CG4x16HxF4x16HxCG4, Triple glazed unit with 2 low-emissivity 1.0 glass, Ug = 0.088

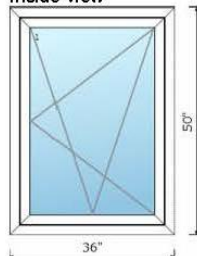
Sash: 1: Tilt

Dimension	Area				Price, USD	Quantity, Qnt	Total
1829 x 1270	2.3 m2				731.89	1	731.89

6 WE1-01 Window

Window

Inside view



System: EFORTE

Fittings: MACO

Frame: INOUTIC passive house window profile

Color (inside/outside): White/White

Filler:

1: CG4x16HxF4x16HxCG4, Triple glazed unit with 2 low-emissivity 1.0 glass, Ug = 0.088

Sash: 1: Tilt & turn

Accessories:

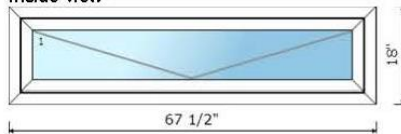
- Connect profile KP14/KP14, white - 2.21 m

Dimension	Area				Price, USD	Quantity, Qnt	Total
914 x 1270	1.2 m2				641.79	1	641.79

7 WE1-02

Window

Inside view

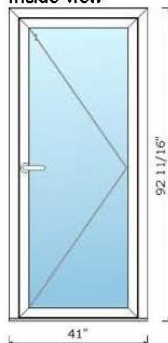


System: EFORTE
Fittings: MACO
Frame: INOUTIC passive house window profile
Color (inside/outside): White/White
Filler:
 1: CG4x16HxF4x16HxCG4, Triple glazed unit with 2 low-emissivity 1.0 glass, Ug = 0.088
Sash: 1: Tilt
Accessories:
 - Connect profile KP14/KP14, white - 2.21 m

Dimension	Area				Price, USD	Quantity, Qnt	Total
1715 x 457	0.8 m2				589.88	1	589.88

8 WS1-01

Inside view



System: PRESTIGE FRONT DOORS IN
Color (inside/outside): White/White
Filler:
 1: GrudSel4+16H+Grud4+14H+GrudSel4, Triple glazed unit with 1 tempered glass and 2 tempered-low-emissivity Ug = 0.106
Sash: 1: Doorstep: ALIUMINUM
Lock: 3-point key-operated lock with latch
Handle: Door handle 35/2200, white
Accessories:
 - Lock cylinder 50/50 - 1.00 unit

Dimension	Area				Price, USD	Quantity, Qnt	Total
1041 x 2354	2.5 m2				1908.28	2	3816.57

9 Total

				Price, USD
Total unique positions: 8 Total units: 9 Area: 19.09 m2 Screens: 88.65 ft2	Sub Total			8979.21
	Under-sill profile BP-PP340TH (38.25 ft)			66.17
	Aluminum pan flashing (38.25 ft)			572.22
	End caps (Qty.14)			85.96
	Screens			332.44
	Total			10036.00

END OF SECTION 08 06 50



SECTION 08 14 73: SLIDING WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes materials used for all interior doors within the Delta T-90 House.

1.2 SYSTEM DESCRIPTION

- A. Interior and Exterior door hardware sets. This includes hinges, sliders, pulls, tracks and lock sets.

1.3 SUBMITTAS

- A. Product Data

1.4 REFERENCES

- A. Appendix B: Page 219-249
- B. Construction Documents A-531, A-604

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. L.E. Johnson Products, Inc.
2100 Sterling Avenue
Elkhart, Indiana 46516
Phone: (800) 837-5664
www.johnsonhardware.com
- B. Allen Lumber
707 Stone Cutters Way
Montpelier, VT 05602
Phone: (802)-223-2335
www.allenlumbercompany.com

2.2 PRODUCTS

- A. Wall Mount Sliding Door Hardware
 1. Model Number: 2610F72B or equal
 2. Location: Bathroom and Bedroom doors
 3. Door Thickness: 1" – 1 3/4", 36" wide door
 4. Maximum Door Weight: 200 lbs
 5. Finish: Bronze
 6. Includes:
 - a. Wall mounted fascia track
 - b. Balanced wheel hanger
 - c. Door guides



- d. Track stops
- e. Mounting screws
- 7. Available: A. Johnson Hardware
- B. 100SD Sliding Bypass Door Hardware
 - 1. Model: 100602DR
 - 2. Location: Master Bedroom Closet Door
 - 3. Length: 60"
 - 4. Available: A. Johnson Hardware
- C. 5/4" x 6" Tongue and Groove Pine Decking boards
 - 1. Location: Bathroom, Bedrooms
 - 2. Finish: Vermont Natural Coatings Polywhey
 - 3. Species: Pine
 - 4. Grade: #3 or better
- D. 2" x 4" Dimensioned Lumber
 - 1. Location: Master Bedroom Closet
 - 2. Height: 7' 9 1/4"
- E. 2" x 4" Dimensioned Lumber
 - 1. Location: Master Bedroom Closet
 - 2. Height: 24 1/2"
- F. 2" x 6" Dimensioned Lumber
 - 1. Location: Master Bedroom Closet
 - 2. Height: 24 1/2"
- G. 2" x 8" Dimensioned Lumber
 - 1. Location: Master Bedroom Closet
 - 2. Height: 24 1/2"
- H. 1" x 4" Dimensioned Lumber
 - 1. Location: Master Bedroom Closet
 - 2. Height: 24 1/2"

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's recommendations

END OF SECTION 08 14 73



SECTION 08 50 00: WINDOWS

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes the windows used throughout the Delta T-90 House.

1.2 REFERENCES

- A. Construction Products Directive (CPD), a legal mandate of the European Commission.
 - 1. CE Mark
- B. DIN Standards- Construction Materials and Building (European Standards)
 - 1. DIN 1027/12208 – Windows and Doors -Water Tightness
 - 2. DIN 1026/12207 - Windows and Doors -Air Permeability
 - 3. DIN 12211/12210 – Windows and Doors -Resistance to Wind Load
 - 4. DIN 1191/12400 – Windows and Pedestrian Doors- Mechanical Durability,
 - 5. DIN EN ISO 10077 - Thermal Performance

1.3 SYSTEM DESCRIPTION RATING

- A. Thermally broken window frame
- B. R-11.36 glass planes installed by manufacturer

1.4 PERFORMANCE REQUIREMENTS

- A. Testing shall demonstrate fulfillment of requirements indicated in NWWDA I.S. 6 and Passive House Standard.
 - 1. Thermal Performance- $U_w=0.1287$ Btu/(h.ft².F), $R=7.7$
Frame - $U_f=0.167$ Btu/(h.ft².F)
Triple window seal to demonstrate class 4 air tightness (Passive House Standard)
 - 2. Water Penetration for Windows: No water penetration as defined in the test method ASTM E 547.
 - 3. Condensation Resistance Factor (CRF): Provide UPVC windows tested for thermal performance according to Passive House Standard.
 - 4. Structural Performance: No failure or permanent deflection as defined in the test method ASTM E 330.
 - 5. Acoustic performance: Triple glazing- up to $U_g=0.07$ Btu/(h.ft².F). Increased thermal insulation. Superior noise insulation up to 47 dB.

1.5 SUBMITTALS

- A. Product Data

1.6 REFERENCES

- A. Appendix B: Page 251-253
- B. Construction Documents: A-541, A-605, A-301



PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Intus
1042 Wisconsin Avenue, NW, 2nd Floor
Washington DC, 20007
Phone: 1-(888)-380-9940
Email: info@intuswindows.com

2.2 SUPPLIER

- A. Maine Green Building Supply
111 Fox Street
Portland, ME 04101
Phone: (209)-780-1500
mainegreenbuilding.com

2.3 PRODUCTS

- A. IntusEforte WE1- 02
1. Model Number: WE1-02
 2. Location: Bathroom
 3. Dimension (L x H): 5'-7 1/2" x 1'-6"
 4. System: Eforte
 5. Fittings: Maco
 6. Frame: Inoutic passive house window profile
 7. GC4x16HxF4x16HxCG4, Triple glazed unit with 2 low-emissivity 1.0 glass, Ug=0.088
 8. Operation: Tilt
 9. Color: White
- B. IntusEforte WW1-01
1. Model Number: WW1-01
 2. Location: Bedrooms and Living Room
 3. Dimension (L x H): 3' x 4'-2"
 4. System: Eforte
 5. Fittings: Maco
 6. Frame: Inoutic passive house window profile
 7. GC4x16HxF4x16HxCG4, Triple glazed unit with 2 low-emissivity 1.0 glass, Ug=0.088
 8. Operation: Tilt and turn
 9. Color: White
- C. IntusEforte WW1-02
1. Model Number: WW1-02



2. Location: Office
 3. Dimension (L x H): 6' x 4'-2"
 4. System: Eforte
 5. Fittings: Maco
 6. Frame: Inoutic passive house window profile
 7. Filler: GC4x16HxF4x16HxCG4, Triple glazed unit with 2 low-emissivity 1.0 glass, Ug=0.088
 8. Operation: Tilt
 9. Color: White
- D. IntusEforte WW1-03
1. Model Number: WW1-03
 2. Location: Kitchen
 3. Dimension (L x H): 8'-10 1/2" x 2'-3"
 4. System: Eforte
 5. Fittings: Maco
 6. Frame: Inoutic passive house window profile
 7. Filler: GC4x16HxF4x16HxCG4, Triple glazed unit with 2 low-emissivity 1.0 glass, Ug=0.088
 8. Operation: Tilt
 9. Color: White
- E. IntusEforte WS1-03
1. Model Number: WS1-03
 2. Location: South Window
 3. Dimension (L x H): 9'-9" x 6'-7"
 4. System: Eforte
 5. Fittings: Maco
 6. Frame: Inoutic passive house window profile
 7. Filler: Sel6x18HxF4x16HxSel6, Triple glazed unit with 2 low-emissivity 1.0 glass, Ug=0.088
 8. Operation: Fixed
 9. Color: White
- G. Hanita Window Film
1. Location: South Window
 2. Model Number: R19801T
 3. Purpose: Provide extra safety and protection from potential of broken glass
 4. Thickness: 7 mil

PART 3 - EXECUTION

1.1 INSTALLATION



A. Install in accordance with manufacturer's recommendations

END OF SECTION 08 50 00



SECTION 08 61 00: ROOF WINDOWS

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes information for the skylight in the Delta T-90 House.

1.2 SYSTEM DESCRIPTION

- A. The EFW flat roof system makes it possible to install windows on flat and very low pitched roofs. It elevates the installation of the window by 15 degrees in relation to the roof pitch.

1.3 REFERENCES

- A. Appendix B: Page 254-255
- B. Construction Documents S-110, A-113, A-121, A-211, A-212, A-301, A-303

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Fakro America, L.L.C.
311 West Laura Dr.
Addison, IL 60101
Phone: (630)-543-1010
 - 1. Available through Four Seven Five High Performance Building Supply

2.2 PRODUCTS

- A. EFW Flat Roof System
 - 1. Model Number: FTT U6
 - 2. Location: East Module
 - 3. Dimension: 1'-9 21/32" x 3'-2 19/32"
 - 4. Air Permeability: Class 4
 - 5. Thermal Performance: $U_g=0.5$ W/m²K
 - 6. Window U-Value: 0,81 W/m²K
 - 7. Glazing U-Value: 0.5 W/m²K
 - 8. Number of Seals: 5
 - 9. Acoustic Insulation R_w : 38 dB

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's recommendations

END OF SECTION 08 61 00



DIVISION 09: FINISHES



SECTION 09 21 16: GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes information on all types of gypsum sheathing used in the Delta T-90 House.
Gypsum wall board is used for ceilings and walls within the interior of the house.

1.2 RELATED SECTIONS

- A. Section 01 25 13- Product Substitution Procedures

1.3 SUBMITTALS

- A. Product Data
- B. Material Safety Data Sheets (MSDS)

1.4 REFERENCES

- A. Appendix B: Page 257-304
- B. Construction Documents S-102, S-112, A-111, A-311, A-312, A-541,

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. USG Corporation Headquarters
550 West Adams St.
Chicago, IL 60661-3676
Phone: (312)-436-2424
- B. GripRite
Phone: (800)-676-7777
- C. OSI Sealant, Inc.
Division, Henkel
Mentor, OH 44060
Phone: (430)-255- 8900f

2.2 SUPPLIER

- A. Allen Lumber
707 Stone Cutters Way
Montpelier, VT 05602
Phone: (802)-223-2335
www.allenlumbercompany.com

2.2 PRODUCTS

- A. Gypsum Wallboard Fireshield Type X
 - 1. Dimensions: 4' x 8' panels
 - 2. Thickness:
 - a. 5/8" for the exterior walls 24" O.C. (CSI 09 29 00.D1)



- b. 5/8" for the ceiling 24" O.C. (CSI 09 29 00. D1)
- c. 5/8" for the partitions (CSI 09 29 00. A3)

B. Moisture Resistance Wallboard

- 1. Location: Wet core and bathroom partitions (CSI 09 29 00. D2)
- 2. Thickness: 5/8"

2.3 ACCESSORIES

A. GripRite: coarse thread drywall screws or equal

- 1. Size: 8 x 2 1/2"

B. OSI Greenseries F-38 Drywall and Panel Adhesive

- 1. Model Number: F-38
- 2. Available: OSI Sealants

C. All Purpose Joint Compound

- 1. Model Number: 6262059 or equal
- 2. Location: Walls and ceiling throughout house

D. Joint Tape

- 1. Model Number: 382175
- 2. Dimensions: 2 1/16" x 250' roll
- 3. Color: White

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install all gypsum wallboard plumb, square, and true to line.

END OF SECTION 09 21 16



SECTION 09 62 29: CORK FLOORING

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes the cork flooring that will be applied to the bathroom of the Delta T-90 House.

1.2 REFERENCES

- A. Appendix B: Page 305-308
- B. Construction Documents: A-112, I-203

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Lumber Liquidators
329 Harvest Lane
Suite 200
Williston, VT 05495
Phone: (802) 316-4113
- B. East Montpelier Home Center
Route 2
East Montpelier, VT 05651
Phone (802) 223-4131

2.2 PRODUCTS

- A. Lisbon Cork Por do Sol Cork Flooring
 - 1. Model Number: 10022308
 - 2. Location: Bathroom
 - 3. Dimensions:
 - Length: 11.8"
 - Width: 23.6"
 - Thickness: 0.25"
 - 4. Color: Light shade
 - 5. Available: Lumber Liquidators

2.3 ACCESSORIES

- A. LePage PL 400 Sub Floor Construction Adhesive
 - 1. Model Number: 2032-945
 - 2. Size: 295 mL
 - 3. Interior and Exterior Use

PART 3 - EXECUTION

3.1 INSTALLATION



A. Install in accordance with manufacturer's recommendations.

END OF SECTION 09 62 29



SECTION 09 64 23: WOOD FLOORING

PART 1- GENERAL

1.1 SUMMARY

- A. This section includes the interior wood flooring for the Delta T-90 House.

1.2 RELATED SECTIONS

- A. Section 06 11 00 - Wood Framing

1.3 REFERENCES

- A. Appendix B: Page 309-317
- B. Construction Documents: A-112

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Atlantic Plywood
5319 Vermont 14
South Royalton, VT 05068
(802) 763-9997
- B. Northeast Wholesale
980 Turnpike Street
Canton, MA 02021
(781) 767-1019

2.2 PRODUCTS

- A. 1/2" Plywood (Grade A/C): Finish Floor
 1. Location: Kitchen, Living and Bedrooms
 2. Dimensions: 4' x 8'
 3. Finish: 3 coats of Vermont Natural Coatings Clear Polywhey
 4. Rating: FSC certified

2.2 ACCESSORIES

- A. Trim Head Screws
 1. Model Number: 214TS5
 2. Location: Throughout whole house
 3. Length: 2 1/4"
 4. Color: Black
- B. Vermont Natural Coatings Floor Finish
 1. Location: Throughout house
 2. Base Mineral: Water polyurethane
 3. Finish: Polywhey



4. VOCs: Less than 180 g/L
5. Neutral Odor

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's recommendations and construction drawings.

END OF SECTION 09 64 23



SECTION 09 93 23.13: INTERIOR STAINING

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes information on interior staining for the Delta T-90 House.

1.2 SYSTEM DESCRIPTION

- A. Interior Stains, low VOC

1.3 REFERENCES

- A. Appendix B: Page 311-317

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Vermont Natural Coatings
180 Junction Road
Hardwick, VT
Phone: (802) 472-8700

2.2 PRODUCTS

- A. Vermont Natural Coatings Floor Finish
 - 1. Location: Floors, built in furniture, cabinets
 - 2. Base Mineral: Water polyurethane
 - 3. Finish: Polywhey
 - 4. VOCs: Less than 180 g/L
 - 5. Neutral Odor

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's recommendations.

END OF SECTION 09 93 23.13



SECTION 09 91 23: INTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes all interior paint finishing applied to the Delta T-90 House.

1.2 REFERENCES

- A. Appendix B: Page 318-324

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Sherwin-Williams
131 S Main St, Suite 6
Barre, VT 05641-4814
Phone: (802) 476-3177

2.2 PRODUCTS

- A. Sherwin Williams Harmony
 - 1. Model Number: 650259146
 - 2. Location: All interior walls
 - 3. Color: Eco-White Semi Gloss
 - 4. Available: Sherwin-Williams

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's recommendations.

END OF SECTION 09 91 23



SECTION 09 93 13.13: EXTERIOR STAINING

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes information on exterior staining for the Delta T-90 House.

1.2 SYSTEM DESCRIPTION

- A. Exterior Stains

1.3 REFERENCES

- A. Appendix B: Page 325-344

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Vermont Natural Coatings

P.O. Box 512

Hardwick, VT 05843

Phone: (802) 472 – 8700

- B. Benjamin Moore and Co.

101 Paragon Drive

Montvale, NJ 07645

(855) 724-6802

2.2 PRODUCTS

- A. Benjamin Moore Exterior Finish

- 1. Model Number: 326 10

- 2. Location: Exterior Rain Screen, siding, and decks

- 3. Base Material: Oil

- 4. Finish: Alkyd Translucent

- 5. Number of coats: 2

- B. Vermont Natural Coatings Exterior Wood Finish

- 1. Location: Rainscreen and kiosks

- 2. Base Mineral: Water

- 3. Finish: Acorn Brown

- 4. Number of Coats: 2

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's recommendations.

END OF SECTION 09 93 13.13



DIVISION 10: SPECIALTIES



SECTION 10 18 00: INFORMATIONAL KIOSK

PART 1-GENERAL

1.1 SUMMARY

- A. This section includes all materials used for making the outdoor information kiosk.

1.2 SYSTEM DESCRIPTION

- A. The outdoor kiosk is what visitors will interact with when entering the Delta T-90 site. The system consists of custom fabricated pieces of wood and PVC that will allow visitors to learn more about the Delta T-90 house. The wood post would be stationary, while the PVC plastic cylinders would be free to rotate around.

1.3 REFERENCES

- A. Appendix B: 346-372
- B. Construction Documents: G-201, G-202, G-603

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. East Montpelier Home Center
Route 2
East Montpelier, VT 05651
Phone (802) 223-4131
- B. Fernandez Ace Hardware
58 Depot Square
Northfield, VT 05663
- C. McMaster-Carr
200 New Canton Way
Robbinsville, NJ 08691-2343
Phone: (609)-689-3000
www.mcmaster.com
- D. Atlantic Plywood
5319 Vermont 14
South Royalton, VT 05068
(802) 763-9997

2.2 PRODUCTS

- A. Wood Posts PSF
 - 1. Location: Signage at south ramp
 - 2. Dimensions: 3 1/2" x 3 1/2" x 8'
 - 3. Finish: Vermont Natural Coatings Acorn Brown



- B. PVC Schedule 40 Drainage Pipe
 - 1. Location: Kiosk at south ramp
 - 2. Dimensions: 8.625" outside diameter
 - 3. Circumference: 27.0825"
 - 4. Height: 16"
- C. L-Brackets
 - 1. Location: Attaching kiosk cylinder top and bottom pieces to wood posts
 - 2. Size: 1 1/2" x 1 1/2"
- D. Polycarbonate
 - 1. Location: Wraps cylinder top and bottom pieces
 - 2. Thickness: 1/8" x 1 3/4"
- E. High Density Overlay
 - 1. Location: Top and bottom cap and base pieces of kiosk cylinder
 - 2. Thickness: 3/4"
 - 3. Available at Atlantic Plywood
- F. Stainless Steel BBs
 - 1. Location: Kiosk rolling channel at bottom of cylinder base
 - 2. 30 Caliber
- G. Acrylic
 - 1. Location: Top cap of kiosk
 - 2. Thickness: 1/4"
 - 3. Color: Black
- H. Fasteners and related hardware as needed
 - 1. Sizes: 1/2" for fastening L bracket to wood post, 1/2" for attaching polycarbonate to HDO, 1 1/4" to fasten caps and bases together

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's specifications and the construction documents.

END OF SECTION 10 18 00



SECTION 10 20 00: INTERIOR SPECIALTIES

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes the storage wall between the office and master bedroom.

1.2 SUBMITTALS

- A. Product Data

1.3 REFERENCES

- A. Appendix B: Pages 309-310, 373-391
- B. Construction Documents: I-204, I-201

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Atlantic Plywood
5319 Vermont 14
South Royalton, VT 05068
(802) 763-9997
- B. Northend Hardwoods
8 Deans Lane
Lyndonville, VT 05851
- C. Amerock
3 Glenlake Parkway
Atlanta, GA 30328
(802) 752-9677

2.2 PRODUCTS

- A. 1/2" Plywood (Grade A/C): Finish Floor
 1. Location: Kitchen, Living and Bedrooms
 2. Dimensions: 4' x 8'
 3. Finish: 3 coats of Vermont Natural Coatings Clear Polywhey
 4. Rating: FSC certified
 5. Flame Spread Index: 130-150
- B. 3/4" x 4' x 8' Douglas Fir Marine Grade Plywood
 1. Dimensions:
 - Thickness: 3/4"
 - Width: 4'
 - Length: 8'
 2. Location: Bathroom walls
 3. Price: \$125.00 sheet



4. Available: Northend Hardwoods
- C. 1 x 3 Pine
 1. Location: Joint covers over bathroom marine plywood
 2. Dimension: 3/4" x 2 1/2" x 8'10"
- 2.3 ACCESSORIES
 - A. Fasteners
 1. Model: 1/2" Trim Screws
 2. Location: storage wall between the office and bedroom
 3. Finish: Black Oxide
 - B. Benjamin Moore Studio Finishes
 1. Location: Office wall chalkboard
 2. Finish: Chalkboard Paint
 - C. Functional Roller Catch
 1. Model Number: BP 97142G
 2. Location: Desk of office wall
 3. Finish: Permabrite Zinc
 - D. Blum 170 Degree Snap Close Clip Top Frameless Overlay Hinges
 1. Model Number: 55840
 2. Location: Office wall desk
 3. Finish: Nickel

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in accordance to the construction documents.

END OF SECTION 10 20 00



SECTION 10 22 23.13: WALL SCREENS

PART 1-GENERAL

1.1 SUMMARY

- A. This section includes the transom above the door in the auxiliary bedroom.

1.2 REFERENCES

- A. Appendix B: Page 392-395
- B. Construction Documents: I-205

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Ridout Plastics Company Inc.
5535 Ruffin Road
San Diego, CA 92123
(858) 560-1551
- B. East Montpelier Home Center
Route 2
East Montpelier, VT 05651
Phone (802) 223-4131

2.2 PRODUCTS

- A. Plexiglass Clear Extruded Sheet
 - 1. Model Number: ACRYCLRO .125PM24X28
 - 2. Dimensions: 1/8" x 24" x 48"
 - 3. Weight: 5.85 lbs
 - 4. Available: Vermont Plastics
- B. Transom Framing Material
 - 1. Location: Above utility closet and auxiliary bedroom
 - 2. Dimensions: 1" x 6"
 - 3. Species: Pine
 - 5. Available: East Montpelier Home Center
- C. Screws
 - 1. Location: Above utility closet and auxiliary bedroom
 - 2. Type: 2 1/4" finish screws

PART 3 – EXECUTION

3.1 INSTALLATION



- A. Transom plastic screen will be laser cut to specified design and mounted in wood frame. Wood frame is then installed into wall opening and fastened in place.
- B. Install transoms according to shop drawings and construction documents.

END OF SECTION 10 22 23.13



SECTION 10 28 00: TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1-GENERAL

1.1 SUMMARY

- A. This section includes all bathroom accessories used throughout the Delta T-90 House.

1.2 SUBMITTAL

- A. Product Data

1.3 REFERENCES

- A. Appendix B: Page 396-401
- B. Construction Documents: I-203

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. IKEA
8300 IKEA Blvd.
Charlotte, NC 28262
Phone: 704-549-4532
www.ikea.com

- 1. Available through IKEA

2.2 PRODUCTS

- A. IKEA Lillhomen Toilet Roll Holder [CSI 10 28 00.A2]
 - 1. Model #: 300.741.79
 - 2. Location: Bathroom
 - 3. Dimensions (Width x Height): 5 7/8"x 3 7/8"
 - 4. Finish: nickel plated
 - 5. Price: \$7.99
- B. IKEA Grundtal Hanger (2 Pack) [CSI 10 28 00. A9]
 - 1. Model #: 300.612.47
 - 2. Location: Bathroom
 - 3. Finish: stainless steel
 - 4. Price: \$3.99
- C. IKEA Lillholmen Towel Holder [CSI 10 28 00. B2]
 - 1. Model #: 300.741.84
 - 2. Location: Bathroom
 - 3. Dimensions (Width x Height): 16 1/8"x9"
 - 4. Finish: nickel plated
 - 5. Price: \$19.99

PART 3 – EXECUTION



3.1 INSTALLATION

- A. Install in accordance with manufacturer's recommendations.

END OF SECTION 10 28 00



SECTION 10 44 16.13: PORTABLE FIRE EXTINGUISHERS

PART 1-GENERAL

1.1 SUMMARY

- A. This section specifies a portable fire extinguisher.

1.2 REFERENCES

- A. Appendix B: Page 402-410
- B. Construction Documents: F-101

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Kidde Fire Safety
1016 Corporate Park Drive
Mebane, NC 27302
Phone: 919-563-5911

- 1. Available at Home Depot

2.2 PRODUCTS

- A. Kidde Recreation Fire Extinguisher
 - 1. Model # 466142 or equal
 - 2. Class 1-A:10-B:C
 - 3. Dimensions (Depth x Width x Height): 3.25" x 4.75" x 13.75"
 - 4. Finishes: Lightweight Aluminum
 - 5. Location: Under sink

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's recommendations.

END OF SECTION 10 44 16.13



SECTION 10 57 33: CLOSET AND UTILITY SHELVING HARDWARE

PART 1-GENERAL

1.1 SUMMARY

- A. This section includes the poles and socket for the master bedroom closet.

1.2 REFERENCES

- A. Appendix B: Page 411-414

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Home Depot Corporate Office & Headquarters
759 Harvest Lane
Williston, VT 05495
(802) 872-0039

2.2 PRODUCTS

- A. Closet Max 72" X 1.5" Heavy-Duty Chrome Closet Pole
1. Model Number: 0015-6CH
 2. Location: Master Bedroom closet
 3. Dimensions
 - Depth: 1.3125"
 - Width: 72"
 - Adjustable Length: 6'
 4. Color: Silver metallic
- B. Closet Max 1 5/16" Heavy Duty Chrome Closet Pole Sockets (2 Pack)
1. Model Number: CD-0010-CH
 1. Location: Master Bedroom closet
 2. Dimensions
 - Depth: 2.75"
 - Width: 0.875"
 3. Color: Silver metallic

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Install to code.
- B. Install in accordance with manufacturer's recommendations.

END OF SECTION 10 57 33



SECTION 10 71 13: EXTERIOR SUN CONTROL DEVICES

PART 1 – GENERAL

1.1 Summary

- A. This section includes the materials used for the shading device used to protect the water tanks from direct solar gain.

1.2 SUBMITTALS

- A. Product Data

1.3 REFERENCES

- A. Appendix B: Page 169-170 , 415-424
- B. Construction Documents: A-114, A-115

PART 2 – PRODUCTS

2.1 MANUFACTURER

- A. Fontaine Forestry and Millworks
East Montpelier, Vermont
United States
Phone: (802)-223-7719
www.fontainemillworks.com
- B. Allen Lumber
707 Stone Cutters Way
Montpelier, VT 05602
(802)-223-2335
- C. Stanley Bostitch
East Greenwich, RI
 - 1. Available at Allen Lumber
- D. McMaster- Carr
6100 Fulton Industrial Blvd
Atlanta, GA 30336

2.2 PRODUCTS

- A. Horizontal Rough Sawn Cedar
 - 1. Location: Water tank shading device
 - 2. Dimension (Depth x Width): 5/4" x 6"
 - 3. Grade: #3 or better
 - 4. Available: Fontaine Forestry and Millworks
- B. 2" x 4" x 8' SPF Stud
 - 1. Location: Water tank shading device
 - 2. Dimensions: 1 3/4" x 3 1/2" x 8'



3. Available: Allen Lumber
- C. 2" x 4" x 10' SPF Stud
 1. Location: Water tank shading device
 2. Dimensions: 1 3/4" x 3 1/2" x 10'
 3. Available: Allen Lumber
- D. 2" x 4" x 8' SPF Stud
 1. Location: Water tank shading device
 2. Dimensions: 1 3/4" x 3 1/2" x 8'
 3. Available: Allen Lumber
- E. 2" x 4" x 10' SPF Stud
 1. Location: Water tank shading device
 2. Dimensions: 1 3/4" x 3 1/2" x 10'
 3. Available: Allen Lumber
- F. Bostitch-HQG-Hurriquake - 2 1/2" X .113 HQG
 1. Model: Rh-S8dr113-Hqg
 2. Location: Water tank shading device
 3. Plastic Collated Galvanized Sheathing Nails
 4. Dimensions: 2 1/2" X .113"
 5. Available: Bostitch
- G. 2 1/2" Torque Screws
 1. Location: Connection of shading slats to vertical pieces of shading device
- H. Canvas Drop Cloth
 1. Location: Water tank shading device
 2. Model Number: 7884T23
 3. Size: 12' x 15'
 4. Weight: 12 oz/square yard
 5. Color: White
 6. Available: McMaster Carr

PART 3 – EXECUTION

- A. Install in accordance with manufacturer specifications and construction documents.

END OF SECTION 10 71 13



DIVISION 11: EQUIPMENT



SECTION 11 06 60: SCHEDULES FOR ENTERTAINMENT

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes the entertainment center for the living room of the Delta T-90 House.

1.2 SUBMITTALS

- A. Product Data

1.3 REFERENCES

- A. Appendix B: Page 426-429
- B. Construction Documents: A-301

PART 2- PRODUCTS

2.1 MANUFACTURER

- A. Sony Corporation of America
550 Madison Avenue
New York, NY 10022

2.2 PRODUCTS

- A. Sony DVD Home Theater System
 - 1. Model Number: DAV-TZ140 or equal
 - 2. Location: Living Room
 - 3. Available: Sony Electronics
 - 4. Price: \$129.00

PART 3- EXECUTION

3.1 INSTALLATION

- A. Supply computer for use in the Delta T-90 House for contest purposes.

END OF SECTION 11 06 60



SECTION 11 28 13: COMPUTER

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes the computer used for the home entertainment contest of the competition, in which it shall be operated during specific periods of time.

1.2 SUBMITTALS

- A. Product Data

1.3 REFERENCES

- A. Appendix B: Page 430-431

PART 2- PRODUCTS

2.1 MANUFACTURER

- A. Apple
 - 1 Infinite Loop
 - Cupertino, CA 95014
 - Phone: (408) - 996 - 1010

2.2 PRODUCTS

- A. Apple MacBook Pro 15.4"
 - 1. Model Number: MD104LL/A or equal
 - 2. Location: Office
 - 3. Dimensions
 - Width: 14.3"
 - Height: 1"
 - Depth: 9.8"
 - 4. Weight: 5.6 lbs
 - 5. Features
 - a. Processor: Intel Core i7
 - b. Processor Speed: 2.6 GHz
 - c. Battery Type: Lithium Polymer
 - d. Display Type: Widescreen LED backlit (1440 x 900)
 - e. Cache Memory: 6 MB
 - f. System Memory: 8 GB RAM
 - g. Hard Drive: 750 GB
 - h. Operating System: Mac OS X Mountain Lion
 - 6. Electrical:
 - a. Wattage: 65W
 - b. Voltage: 100-240 V



PART 3- EXECUTION

3.1 INSTALLATION

- A. Supply computer for use in the Delta T-90 House for contest purposes.

END OF SECTION 11 28 13



SECTION 11 31 13: RESIDENTIAL KITCHEN APPLIANCES

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes all kitchen appliances in the Delta T-90 House to be used during the competition.

1.2 SYSTEM DESCRIPTION

- A. These appliances will be used for both the appliance and entertainment contests. The dishwasher will need to successfully wash five loads of dishes during the contest week. The stovetop and oven will be needed to complete the dining and cooking contest, which includes preparing two meals, snacks for movie night, and evaporating five pounds of water. The refrigerator will need to maintain a temperature within 34°F (1.11°C) and 40°F(4.44°C) and a range within -20°F (-28.9°C) and 5°F (-1.5°C) for the freezer.

1.3 SUBMITTALS

- A. Product Data

1.4 REFERENCES

- A. Appendix B: Page 432-442
B. Construction Documents: I-101, I-206, I-505

PART 2- PRODUCTS

2.1 MANUFACTURERS

- A. Frigidaire
2715 Washington Road
Augusta, GA 30909
Phone: 800 - 374 - 4432
www.frigidaire.com
1. Available at national appliance stores, such as A.J Madison.
- B. GE Appliances
4000 Buechel Bank Rd
Louisville, KY 40225
(502) 452-4311
- C. Whirlpool
553 Benson Road
Benton Harbor, MI 49022
(866) 698-2538

2.2 PRODUCTS

- A. Frigidaire Countertop Refrigerator and Freezer Energy Star
1. Model Number: FFHT10F2LW or equal
2. Location: Kitchen



3. Dimensions
 - Width: 23.75"
 - Height: 59.75"
 - Depth: 26.75"
 4. Overall Capacity: 9.9 cu.ft.
 5. Finish: White
 6. Electrical:
 - a. Current: 15A
 - b. Voltage: 120 V
- B. Frigidaire Freestanding Electric Range
1. Model Number: FFEF3015LS or equal
 2. Location: Kitchen
 3. Dimensions:
 - Width: 29 7/8"
 - Depth: 28.5"
 - Height: 47"
 4. Finish: Stainless Steel
 5. Installation Type: Freestanding
 6. Electrical:
 - a. Current: 40 A
 - b. Voltage: 240 V
 - c. Wattage
 - Electric Bake Element: 2,600 Watts
 - Eight-pass Broil Element: 3,000 Watts
 7. Power Supply Connection Location: Rear Centerline Lower
 8. Oven Interior
 - Depth: 19 1/8"
 - Height: 21"
 - Width: 24 3/8"
- C. Whirlpool Built-In Dishwasher Energy Star
1. Model Number: WDF510PAYS or equal
 2. Location: Kitchen
 3. Dimensions
 - Width: 23 7/8"
 - Height: 34 1/2"



Depth: 23 7/8"

4. Finish: Stainless Steel
5. Tub Material: Plastic
6. Electrical:
 - a. Current: 10 A
 - b. Voltage: 120 V
7. Wash System: Direct Feed
8. Capacity: 14 Place Settings

D. Frigidaire Countertop Microwave

1. Model Number: FFCM0734LS or equal
2. Location: Kitchen
3. Dimensions
 - Width: 17"
 - Height: 10 1/8"
 - Depth: 13"
4. Finish: Stainless Steel
5. Weight: 24 lbs.
6. Electrical:
 - a. Wattage: 700 W
 - b. Interior Light Wattage: 20
7. Capacity: 0.7 cu. Ft.
8. Frequency (Mhz): 2,450

2.3 ACCESSORIES

A. GE Under-Cabinet Range Hood

1. Model: JVE40STSS or equal
2. Location: Kitchen
3. Length: 30"
4. Finish: Stainless Steel
5. Voltage: 120 volts
6. Power: 15 amps

PART 3- EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's recommendations.

END OF SECTION 11 31 13



SECTION 11 31 23: RESIDENTIAL LAUNDRY APPLIANCES

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes the washer and dryer used for The Solar Decathlon Appliance contest.

1.2 SYSTEM DESCRIPTION

- A. These appliances will be used for the appliance portion of the contest. The clothes washer will need to successfully wash 8 loads of laundry (one load=six bath towels) during the contest week. The clothes dryer will need to return 8 loads of laundry during the contest week.

1.3 SUBMITTALS

- A. Product Data

1.4 REFERENCES

- A. Appendix B: Page 443-444
- B. Construction Documents : I-203

PART 2- PRODUCTS

2.1 MANUFACTURERS

- A. Summit
771 Garrison Ave
Bronx, NY 10474
Phone: 718 - 842 - 3093
www.summitappliance.com

2.2 SUPPLIERS

- A. Brook Valley Appliance
P.O. Box 810, 390 Depot Street
Manchester Center, VT 05255
Phone: (802) 362 - 3342

2.3 PRODUCTS

- A. Summit 24" Front Load Washer/Dryer Combo 11 Fabric Care Wash Cycles and LED Control Display
 1. Model Number: SPWD1800 or equal
 2. Location: Utility Closet
 3. Dimensions
 - Width: 23.38"
 - Height: 33.63"
 - Depth: 23.5"
 4. Electrical:
 - Current: 12A
 - Voltage: 115 V



5. Capacity: 1.8 cu. ft.

PART 3- EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's recommendations.

END OF SECTION 11 31 23



SECTION 11 34 00: RESIDENTIAL CEILING FANS

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes the ceiling fan in the living room of the Delta T-90 House.

1.2 SYSTEM DESCRIPTION

- A. These appliances will be used for the entertainment contest. A portion of the entertainment contest will involve operating the television during specific time periods.

1.3 REFERENCES

- A. Appendix B: Page 445-446
- B. Construction Documents: A-121

PART 2- PRODUCTS

2.1 MANUFACTURERS

- A. Big Ass Fans
2348 Innovation Drive
Lexington, KY 40511

2.2 PRODUCTS

- A. Haiku Bamboo
 - 1. Model Number: K3150-S1
 - 2. Location: Living Room
 - 3. Size: 60" Fan
 - 4. Wattage: 25 watts max
 - 4. Available through Big Ass Fans

PART 3- EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's recommendations.

END OF SECTION 11 34 00



SECTION 11 52 00: AUDIO VISUAL EQUIPMENT

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes the audio-visual equipment necessary for the movie night contest part of the competition.

1.2 SYSTEM DESCRIPTION

- A. These appliances will be used for the entertainment contest. A portion of the entertainment contest will involve operating the television during specific time periods.

1.3 SUBMITTALS

- A. Product Data

1.4 REFERENCES

- A. Appendix B: Page 447-449

PART 2- PRODUCTS

2.1 MANUFACTURERS

- A. LG
1000 Sylvan Avenue
Englewood Cliffs, NJ 07632
Phone: 800 - 243 - 0000
www.lg.com
 - 1. Available at national appliance stores, such as Best Buy

2.2 PRODUCTS

- A. Vizio 32" 1080P HD 3-D Optional TV
 - 1. Model Number: E3201-A0 or equal
 - 2. Location: Living Room
 - 3. Dimensions
 - Width: 28.74"
 - Height: 19.25"
 - Depth: 7.46"
 - 4. Electrical:
 - Wattage: 49.8 W
 - Voltage: 108-132 V
 - 5. Weight: 18.3 lbs
 - 6. Resolution [native format]: 1366 x 768
 - 7. Contrast ratio: 200,000:1
 - 8. Energy Star 6.0 qualified



PART 3- EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's recommendations.

END OF SECTION 11 52 00



DIVISION 12: FURNISHINGS



SECTION 12 24 00: WINDOW SHADES

PART 1 – GENERAL

1.1 SUMMARY

- A. West and South door shading devices and window shutters

1.2 SYSTEM DESCRIPTION

- A. Custom manufactured swinging and bi-folding window shades and door shading devices

1.3 REFERENCES

- A. Appendix B: Page 451-464
- B. Construction Documents A-114, A-115, G-601

PART 2 – PRODUCTS

2.1 MANUFACTURING

- A. Capitol Steel and Supply Co., Inc.
115 Junction Road
Berlin, Vermont 05602
- B. Cannonball: HNP, LLC
555 Lawton Ave
Beloit, WI 53512
- C. McMaster- Carr
6100 Fulton Industrial Blvd
Atlanta, GA 30336
- D. Lyndonville Agway
6601 Memorial Drive
Lyndonville, VT 05851
- E. Amerock
3 Glenlake Parkway
Atlanta, GA 30328
(802) 752-9677

2.2 PRODUCTS

- A. Bar Angle
 - 1. Location: Solar Shade
 - 2. Dimensions: 1.5" x 1.5" x 1/8"
Length: 20'
 - 3. Quantity: 6
 - 4. Available: Capitol Steel and Supply Co.
 - 5. Price: \$25



- B. Washer
 - 1. Location: Solar Shade
 - 2. Dimensions:
 - Outer Diameter: 1/2"
 - Inner Diameter: 1/4"
 - Thickness: 1/16"
 - 3. Quantity: 225
 - 4. Available: Capitol Steel and Supply Co.
- C. Stainless Steel Machine Screw 1/4"-20
 - 1. Location: Solar Shade
 - 2. Dimensions: 1 1/2"
 - 3. Quantity: 225
- D. Horizontal Rough Sawn Cedar
 - 1. Location: Exterior walls
 - 2. Dimension (Depth x Width): 5/4" x 6"
 - 3. Finish: Benjamin Moore Exterior Finish Alkyd Translucent
 - 4. Air Gap: 1/4"
 - 5. Species: Cedar
 - 6. Grade: #3 or better
- E. Tubular Door Track
 - 1. Model Number: CB-2
 - 2. Location: Solar Shade
 - 3. Material: 13 ga. High Carbon Steel
 - 4. Available: Cannonball HNP
- F. Derlin & Steel Single-Truck, Adjustable Trolley Hangers
 - 1. Model Number: CB-8
 - 2. Dimensions: 7" x 5 5/8"
 - 3. Finish: Galvanized
 - 4. Available: Cannonball HNP
- G. Load Rated Piano Hinges with Holes
 - 1. Model Number: 15665A581
 - 2. Location: South window Solar Shade
 - 3. Dimensions:
 - Thickness: 0.120 "
 - Width: 2"
 - Pin Diameter: 1/4"



Length: 6'

4. Finish: Primed Steel
 5. Available: McMaster-Carr
- H. Heavy Duty Catch Magnet
1. Model Number: BP 9798 AW
 2. Location: West living room window shade
 3. Finish: Aluminum
 4. Dimensions: 2 1/32" x 1 1/16" x 13/16"

PART 3 – EXECUTION

3.1 INSTALLATION (West and South Door Shading)

- A. Install in accordance with shop drawings included in Construction Documents.

END OF SECTION 12 24 00



SECTION 12 35 30.31: KITCHEN CASEWORK

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes all casework for the kitchen, as well as the kitchen accessories.
- B. Refer to cabinet schedule in Construction Documents.

1.2 SUBMITTALS

- A. Shop Drawings
- B. Product Data

1.3 REFERENCES

- A. Appendix B: Page 465-486
- B. Construction Documents: A-401, I-101 I-206, I-505

PART 2- PRODUCTS

2.1 MANUFACTURER

- A. Homecrest
P.O. Box 420
Jasper, IN 47547
- B. Allied Trade Group, Inc.
11410 N.E. 122nd War, Suite 200
Kirkland, WA 98034
Phone: (425) 814-2515

2.2 PRODUCTS

- A. Homecrest Base Cabinets 42" Corner Sink Base
 - 1. Model Number: CSB4234-24
 - 2. Location: Kitchen
 - 3. Dimensions
 - Width: 42"
 - Height: 34.5"
 - Depth: 24"
 - 4. Finish: Maple
- B. Homecrest Base Cabinets 24" Three Drawer Base
 - 1. Model Number: B3D2434.5-24
 - 2. Location: Kitchen
 - 3. Dimensions
 - Width: 24"
 - Height: 34.5"
 - Depth: 24"



- 4. Finish: Maple
- C. Homecrest 30" Base Cabinet
 - 1. Model Number: B3034.5-34
 - 2. Location: Kitchen
 - 3. Dimensions
 - Width: 30"
 - Height: 34.5"
 - 4. Finish: Maple
- D. Homecrest Custom Cabinet
 - 1. Model Number: MBC1824-24.5
 - 2. Dimensions:
 - Width: 18"
 - Height: 24"
 - Length: 24.5"
- E. Plywood Shelving
 - 1. Location: Kitchen Shelves
 - 2. Dimensions: 3/4" x 4' x 8'
 - 3. Material: Maple

2.3 ACCESSORIES

- A. Amerock T-Knob
 - 1. Model Number: BP19009SS
 - 2. Location: Kitchen Drawers
 - 3. Finished: Stainless Steel
 - 4. Price: \$6.57
 - 5. Available: Allied Trade Group: Knobs and Hardware
- B. Grass Tec 864 Side Mount 45 mm Screw On Hinge
 - 1. Model Number: 03050
 - 2. Location: Kitchen
 - 3. Swing Angle: 108 degrees
 - 3. Finish: Polished Nickel
- C. Grass Elite 7523 Full Extension Concealed Drawer Slide with Airmatic Controlled Closing
 - 1. Model: 7523
 - 2. Location: Kitchen
 - 3. Dimensions:
 - Slide Length: 21 21/32"
 - Drawer Length: 22"



4. Finish: Zinc plated

PART 3- EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer specifications.

END OF SECTION 12 35 30.13



SECTION 12 36 19: WOOD COUNTERTOPS

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes all wood countertops used in the kitchen of the Delta T-90 House.

1.2 SUBMITTALS

- A. Product Data

1.3 REFERENCES

- A. Appendix B: Page 487-490
- B. Construction Documents: A-401, I-206

PART 2- PRODUCTS

2.1 MANUFACTURER

- A. Lumber Liquidators
495 Watson Road
Arden, NC 28704
Phone: 828 - 483 - 4189
www.lumberliquidators.com
- B. Claphams Beeswax Products
104 Lee Road
Salt Spring Island, BC V8K2A5
(800) 667-2939

2.2 PRODUCTS

- A. Williamsburg Butcher Block
 1. Model Number: 10006983 or equal
 2. Location: Kitchen
 3. Dimensions
 - Width: 1 1/2"
 - Length: 16'
 - Depth: 25"
 4. Finish: Maple

2.3 ACCESSORIES

- A. Clapham's Bees Wax Salad Bowl Finish
 1. Finish: Beeswax/Carnauba/Mineral Oil
 2. Location: Finishing of kitchen countertop

PART 3- EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's recommendations.



END OF SECTION 12 36 19

SECTION 12 44 16: SHOWER CURTAINS

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes the shower curtain used in the bathroom of the Delta T-90 House.

1.2 SUBMITTALS

- A. Product Data

1.3 REFERENCES

- A. Appendix B: Page 491-494
- B. Construction Documents: I-203

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Home Decorators Collection
8920 Pershall Road
Hazelwood, MO 63042

- A. Ikea
8300 IKEA Blvd.
Charlotte, NC 28262
Phone: 704-549-4532
www.ikea.com

- 1. Available through IKEA

2.2 PRODUCTS

- A. Tribeka Shower Curtain
 - 1. Model Number: 08187 or equal
 - 2. Location: Bathroom
 - 3. Dimensions
 - Width: 72"
 - Height: 72"

2.3 ACCESSORIES

- A. Dignitet Shower Curtain Wire
 - 1. Model Number: 600.752.95 or equal
 - 2. Location: Bathroom
 - 3. Dimensions:
 - Length: 196 3/4"
 - 4. Finish: Stainless Steel
 - 5. Max Load Capacity: 11 lbs



5. Available: Ikea

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's recommendations.

END OF SECTION 12 44 16



SECTION 12 52 13: CHAIRS

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes the office and desk space seating within the Delta T-90 House.

1.2 SUBMITTALS

- A. Product Data

1.3 REFERENCES

- A. Appendix B: Page 495-501

PART 2- PRODUCTS

2.1 MANUFACTURER

- A. Resource Furniture
969 Third Avenue @ 58th Street
New York, NY 10022
(272) 753 - 2039

2.2 PRODUCTS

- A. Bookseat
 - 1. Locations: Auxiliary bedroom
 - 2. Dimensions: 36 3/4" x 26 3/4"
- B. Cubista Ottoman
 - 1. Location: Living room
 - 2. Dimensions: 20" x 20" x 20"
 - 3. System: Converts to 5 stools
- C. Pocket Chair
 - 1. Location: Dining room
 - 2. Dimensions: 18.5" x 17.75" x 30.5"
 - 3. System: Folding Dining Chairs

PART 3- EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's recommendations.

END OF SECTION 12 52 13



SECTION 12 58 00: RESIDENTIAL FURNITURE

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes the bookcase within the master and auxiliary bedrooms of the Delta T-90 House.
This section also includes the coffee table and bench used in the living room.

1.2 SUBMITTALS

- A. Product Data

1.3 REFERENCES

- A. Appendix B: Page 502-506
- B. Construction Documents: I-101, I-504

PART 2- PRODUCTS

2.1 MANUFACTURER

- A. Resource Furniture
969 Third Avenue @ 58th Street
New York, NY 10022
(272) 753 - 2039

2.2 PRODUCTS

- A. New Table Concept
 - 1. Location: Auxiliary Bedroom
 - 2. Color: White
 - 3. Dimensions: 19.75" x 27.5" x 1.25"
 - 4. Available: Resource Furniture
- B. Goliath Table
 - 1. Location: Office/living room
 - 2. System: Extends from 17" – 115"
 - 3. Color: White

PART 3- EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's recommendations.

END OF SECTION 12 58 00



SECTION 12 58 13: COUCHES AND LOVESEATS

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes the couch furniture of the Delta T- 90 House.

1.2 SUBMITTALS

- A. Product Data

1.3 REFERENCES

- A. Appendix B: Page 507-509
- B. Construction Documents: I-101, I-504

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Pompanoosuc Mills
50 Church Street Marketplace
Burlington, VT 05401
(802) 862-8208

2.2 PRODUCTS

- A. Spindle Living Room Seating
 - 1. Location: Living Room
 - 2. Dimensions: 32" x 80" x 32"
 - 3. Fabric Color: Plum
- B. Benson Chair
 - 1. Location: Living Room
 - 2. Finish: Walnut frame with cream leather

PART 3- EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's recommendations.

END OF SECTION 12 58 13



SECTION 12 58 19: DINING TABLES AND CHAIRS

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes the dining area furniture of the Delta T- 90 House.

1.2 SUBMITTALS

- A. Product Data

1.3 REFERENCES

- A. Appendix B: Page 499-451, 510-512
- B. Construction Documents: I-101, I-504

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Resource Furniture
969 Third Avenue @ 58th Street
New York, NY 10022
(272) 753 – 2039
- B. Vermont Farm Table
206 College Street
Burlington, VT
(888) 712-0864

2.2 PRODUCTS

- A. Vermont Farm Table
 - 1. Location: Dining Room
 - 2. Dimensions
 - Width: 36"
 - Length: 70"
 - Height: 30"
 - 3. Finish: Walnut top with steel legs
 - 4. Available: Vermont Farm Table
- 6. Pocket Chair
 - 1. Location: Dining room
 - 2. Dimensions: 18.5" x 17.75" x 30.5"
 - 3. System: Folding Dining Chairs

PART 3- EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's recommendations.

END OF SECTION 12 58 19



SECTION 12 58 26: ENTERTAINMENT CENTERS

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes the television stand for the living space of the Delta T-90 House.

1.2 SUBMITTALS

- A. Product Data

1.3 REFERENCES

- A. Appendix B: Page 511-512
- B. Construction Documents: A-301, I-201

PART 2- PRODUCTS

2.1 MANUFACTURER

- A. Resource Furniture
969 Third Avenue @ 58th Street
New York, NY 10022
(272) 753 – 2039

2.2 PRODUCTS

- A. Pianca TV System
 - 1. Location: Living room to hold TV
 - 2. System: Mounted to wall with sliding door
 - 3. Color: White
 - 4. From the Floor to bottom edge: 32 1/4"
 - 5. To center of the outlet from floor: 42 1/2"
 - 6. Length: 78 3/4"
 - 7. Left Side (TV Side): 34"
 - 8. Right Side (Closed): 35 1/2"
 - 9. Available: Resource Furniture

PART 3- EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's recommendations.

END OF SECTION 12 58 26



SECTION 12 58 29: BEDS

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes the beds for the master bedroom and auxiliary bedroom of the Delta T-90 House.

1.2 SUBMITTALS

- A. Product Data

1.3 REFERENCES

- A. Appendix B: Page 513-516
- B. Construction Documents: I-504

PART 2- PRODUCTS

2.1 MANUFACTURER

- A. Cymax USA
12020 Sunrise Valley Drive, Suite 100
Reston, VA 20191
 - 1. Available at South Shore Central
- B. South Shore Central
21586 Atlantic Blvd Unit 140
Sterling, VA 20166
(866) 740-9830

2.2 PRODUCTS

- A. Copley Queen Platform Storage Bed
 - 1. Location: Master Bedroom
 - 2. Dimensions:
 - Length: 80.5"
 - Width: 61.75"
 - Height: 9"
 - 3. Finish: Maple
 - 4. Available: South Shore Central
- B. Shiloh Kids Twin Mates Storage Bed
 - 1. Location: Auxiliary Bedroom
 - 2. Dimensions:
 - Width: 41"
 - Depth: 76.5"
 - Height: 5.5"
 - 3. Finish: Natural Maple
 - 4. Available: South Shore Central



PART 3- EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's recommendations.

END OF SECTION 12 58 29



SECTION 12 58 36: NIGHTSTANDS

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes the nightstands for the master bedroom and auxiliary bedroom of the Delta T-90 House.

1.2 SUBMITTALS

- A. Product Data

1.3 REFERENCES

- A. Appendix B: Page 517-518
- B. Construction Documents I-504

PART 2- PRODUCTS

2.1 MANUFACTURER

- A. Crate and Barrel
1250 Techny Road
Northbrook, IL 60062

2.2 PRODUCTS

- A. Midcentury Nightstand
 - 1. Location: Master Bedroom
 - 2. Dimensions:
 - Width: 18"
 - Depth: 15"
 - Height: 24"
 - 3. Available: West Elm

PART 3- EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's recommendations.

END OF SECTION 12 58 36



SECTION 12 58 83: CUSTOM RESIDENTIAL FURNITURE

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes the materials necessary to construct the custom furniture and office wall of the Delta T-90 House.

1.2 RELATED SECTIONS

- A. Section: 12 35 30.13 Kitchen Casework
- B. Section: 12 35 30.23 Bathroom Casework

1.3 SUBMITTALS

- A. Product Data
- B. MSDS

1.4 REFERENCES

- A. Appendix B: Page 305-306, 311-317, 338-344, 377-387, 519-541
- B. Construction Documents: I-101, I-201, I-202, I-203, I-205

PART 2- PRODUCTS

2.1 MANUFACTURER

- A. Northend Hardwoods
8 Deans Lane
Lyndonville, VT 05851
- B. Home Depot Corporate Office & Headquarters
2455 Paces Ferry Road
Atlanta, GA 30339
- C. Autozone
123 S Front St
Memphis, TN 38103
Phone: 901 495 6500
- D. School Outfitters
3736 Regent Ave.
Cincinnati, OH 45212
- E. Allied Trade Group, Inc.
11410 N.E. 122ndWar, Suite 200
Kirkland, WA 98034
Phone: 425-814-2515
- F. Aubuchon Hardware
95 Aubuchon Drive



Westminster, MA 01473

2.2 PRODUCTS

- A. 3/4" x 4' x 8' Douglas Fir Marine Grade Plywood
 - 1. Dimensions:
 - Thickness: 3/4"
 - Width: 4'
 - Length: 8'
 - 2. Location: Bathroom Cabinets
 - 3. Price: \$125.00 sheet
 - 4. Available: Northend Hardwoods
- B. 3/4" x 4' x 10' Douglas Fir Marine Grade Plywood
 - 1. Dimensions:
 - Thickness: 24/32"
 - Width: 4'
 - Length: 8'
 - 2. Location: Bathroom Cabinets and walls
 - 3. Price: \$130.00 sheet
 - 4. Available: Northend Hardwoods
- C. 23/32" X 4' X 8' BC Sanded Pine Plywood
 - 1. Model Number: 166057
 - 2. Dimensions:
 - Thickness: 0.47"
 - Width: 4'
 - Length: 8'
 - 3. Species: Pine
 - 4. Location: Kitchen
 - 5. Available: Home Depot

2.3 ACCESSORIES

- A. Pioneer/Tailgate Cable
 - 1. Model Number: CA-2310
 - 2. Length: 15.5"
 - 3. Location: Office Wall Desk
 - 4. Available: Autozone
- B. Blum 170 Degree Snap Close Clip Top Frameless Overlay Hinges
 - 1. Model Number: 55840 or equal
 - 2. Location: Office wall desk



3. Finish: Nickel
- C. Lisbon Cork Por do Sol Cork
 1. Model Number: 10022308
 2. Location: Office Wall
 3. Dimensions:
 - Length: 11.8"
 - Width: 23.6"
 - Thickness: 0.16"
 4. Color: Light shade
 5. Available: Lumber Liquidators
- D. Benjamin Moore Studio Finishes
 1. Location: Office wall chalkboard
 2. Finish: Chalkboard Paint
- E. Elmer's 16 Oz. Carpenter's Wood Glue
 1. Model Number: E7020
 2. Location: Office Wall
 3. Available: Home Depot
- F. Vermont Natural Coatings Floor Finish
 1. Location: Throughout house
 3. Base Mineral: Water polyurethane
 4. Finish: Polywhey
- G. Amerock BP19018SS Handle Pull
 1. Model Number: BP19018SS
 2. Dimensions
 - Center to Center: 25.2"
 - Width: 0.469"
 - Length: 28.3"
 4. Metal: Stainless Steel
 5. Location: Kitchen
 6. Available: Allied Trade Group
- H. Vermont Natural Coatings Floor Finish
 1. Location: Throughout house
 2. Base Mineral: Water based
 2. Finish: Acorn Brown

PART 3- EXECUTION



3.1 INSTALLATION

- A. Refer to the construction documents for installation.

END OF SECTION 22 12 19



DIVISION 21: FIRE SUPPRESSION



SECTION 21 10 00: WATER-BASED FIRE-SUPPRESSION SYSTEMS

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes the water-based fire-suppression system used in the Delta T-90 House.

1.2 SYSTEM DESCRIPTION

- A. This systems uses a non-coded, hardwired, zoned and battery back-up smoke detectors coupled with a fire-suppression system utilizing sprinkler heads. The sprinkler heads and smoke detectors are all interconnected.

1.3 SUBMITTALS TO AUTHORITIES HAVING JURISDICTION

- A. Submittal to Northfield, VT Fire Department for code approval specified to NFPA 13D.

1.4 UL LISTED AND LABELED

- A. All electrical components of fire suppression and detection system are listed and labeled as defined as pursuant to the NFPA 70, by a qualified testing agency and located as determined by design.

1.5 RELATED SECTIONS

- A. Section 22 11 16 - Domestic Water Piping
- B. Section 28 31 00 - Fire Detection and Alarm

1.6 SUBMITTALS

- A. Product Data

1.7 REFERENCES

- A. Appendix B: Page 543-581
- B. Construction Documents: F-101, F-102, F-601

PART 2- PRODUCTS

2.1 MANUFACTURER

- A. Viking Corporation
210 North Industrial Park Drive
Hastings, MI 49058
Phone: 269 - 945 - 9501
www.vikinggroupinc.com

2.2 PRODUCTS

- A. Viking Residential Horizontal Concealed Pendant Sprinkler Heads (VK457)
 1. Model Number: 14694A or equal
 2. Location: Office, Bedrooms, Bathroom, Kitchen, Living Room
 3. Finish: White
 4. K-factor: 4.9
 5. Thread size: 1/2" [15mm]
 6. UL pressure: 175 psi [1200 kPa]



7. Sprinkler temperature range: 155°F - 175°F [68°C - 79°]
- B. Viking Residential Horizontal Concealed Sidewall Sprinklers (VK480)
 1. Model Number: VK104 or equal
 2. Location: Closet
 3. Finish: White
 4. K-factor: 5.6
 5. Thread size: 1/2" [15mm]
 6. UL pressure: 175 psi [1200 kPa]
 7. Sprinkler temperature range: 200°F
- C. Viking BlazeMaster 1" CPVC Piping [CS121 10 00.B1]
 1. Model Number: 1PIPE or equal
 2. Dimensions
 - Diameter: 1" [19mm]
 - Length: 15' [4.6 m]
 3. Weight: 3.93 lbs/15' [1.78 kg/4.6m]
 4. Meets NFPA 13R and 13D standards for residential occupancies as well as NFPA 13 standards for light hazard occupancies.
 5. Pipe meets or exceeds ASTM F442.

2.3 ACCESSORIES

- A. NIBCO Blazemaster CPVC Fittings [CSI 32 20 00.B2]
 1. 1" x 1/2" BRASTIC Sprinkler Head Adapters
 2. Model Number: 5003-S-BT or equal
 3. Location: throughout the Delta T-90 House
 4. Weight: 0.17 lbs [77 g]
 5. Joint: SXFNPT
- B. 3/4" 5011 TEES
 1. Model Number: 5011 or equal
 2. Location: throughout the Delta T-90 House
 3. Weight: 0.17 lbs [77 g]
 4. Joint: SXSXS
- C. 1" 5007 Elbows
 1. Model Number: 5077 or equal
 2. Location: entering the closet
 3. Weight: 0.14 lbs [64 g]
 4. Joint: SXS

PART 3- EXECUTION



3.1 INSTALLATION

- A. The fire-suppression and detection systems will be installed pursuant to NFPA 13D regulations. The system has been oversized to ensure proper protection.
- B. The water storage for fire-suppression will have a separate storage tank from the fresh water supply. The system shall be designed and stamped by Chase Engineering.

END OF SECTION 21 10 00



SECTION 21 30 00: FIRE PUMPS

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes the pump and accessories for the fire suppression system.

1.2 SUBMITTALS TO AUTHORITIES HAVING JURISDICTION

- A. Submittal to Northfield, VT Fire Department for code approval specified to NFPA 13D.

1.3 UL LISTED AND LABELED

- A. All electrical components of fire suppression and detection system are listed and labeled as defined as pursuant to the NFPA 70, by a qualified testing agency and located as determined by design.

1.4 RELATED SECTIONS

- A. Section 22 11 16 - Domestic Water Piping
- B. Section 28 31 00 - Fire Detection and Alarm

1.5 SUBMITTALS

- A. Product Data

1.6 REFERENCES

- A. Appendix B: Page 582-618
- B. Construction Documents: F-101, F-102, F-601

PART 2- PRODUCTS

2.1 MANUFACTURER

- A. *Firewater Systems Inc.*

2927 Canby Street

Harrisburg, PA 17103

Phone # 717-234-FIRE (3473)

2.2 PRODUCTS

- A. Joslyn Clark Residential Fire Pump Controller
 1. Model Number: P100-518 or equal
 2. Location: Ground mounted by north elevation
 3. Maximum Flow: 47 GPM
 4. Rated: 35 PSI @ 30 GMP
 5. Voltage: 230 V
 6. Phase: 1 PH motor
 7. Base Dimension: 24" x 24" x 3"
- B. NPE End Suction Centrifugal Pump



1. Model Number: 316L SS
 2. Material: Stainless Steel
 3. Inlet: 1 ¼"
 4. Outlet: 1"
- C. Butterball Butterfly Valves
1. Model Number: BB-SCS
 2. Valve with tamper
 3. FM approved
- D. Control Box
1. Model Number: RPC-115230V-50A
- E. Alarm Switch
1. Model Number: VSR-SF
 2. Rating: UL-listed
 3. Service Pressure: up to 250 psi
 4. Minimum Flow Rate for Alarm: 10 GPM
 5. Contact Ratings: 15 Amps at 125/250 VAC
 6. Amps: 10

PART 3- EXECUTION

3.1 INSTALLATION

- A. The fire-suppression and detection systems will be installed pursuant to NFPA 13D regulations. The system has been oversized to ensure proper protection.
- B. The water storage for fire-suppression will have a separate storage tank from the fresh water supply. The system shall be designed and stamped by Chase Engineering.
- C. Install in accordance with manufacturer's specifications.

END OF SECTION 21 10 00



DIVISION 22: PLUMBING



SECTION 22 05 16: EXPANSION FITTINGS AND LOOPS FOR PLUMBING PIPES

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes the fittings and loops for plumbing pipes in the Delta T-90 House.

1.2 REFERENCES

- A. Appendix B: Page 620-621
- B. Construction Documents: P-102, P-103, P-603, P-604

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Charlotte Pipe and Foundry Company
P.O. Box 35430
Charlotte, NC 28235
Phone: (800)-438-6091

2.2 PRODUCTS

- A. Charlotte PVC 400 Sanitary Tee
 - 1. Model Number: PVC 400 03463 or equal
 - 2. Location: Wet wall
 - 3. Diameter: 1 1/2"
 - 4. Available: Charlotte Pipe and Foundry Company

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in accordance to manufacturer's recommendations.

END OF SECTION 22 05 16



SECTION 22 11 16: DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. This section including the domestic water piping of the Delta T-90 House.

1.2 REFERENCES

- A. Appendix B: Page 622-630
- B. Construction Documents P-101

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Watts
815 Chestnut Street
North Andover, MA, 01854-6098
Phone: (847)-535-1000
- B. JM Eagle
5200 West Century Boulevard
Los Angeles, CA 90045
Phone: (800)-621-4404
- C. Ipex
10100 Rodney Street
Pineville, North Carolina 28134
Phone: (704)-889-2431

2.2 PRODUCTS

- A. Watts Waterpex Tubing
 - 1. Model Number: WPTC08-10R or equal
 - 2. Location: Wet wall
 - 3. Use: Hot & Cold water
 - 4. Outside Diameter: 3/4"
 - 5. Length: 20'
- B. 4" F480 Well Casing Schedule 40
 - 1. Model Number: Schedule 40 or equal
 - 2. Location: Wet wall
 - 3. Outside Diameter: 4 1/2"
 - 4. Inside Diameter: 4"
- C. 1 1/2" Xirtec140 Ipex Schedule 40 PVC
 - 1. Location: Wet wall
 - 2. Diameter: 1 1/2"



3. Maximum Pressure: 330 psi
4. Available: IPEX

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in accordance to manufacturer's recommendations.

END OF SECTION 22 11 16



SECTION 22 11 23: DOMESTIC WATER PUMPS

PART 1 – GENERAL

1.1 SUMMARY

- A. This is a temporary assembly that is only used for the purpose of the competition in Irvine, CA and does not apply to the affordability contest of the Delta T-90 House.
- B. This section includes the pump used to supply all potable water to the Delta T-90 House during Solar Decathlon 2013.

1.2 RELATED SECTIONS

- A. Section 22 11 16: Domestic Water Piping
- B. Section 22 12 19: Facility Ground Mounted, Potable Water Storage Tanks
- C. Section 22 33 13: Instantaneous Electric Domestic Water Heaters

1.3 SUBMITTALS

- A. Product Data

1.4 REFERENCES

- A. Appendix B: Page 633-634
- B. Construction Documents: P-101, P-102, P-103, P-603

PART 2- PRODUCTS

2.1 MANUFACTURER

- A. W W Grainger Corporate Office
100 Grainger Pkwy
Lake Forest, IL 60045

2.2 PRODUCTS

- A. Liberty Automatic Drain Pump
 - 1. Model Number: 405
 - 2. Above Grade, ½ HP
 - 3. Voltage: 115
 - 4. Amps: 7.3
 - 5. Dimensions: 14 1/8" x 13 5/8"
 - 5. Max Temp: 180 degrees Fahrenheit

2.3 ACCESSORIES

- A. 1 1/4" foot valve
- B. 1 1/4" check valve
- C. 1 1/4" priming tee

PART 3- EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's recommendations.



END OF SECTION 22 11 23

SECTION 22 12 19: FACILITY GROUND-MOUNTED, POTABLE WATER STORAGE TANKS

PART 1 – GENERAL

1.1 SUMMARY

- A. This is a temporary assembly that is only used for the purpose of the competition in Irvine, CA and does not apply to the affordability contest of the Delta T-90 House.
- B. This section includes the storage tank for potable water.

1.2 RELATED SECTIONS

- A. Section 22 11 16: Domestic Water Piping
- B. Section 22 11 23: Domestic Water Pumps

1.3 SUBMITTALS

- A. Product Data

1.4 REFERENCES

- A. Appendix B: Page 635-638
- B. Construction Documents: F-102, A-101, A-501

PART 2- PRODUCTS

2.1 MANUFACTURER

- A. Norwesco, Inc.
P.O. Box 439
4365 Steiner Street
St. Bonifacius, MN 55375-0439
Phone: 800 - 328 - 3420

2.2 PRODUCTS

- A. Two (2) Norwesco Vertical Water Storage Tanks: 500 Gallon Capacity (each)
 - 1. Part Number: N-43101
 - 2. Location: Outside North side of the Delta T-90 house
 - 3. Finish: Black
 - 4. Dimensions:
 - a. Overall height: 73"
 - b. Diameter: 48"
 - 5. Storage Capacity: 500 Gallons
 - 6. Fill Opening: 16'
- B. Norwesco Vertical Water Storage Tanks: 305 Gallon Capacity
 - 1. Part Number: N-40702
 - 2. Location: Outside North side of the Delta T-90 house
 - 3. Finish: Black



4. Dimensions:
 - a. Overall height: 49"
 - b. Diameter: 46"
5. Storage Capacity: 305 Gallons
6. Fill Opening: 16 3/8"

PART 3- EXECUTION

3.1 PLACEMENT

- A. Tanks will rest on existing pavement on the North side of the Delta T-90 House.

3.2 INSTALLATION

- A. Plumb with 2" PVC piping unless otherwise specified.
- B. Install in accordance with manufacturer's specifications.

END OF SECTION 22 12 19



SECTION 22 33 00: INSTANTANEOUS ELECTRIC DOMESTIC WATER HEATERS

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes the mechanism for a single instantaneous water heater in the Delta T-90 House.

1.2 RELATED SECTIONS

- A. Section 22 11 16: Domestic Water Piping

1.3 SUBMITTALS

- A. Product Data

1.4 REFERENCES

- A. Appendix B: Page 639-648
B. Construction Documents P-101, P-102, P-103, E-103, P-603

PART 2- PRODUCTS

2.1 MANUFACTURERS

- A. Steibel Eltron USA
17 West Street
West Hatfield, MA 01088
Phone: 413 - 247 - 3380
www.stiebel-eltron-usa.com
- B. Flotec
P.O. Box 342
Delevan, WI 53115
(800) 526-3757

2.2 PRODUCTS

- A. Steibel EltronTempra 20 Plus Electric Tankless Water Heater
1. Model Number: 094922100658 or equal
 2. Location: Utility closet
 3. Dimensions:
 - Width: 16 5/8"
 - Height: 14 1/2"
 - Depth: 4 5/8"
 4. Weight: 15.4 lbs
 5. Working Pressure: 150 psi
 6. Electrical
 - Wattage: 19.2 kW
 - Voltage: 240 V
 - Current: 2 x 40 A



2.3 ACCESSORIES

- A. Pre-Charged Pressure Tanks
 1. Model Number: FP7100H-08
 2. Location: Pavement on north wall
 3. Tank Precharge: 40 psi Nitrogen-rich charge
 4. Dimensions: 12" x 14"
 5. Maximum Pressure Rating: 100 PSI
- B. Shallow Well Jet Pump
 1. Model Number: FP401215H-10
 2. Location: Pavement on north wall
 3. Max Pressure: 77 psi
 4. Maximum Capacity: 8 GPM
 5. AMP Draw (full load): 9.4 amps
 6. Maximum Water Temperature: 120 degrees F
- C. Adjustable Three Way Thermostatic Mixing Valve
 1. Model Number: 521 Series
 2. Setting Range: 85-150 degrees
 3. Max working pressure: 200 psi
 4. Minimum flow rate for optimal performance: 1.3 GPM
- C. PEX piping

PART 3- EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's recommendations.

END OF SECTION 22 33 00



SECTION 22 41 13: RESIDENTIAL WATER CLOSETS, URINALS, AND BIDETS

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes the residential water closets in the Delta T-90 House.

1.2 SUBMITTALS

- A. Product Data

1.3 REFERENCES

- A. Appendix B: Page 586-587
- B. Construction Documents: I-203, A-111

PART 2- PRODUCTS

2.1 MANUFACTURERS

- A. Penguin Toilet, LLC
28525 Beck Road, Suite 121
Wixom, MI 48393
Phone: 888 - 600 - 0320
www.penguintoilets.com
 - 1. Available through Lowes

2.2 PRODUCTS

- A. Penguin Toilets High Efficiency WaterSense
 - 1. Model Number: 509 or equal
 - 2. Location: Bathroom
 - 3. Finish: White
 - 4. 12" rough-in
 - 5. Gallons per flush: 1.29
 - 6. Meets EPA WaterSense® criteria
 - 7. Price: \$139

PART 3- EXECUTION

3.1 INSTALLATION

- A. Clear 100% silicone caulk shall be used in all joints
- B. Install in accordance with manufacturer's recommendations.

END OF SECTION 22 41 13



SECTION 22 41 16: RESIDENTIAL LAVATORIES AND SINKS

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes the sinks for the Delta T-90 House.

1.2 SUBMITTALS

- A. Product Data

1.3 RELATED SECTIONS

- A. Section 12 35 30.31- Bathroom Casework

1.4 REFERENCES

- A. Appendix B: Page 649-659
- B. Construction Documents: A-111, A-401, I-203, I-206

PART 2- PRODUCTS

2.1 MANUFACTURERS

- A. Kraus USA
12 Harbor Park Drive
Port Washington, NY 11050
Phone: 800 - 775 - 0703
www.kraususa.com

- 1. Available at surplusdecor.com

2.2 PRODUCTS

- A. Kraus under mount single bowl 15-gauge stainless steel kitchen sink

- 1. Model Number: KBU14 or equal
- 2. Location: Kitchen
- 3. Dimensions
 - Width: 18"
 - Height: 10"
 - Length: 30"
- 4. Finish: stainless steel

- B. Kraus 15" White Ceramic Square Bathroom Sink

- 1. Model Number: KCV-120-CH or equal
- 2. Location: Bathroom
- 3. Price: \$120

2.3 ACCESSORIES

- A. Kraus Soap Dispenser
 - 1. Model Number: SD-20
 - 2. Location: Kitchen sink



3. Color: Stainless Steel
4. Length: 4.5"
5. Height: 3"
6. Hole Diameter Required: 1.25"

PART 3- EXECUTION

3.1 INSTALLATION

- A. Level shall be maintained while installing sinks.

END OF SECTION 22 41 16



SECTION 22 41 19: RESIDENTIAL BATHTUBS

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes the bathtub for the Delta T-90 House.

1.2 SUBMITTALS

- A. Product Data.

1.3 REFERENCES

- A. Appendix B: Page 660-661
B. Construction Documents A-111, I-203

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Sterling Plumbing
444 Highland Drive
Kohler, WI 53044
Phone: 1-(800)-783-7546

2.2 PRODUCTS

- A. Sterling Acclaim White Oval Rectangular Skirted Tub
1. Model Number: 71041112-0or equal
 2. Location: Bathroom
 3. Dimensions:
 - Length: 60"
 - Width: 30"
 - Height: 15"
 4. Finish: White
 5. Available: Lowes
 6. Price: \$230.85

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Level shall be maintained while installing bathtub.

END OF SECTION 22 41 19



SECTION 22 41 39: RESIDENTIAL FAUCETS, SUPPLIES, AND TRIMS

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes the faucets, supplies, and trims for the Delta T-90 House.

1.2 SUBMITTALS

- A. Product Data

1.3 REFERENCES

- A. Appendix B: Page 662-669
- B. Construction Documents: A-111, A-401, I-203, I-206

PART 2- PRODUCTS

2.1 MANUFACTURERS

- A. Kraus USA
12 Harbor Park Drive
Port Washington, NY 11050
Phone: 800 - 775 - 0703
www.kraususa.com
 - 1. Available through faucetdirect.com
- B. Elite Home Products
195 Bay 19th Street, 3 Fl
Brooklyn, NY 11214
- C. Kohler Co.
444 Highland Drive
Kohler, WI 53044
 - 1. Available through national chain hardware stores, such as Lowes.

2.2 PRODUCTS

- A. Kraus Single Handel Gooseneck Kitchen Faucet with Pull Out Spray
 - 1. Model Number: KPF – 1621 or equal
 - 2. Location: Kitchen
 - 3. Spout height: 18.5"
 - 4. Finish: stainless steel
- B. Elite Tall Single Handle Sink Faucet
 - 1. Model Number: F371023C or equal
 - 2. Location: Bathroom
 - 3. Finish: Polished Chrome
 - 4. Price: \$75.00



- C. Kohler Coralais Polished Chrome 1-Handle Tub & Shower Faucet Trim Kit With Single Function Showerhead
 - 1. Model Number: T15601-7-CPor equal
 - 2. Location: Bathroom
 - 3. Showerhead Width: 3.97"
 - 4. Finish: Polished Chrome

PART 3- EXECUTION

3.1 INSTALLATION

- A. Clear 100% silicone caulk shall be used at all joints.
- B. Install in accordance with manufacturer's recommendations.

END OF SECTION 22 41 39



DIVISION 23: HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC)



SECTION 23 09 13.23: INSTRUMENTATION AND CONTROL DEVICES

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes sensors and transmitters for energy monitoring used in the Delta T-90 house.

1.2 SUBMITTALS

- A. Product Data

1.3 REFERENCES

- A. Appendix B: Page 671-673

PART 2- PRODUCTS

2.1 MANUFACTURER

- A. PowerWise Systems
6 Mines Rd, Unit A
PO Box 1013
Blue Hill, ME 04614

2.2 SUPPLIER

- A. PowerWise Systems
6 Mines Rd, Unit A
PO Box 1013
Blue Hill, ME 04614

2.3 PRODUCTS

- A. eMonitor 24R
 - 1. Model Number: 24R or equal
 - 2. Location: Electrical Panel / Auxiliary Bedroom
 - 3. xPod: external temperature / RH monitors
 - 4. 32 circuit monitors, plus 2 mains, plus one renewable energy circuit
 - 5. external RH & temperature sensors

PART 3- EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's recommendations.

END OF SECTION 23 09 13.23



SECTION 23 72 23: PACKAGED AIR-TO-AIR ENERGY RECOVERY SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes the ductless heat recovery ventilation system used throughout Delta T-90 house.

1.2 REFERENCES

- A. Appendix B: Page 673-684
B. Construction Documents M-103

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Lunos Luftungestechnik Harford, GmbH
Wilhelmstr. 31-34
13593 Berlin, Germany
Phone +49 (0)30 36 20 01-0
www.lunos.de

2.2 SUPPLIER

- A. 475 Building Supply
131 Union Street
Brooklyn, NY 11231

2.3 PRODUCTS

- A. Lunos E2
1. Model Number: e2
 2. Location: pair- bathroom, bedrooms, living room & kitchen
 3. Dimensions:
 - Length: 12"
 - Width: 6"
 - Height: 6"
 - Weight: 12.2 lbs
 4. Humidity Recovery: 20%-30%
 5. 25 CFM per pair, continuous
 6. Efficiency: 90.6%

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's recommendations.

END OF SECTION 23 72 23



SECTION 23 81 26: SPLIT-SYSTEM AIR CONDITIONERS

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes specifications for the ductless Mini-Split Heat Pump system for the Delta T-90 House.

1.2 SUBMITTALS

- A. Product Data

1.3 REFERENCES

- A. Appendix B: Page 685-708
- B. Construction Documents: M-101, M-102

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Mitsubishi Electric and Electronics USA, Inc.
HVAC Advanced Products Division
3400 Lawrenceville Suwanee Road
Suwanee, Georgia 30024

2.2 SUPPLIER

- A. Homans, Inc.
74 Armand Lane
Williston, VT 05495
Phone (802) 863-0355

2.3 PRODUCTS

- A. Mitsubishi Mr. Slim Mini Split Heat Pump
 - 1. Exterior:
 - a. Model Number: SUZ-KA15NA
 - b. Location: North Exterior Wall
 - c. Dimensions:
 - Width: 31 1/2"
 - Height: 21 5/8"
 - Depth: 11 1/4"
 - Weight: 80 lbs
 - 2. Interior:
 - a. Model Number: SEZ-KD15NA
 - b. Location: Utility closet
 - c. Dimensions:
 - Width: 39"



Height: 7 7/8"

Depth: 27 9/16"

Weight: 54 lbs

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's specifications.

END OF SECTION 23 81 26



SECTION 23 84 16.33: PORTABLE DEHUMIDIFIER

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes the dehumidifier used in the bathroom.

1.2 SUBMITTALS

- A. Product Data

1.3 REFERENCES

- A. Appendix B: 709-711

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Global Industrial
11 Harbor Park Drive
Port Washington, NY 11050
Phone: (888)–978-7759

2.2 PRODUCTS

- A. Bonaire Small Space Mini Dehumidifier
 - 1. Model Number: BDQ01-UC
 - 2. Location: Bathroom
 - 3. Dimensions
 - Depth: 6 1/2"
 - Width: 9 13/16"
 - Height: 17 11/16"
 - 4. Weight: 5 lbs
 - 5. Available: Global Industrial

PART 3 - EXECUTION

1.1 INSTALLATION

- A. Install in accordance with manufacturer's recommendations.

END OF SECTION 23 84 16.33



DIVISION 26: ELECTRICAL



SECTION 26 05 19: LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 – GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Product Data
- B. Comply with NFPA 70, "National Electrical Code."

1.2 REFERENCES

- A. Appendix B: Page 713-726
- B. Construction Documents E-103, E-104, E-602, E-604

PART 2- PRODUCTS

2.1 MANUFACTURER

- A. Simpull Solutions
1 Southwire Drive
Carrolton, Georgia 30119
(770) 832-4242
- B. Specified Technologies Inc.
210 Evans Way
Somerville, NJ 08876
Phone: 1-(908)-526-800

2.2 PRODUCTS

- A. SER 4/0 Alumaflex
 - 1. Style: SER
 - 2. Type: XHHW-2
 - 3. 600 Volts
 - 4. Stranded Aluminum
 - 5. 3 Conductor 4/0 AWG; 1 Conductor 2/0 AWG
 - 6. Used for Line Voltage power transfer to electrical device located throughout the house.

2.3 ACCESSORIES

- A. BlazeStop Intumescent Firestop Caulk
 - 1. Model Number: WF320
 - 2. Location: Inside the walls where gaps are formed from the electricalwiring
 - 3. ASTM E-814
 - 4. Rating: UL 1479

PART 3- EXECUTION

3.1 INSTALLATION

- A. Install according to manufacturer's specification.

END OF SECTION 26 05 19



SECTION 26 05 26: GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Product Data
- B. Comply with NFPA 70, "National Electrical Code."
- C. This is for Solar Decathlon 2013 only

1.2 REFERENCES

- A. Appendix B: Page 727- 732
- B. Construction Documents E-101, A-212
- C. See Interconnection checklist

PART 2- PRODUCTS

2.1 MANUFACTURER

- A. Galvan Industries
7320 Millbrook Road
Harrisburg, North Carolina 28075
(800) 277-5675

2.2 PRODUCTS

- A. Galvan Rod
 - 1. Ground Electrical System
 - 2. 4 AWG copper wire
 - 3. Length: 100'
 - 4. <http://www.galvanelectrical.com>
- B. Galvan Rod Clamp
 - 1. Ground Electrical System
 - 2. Galvan 5/8" Copper Alloy Ground Rod Clamp
 - 3. <http://www.galvanelectrical.com>
- C. Grounding Electrode Conductor
 - 1. Type: 4 AWG
 - 2. Material: Copper

PART 3- EXECUTION

3.1 INSTALLATION

- A. Prepare grounding location by clearing debris and other obstructions
- B. Bond Main Service Panel and PV circuit bare ground copper wires to grounding rod.
- C. Correct deficiencies in or remove and reinstall wires and connectors that do not comply with requirements.

END OF SECTION 26 05 26



SECTION 26 05 33: RACEWAY AND BOXES FOR ELECTRICAL

PART 1 – GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Product Data
- B. Comply with NFPA 70, "National Electrical Code."
- C. Comply with NEC 406.9

1.2 REFERENCES

- A. Appendix B: Page 733-745
- B. Construction Documents: E-107, E-602, E-604

PART 2- PRODUCTS

2.1 MANUFACTURERS

- A. JM Eagle
 - 5200 West Century Boulevard
 - Los Angeles, CA 90045
 - Phone: (800)-621-4404
- B. Carlon Electrical Supply
 - 1. Available through Home Depot
- B. Legrand/Pass & Seymour
 - P.O. Box 4822
 - Syracuse, NY 13221
 - Phone: (800)-776-4035
 - <http://www.jmeagle.com>.

2.2 PRODUCTS

- A. Raceway and Conduit
 - 1. Electrical Nonmetallic Tubing used as raceway or conduit walls of house
 - 2. Rigid PVC Schedule 40 Conduit
- B. Single, Double, and Four Gang Non Metallic junction box for residential and light commercial use
- C. P & S Wiring Devices
 - 1. Single weather proof for outdoor receptacles
- D. Legrand P122rn Switch & Outlet Box
 - 1. Model Number: P122RNor equal
 - 2. Location: Interior of House
 - 3. Dimensions:
 - Depth: 3.375"
 - Width: 2.25"
- E. Wireway Straight Section Cover



1. Model Number: 6648 GRT NK
 2. Type: 3R
 3. UL 870 listed
 4. Material: 16 gauge steel
 5. Dimensions: 6" x 6" x 36"
 6. Knockout Quantity: 15
- F. Royal Junction Box
1. Model Number: RJB88L
 2. Location: Roof
 3. Dimensions: 8" x 8"

2.3 METER HOUSING

- A. Milbank 200 AMP Ringless Meter Main
1. Model Number: U5898-0-200
 2. Location: Approx. 5 feet above grade on north wall
 3. 200 Amp Main Breaker
 4. Dimensions:
 - Depth: 4.5"
 - Width: 17"
 - Height: 34.5"

PART 3- EXECUTION

3.1 INSTALLATION

- A. Set units level, plumb, and true to line, without wrap or rack of frames and panels and anchor securely in place.
- B. Fasten raceway and boxes securely in place, with provisions for thermal and structural movement. Install with concealed fasteners, unless otherwise indicated.
- C. Repair, refinish, or replace raceway or boxed damaged during installation, as directed by Electrician

END OF SECTION 26 05 33



SECTION 26 06 20.16: ELECTRICAL PANELBOARD SCHEDULE

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes the electrical panelboard used in the Delta T-90 House.

1.2 SUBMITTALS

- A. Product Data

1.3 REFERENCES

- A. Appendix B: Page 670-673
- B. Construction Documents E-604

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Eaton Corporation
Investor Relations
1111 Superior Avenue
Cleveland, OH 44114

2.2 PRODUCTS

- A. Single Phase Main Circuit Breaker BR4040B200
 - 1. Model Number: BWH25KAIC or equal
 - 2. Location: Main house
 - 3. Size: L1
 - 4. Amps: 200
 - 5. 40 breaker slots
- B. Circuit Breaker
 - 1. Type: BR, Combination
 - 2. Location: Main House
 - 3. AFCI

PART 3 - EXECUTION

1.1 INSTALLATION

- A. Install in accordance with manufacturer's recommendations

END OF SECTION 26 06 20.16



SECTION 26 24 16: PANELBOARDS

PART 1 – GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Product Data
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Comply with NEMA PB
 - 1. www.nema.org/

1.2 REFERENCES

- A. Appendix B: Page 746-758
- B. Construction Documents: E-604, E-603, E-602
- C. Refer to E-604 – Service Panel Chart

PART 2- PRODUCTS

2.1 GENERAL REQUIREMENTS FOR PANELBOARDS

- A. Enclosures: Flush and surface-mounted cabinets; NEMA 250, Type 1.
 - 1. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover.
- B. Incoming Mains Location: Top
- C. Phase, Neutral, and Ground Buses: Tin-plated aluminum
- D. Conductor Connectors: Suitable for used with conductor material and sizes.
 - Material: Tin-plated copper.
 - Main and Neutral Lugs: Mechanical type.
 - Ground Lugs and Bus Configured Terminators: Mechanical Type.
- E. Panelboard Short-Circuit Current Rating: Rated for series-connected system with integral or remote upstream overcurrent protective devices and labeled by an NRTL. Include size and type of allowable upstream and branch devices, and listed and labeled for series-connected short-circuit rating by an NRTL.
- F. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals.

2.2 DISTRIBUTION PANELBOARDS

- A. Mains: Circuit breaker 200 Amp
- B. Smaller: Plug-in circuit breakers.
- C. Main Service Panel
 - 1. Service panel for connecting grid and house sub panels
 - 2. Cutler Hammer BR4040B-200
 - 3. www.eaton.com



- D. Sub Service Panels
 - 1. Service panels for house electrical wiring in each module
 - 2. Square D- Q0140M200C or equal
 - 3. <http://products.schneider-electric.us/products-services/>
- E. Mains: Circuit breaker, BWH2200 (200 A, 25,000 kAIC)
- F. Branch Overcurrent Protective Devices: Plug-in circuit breakers, replaceable without disturbing adjacent units.

2.3 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

- A. Milbank 200 AMP Ringless Meter Main
 - 1. Model Number: U5898-0-200
 - 2. Location: Approx. 5 feet above grade on north wall
 - 3. 200 Amp Main Breaker
 - 4. Dimensions:
 - Depth: 4.5"
 - Width: 17"
 - Height: 34.5"
- B. Ground Fault Breaker
 - 1. Protect house electric system from voltage spikes
 - 2. Schneider Electric Q02175SB or equal
 - 3. Locations: Kitchen, Bathroom, and outside
 - 4. Available through Eaton Corporation
 - 5. <http://ecatalog.squared.com/fulldetail.cfm?partnumber=Q02175SB>
- C. Arc Fault Breaker
 - 1. Eaton BR115AF or equal
 - 2. <http://ecatalog.squared.com/fulldetail.cfm?partnumber=Q0120CAFIC>
- D. Circuit Breaker
 - 1. Available through Eaton

PART 3- EXECUTION

3.1 INSTALLATION

- A. Receive, inspect, handle, store, and install panel boards and accessories according to NECA 407 and NEMA PB 1.1.
- B. Mount bottom of trim 55 inches above finished floor unless otherwise indicated
- C. Arrange conductors into groups; bundle and wrap with wire ties.
- D. Create a directory to indicate installed circuit loads and incorporating Owner's final room designations. Obtain approval before installing. Use a computer or typewriter to create directory.

END OF SECTION 26 24 16



SECTION 26 27 26: WIRING DEVICES

PART 1 – GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Product Data
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Comply with NFPA 70.
- D. Compliance with NEC 406.12

1.2 REFERENCES

- A. Appendix B: Page 759-792
- B. Construction Documents E-104, E-103

PART 2- PRODUCTS

- A. Convenience Receptacles: NEMA WD 1, NEMA WD 6, Configuration 5-20 R, and UL 498
 - 1. Legrand Pass and Seymour or equal
 - 2. BR20W-L or equal
 - 3. Tamper Resistant, in compliance with NEC 406.12
 - 4. Weather Resistant, in compliance with NEC 406.9 (A) and (B)
 - 5. <http://www.legrand.us/weatherproof-covers-boxes.aspx#.UVr4wXBQYfw>
- B. Duplex GFCI Convenience Receptacles: 125 V, 15 A, straight blade, feed-through type. NEMA WD 1, NEMA WD 6, UL 498, and UL 943, Class A, and include indicator light that is lighted when device is tripped.
 - 1. Legrand Pass and Seymour or equal
 - 2. Model Number: VGF15W-M-L or equal
 - 3. Tamper Resistant, in compliance with NEC 406.12
 - 4. Weather Resistant, in compliance with NEC 406.9 (A) and (B)
 - 5. <http://www.legrand.us/weatherproof-covers-boxes.aspx#.UVr4wXBQYfw>
- C. Switches: NEMA WD 1 and UL 20. Single-pole, Single-throw, 120/277 V, 20 A; for use with mechanically held lighting contactors.
 - 1. Products: Legrand Pass and Seymour or equal
 - 2. 1301-7W-L or equal
 - 3. Tamper Resistant, in compliance with NEC 406.12
 - 4. <http://www.legrand.us/>
- D. Wall Plates, Finished Areas: Smooth, high-impact thermoplastic fastened with metal screws having heads matching plate color.
 - 1. Legrand Pass and Seymour or equal



2. Single gang, Duplex Receptacle faceplate
3. 5132W-SP-L or equal
- E. Wall Plates, Unfinished Areas: Smooth, high-impact thermoplastic with metal screws.
- F. Wall Plates, Damp Locations: Thermoplastic with spring-loaded lift cover, and listed and labeled for use in wet locations.
- G. Cast Weatherproof Cover Duplex Receptacle, Vertical
 1. Model Number: CA8WV or equal
 2. Dimensions: 4.56" x 2.81"
- H. Legrand Pass and Seymour Receptacle
 1. Model Number: 0301L or equal
 2. Location: Interior of House
 3. Electrical:
 - Volts: 125
 - Amps: 15
 4. Tamper Resistant, in compliance with NEC 406.12
- I. Legrand Pass and Seymour Cover, Outlet Box
 1. Model Number: TP2-W or equal
 2. Location: Interior of House
- J. Legrand Pass and Seymour Switch
 1. Model Number: 660-W or equal
 2. Location: Interior of House
 3. Electricity:
 - Volts: 120
 - Amps: 15
 5. Tamper Resistant, in compliance with NEC 406.12

PART 3- EXECUTION

3.1 INSTALLATION

- A. Comply with NECA 1, including the mounting heights listed in that standard, unless otherwise noted.
- B. Install devices and assemblies plumb, level and square with building lines.
- C. When mounting into metal boxes, remove the fiber or plastic washers used to hold device mounting screws in yokes, allowing metal-to-metal contact.
- D. Install unshared neutral conductors on line and load side of dimmers.
- E. Mount devices flush, with long dimension vertical, and grounding terminal of receptacles on top unless otherwise indicated. Group adjacent devices under single, multi-gang wall plates.

END OF SECTION 26 27 26



SECTION 26 28 16: ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes the switches and circuit breakers used for the Delta T-90 House.

1.2 SUBMITTALS

- A. Product Data

1.3 REFERENCES

- A. Appendix B: Page 793-800
B. Construction Documents E-103, E-104, E-602, E-603

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Eaton Corporation
Investor Relations
1111 Superior Avenue
Cleveland, OH 44114
- B. Ronk Electrical Industries, Inc.
106 E State Street
Nokomis, IL 62075
Phone: (217) 563-8333

2.2 PRODUCTS

- A. QO200TR AC Disconnect Molded Case Switch
1. Model Number: BR or equal
 2. Location: house
 3. Dimensions:
Depth: 3.88"
Height: 6.5"
Width: 4.63"
 4. Electrical:
Voltage: 240 V
Current: 60A
- B. Ronk Generator Transfer Switch
1. Model Number: 7205A or equal
 2. Location: Connected with two main trunks from inverter
 3. Double Pole-Double Throw with 200 amp main contacts, 200 amp aux contacts
 4. Weight: 35 lbs

PART 3 - EXECUTION



1.1 INSTALLATION

- A. Install in accordance with manufacturer's recommendations

END OF SECTION 26 28 16



SECTION 26 51 13: INTERIOR LIGHTING FIXTURES, LAMPS, AND BALLASTS

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes the lighting fixtures and lamps on the interior of the Delta T-90 House.

1.2 SUBMITTALS

- A. Product Data

1.3 REFERENCES

- A. Appendix B: Page 801-804
- B. Construction Documents E-104

PART 2- PRODUCTS

2.1 MANUFACTURER

- A. Yeti Solar
YetiSolar.com
(603) 359-9696

2.2 PRODUCTS

- A. Exclamation Light
 1. Location: Living room, kitchen
 2. Type: LED
 3. Power: 12 Volts DC
 4. 1600 lumens
 5. Available: Yeti Solar
- B. LED
 1. Number of LEDs per light fixture: 4
 2. Color Temperature: 4500 K
 3. Efficacy: 128 lumens/watt
 4. Total Lumens: 1620 per light fixture
- C. LED Driver
 1. 120V AC 60 HZ supply
 2. 12V DC, 1.05 Amp output (12.6 W output)
 3. Power Factor: 0.98
 4. Efficiency: 82%

2.3 ACCESSORIES

- A. Legrand New Construction Slides
 1. Model Number: 65521
 2. Location: Living Room Fan
 3. Spans: 16"-24"



4. Available: Legrand
- B. Edison sockets
1. 120V AC 60 HZ supply
 2. LED light bulbs

PART 3- EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's recommendations.

END OF SECTION 26 51 13



DIVISION 28: ELECTRICAL SAFETY AND SECURITY



SECTION 28 05 13: CONDUCTORS AND CABLES FOR ELECTRONIC SAFETY AND SECURITY

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes the conductors and cables for electronic safety and security used for the Delta T-90 House.

1.2 SUBMITTALS

- A. Product Data

1.3 REFERENCES

- A. Appendix B: Page 807-814
- B. Construction Documents: E-103

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Southwire Company
One Southwire Drive
Carrollton, GA 30119
- B. LV Building & Wire Equipment Cables
600 Parker Street
Elm City, NC 27822
Phone: (800)-644-4547
 - 1. Available at Nexans

2.2 PRODUCTS

- A. Romex Simpull NMD90 Three Wire Conductor
 - 1. Model: CU-NMD90
 - 2. Size (AWG): 12
 - 3. Insulation Thickness: 0.004"
- B. EnergexNM-B copper insulated cable
 - 1. Model: Energex NM-B
 - 2. Size: 12 AWG
 - 3. Electrical: 600 V

PART 3 - EXECUTION

1.1 INSTALLATION

- A. Install in accordance with manufacturer's recommendations

END OF SECTION 28 05 13



SECTION 28 30 00: ELECTRONIC DETECTION AND ALARM

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes the conductors CO2 Monitor used for safety within the Delta T-90 House.

1.2 SUBMITTALS

- A. Product Data

1.3 REFERENCES

- A. Appendix B: Page 815-823
- B. Construction Documents: F-101

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. First Alert
3901 Liberty Street Road
Aurora, Illinois, 60504
Phone: (630) 851-7330

2.2 PRODUCTS

- A. Kidde Carbon Monoxide Alarm
 - 1. Model: KN-COB-IC or equal
 - 2. Electrical: 120 VAC plug in with battery backup
 - 3. Color: White
 - 4. Loudness: 85 dB alarm
 - 5. Sensor: Electrochemical
 - 6. Available: Home Depot
- B. Sprinkler Alarm Strobe/Horn/Sign Combination SASH-24
 - 1. Model Number: 1000755
 - 2. Location: Exterior north wall of house
 - 3. Voltage: 12/24 VDC
 - 4. Dimensions: 10 3/4" x 9" x 4 1/2"

PART 3 - EXECUTION

1.1 INSTALLATION

- A. Install in accordance with manufacturer's recommendations

END OF SECTION 28 30 00



SECTION 28 31 46: SMOKE DETECTION SENSORS

PART 1 – GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Product Data and System Operating Description.
- B. Submittals to Authorities Having Jurisdiction: In addition to distribution requirements for submittals, make an identical submittal to authorities having jurisdiction. To facilitate, review, and include copies of annotated Contract Drawings as needed to depict component locations.
- C. Comply with NFPA 72.
- D. UL listed and labeled.
- E. Electrical Components, Devices, and Accessories: Listed and labeled as directed in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.2 REFERENCES

- A. Appendix B: Page 824-826
- B. Construction Documents: F-101, A-121

PART 2- PRODUCTS

2.1 MANUFACTURERS

- A. First Alert
3901 Liberty Street Road
Aurora, Illinois, 60504
Phone: (630) 851-7330

2.2 PRODUCTS

- A. Smoke Detectors
 - 1. Kidde Smoke Alarm and Carbon Monoxide Alarm
 - a. Model: KN-COSM-IB
 - b. Electrical: 120 VAC
 - c. Color: White
 - d. CO Sensor: Electrochemical
 - e. Size: 5.75" in diameter x 1.7" depth
 - f. Available: Home Depot
- B. Wire and Cable
 - 1. UL listed and labeled as complying with NFPA 70 Article 760
 - 2. Solid Copper Conductors with 600 V rated, 75 deg. C colored-coded NO 12 insulation AWG or larger as required by local codes

PART 3- EXECUTION

3.1 INSTALLATION



- A. Install and test systems according to NFPA 72. Comply with NECA 1.
- B. Install wiring "fished" in concealed spaces and exposed on ceiling and walls where indicated.
- C. Wire system per manufacturer specifications.

END OF SECTION 28 31 46



DIVISION 32: EXTERIOR IMPROVEMENTS



SECTION 32 05 13: SOILS FOR EXTERIOR IMPROVEMENTS

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes the potting soil that will be in the pots for the plants.

1.2 RELATED SECTIONS

- A. Section 32 93 23- Plants and Bulbs
- B. Section 32 93 33- Shrubs

1.3 SUBMITTALS

- A. Material Safety Data Sheet

1.4 REFERENCES

- A. Appendix B: Page 828-829
- B. Construction Documents: A-101, L-101, L-401

PART 2- PRODUCTS

2.1 MANUFACTURER

- A. The Scotts Company
14111 Scottslawn Road
Marysville, OH 43041
(937)-644-0011
 - 1. Available at Home Depot

2.2 PRODUCTS

- A. Scotts 1 cu. ft. Premium Garden Soil
 - 1. Model Number: 72251750
 - 2. Location: Pots of plants in planting bed
 - 3. Size: 1Cu. Ft.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Install in accordance to manufacturer's specifications.

END OF SECTION 32 05 13



SECTION 32 05 16: AGGREGATES FOR EXTERIOR IMPROVEMENTS

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes the gravel that will be placed under the pots in the planting bed.

1.2 RELATED SECTIONS

- A. Section 32 91 13.26: Planting Beds

1.3 REFERENCES

- A. Appendix B: Page 830-833
- B. Construction Documents: A-101, L-101, L-401

PART 2- PRODUCTS

2.1 MANUFACTURER

- A. The Home Depot
759 Harvest Lane
Williston, VT 05495
Phone: (802)-872-0039
www.homedepot.com

2.2 PRODUCTS

- A. Gravel
 - 1. Type: Pavestone 0.5 cubic feet All Purpose Decorative Stone
 - 2. Location: Bottom of planting beds
 - 3. Available: Home Depot
- B. Pebbles
 - 1. Type: Vigoro 0.5 cubic feet Pea Pebbles
 - 2. Location: Planting Beds
 - 3. Available: Home Depot

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Install in accordance with the construction documents.

END OF SECTION 32 05 16



SECTION 32 91 13.16: MULCHING

PART 1 – GENERAL

1.1 SUMMARY

A. This section includes the mulch that will be in the planting beds.

1.2 RELATED SECTIONS

A. Section 32 91 13.26: Planting Beds

1.3 REFERENCES

A. Appendix B: Page 834-835

B. Construction Documents: A-101, L-101, L-401

PART 2- PRODUCTS

2.1 MANUFACTURER

A. The Scotts Company

14111 Scottslawn Road

Marysville, OH 43041

(937)-644-0011

1. Available at Home Depot

2.2 PRODUCTS

A. Scotts Earthgro 2 Cu. Ft. Brown Mulch

1. Model Number: 647185

2. Location: Planting bed

3. Size: 2 Cu. Ft.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Install in accordance to manufacturer's specifications and the construction documents.

END OF SECTION 32 91 13.16



SECTION 32 91 13.26: PLANTING BEDS

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes the lumber necessary to construct the planting beds.

1.2 RELATED SECTIONS

- A. Section 32 05 16: Aggregates for Exterior Improvements
- B. Section 32 93 23: Plants and Bulbs

1.3 REFERENCES

- A. Appendix B: Page 12-13, 169-170,
- B. Construction Documents: A-101, L-101, L-401

PART 2- PRODUCTS

2.1 MANUFACTURER

- A. Allen Lumber
707 Stone Cutters Way
Montpelier, VT 05602
(802)-223-2335
- B. Fontaine Forestry and Millworks
East Montpelier, Vermont
United States
Phone: (802)-223-7719
www.fontainemillworks.com

2.3 PRODUCTS

- A. 2 x 4" Rough Sawn Lumber
 - 1. Dimensions: 2" x 4"
 - 2. Location: Framing for Planter Boxes
 - 3. Species: Pine
- B. 5/4 x 6 Rough Sawn Cedar
 - 1. Dimensions: 5/4" x 6" x various lengths
 - 2. Location: Siding of all Planter Box
 - 3. Species: Cedar

2.4 ACCESSORIES

- A. 2 1/2" Torque screws
- B. Planting Pots
 - 1. Type: Coex Round Pots
- C. Watering Can
 - 1. Type: Fiskars 2-Gallon Watering Can



PART 3 – EXECUTION

3.1 INSTALLATION

- A. Install in accordance with the construction documents.

END OF SECTION 32 19 13.26



SECTION 32 93 23: PLANTS AND BULBS

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes the vegetables, herbs, grasses and flowers for the planter boxes on the exterior of the Delta T-90 House.

1.2 RELATED SECTIONS

- A. Section 32 05 16: Aggregates for Exterior Improvements
- B. Section 32 91 13.26: Planting Beds

1.3 REFERENCES

- A. Appendix B: Page 836-859
- B. Construction Documents: A-101, L-101, L-401

PART 2- PRODUCTS

2.1 MANUFACTURER

- A. Planting Depot
32413 San Juan Creek Rd.
San Juan Capistrano, CA 92675

2.2 SUPPLIER

- A. Planting Depot
32413 San Juan Creek Rd.
San Juan Capistrano, CA 92675
(949)-240-2107

2.3 PRODUCTS

- A. Feather Reed Grass
 - 1. Location: Planting Bed 2
 - 2. Price: \$10.00 ea.
- B. Blue Fescue Grass
 - 1. Location: Planting Bed 1
 - 2. Price: \$3.50 ea.
- C. Salvia
 - 1. Location: Planting Bed 1
 - 2. Price: \$8.00 ea.
- D. Alyssum
 - 1. Location: Planting bed 1
 - 2. Price: \$1.50 ea.
- E. Mighty Red Oak Lettuce
 - 1. Location: Planting bed 1



- F. Tomato
 - 1. Location: Planting Bed 1
 - 2. Price: \$2.50 ea.
- G. Sage
 - 1. Location: Planting bed 3
 - 2. Price: \$4.00 ea.
- H. Thyme
 - 1. Location: Planting bed 3
 - 2. Price: \$4.00 ea.
- K. Chives
 - 1. Location: Planting bed 3
 - 2. Price: \$2.50 ea.
- L. Oregano
 - 1. Location: Planting bed 3
 - 2. Price: \$2.50 ea.
- M. Lavender
 - 1. Location: Planting Bed 3
- N. Black Seeded Simpson Lettuce
 - 1. Location: Planting Bed 1

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Install in accordance with the construction documents.

END OF SECTION 32 93 23



SECTION 32 93 33: SHRUBS

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes the vegetables, herbs, grasses and flowers for the planter boxes on the exterior of the Delta T-90 House.

1.2 RELATED SECTIONS

- A. Section 32 05 16: Aggregates for Exterior Improvements
- B. Section 32 91 13.26: Planting Beds

1.3 REFERENCES

- A. Appendix B: Page 859-860
- B. Construction Documents: A-101, L-101, L-401

PART 2- PRODUCTS

2.1 MANUFACTURER

- A. Planting Depot
32413 San Juan Creek Rd.
San Juan Capistrano, CA 92675

2.2 SUPPLIER

- A. Planting Depot
32413 San Juan Creek Rd.
San Juan Capistrano, CA 92675
(949)-240-2107

2.3 PRODUCTS

- A. Desert Mallow
 - 1. Location: Planting Bed 1
 - 2. Price: \$13.00 ea.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Install in accordance with the construction documents.

END OF SECTION 32 93 33



DIVISION 41: MATERIAL PROCESSING AND HANDLING EQUIPMENT



SECTION 41 22 00: CRANES AND HOISTS

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes all information pertaining to construction machinery and materials movement.

1.2 SYSTEM DESCRIPTION

- A. The mobile crane will be used to lift the two modules from the trailer and lower them into place.

1.3 SUBMITTALS

- A. 25 Ton Mantix 4 Mobile Crane

1.4 REFERENCES

- A. Appendix B: Page 863
- B. Construction Documents: 0-101, 0-102, 0-109, 0-602

PART 2- PRODUCTS

2.1 MANUFACTURER

- A. Crainco Inc.
10702 Painter Ave.
Sante Fe Springs, CA 90670
Phone: (562) 903-7290

2.2 PRODUCT/EQUIPMENT

- A. 70 Ton Crane with operator or approved equal
 1. Rate: \$265.00/hr with 4 hr minimum
 2. Travel Permit Fee: \$75.00
 3. Module Weight: 30,000 lbs each without rigging
 4. Dimensions:
 - Length: 40'
 - Outriggers: 26'
- B. Articulated Electric Boom Lift
 1. Rate: \$225.00/day or \$675.00 per week
 2. Delivery and Pick Up Fees: \$100.00
 3. Boom Height: 42'

PART 3- EXECUTION

3.1 DELIVERY, STORAGE & HANDLING

- A. Delivery: The mobile crane will be driven to the site in Irvine, CA by a qualified driver.

3.2 INSTALLATION

- A. The mobile crane will be positioned and properly set in place by the trained operators and rigging crew

END OF SECTION 41 22 00



SECTION 41 62 23: FORKLIFT TRUCKS

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes all information that is referring to the use of forklift trucks during construction and installation.

1.2 SYSTEM DESCRIPTION

- A. The forklift will be used for materials handling that is too large for workers. The forklift will perform the final, precise placement of the two modules.

1.3 SUBMITTALS

- A. Komatsu FG40T

1.4 REFERENCES

- A. Appendix B: Page 864

PART 2- PRODUCTS

2.1 MANUFACTURER

- A. Komatsu Forklift U.S.A.
One Continental Towers
1701 W. Golf Rd P.O. Box 5049
Rolling Meadows, IL 60008

2.2 SUPPLIER

- A. Clairemont Equipment
1330 Misison Rd
Escondino, CA 92029

PART 3- EXECUTION

3.1 DELIVERY, STORAGE & HANDLING

- A. Delivery: Delivery will be secured by the supplier in the form of a roll-back truck. The supplied will also remove the forklift when it is no longer needed.

3.2 INSTALLATION

- A. The forklift will be operated by qualified and trained individuals in accordance with OSHA standards.

END OF SECTION 41 62 23



SECTION 41 65 13: MOBILE AIR COMPRESSORS

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes all information that pertains to the use of a 11v air compressor.

1.2 SYSTEM DESCRIPTION

- A. An air compressor will be used for the installation of and wooden structure or moldings.

1.3 SUBMITTALS

- A. Ingersoll Rand 3 HP Stationary Compressor

1.4 REFERENCES

- A. Appendix B: Page 865-866

PART 2- PRODUCTS

2.1 MANUFACTURER

- A. Ingersoll Rand
800 E Beaty Street
Davidson, NC 28036
Phone: (704)-655-4000

- 1. Available at any national chain store such as Home Depot or Lowes

2.2 SUPPLIER

- A. Any national chain store such as Home Depot or Lowes will carry this product.

2.3 PRODUCT

- A. INGERSOLL RAND 3 HP STATIONARY COMPRESSOR

- 1. Model Number: SS3L3 or equal
- 2. Dimensions:
 - Height: 23”
 - Depth: 20”
 - Width: 23”
- 3. Finish: Cast Iron

PART 3- EXECUTION

3.1 DELIVERY, STORAGE & HANDLING

- A. Delivery: The air compressor can be obtained from the supplier in a pick-up by any member of the Delta T-90 team.

3.2 INSTALLATION

- A. The installation of air compressor is dependent upon the current needs. The compressor will be located close to the power supply on firm level ground and where it will be of most use.

END OF SECTION 41 65 13



SECTION 41 65 16: MOBILE GENERATORS

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes all information pertaining to the mobile generator that will be used on site in Irvine, CA.

1.2 SYSTEM DESCRIPTION

- A. The mobile generator will conform to the OSHA standard decibel levels and provide sufficient power output to use all required power tools.

1.3 SUBMITTALS

- A. Honda EU6500iS 6500 wall output

1.4 REFERENCES

- A. Appendix B: Page 3-6
- B. Construction Documents A-212

PART 2- PRODUCTS

2.1 MANUFACTURER

- A. American Honda Power Equipment Division
4900 Marconi Drive
Alpharetta, GA 30005-8847

2.2 SUPPLIER

- A. Parkway Lawnmower Shop
9935 Muirlands Blvd
Irvine, CA 92618-508
Phone: 949-855-2488

2.3 PRODUCT

- A. Honda EU6500iS 6500
 - 1. Model Number: EU6500I or equal
 - 2. Location: Construction Staging Area
 - 3. Dimensions:
 - Height: 27.5"
 - Length: 33.5"
 - Width: 26.4"
 - 4. Electrical:
 - a. Wattage: 6500 Watts
 - b. Voltage: 120/240 Single-Phrase
 - 5. Available: Parkway Lawnmower Shop, Irvine CA

PART 3- EXECUTION



3.1 DELIVERY, STORAGE & HANDLING

A. Delivery will consist of using a pick-up to transport the generator to the site from the store.

3.2 INSTALLATION

A. The generator installation will consist of initial set up and break in procedures per manufacturer specifications. The generator will be located in the most practical location while maintaining proper distance to minimize unnecessary noise at high levels.

END OF SECTION 41 65 16



DIVISION 46: WATER AND WASTEWATER EQUIPMENT



SECTION 46 00 00: WATER AND WASTE WATER EQUIPMENT

PART 1 – GENERAL

1.1 SUMMARY

- A. This division includes information on the water and wastewater equipment that the Delta T-90 house will utilize. The use of water tanks at the competition is a temporary facility and should not affect the affordability contest.
- B. This section includes the storage tank for greywater, potable water and for the fire suppression system.

1.2 RELATED SECTIONS

- A. Section 22 11 16
- B. Section 22 11 23

1.3 REFERENCES

- A. Appendix B: Page 635-638
- B. Construction Documents P-102, P-501, P-603, P-604, A-101, A-301, C-103, F-601, H-101, P-101

PART 2- PRODUCTS

2.1 MANUFACTURER

- A. The Tank Source
905 Tavern Road
Alpine, CA 91901
www.tanksource.com
 - 1. Available through The Tank Source

2.2 PRODUCTS

- A. Two (2) Norwesco Vertical Water Storage Tanks: 500 Gallon Capacity (each)
 - 1. Part Number: N-43101
 - 2. Location: Outside North side of the Delta T-90 house
 - 3. Finish: Black
 - 4. Dimensions:
 - a. Overall height: 73"
 - b. Diameter: 48"
 - 5. Storage Capacity: 500 Gallons
 - 6. Fill Opening: 16'
- B. Norwesco Vertical Water Storage Tanks: 305 Gallon Capacity
 - 1. Part Number: N-40702
 - 2. Location: Outside North side of the Delta T-90 house
 - 3. Finish: Black
 - 4. Dimensions:
 - a. Overall height: 49"



- b. Diameter: 46"
- 5. Storage Capacity: 305 Gallons
- 6. Fill Opening: 16 3/8"

END OF SECTION 46 00 00



DIVISION 48: ELECTRICAL POWER GENERATION



SECTION 48 14 00: SOLAR ENERGY ELECTRICAL POWER GENERATION EQUIPMENT

PART 1 – GENERAL

1.1 SUMMARY

- A. A flexible light weight module based upon copper, indium, gallium, selenium semiconductor material that provides optimal performance at a zero degree angle. These panels do not use a bracing system for the entire solar array as they adhere to the roof membrane of the Delta T-90 House.

1.2 REFERENCES

- A. Appendix B: Page 869-890
- B. Construction Documents : S-102, A-212, E-601, E-106, E-107, E-603, A-101, A-113, E-101

PART 2- PRODUCTS

2.1 MANUFACTURER

- A. Solopower
6308 North Marine Drive
Portland, OR 97203
Phone: 408-281-1582
<http://solopower.com/products/solopower-sp3s/>
 - 1. Available through Solopower online
- B. SMA America, LLC
6020 West Oaks Blvd, Ste 300
Rocklin, CA 95765
Phone: (916) 625-0870
www.SMA-America.com
- C. Solar BOS
310 Stealth Court
Livermore, CA 94551
Phone: 925-456-7744
- D. 3M
3M Center
St. Paul, MN 55144
- E. ADCO
4401 Page Avenue
P.O. Box 457
Michigan Center, MI 49254

2.2 PRODUCTS

- A. SP1 Solopower Panel
 - 1. Location: On the roof membrane of the Delta T-90 house



2. Finish: Clear
 3. Dimensions:
 - Length: 86.1 in/2.189 m
 - Width: 15.7 in/0.399 m
 - Thickness: 0.1 /2.0 mm
 - Weight: 4.6 lbs / 2.1 kg
 4. Rated Power: 75-95 Watts
- B. Solectria Inverter
1. Model Number: PVI-6500
 2. Location: Near meter disconnect box on north side of house
 2. Dimensions:
 - Width: 28.8 in
 - Height: 17.3 in
 - Depth: 8.2 in
 3. Weight: 88.9 lbs
 4. Output Data:
 - AC power: 6500 W each
 - Max Operating Input Current: 35A
 - Voltage: 240 VAC
 5. Peak Efficiency: 96.3%
 6. Quantity: 1
- C. Solar BOS Source Circuit Combiner
1. Model Number: CST-08-15-N3
 2. Location: Exterior North wall
 3. Features: ETL listed to UL-1741
 4. Configuration: 6 string combiner
 5. Max Fuse Size (Amps) : 30
 6. Steel Enclosure Dimensions: 16" x 12" x 6"
 7. Weight: 30 lbs
- D. 3M Dual Lock Reclosable Adhesive Mounting System
1. Model Number: SJ3560
 2. Location: Velcro Fastener for solar panels to roof
 3. Stem Density: 250
 4. Thickness: 0.23 in
 5. Dimensions: 2" x 50 yards
- E. ADCO Helio Bond Tape



1. Model Number: PVA-600BT
2. Dimensions: 3" x 0.035" x 120'
3. Shear Strength: 5 psi
4. Peel Strength: 10 pssummary oi @ 70 degree F
4. Purpose: PV Module attachment tape

2.3 ACCESSORIES

A. Wire Management System

1. Model Number: WM18-PVC
2. Location: On the roof
3. Cover Dimensions: 3.44 x 1.78 x 18.5'
4. Tray Dimensions: 2.9" x 1.78" x 18.5"
5. Wing Dimensions: 4.03" x 2.33" x 18.5"
6. Tensile Strength: 6200 psi

PART 3 - EXECUTION

3.1 INSTALLATION

- #### A. Install according to manufacturer's specifications.

END OF SECTION 48 14 00

Solar Design Calculations



$\Delta T-90$ PV System Design

Solopower SP1 Panel Specifications

Metric	Units	85	90	95	Final Design
Rated Power (P_{max})	W	85	90	95	95
Voltage at P_{max} (V_{mp})	V	23.3	24.7	26.2	26.2
Current at P_{max} (I_{mp})	A	3.6	3.6	3.6	3.6
Short-circuit current (I_{sc})	A	4.4	4.3	4.2	4.2
Open-circuit voltage (V_{oc})	V	32.4	33.6	34.8	34.8
Efficiency	%	11.2	11.9	12.5	12.5
Temp. Coefficient of I_{sc}	%/ deg. C	-0.03	-0.03	-0.03	-0.03
Temp. Coefficient of V_{oc}	%/ deg. C	-0.36	-0.36	-0.36	-0.36
Max. Series Fuse Rating	A	7	7	7	7
Temp. Coefficient of P_{mp}	%/ deg. C	-0.48	-0.48	-0.48	-0.48
Maximum DC Voltage	V	600			
Standard test conditions	deg C	25			
Environmental Constraints					
Minimum Outdoor Temperature	deg F	-30			
Minimum Outdoor Temperature	deg C	-34			
Total number of PV panels	count	82.4	77.8	73.7	72.0

Values in orange boxes are calculated values in the spreadsheet



Design Calculations

	85	90	95	Final Design
Maximum panel voltage at min. temp.	39.3	40.8	42.2	42.2
Maximum number of panels in a string	15	14	14	14
Maximum short-circuit current (note 3)	4.48	4.38	4.27	4.27
Max (NEC) PV Source current	33.59	32.83	32.06	32.06

Output of 6 equal length strings	7140	7020	7410	6840
# of panels in each string	14	13	13	12
String V _{oc} @ 25 deg C	453.6	436.8	452.4	417.6
Maximum string voltage	550.7	530.3	549.2	507.0

Notes:

1. NEC 690.7(D) - provide protection for unqualified persons. May be an enclosure that permits access by only qualified persons.
2. 90 deg C rated conductors, corrected for temperature using Table 310.15(B)(16) or 310.15(B)(17)
3. Since the coldest temperatures would be at night, and the sun is lowest on the horizon, this maximum is unlikely.



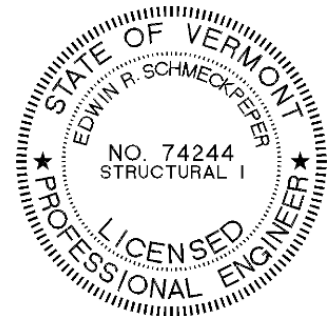
Solar Panel Grouping Chart

Panel #	String	ModuleID	Power rating, Watts	Quantity invoiced, Watts	Unit price per Watt	Invoice, \$	Voc	
1	E	1306AL-0042	95	95	\$1.50	\$142.50	37.2	
2		1306AL-0037	95	95	\$1.50	\$142.50	36.5	
3		1306AL-0026	95	95	\$1.50	\$142.50	36.3	
4		1306AL-0036	90	90	\$1.50	\$135.00	36.3	
5		1306AL-0028	95	95	\$1.50	\$142.50	36.2	
6		1306AL-0025	90	90	\$1.50	\$135.00	36.1	
67		1307ALMD-00070	75	75	\$1.50	\$112.50	30.9	
68		1307ALMD-00040	75	75	\$1.50	\$112.50	30.9	
69		1307ALMD-00104	75	75	\$1.50	\$112.50	30.8	
70		1307ALMD-00071	75	75	\$1.50	\$112.50	30.8	
71		1305ALMD-00216	75	75	\$1.50	\$112.50	30.8	
72		1307ALMD-00038	75	75	\$1.50	\$112.50	30.7	
7		D	1306AL-0027	90	90	\$1.50	\$135.00	36.0
8			1306AL-0034	95	95	\$1.50	\$142.50	35.8
9	1306AL-0031		95	95	\$1.50	\$142.50	35.8	
10	1307AL-0027		90	90	\$1.50	\$135.00	35.8	
11	1306AL-0029		90	90	\$1.50	\$135.00	35.6	
12	1306AL-0041		90	90	\$1.50	\$135.00	35.6	
61	1307ALMD-00079		75	75	\$1.50	\$112.50	31.2	
62	1307AL-0010		75	75	\$1.50	\$112.50	31.1	
63	1307ALMD-00077		75	75	\$1.50	\$112.50	31.0	
64	1307ALMD-00072		75	75	\$1.50	\$112.50	31.0	
65	1307ALMD-00031		75	75	\$1.50	\$112.50	30.9	
66	1307ALMD-00102		75	75	\$1.50	\$112.50	30.9	
13	C		1306AL-0032	90	90	\$1.50	\$135.00	35.6
14			1306AL-0007	90	90	\$1.50	\$135.00	35.5
15		1306AL-0040	90	90	\$1.50	\$135.00	35.5	
16		1306AL-0023	90	90	\$1.50	\$135.00	35.1	
17		1306AL-0030	90	90	\$1.50	\$135.00	35.0	
18		1306AL-0013	90	90	\$1.50	\$135.00	34.8	
55		1307AL-0026	85	85	\$1.50	\$127.50	31.4	
56		1307AL-0011	75	75	\$1.50	\$112.50	31.4	
57		1307AL-0012	75	75	\$1.50	\$112.50	31.4	
58		1305AL-0031	80	80	\$1.50	\$120.00	31.3	
59		1307ALMD-00098	75	75	\$1.50	\$112.50	31.3	
60		1307ALMD-00081	75	75	\$1.50	\$112.50	31.2	
19		F	1306AL-0024	90	90	\$1.50	\$135.00	34.7
20			1306AL-0014	90	90	\$1.50	\$135.00	34.6
21	1306AL-0035		90	90	\$1.50	\$135.00	34.5	
22	1306AL-0022		85	85	\$1.50	\$127.50	34.4	
23	1306AL-0038		90	90	\$1.50	\$135.00	33.8	
24	1306AL-0009		90	90	\$1.50	\$135.00	33.7	
49	1307ALMD-00088		75	75	\$1.50	\$112.50	32.0	
50	1307ALMD-00093		80	80	\$1.50	\$120.00	32.0	
51	1307ALMD-00092		80	80	\$1.50	\$120.00	31.9	
52	1307AL-0023		85	85	\$1.50	\$127.50	31.8	
53	1307ALMD-00073		80	80	\$1.50	\$120.00	31.7	
54	1307ALMD-00097		75	75	\$1.50	\$112.50	31.5	
25	A		1306AL-0012	90	90	\$1.50	\$135.00	33.6
26			1306AL-0010	85	85	\$1.50	\$127.50	33.6
27		1312ALMD-00048	80	80	\$1.50	\$120.00	33.6	
28		1306AL-0011	90	90	\$1.50	\$135.00	33.6	
29		1312ALMD-00052	80	80	\$1.50	\$120.00	33.6	
30		1312ALMD-00058	80	80	\$1.50	\$120.00	33.3	
43		1305AL-0081	85	85	\$1.50	\$127.50	32.6	
44		1312ALMD-00046	75	75	\$1.50	\$112.50	32.4	
45		1307ALMD-00084	80	80	\$1.50	\$120.00	32.3	
46		1307ALMD-00085	80	80	\$1.50	\$120.00	32.3	
47		1306AL-0003	80	80	\$1.50	\$120.00	32.2	
48		1307ALMD-00087	75	75	\$1.50	\$112.50	32.2	
31		B	1312ALMD-00055	80	80	\$1.50	\$120.00	33.3
32			1312ALMD-00062	80	80	\$1.50	\$120.00	33.2
33	1312ALMD-00064		80	80	\$1.50	\$120.00	33.2	
34	1308ALMD-00070		80	80	\$1.50	\$120.00	33.2	
35	1306AL-0004		80	80	\$1.50	\$120.00	33.2	
36	1312ALMD-00057		80	80	\$1.50	\$120.00	33.1	
37	1312ALMD-00061		75	75	\$1.50	\$112.50	32.9	
38	1312ALMD-00051		80	80	\$1.50	\$120.00	32.8	
39	1307ALMD-00091		80	80	\$1.50	\$120.00	32.8	
40	1312ALMD-00047		80	80	\$1.50	\$120.00	32.7	
41	1312ALMD-00042		80	80	\$1.50	\$120.00	32.6	
42	1305AL-0083		85	85	\$1.50	\$127.50	32.6	



Structural Design Calculations
2013 Solar Decathlon Competition
Delta T-90 House
Norwich University

Edwin R. Schmeckpeper, P.E.
4/02/2013





STRUCTURAL DESIGN

General Description

Delta-T-90: A dwelling designed to maintain the comfort zone (70°F) while outside temperatures are -20°F.

The project is conceived as an economical, highly energy efficient, single-family residence. The main building modules are constructed using double wall timber framing.

Foundations

The foundation will consist of dimensional timbers directly bearing on the asphalt surface. For the competition all uplift and overturning forces will be resisted by building weight and the footing stance. The foundation for the permanent location will utilize concrete anchor bolts.

Building structure

The design of the building structure was controlled by thermal efficiency, constructability, and economy. The gravity and lateral forces will be resisted by the same system of elements.



SUPERSTRUCTURE DETAILS:

- Roof framing will utilize engineered and dimensions lumber.
- Roof diaphragms will utilize 3/4"plywood sheathing.
- Floor framing will utilize engineered and dimensional lumber.
- Floor diaphragms will utilize 1-1/8"plywood sheathing.
- The exterior walls will utilize double-wall construction, sheathed with plywood, to achieve increased thermal efficiency.
- The lateral system will utilize exterior shear walls.

STRUCTURAL DESIGN GUIDELINES

Applicable Codes and Standards

The following codes and standards are specified:

- 2013 Solar Decathlon Building Code (SDBC)
- 2012 International Residential Code (IRC)
- ASCE 7-10, Minimum Design Loads for Buildings and Other Structures
- EPA Comprehensive Procurement Guidelines as they relate to recycled content of construction materials, if necessary.
- Fire & Building Safety Code, 2012 (2006), Vermont Department of Public Safety

The following structural design codes will be followed as specified by the governing codes and standards:

- NDS, National Design Specification for Wood Construction (NDS)
- ACI318-11 Building Code Requirements for Structural Concrete

Structural Loading

Uniformly Distributed Live Loading

The following values are specified by the applicable codes and standards or are higher values selected for use on this project.

Occupancy or Use Live Loading

	Uniform (psf)	Concentrated (pounds)
Interior floor, decks, ramps:	50 psf	
Exterior floor, decks, ramps used for tour staging and egress purposes:	100psf	2000 ⁽¹⁾
Roof	20psf	250 ⁽¹⁾
Railings:		200 ⁽²⁾

⁽¹⁾ Non-concurrent with uniform live load

⁽²⁾The concentrated load may be applied in any direction at any point at the top of the rail

Snow Loading

Flat Roof Snow Load: 60 psf

Sloped roof snow loads, snowdrift, and sliding snow will be accounted for in accordance with ASCE 7-10.



Future Use/ Expansion Provisions

Except provisions noted above, no provisions for future changes in use or expansion will be included in the structural design.

Solar Decathlon 2013 Anchoring System Design Parameters

- Ground anchorage shall be 1" diameter steel stakes driven a minimum of 36" into the existing pavement section consisting of asphalt, macadam and underlying soil.
- Teams are responsible for providing their own anchors.
- Minimum strength steel should be A36 mild steel
- Assumed pullout design capacity will be 1,250 pounds
- Assumed shear design capacity will be 1,500 pounds
- The quantity and placement of anchors shall be such that the combination of Actual Pullout Load/1,250 + Actual Shear Load/1,500 shall be less than or equal to 1
- Both threaded or unthreaded rods are permissible.
- Anchors shall be solid - composition pipe is not permissible.
- Anchors shall be installed vertically - angled installation is not permissible.
- Rods will need to be greater than 36" in length to allow a minimum of 36" embedment. The length and connection method is to be determined by each team.
- Teams may choose a rod-end design (i.e. threaded, cotter-pin, etc.) to meet their design requirements.
- Anchors shall be spaced with a minimum distance of 2' between anchors.
- At the conclusion of the event, the stakes will need to be driven into the asphalt to a depth wherein the top of the anchor is at least 4" below the surface of the runway OR will need to be pulled out of the runway surface completely. Prior to being driven into the asphalt, teams may need to saw-cut the top of the anchor to minimize the amount of material to be embedded and remove end features to allow for driving the anchor beneath the surface of the asphalt.



Preliminary Dead Load Calculations

Roof Area = 27.24ft x 36.67ft = 999 sq.ft.
East wall area = west wall area = 356.7 sq.ft.
North wall area = South wall area = 280 sq.ft.

Dense Pack Cellulose:

Density 3.5 lb/cuft. 12,000 lb

Framing lumber.

Southern Yellow pine.

Density with 20% moisture content = 40lbs/cuft

http://www.engineeringtoolbox.com/weight-wood-d_821.html

260 count 2x4 studs at 9 ft = 3,000 lb

12 central beams in roof and floor (3 per side of the house each in the roof and floor)= 6,000 lb

2x12 rafters 40 count at 14 ft = 5,000 lb

2x12 window headers and rim boards = 4,000 lb

2x6 lumber (wet wall, base plates) = 1,000 lb

Total for Framing Lumber = 19,000 lb

Roxul Comfort board insulation

density = 4.4 lb/cuft (Roxul's Website) 2 inches covering external walls = 950 lb

Roxul Top Rock insulation Density = 11 lb/cuft (Roxul's Website)

Total for Roxul insulation = 8,000 lb

Gypsum wall board

1/2 inch (walls) weighs 1.7 lbs per sq. ft.

5/8 inch Ceiling weighs 2.2 lbs per sq. ft.

<http://www.nationalgypsum.com/resources/construction-guide/NGCGypWallBoard.pdf>

Total gypsum board weight = 5,000 lb

Plywood sheathing 5/8" (Subfloor) weighs 1.77 lb/ft²

<http://www.rfcafe.com/references/general/density-building-materials.htm>

Total weight = 2,000 lb

OSB

1/2" OSB (external walls) weighs 1.7 lbs/sqft

3/4" OSB (Roof) weighs 2.5 lbs/sqft

Total OSB weight= 4,000 lb

Finish Flooring

Density 2.5 lb/sqft

Rough average from online sources (values ranged from 1lb/sq.ft. to 3.5 lb/sq.ft.)

Total finish flooring weight = 2,000 lb

Total estimated weight of both modules not including appliances = 52,000 lb

Measured weight during shipping: West Module: 25,000 lb, East Module 29,000 lb = 54,000 lb (without finish siding or appliances).

Wind Load Calculations

Main Wind-Force Resisting System (MWFRS)

Based upon the provisions of ASCE 7-10, section 26.2, for wind load calculations the structure is classified as a “Simple Diaphragm Building” since both windward and leeward wind loads are transmitted by roof and laterally spanning wall assemblies, through continuous floor and roof diaphragms to the MWFRS.

Basic Wind Speed

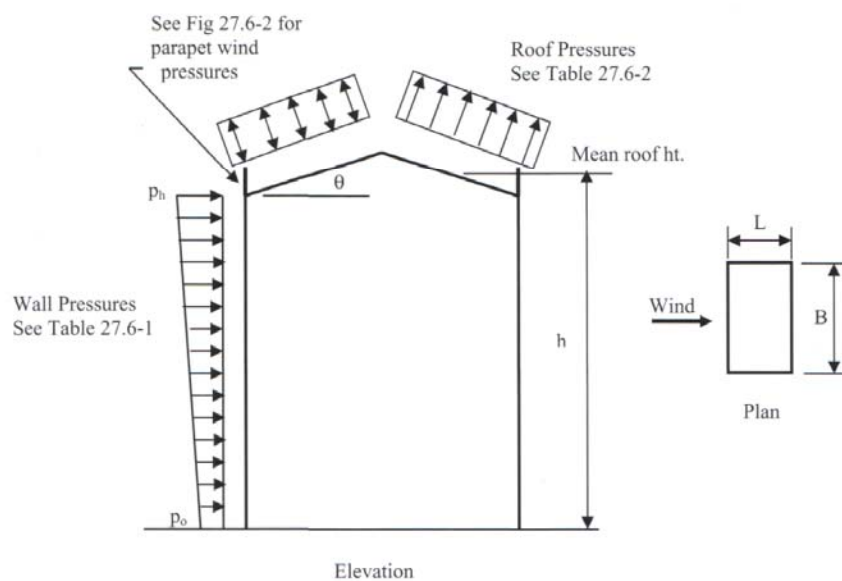
- Competition 85 mph
- Permanent 115 mph (Figure 26.5-1, Category II)

Wind Load Parameters

- Wind Directionality factor $K_d = 0.85$ (Table 26.6-1)
- Exposure Category C
- Topographic factor $K_{zt} = 1.0$ (Section 26.8-2)
- Enclosure classification Enclosed

Based upon the provisions of ASCE 7-10, section 26.2, for wind load calculations the structure is classified as an “Enclosed Building” since the total area of openings in any given wall is less than the sum of the area of openings in the balance of the buildings.

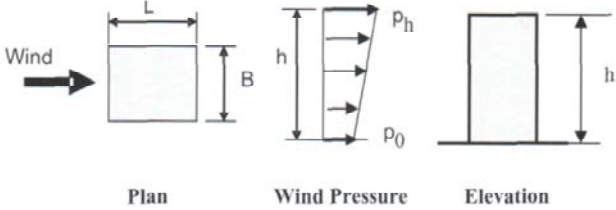
Main Wind Force Resisting System – Part 2		$h \leq 160$ ft.
Figure 27.6-1	Wind Pressures – Walls and Roof	Application of Wind Pressures
Enclosed Simple Diaphragm Buildings		See Tables 27.6-1 and 27.6-2



From Table 27.6-1, Wind Loads on Walls

Exposure C, $V=115\text{mph}$, $h=15\text{ft}$, for $L/B \leq 1.0$: $p_h = p_o = 27.6\text{psf}$, for $L/B=2$: $p_h = p_o = 23.8\text{psf}$

- For wind from East or wind from West: $L/B = 28/36 \leq 1.0$: $p_h = p_o = 27.6\text{psf}$
- For wind from North or wind from South: $L/B = 36/28 = 1.3$, interpolating between the values for $L/B=1$ and $L/B=2$ results in $p_h = p_o = 26.5\text{psf}$

Main Force Resisting System – Part 2		$h \leq 160\text{ ft.}$
Table 27.6-1	Wind Pressures - Walls	Application of Wall Pressures
Enclosed Simple Diaphragm Buildings		
		

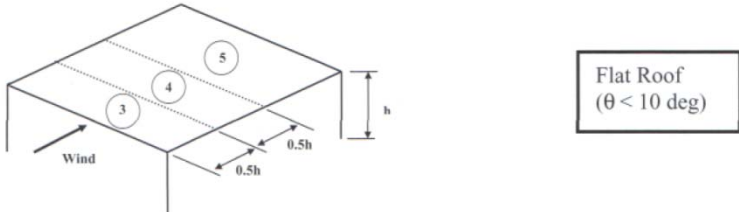
In order to determine wind forces based upon the competition wind velocity of 85mph , the wind pressures determined using a wind velocity of 115mph should be multiplied by $(85/115)^2 = 0.546$

- For 85 mph wind from East or wind from West: $p_{h85} = p_{o85} = 27.6\text{psf}(0.546) = 15.1\text{psf}$
- For 85 mph wind from North or wind from South: $p_{h85} = p_{o85} = 26.5\text{psf}(0.546) = 14.5\text{psf}$

From Table 27.6-2, Wind Loads on Roof, Exposure C, $V=115\text{mph}$, $h=15\text{ft}$, Flat < 2:12 roof.

The roof wind pressures are as follows: Zone 3 $p_{\text{roof}} = -25.9\text{psf}$, Zone 4 $p_{\text{roof}} = -23.1\text{psf}$, Zone 5 $p_{\text{roof}} = -18.9\text{psf}$ (negative means uplift)

The roof wind pressures for a wind velocity of 85mph are Zone 3 $p_{\text{roof}85} = -14.1\text{psf}$, Zone 4 $p_{\text{roof}85} = -12.6\text{psf}$, Zone 5 $p_{\text{roof}85} = -10.3\text{psf}$

Main Wind Force Resisting System – Part 2		$h \leq 160\text{ ft.}$
Table 27.6-2	Wind Pressures - Roof	Application of Roof Pressures
Enclosed Simple Diaphragm Buildings		
		

The reactions at the base of the structure when loaded with wind loads from the West and Dead loads are shown in the following figure.

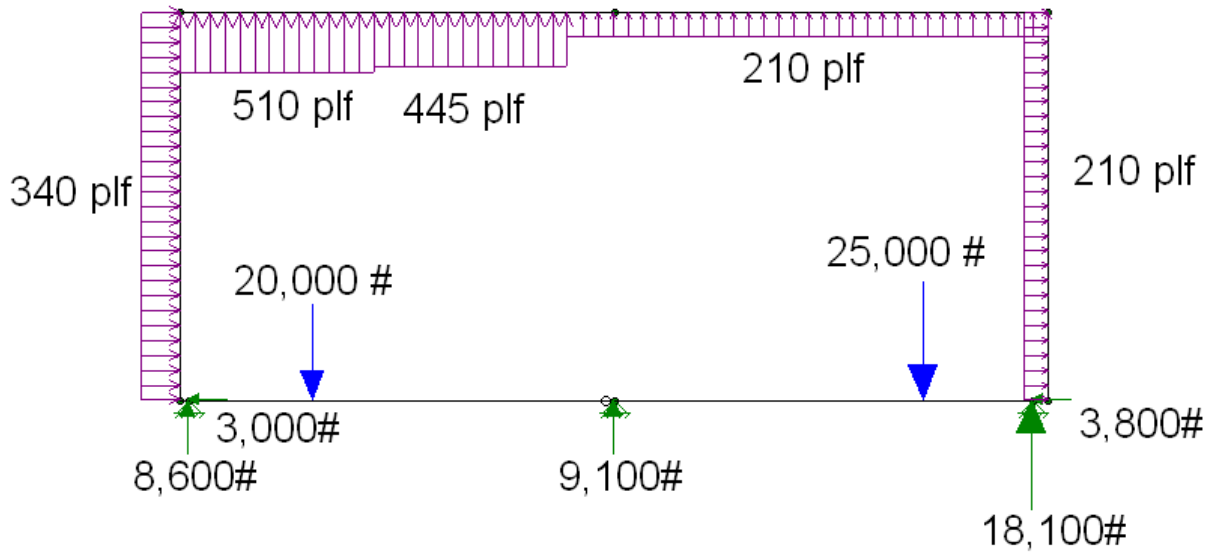


Figure 1: Reactions from Wind Load from West and Dead Load

Note that the wind load reactions do not result in uplift at the base of the structure. The horizontal anchorage will be designed after information concerning the asphalt composition has been determined. (analysis was conservatively done using an estimated weight of 45,000 lb, rather than the actual 54,000 lb)

Total horizontal force on building structure
 $3000\text{lb (windward wall)} + 3800\text{lb (leeward wall)} = 6800\text{ lb}$

In order to meet Solar Decathlon Building Code Requirements and the constraints of the floor plan configuration, the project will use a total of eight ground anchors (four anchors along each outer wall). Refer to the Ground Contact Plan.

Note: Using actual building weight, the horizontal force required to overcome static friction is approximately $0.20 * 54,000\text{lb} = 10,800\text{ lb}$. (coefficient of static friction for wet wood is approximately 0.20)



Seismic Base Shear

Seismic: IRC Seismic Design Category (SDC) D₂ See IRC Section R301.2.2
Table R301.2.2.1: Seismic Design Category Determination $0.83g < S_{DS} \leq 1.17$

Irvine California, Orange County Great Park, Irvine, CA, 92618, 33.67 N, -117.73 W
Design Spectral Response Acceleration Parameter: $S_{DS} = 0.995 g$
(refer to attached sheet from USGS)

Bearing wall system, Light Frame (wood) walls sheathed with wood structural panels rated for shear resistance.

ASCE7-10 Table 12.2.1 Response Modification Factor: $R = 6.5$
Importance Factor $I_e = 1.0$

$$\text{Seismic Response Coefficient } C_s = \frac{S_{DS}}{\left(\frac{R}{I_e}\right)} \quad C_s = 0.153$$

For dead weight $W = 54,000 \text{ lb}$ (measured)

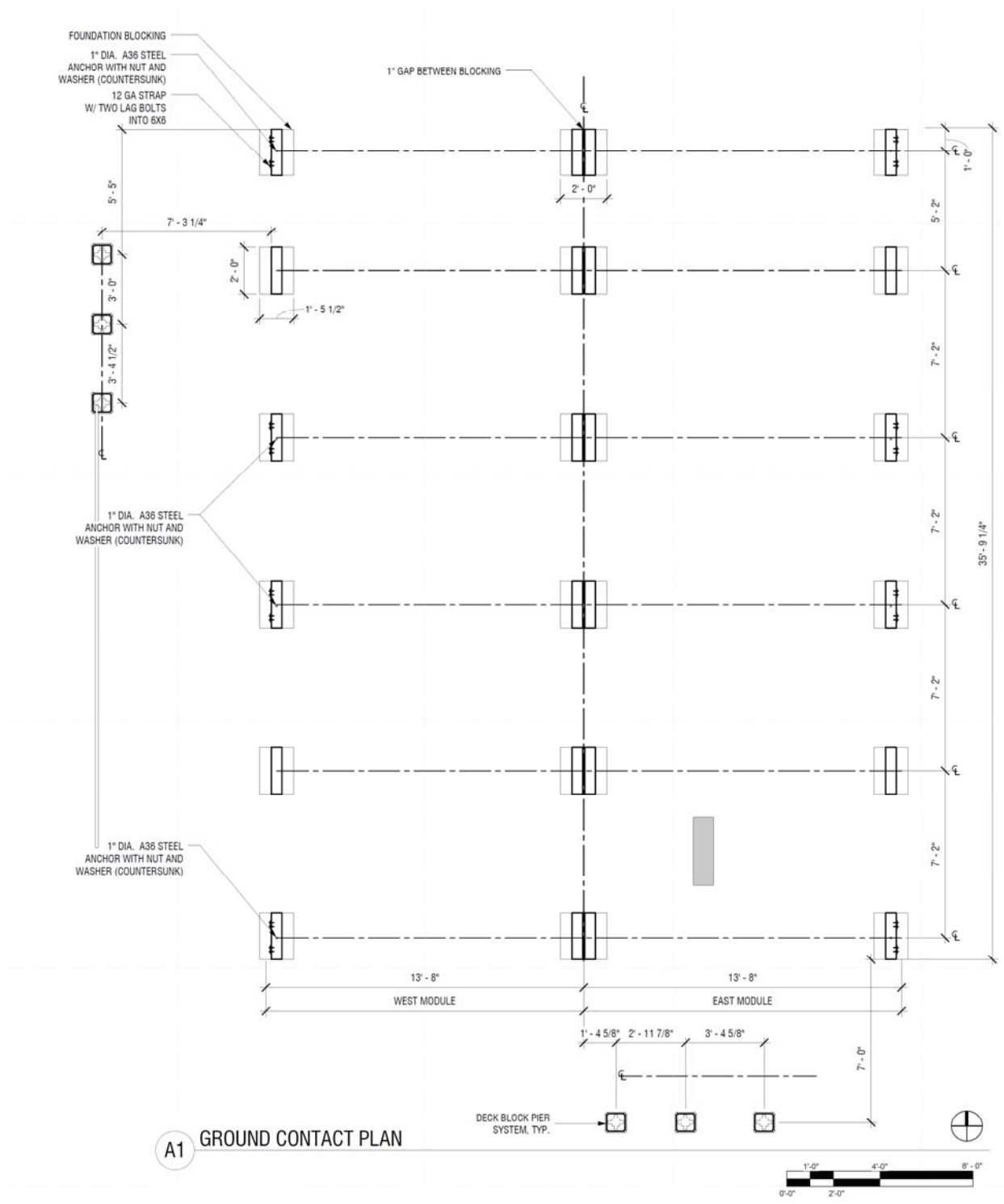
Seismic Base Shear $V = C_s W = 0.153(54,000 \text{ lb}) = 8,300 \text{ lb}$

Shear capacity per anchor is 1500 lb.

In order to meet Solar Decathlon Building Code Requirements and the constraints of the floor plan configuration, the project will use a total of eight ground anchors (four anchors along each outer wall). Refer to the Ground Contact Plan.

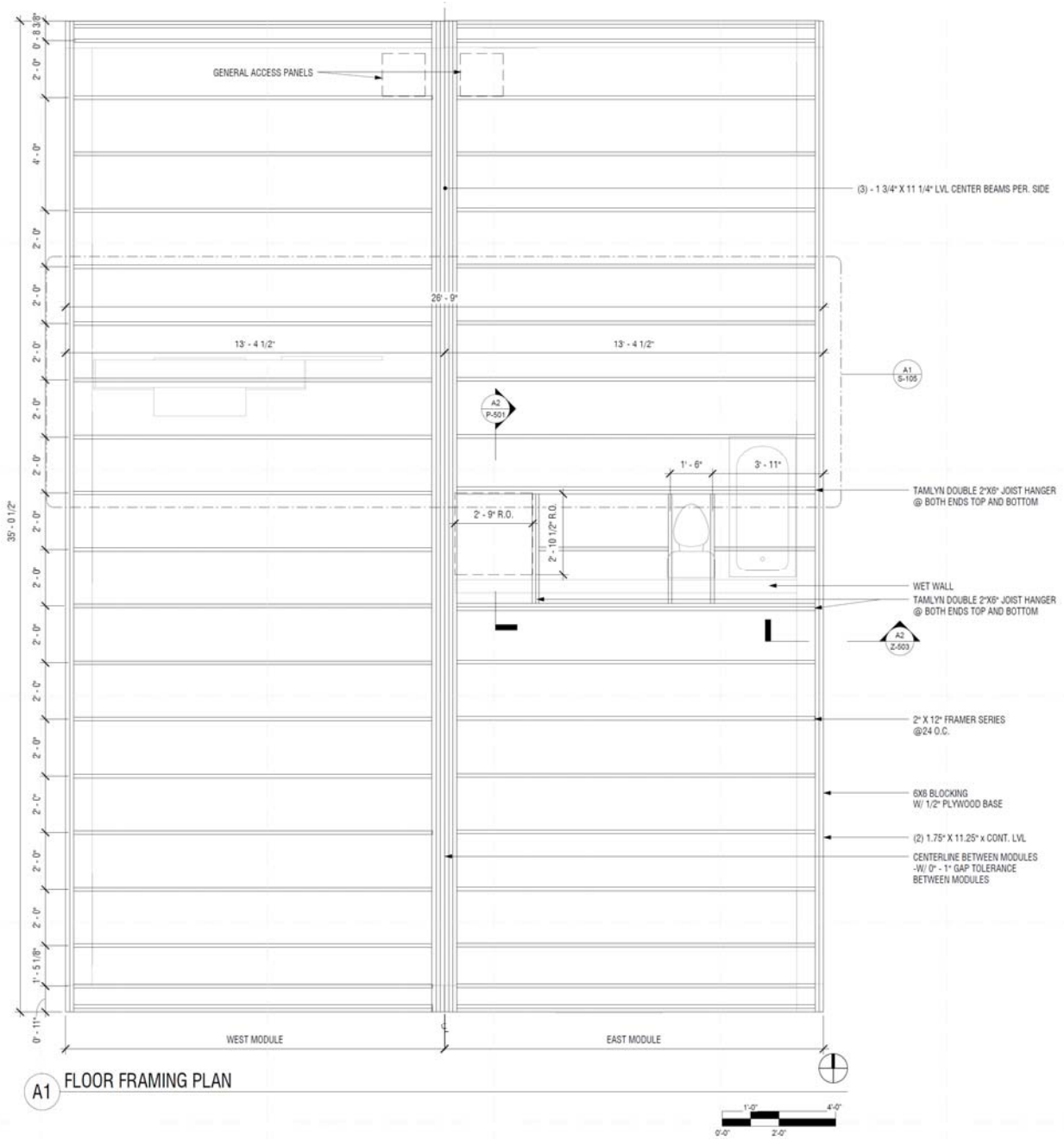


Ground Contact Plan:





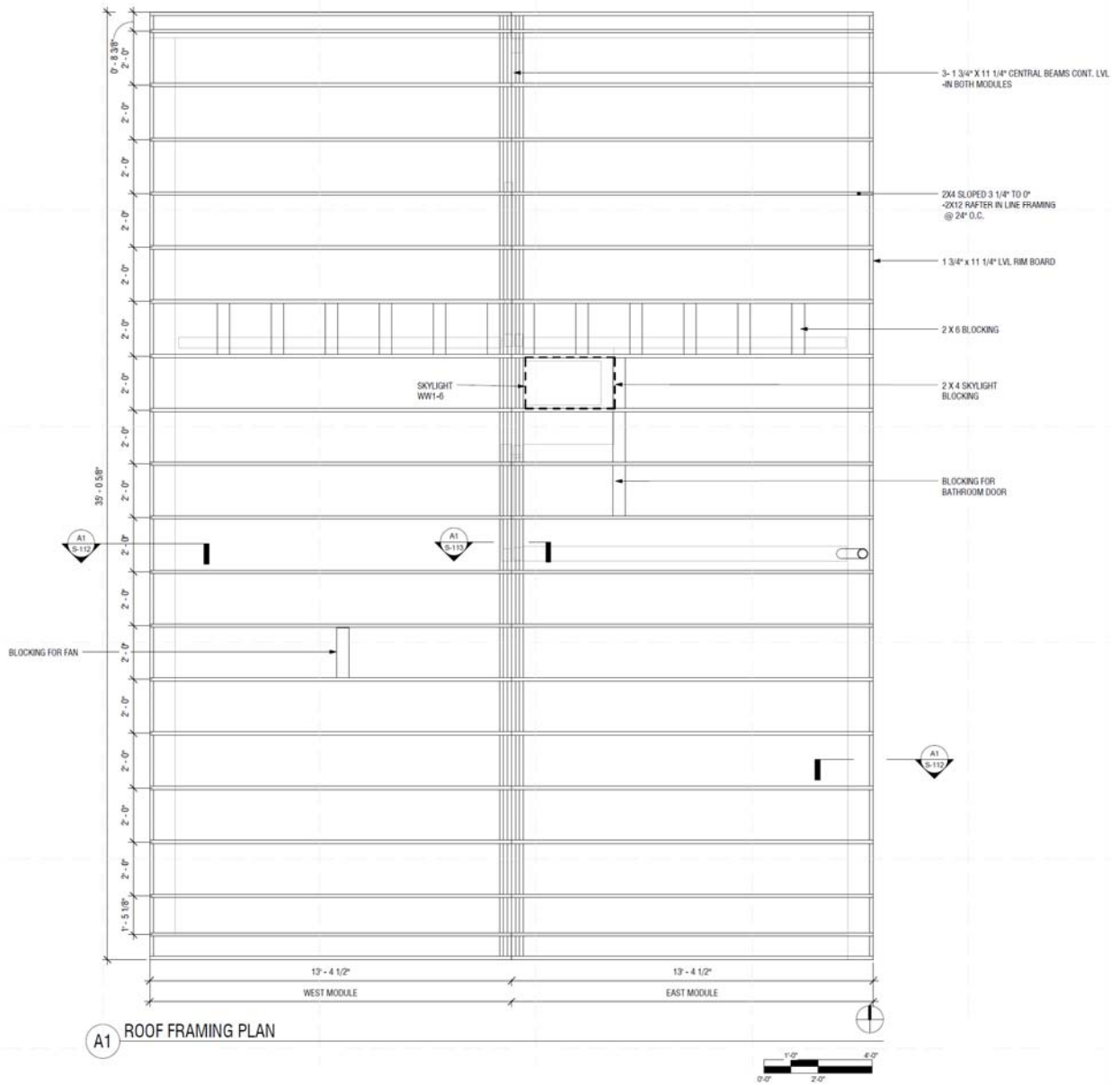
Floor Framing Plan



A1 FLOOR FRAMING PLAN



Roof Framing Plan



Roof Joists

Framer Series Grade M-12

Allowable Stresses:

$$F_b := 1600 \cdot \text{psi} \quad F_v := 175 \cdot \text{psi} \quad E := 1600000 \cdot \text{psi}$$

Member Properties $d := 11.25 \cdot \text{in}$ $b := 1.5 \cdot \text{in}$

$$S_x := \frac{(b \cdot d^2)}{6} \quad S_x = 31.6 \cdot \text{in}^3 \quad I_x := \frac{b \cdot d^3}{12} \quad I_x = 178.0 \cdot \text{in}^4 \quad A := b \cdot d \quad A = 16.9 \cdot \text{in}^2$$

Joist Span and Loads $L := 13.9 \cdot \text{ft}$ $S := 2 \cdot \text{ft}$ $w_{dl} := 15 \cdot \text{psf}$ $w_{lr} := 20 \cdot \text{psf}$ $w_{sl} := 70 \cdot \text{psf}$

Loads on Joists (per foot of joist)

$$W_{dl} := w_{dl} \cdot S \quad W_{dl} = 30 \cdot \text{plf} \quad W_{lr} := w_{lr} \cdot S \quad W_{lr} = 40 \cdot \text{plf} \quad W_{sl} := w_{sl} \cdot S \quad W_{sl} = 140 \cdot \text{plf}$$

$$W_{service} := \max(W_{dl}, W_{dl} + \max(W_{lr}, W_{sl})) \quad W_{service} = 170 \cdot \text{plf}$$

Analysis:

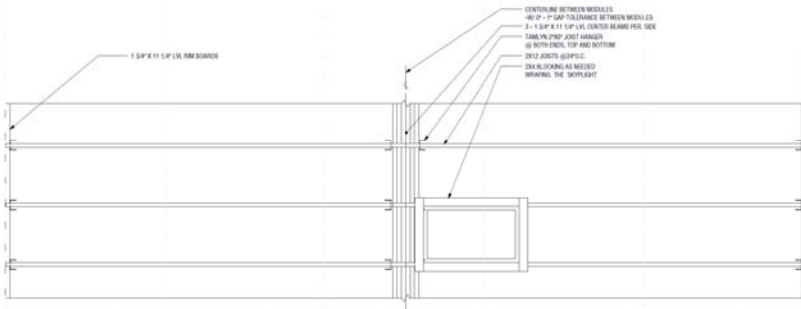
$$M_{max} := (W_{service}) \cdot \frac{L^2}{8} \quad M_{max} = 4.1 \cdot \text{kip} \cdot \text{ft} \quad V_{max} := (W_{service}) \cdot \frac{L}{2} \quad V_{max} = 1.2 \cdot \text{kip}$$

$$f_b := \frac{M_{max}}{S_x} \quad f_b = 1557 \cdot \text{psi} < F_b = 1600 \cdot \text{psi} \quad f_v := \frac{3}{2} \cdot \frac{V_{max}}{A} \quad f_v = 105 \cdot \text{psi} < F_v = 175 \cdot \text{psi}$$

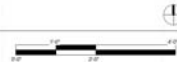
Deflections:

$$\Delta_{sl} := \frac{5 \cdot W_{sl} \cdot L^4}{384 \cdot E \cdot I_x} \quad \Delta_{sl} = 0.413 \cdot \text{in} < \Delta_{sl_allowable} := \frac{L}{360} \quad \Delta_{sl_allowable} = 0.46 \cdot \text{in}$$

$$\Delta_{Total} := \frac{5 \cdot (W_{dl} + W_{sl}) \cdot L^4}{384 \cdot E \cdot I_x} \quad \Delta_{Total} = 0.50 \cdot \text{in} < \Delta_{Total_allowable} := \frac{L}{240} \quad \Delta_{Total_allowable} = 0.70 \cdot \text{in}$$



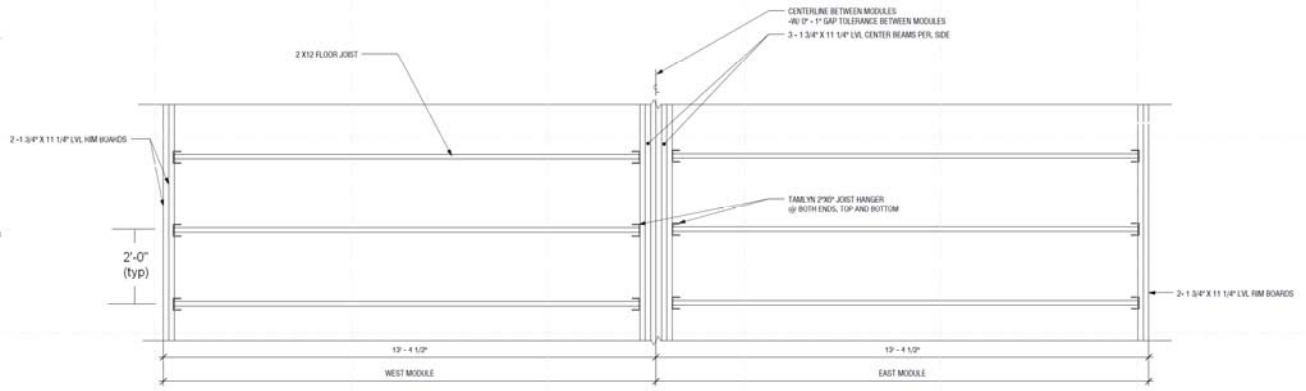
B1 ROOF JOIST DETAIL





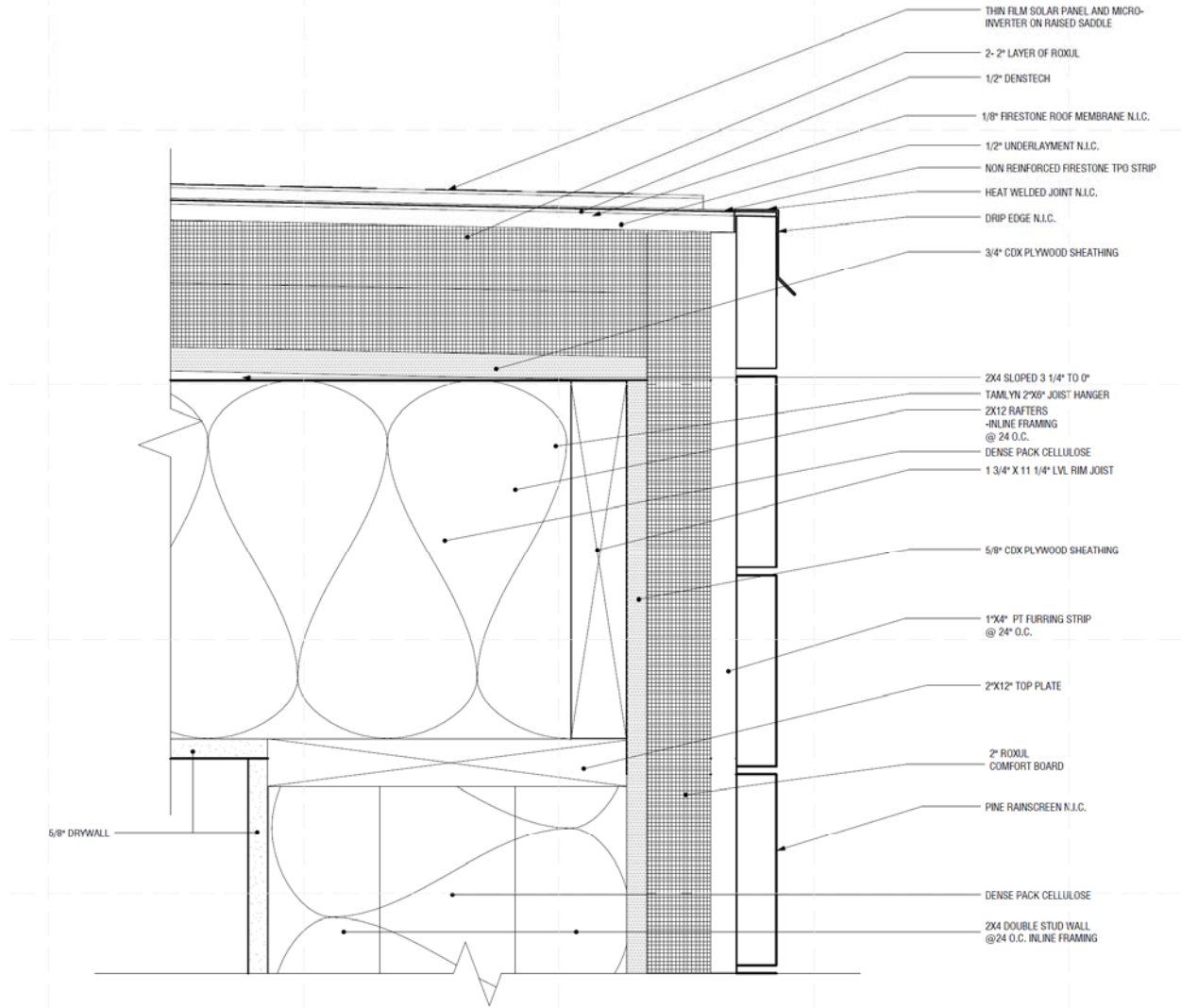
REFERENCE KEYNOTES

06 11 00: WOOD FRAMING
06 15 10: WOOD FLOOR DECKING



A1 FLOOR JOIST DETAIL





A1 ROOF SECTION DETAIL



USGS Design Maps Summary Report

User-Specified Input

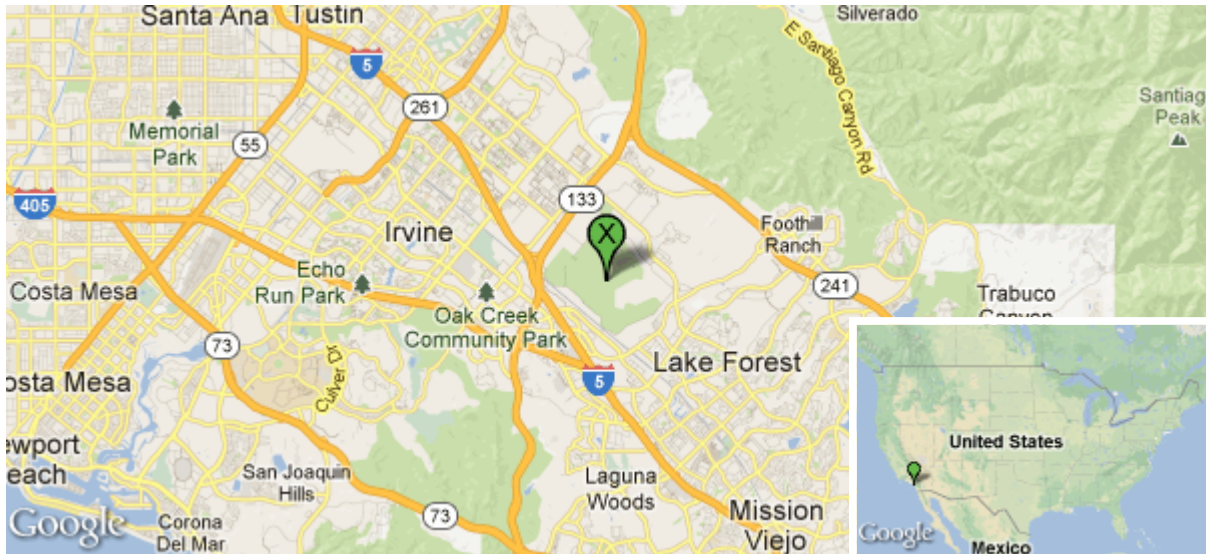
Report Title Norwich University Solar Decathlon Project
Sun March 31, 2013 23:14:13 UTC

Building Code Reference Document 2012 International Building Code
(which makes use of 2008 USGS hazard data)

Site Coordinates 33.67°N, 117.73°W

Site Soil Classification Site Class D – “Stiff Soil”

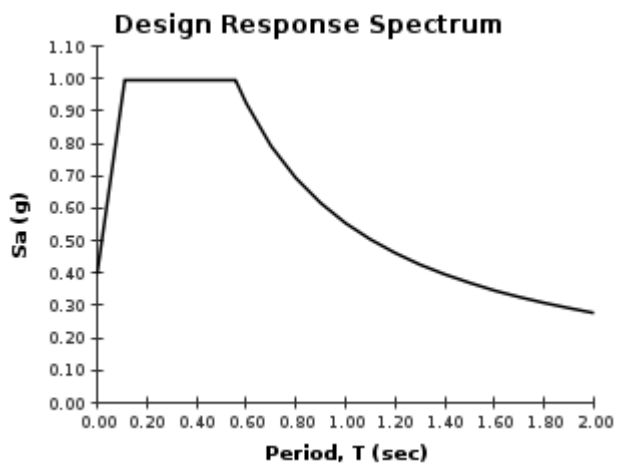
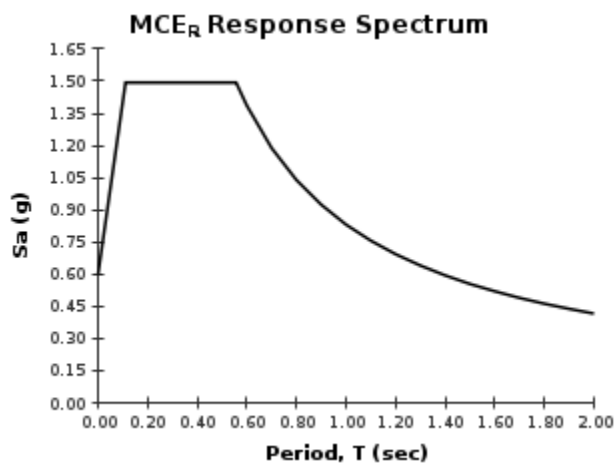
Risk Category I/II/III



USGS-Provided Output

$S_s = 1.493 \text{ g}$	$S_{MS} = 1.493 \text{ g}$	$S_{DS} = 0.995 \text{ g}$
$S_1 = 0.554 \text{ g}$	$S_{M1} = 0.831 \text{ g}$	$S_{D1} = 0.554 \text{ g}$

For information on how the S_s and S_1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the “2009 NEHRP” building code reference document.



Design Maps Detailed Report

2012 International Building Code (33.67°N, 117.73°W)

Section 1613.3.1 — Mapped acceleration parameters

Note: Ground motion values provided below are for the direction of maximum horizontal spectral response acceleration. They have been converted from corresponding geometric mean ground motions computed by the USGS by applying factors of 1.1 (to obtain S_s) and 1.3 (to obtain S_1). Maps in the 2012 International Building Code are provided for Site Class B. Adjustments for other Site Classes are made, as needed, in Section 1613.3.3.

From [Figure 1613.3.1\(1\)](#)^[1] $S_s = 1.493 \text{ g}$

From [Figure 1613.3.1\(2\)](#)^[2] $S_1 = 0.554 \text{ g}$

Section 1613.3.2 — Site class definitions

The authority having jurisdiction (not the USGS), site-specific geotechnical data, and/or the default has classified the site as Site Class D, based on the site soil properties in accordance with Section 1613.

2010 ASCE-7 Standard – Table 20.3-1
SITE CLASS DEFINITIONS

Site Class	\bar{v}_s	\bar{N} or \bar{N}_{ch}	\bar{s}_u
A. Hard Rock	>5,000 ft/s	N/A	N/A
B. Rock	2,500 to 5,000 ft/s	N/A	N/A
C. Very dense soil and soft rock	1,200 to 2,500 ft/s	>50	>2,000 psf
D. Stiff Soil	600 to 1,200 ft/s	15 to 50	1,000 to 2,000 psf
E. Soft clay soil	<600 ft/s	<15	<1,000 psf

Any profile with more than 10 ft of soil having the characteristics:

- Plasticity index $PI > 20$,
- Moisture content $w \geq 40\%$, and
- Undrained shear strength $\bar{s}_u < 500 \text{ psf}$

F. Soils requiring site response analysis in accordance with Section 21.1	See Section 20.3.1
---	--------------------

For SI: 1ft/s = 0.3048 m/s 1lb/ft² = 0.0479 kN/m²

Section 1613.3.3 — Site coefficients and adjusted maximum considered earthquake spectral response acceleration parameters

TABLE 1613.3.3(1)
VALUES OF SITE COEFFICIENT F_a

Site Class	Mapped Spectral Response Acceleration at Short Period				
	$S_s \leq 0.25$	$S_s = 0.50$	$S_s = 0.75$	$S_s = 1.00$	$S_s \geq 1.25$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight-line interpolation for intermediate values of S_s

For Site Class = D and $S_s = 1.493$ g, $F_a = 1.000$

TABLE 1613.3.3(2)
VALUES OF SITE COEFFICIENT F_v

Site Class	Mapped Spectral Response Acceleration at 1-s Period				
	$S_1 \leq 0.10$	$S_1 = 0.20$	$S_1 = 0.30$	$S_1 = 0.40$	$S_1 \geq 0.50$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.7	1.6	1.5	1.4	1.3
D	2.4	2.0	1.8	1.6	1.5
E	3.5	3.2	2.8	2.4	2.4
F	See Section 11.4.7 of ASCE 7				

Note: Use straight-line interpolation for intermediate values of S_1

For Site Class = D and $S_1 = 0.554$ g, $F_v = 1.500$

Equation (16-37): $S_{MS} = F_a S_s = 1.000 \times 1.493 = 1.493 \text{ g}$

Equation (16-38): $S_{M1} = F_v S_1 = 1.500 \times 0.554 = 0.831 \text{ g}$

Section 1613.3.4 — Design spectral response acceleration parameters

Equation (16-39): $S_{DS} = \frac{2}{3} S_{MS} = \frac{2}{3} \times 1.493 = 0.995 \text{ g}$

Equation (16-40): $S_{D1} = \frac{2}{3} S_{M1} = \frac{2}{3} \times 0.831 = 0.554 \text{ g}$

Section 1613.3.5 — Determination of seismic design category

TABLE 1613.3.5(1)

SEISMIC DESIGN CATEGORY BASED ON SHORT-PERIOD (0.2 second) RESPONSE ACCELERATION

VALUE OF S_{DS}	RISK CATEGORY		
	I or II	III	IV
$S_{DS} < 0.167g$	A	A	A
$0.167g \leq S_{DS} < 0.33g$	B	B	C
$0.33g \leq S_{DS} < 0.50g$	C	C	D
$0.50g \leq S_{DS}$	D	D	D

For Risk Category = I and $S_{DS} = 0.995 g$, Seismic Design Category = D

TABLE 1613.3.5(2)

SEISMIC DESIGN CATEGORY BASED ON 1-SECOND PERIOD RESPONSE ACCELERATION

VALUE OF S_{D1}	RISK CATEGORY		
	I or II	III	IV
$S_{D1} < 0.067g$	A	A	A
$0.067g \leq S_{D1} < 0.133g$	B	B	C
$0.133g \leq S_{D1} < 0.20g$	C	C	D
$0.20g \leq S_{D1}$	D	D	D

For Risk Category = I and $S_{D1} = 0.554 g$, Seismic Design Category = D

Note: When S_1 is greater than or equal to 0.75g, the Seismic Design Category is **E** for buildings in Risk Categories I, II, and III, and **F** for those in Risk Category IV, irrespective of the above.

Seismic Design Category \equiv "the more severe design category in accordance with Table 1613.3.5(1) or 1613.3.5(2)" = D

Note: See Section 1613.3.5.1 for alternative approaches to calculating Seismic Design Category.

References

1. *Figure 1613.3.1(1)*: [http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/IBC-2012-Fig1613p3p1\(1\).pdf](http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/IBC-2012-Fig1613p3p1(1).pdf)
2. *Figure 1613.3.1(2)*: [http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/IBC-2012-Fig1613p3p1\(2\).pdf](http://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/IBC-2012-Fig1613p3p1(2).pdf)



B MANUFACTURER'S SPECIFICATIONS



DIVISION 01 GENERAL REQUIREMENTS



HONDA EU6500IS MOBILE GENERATOR ENGINE GX390

Model Number: EU6500Is or equal

Location: Construction Staging Area

Dimensions:

Height: 27.5"

Length: 33.5"

Width: 26.4"

Electrical:

Wattage: 6500 Watts

Voltage: 120/240 Single-Phrase

Available: Parkway Lawnmower Shop, Irvine CA

Model

Model Number: EU6500IS

Manufacturer: Honda

Made in USA: No

Engine

Brand: Honda GX

Starting System: 12-Volt Key Start w/ Recoil

HP/CC: 389 cc

Consumer Engine Warranty: 3 Years

Commercial Engine Warranty: 3 Years

Engine RPM: 3600 RPM

Low Oil Alert: Yes

Cast Iron Sleeve: Yes

Product Specs

Voltage: 120/240 Single-Phase

Frequency: 60 Hertz

Alternator: Inverter

Auto Voltage Regulation: Yes

Fuel Type: Gasoline

Rated Amps: 23 Amps @ 240 Volts (Single Phase)

Portability Kit: NeverFlat

Tank Size: 4.5 Gallons

Fuel Tank Material: Metal

Fuel Gauge: Yes

Idle Control: Yes

Hour Meter: Yes

Voltage Meter: Yes

Lifting Eye: No

Battery: Included (350 CCA)

Decibel Rating @ 3m: 60

Overview

Weight: 260 Lbs. (117.94 kilograms)

Dimensions: 33.5L x 26.4W x 27.5H
(85.09 x 67.06 x 69.85 cm)

Consumer Warranty: 3 Years

Commercial Warranty: 3 Years



ULTRA TECH CONTAINMENT PAN

Model Number: 2352

Dimensions:

Length: 54"

Width: 29 3/4"

Height: 3 1/2"

Weight: 34 lbs.

Containment capacity: 14 gallons

Available: UltraTech International



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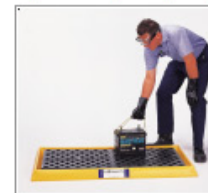
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- Optional 2' x 4' grating elevates containers from spilled liquid — features 14 gallon containment capacity with grating.
- All polyethylene construction will not rust or corrode.
- Meets EPA Container Storage Regulations for small packages with grating in place.



ULTRA-CONTAINMENT TRAYS®	
Ultra-Containment Tray without Grating	Ultra-Containment Tray with Grating
Part# 2351: Yellow Part# 2328: Black	Part# 2352: Yellow Part# 2350: Black
Dimensions: 54" x 29 3/4" x 3 1/2" (1,372 mm x 756 mm x 89 mm)	Dimensions: 54" x 29 3/4" x 3 1/2" (1,372 mm x 756 mm x 89 mm)
Weight: 17lbs. (7.5 kg)	Weight: 34 lbs. (15 kg)
Spill Containment Capacity: 16.5gals.(62 L)	Spill Containment Capacity: 14 gals.(53 L)
Options: Grating Part #0420	
See this product in our e-catalog	
Compliance 40 CFR 264.175	
Chemical Compatibility	

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DIVISION 05 METALS



3 1/2" 16D NAIL HOT DIPPED GALVANIZED SMOOTH

Model Number: 16HGBXBK

Location: Deck, Roof Joists, Floor Joists

Dimensions:

Length: 3.5"

Finish: Yellow Zinc

Available: Lowes

Price: \$45.43

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Grip-Rite 30 lb 16D 3.5-in Hot Dipped Galvanized Smooth Box Nails



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Grip-Rite 30 lb 16D 3.5-in Hot Dipped Galvanized Smooth Box Nails

Item #: 184039 | Model #: 16HGBXBK

★★★★★ Be the first to write a review!

\$45.43



Enlarged Image

Description Specifications Reviews Q&A

Length (Inches)	3.5	Finish	Hot dipped galvanized
Size	16D	Color/Finish Family	Gray/Silver
Gauge	10.0	Interior/Exterior	Exterior
Shank Type	Smooth	Package Unit of Measurement	Pound(s)
Head Type	Flat	Package Quantity	30.0
Material	Steel		

Customers Also Viewed



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Grip-Rite 30 lb 16D 3.5-in Hot Dipped Galvanized Smooth Box Nails \$45.43

Subtotal: \$45.43

Qty.: 1

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Grip-Rite 30 lb 8D 2.5-in Hot Dipped...

Not Yet Rated

\$45.43

Grip-Rite 5 lb 6D



3" 16D NAIL HOT DIPPED GALVANIZED SMOOTH

Model Number: 10HGBX5

Location: Foundation

Dimensions:

Length: 3"

Available: Lowes

Price: \$17.97

me: Search "3" 10D NAIL":

Print

p-Rite 5 lb 10D 3-in Hot Dipped Galvanized Smooth Box Nails



Grip-Rite 5 lb 10D 3-in Hot Dipped Galvanized Smooth Box Nails

Item #: 69932 | Model #: 10HGBX5

★★★★★ Be the first to write a review!

\$17.97

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Description	Specifications	Reviews	Q&A
Length (Inches)	3.0		
Size	10D		
Gauge	10.5		
Shank Type	Smooth		
Head Type	Flat		
Material	Steel		
Finish	Hot dipped galvanized		
Color/Finish Family	Gray/Silver		
Interior/Exterior	Exterior		
Package Unit of Measurement	Pound(s)		
Package Quantity	5.0		

Grip-Rite 5 lb 10D 3-in Hot Dipped Galvanized Smooth Box Nails **\$17.97**

Subtotal: \$17.97

Qty.:

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 Grip-Rite 5 lbs 9-Gauge 3-1/2-in Hot Dipped... ★★★★★ \$16.78	 Top Choice 4 x 4 x 8 #2 Prime Treated Lumber ★★★★★ \$6.57	 Grip-Rite 500-Count Galvanized/Uncoated Lumber Not Yet Rated \$13.93	 Top Choice 2 x 4 x 8 #2 Prime Treated Lumber ★★★★★ \$3.57	 1/2 x 4 x 8 Pine Sheathing Plywood ★★★★★ \$31.97
--	---	--	---	--

Related Items

Top Choice 2 x 4 x 8 #2 Prime Treated Lumber
 ★★★★★
\$3.57

Grip-Rite 5-Lbs.



THE HILLMAN GROUP 4" TORQUE SCREWS

Model Number: 47376

Location: Deck

Dimensions:

Thickness: #10

Length: 4"

Available: Lowes

Price: \$79.47

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The Hillman Group 5 lbs #10 x 4-In Flat-Head Galvanized Dual Torque-Drive Deck Screws



Enlarged image

The Hillman Group 5 lbs #10 x 4-in Flat-Head Galvanized Dual Torque-Drive Deck Screws

Item #: 438825 | Model #: 47376

★★★★★ Be the first to write a review!

\$79.47
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Screw Thickness	#10	Materials Fastened	Wood to wood
Thread Style	Coarse	Finish	Galvanized/Uncoated
Screw Length (Inches)	4.0	Color/Finish Family	Gray/Silver
Head Type	Flat	Material	Steel
Drive	Dual torque	Package Unit of Measurement	Pound(s)
Point Type	Standard	Package Quantity	5.0
Use Location	Exterior		

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 Your order will be ready for pickup from Lowe's Of 8 Burlington, VT by 08/18/2013.

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The Hillman Group 5 lbs #10 x 4-In Flat-Head Galvanized Dual Torque-Drive Deck Screws

\$79.47

Subtotal: \$79.47

 Qty.:
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GRK FASTENERS 8 X 2 1/2" FINISH TRIM HEAD SCREWS

Model Number: 115730

Location: Deck, Furniture

Dimensions:

Screw Thickness: #8

Length: 2 1/2"

Available: Home Depot

Price: \$28.52

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GRK Fasteners 8 x 2-1/2 in. Finish Trim Head Screw (420-Pack)

Model # 115730 Store SKU # 523486

★★★★★ | Write The First Review

\$28.52 / each

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Product Overview | Specifications | Customer Reviews | Shipping Options

PRODUCT OVERVIEW

GRK FIN/Trim Head Screws are an excellent choice for most fine carpentry applications. The FIN/Trim is also suitable for the installation of window extension jambs and moulding. Special features include W-out threads and Zip Tips to help prevent wood splitting. The screws are Climatek coated for corrosion resistance.

- Use for composite decks and trim applications
- Strong heads and star head recess
- No pre-drilling
- Zip-tip self-tapping screws
- W-out threads help prevent wood splitting
- MFG Model #: 115730
- MFG Part #: 115730

Return To Top

SPECIFICATIONS

Assembled Depth (in.)	0.164 in	Assembled Height (in.)	2.5 in
Assembled Width (in.)	0.164 in	Color Family	Metallics
Fastener Type	Specialty Fastener	Manufacturer Warranty	No
Package Quantity	420	Product Depth (in.)	0.164
Product Height (in.)	2.5	Product Weight (lb.)	0.007
Product Width (in.)	0.164		

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Quantity: 1

Item must be picked up in store

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Free

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CUSTOMERS WHO VIEWED THIS ITEM PURCHASED...



\$262.99

Simpson Strong-Tie
#7 x 2-1/4 in. 304
Stainless Steel Trim
Head Decking
W/out hex head

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\$6.79

Hiti
0.22 Caliber Yellow
Booster (100-Pack)
W/out hex head

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PRO-TWIST 1LB 6 X 2-1/4" BLACK SQUARE TRIM SCREWS

Model Number: TH2141

Location: Flooring, Furniture

Dimensions:

Screw Thickness: #6

Length: 2 1/4"

Available: Lowes

Price: \$8.24



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Pro-Twist 1 lb 6 x 2-1/4-in Black Square Drive Trim Screws



Enlarged Image

Pro-Twist 1 lb 6 x 2-1/4-in Black Square Drive Trim Screws

Item #: 227358 | Model #: TH2141

★★★★★ 3 reviews | Write a review

\$8.24

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Description Specifications Reviews Community Q&A

Screw Type	Trim Head	Fastener Length (Inches)	2.25
Screw Style	Wood to Metal	Fastener/Connector Color/Finish	Black
Screw Name	Trim	Fastener/Connector Material	Steel
Use Location	Interior/Exterior	Fastener/Connector Package Quantity	187.0
Fastener Category	Screws		

Customers Also Viewed



Pro-Twist 1 lb Black 5/8-in x 6-in Trim...
★★★★★
\$8.24



Grip-Rite 1 lb 8-in x 2-1/4-in PGP White PVC...
★★★★★
\$11.88



Simpson Strong-Tie Swaneze Trim Head 6-Lobe...
★★★★★
\$31.33

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Pro-Twist 1 lb 6 x 2-1/4-In Black Square Drive Trim Screws \$8.24

Subtotal: \$8.24

Qty:

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Related Items

Pro-Twist 1 lb Black 5/8-in x 6-In Trim...
★★★★★
\$8.24

Grip-Rite 1 lbs #8 x 3-in Bugle-Head Black...
★★★★★
\$4.37

Grip-Rite 1 lbs #8 x 2-1/2-in Bugle-Head...
★★★★★
\$4.37

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GRK FASTENERS 5/16 X 6" RSS SCREWS

Model Number: 112235

Location: Deck

Dimensions:

Diameter: 5/16"

Length: 6"

Available: Home Depot

Price: \$11.64

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GRK Fasteners 5/16 x 6 in. RSS Screws 10-Count Blister-Pak

Model # 112225 Store SKU # 523415

★★★★★ | Write The First Review

\$11.54 / package

This item cannot be shipped to the following state(s): AK, GU, HI, PR, VI

Store Only

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Quantity: 1

Item must be picked up in store

Pick Up In Store Free

Item Not Sold at Williston — Check nearby stores

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Product Overview | Specifications | Customer Reviews | Shipping Options

PRODUCT OVERVIEW

GRK's RSS screw is made out of Climatek coated and hardened steel. Its sharp threads and point bite instantly into material (including hardwood), reducing the splitting effect caused by smaller shanks. Its washer type head has no sharp edges like conventional lag screws and the added shoulder underneath the washer has the ability to center the RSS screw in predrilled hardware.

- Ideal for ledger boards and more
- Self-lagging
- W-out thread design
- May be used as a lag screw alternative
- MFG Model #: 112225
- MFG Part #: 112225

Return To Top

SPECIFICATIONS

Assembled Depth (in.)	10.0 in	Assembled Height (in.)	0.625 in
Assembled Width (in.)	4.5 in	Color Family	Metallic
Fastener Type	Specialty Fastener	Manufacturer Warranty	No
Package Quantity	10	Product Depth (in.)	10
Product Height (in.)	0.625	Product Weight (lb.)	0.62
Product Width (in.)	4.5 in	Returnable	90-Day

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CUSTOMER 8 WHO VIEWED THIS ITEM PURCHASED...



\$23.70

Screen-It® Single and Twin Thread Multi-Purpose Wood Screw #14
UNFINISHED

+ ADD TO CART



\$14.94

Grp-Rite PrimeGuard Plus #4 x 2-1/4 in. Stainless Steel Trim
★★★★★ (1)

+ ADD TO CART



A36 STEEL ROD

Model: 518

Location: Foundation Anchor

Size:


Length: 48"

Diameter: 1"

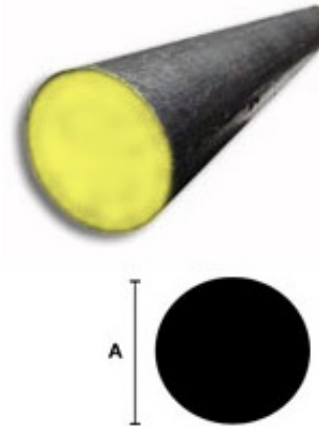
Material: A36 Steel

Available:

HR Steel Round Bar

[Email Friend](#) 

Hot Rolled Steel Round, is widely used for all general fabrication and repairs in industrial maintenance, agricultural implements, transportation equipment, ornamental work, etc. HR Steel Rounds have a slightly grainy textured finish.



- **Specifications:** ASTM A36
- **AKA:** HR round, round bar
- **Applications:** frame work, braces, supports, shafts, axels, etc.
- **Workability:** Easy to Weld, Cut, Form, and Machine
- **Mechanical Properties:** Brinell = 112, Tensile = 58-80,000 +/-, Yield = 36,000 +/-
- **How is it Measured?** Diameter (A) X Length
- **Available Stock Sizes:** 2ft, 4ft, 6ft, 8ft, 10ft, 20ft or Cut to Size

Stock lengths may vary +/- 1/4"

Please call if you need specific lengths

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Stock Number	Product Type	Item Size & Description (Inches)	Click! Arrow to Select Size	Qty	Select / Price
R114	HR CQ Steel Round	1/4 inch Dia. Round Bar	Select ... ▼	<input type="text" value="1"/>	<input type="button" value="Get Price"/>
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R138	HR CQ Steel Round	3/8 inch Dia. Round Bar	Select ... ▼	<input type="text" value="1"/>	<input type="button" value="Get Price"/>
R112	Hot Rolled A-36 Steel Round	1/2 inch Dia. Round Bar	Select ... ▼	<input type="text" value="1"/>	<input type="button" value="Get Price"/>
R158	Hot Rolled A-36 Steel Round	5/8 inch Dia. Round Bar	Select ... ▼	<input type="text" value="1"/>	<input type="button" value="Get Price"/>
R134	Hot Rolled A-36 Steel Round	3/4 inch Dia. Round Bar	Select ... ▼	<input type="text" value="1"/>	<input type="button" value="Get Price"/>
R178	Hot Rolled A-36 Steel Round	7/8 inch Dia. Round Bar	Select ... ▼	<input type="text" value="1"/>	<input type="button" value="Get Price"/>
R11	Hot Rolled A-36 Steel Round	1 inch Dia. Round Bar	Select ... ▼	<input type="text" value="1"/>	<input type="button" value="Get Price"/>
R1114	Hot Rolled A-36 Steel Round	1-1/4 inch Dia. Round Bar	Select ... ▼	<input type="text" value="1"/>	<input type="button" value="Get Price"/>
R1112	Hot Rolled A-36 Steel Round	1-1/2 inch Dia. Round Bar	Select ... ▼	<input type="text" value="1"/>	<input type="button" value="Get Price"/>
R1134	Hot Rolled A-36 Steel Round	1-3/4 inch Dia. Round Bar	Select ... ▼	<input type="text" value="1"/>	<input type="button" value="Get Price"/>
R12	Hot Rolled A-36 Steel Round	2 inch Dia. Round Bar	Select ... ▼	<input type="text" value="1"/>	<input type="button" value="Get Price"/>
R1212	Hot Rolled A-36 Steel Round	2-1/2 inch Dia. Round Bar	Select ... ▼	<input type="text" value="1"/>	<input type="button" value="Get Price"/>
R13	Hot Rolled A-36 Steel Round	3 inch Dia. Round Bar	Select ... ▼	<input type="text" value="1"/>	<input type="button" value="Get Price"/>



TRUFAST #12 6" DP FASTENER

Model Number: DP-6000

Location: Roof to attach Densdeck

#12 DP Roofing Fasteners

PRODUCT DESCRIPTION

TRUFAST® #12 DP Fasteners are specifically engineered to secure insulation, coverboards, and base sheets to corrugated steel (16 – 22 ga.) and wood substrates. Featuring a #2 double flute self-drilling point and exclusive tapered entry thread design, they penetrate steel quickly and offer exceptional back-out resistance.

APPROPRIATE ACCESSORIES

Use with TRUFAST® Metal Insulation Plates MP-3000 and MPR-3000.

CODE APPROVALS & LISTINGS



State of Florida - FL#: 4500



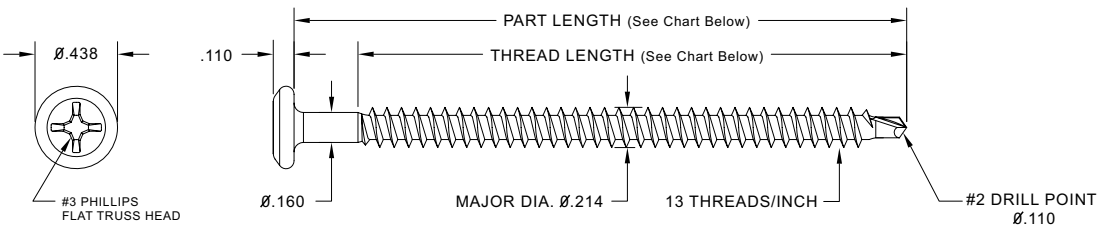
CE European Technical Approval ETA 09/0375

MATERIAL SPECIFICATIONS

Material: SAE C1022, heat treated
Coating: Tru-Kote™ Epoxy E-Coat

Manufacturing Location: Bryan, OH USA
LEED® Eligible Recycled Content: 20%

PRODUCT SPECIFICATIONS



PRODUCT SELECTION

Part No.	Part Length		Thread Length		Pkg. Qty.	Pkg. Wt.	Pallet Qty.
DP-1625	1-5/8"	41.3 mm	1-5/8" (Full)	41.3 mm	1000/Bucket	11.8 lbs.	80,000
DP-2250	2-1/4"	57.2 mm	2-1/4" (Full)	57.2 mm	1000/Bucket	16.2 lbs.	80,000
DP-2875	2-7/8"	73.0 mm	2-7/8" (Full)	73.0 mm	1000/Bucket	19.7 lbs.	80,000
DP-3250	3-1/4"	82.6 mm	2-7/8"	73.0 mm	1000/Bucket	21.5 lbs.	80,000
DP-3750	3-3/4"	95.3 mm	2-7/8"	73.0 mm	1000/Bucket	24.6 lbs.	80,000
DP-4500	4-1/2"	114.3 mm	3-7/8"	98.4 mm	1000/Bucket	28.8 lbs.	60,000
DP-5000	5"	127.0 mm	3-7/8"	98.4 mm	1000/Bucket	31.5 lbs.	60,000
DP-6000	6"	152.4 mm	3-7/8"	98.4 mm	1000/Bucket	37.1 lbs.	60,000
DP-7000	7"	177.8 mm	3-7/8"	98.4 mm	500/Bucket	20.9 lbs.	40,000
DP-8000	8"	203.2 mm	3-7/8"	98.4 mm	500/Bucket	23.9 lbs.	40,000



Enlarged to show detail.

PERFORMANCE DATA

Property	Standard	Average Ultimate Value
Tensile Strength:	ASTM F606-10	2500 lb.
Shear Strength:	NASM 1312-20	1900 lb. (thread zone)
Corrosion Resistance:	FM 4470, DIN 50018	< 15% Red Rust after 30 cycles

Average Ultimate Pullout Values in Corrugated Steel Deck Substrates

Thickness	24 ga.			22 ga.			20 ga.			18 ga.			16 ga.		
Yield Strength	36.5 ksi	33.0 ksi	80.0 ksi	102.0 ksi	33.0 ksi	80.0 ksi	102.0 ksi	33.0 ksi	80.0 ksi	102.0 ksi	33.0 ksi	80.0 ksi	102.0 ksi		
Pullout (lbf.)	230	285	410	465	355	505	580	540	715	800	710	1000	1145		

Average Ultimate Pullout Values in Wood Substrates

Thickness	APA Rated OSB				APA Rated Plywood			SPF #2
	7/16"	15/32"	19/32"	23/32"	15/32"	19/32"	23/32"	
Pullout (lbf.)	265	300	325	440	365	475	720	700*

* lbf./in. of thread penetration, including tip.

INSTALLATION GUIDELINES

For Steel and Wood Decks: Using the #3 Phillips drive bit provided and a 0-2500 rpm screw gun, install the fastener into the deck. The fastener must penetrate the deck a minimum of $\frac{3}{4}$ " as measured from the underside of the deck to the fastener tip. Care should be taken to orient the fastener perpendicular to the deck and not to overdrive the fastener to prevent damage to the insulation or membrane.

DISCLAIMER

The performance specifications published in this TRUFAST product literature are based on controlled laboratory tests and are intended as a guideline only. They are not guaranteed in any way by the ALTENLOH, BRINCK & CO. U.S., INC. (the manufacturer), since building design, engineering, and construction, including workmanship and materials, are beyond the control of the manufacturer. The manufacturer recommends that pull-out tests be conducted to verify the substrate provides adequate pull-out values.



ALTENLOH, BRINCK & CO. U.S., INC.

02105 Williams County Rd. 12-C • Bryan, OH 43506
 Phone: 419-636-6715 or 800-443-9602 • Fax: 419-636-1784
 Email: sales@trufast.com • www.trufast.com

TRUFAST® #12 DP Roofing Fasteners are manufactured by the ALTENLOH, BRINCK & CO. U.S., INC. and are sold through leading roofing and building materials distributors across the U.S. and Canada.



TRUFAST HEAVY DUTY DRILL POINT FASTENERS

Model Number: HD-HV8000

Location: TPO Roofing with metal plates

SIP Fasteners

For Structural Insulated Panel and Nail Base Construction



APPLICATION

TRUFAST SIP Fasteners are specifically engineered for attaching structural insulated panels (sips) and nail base panels to wood and metal framing. Featuring a large, pancake head style with a 6-lobe drive, TRUFAST SIP Fasteners drive quickly and smoothly, and draw panels securely without the need of a washer. And only TRUFAST offers three fastener styles for use in wood, corrugated steel, and steel members without pre-drilling! Contact your panel manufacturer or distributor and ask to test drive a TRUFAST SIP Fastener, and see why they're the #1 fastener in the SIP industry.

PRODUCT FEATURES

- Case hardened and tempered for easy installation and long term durability.
- Large diameter, low profile pancake head provides excellent pull-through resistance without the need for a washer while eliminating "telegraphing" on shingles, metal panels and other roof surface materials.
- 6-Lobe internal drive offers excellent bit engagement during installation, especially in high torque applications.
- Widest selection of fastener lengths in the industry for proper sizing to panel thickness.
- Choice of 3 thread/point styles for job-matched performance in either wood or steel substrates.



SIPTP
Thread Point
for Wood & Timber
Applications



SIPLD
Light Duty -
Drill Point for
Corrugated Steel
Deck & Wood
Applications



SIPHD
Heavy Duty -
Drill Point for
Thick Steel Member
Applications

PRODUCT SPECIFICATIONS

Material: Case hardened and tempered carbon steel
 Head Style/Drive: Pancake Head with T-30 Internal Drive
 Head Diameter: 0.625"
 Nominal Shank Diameter: SIPTP and SIPLD: 0.190"
 SIPHD: 0.212"
 Thread Length: SIPTP* and SIPLD: 2.750"
 SIPHD: 3.875"

** 3" and longer fasteners; 2" and 2-1/2" fasteners are full thread*

Overall Lengths: SIPTP: 2" thru 18"
 SIPLD: 3" thru 18"
 SIPHD: 6" thru 13-3/4"

Point: SIPTP: Gimlet Thread
 SIPLD: #2 (0.135" dia.) Drill Point
 SIPHD: #4 (0.225" dia.) Drill Point

Coating: Epoxy e-coat (black)

Passes more than 15 cycles (Kesternich) in accordance with DIN 50012



SIP Fasteners

For Structural Insulated Panel and Nail Base Construction

PRODUCT SELECTION

Length in. (mm)	SIPTP Part #	SIPLD Part #	Pkg. Qty.
2 (51)	SIPTP-2000	NA	500/Pail
2-1/2 (64)	SIPTP-2500	NA	500/Pail
3 (76)	SIPTP-3000	SIPLD-3000	500/Pail
3-1/2 (89)	SIPTP-3500	SIPLD-3500	500/Pail
4 (102)	SIPTP-4000	SIPLD-4000	500/Pail
4-1/2 (114)	SIPTP-4500	SIPLD-4500	500/Pail
5 (127)	SIPTP-5000	SIPLD-5000	500/Pail
5-1/2 (140)	SIPTP-5500	SIPLD-5500	500/Pail
6 (152)	SIPTP-6000	SIPLD-6000	500/Pail
6-1/2 (165)	SIPTP-6500	SIPLD-6500	500/Pail
7 (178)	SIPTP-7000	SIPLD-7000	500/Pail
7-1/2 (191)	SIPTP-7500	SIPLD-7500	500/Pail
8 (203)	SIPTP-8000	SIPLD-8000	500/Pail
8-1/2 (216)	NA	SIPLD-8500	250/Pail
9 (229)	SIPTP-9000	SIPLD-9000	250/Pail
10 (254)	SIPTP-10000	SIPLD-10000	250/Pail
11 (279)	SIPTP-11000	SIPLD-11000	250/Pail
12 (305)	SIPTP-12000	SIPLD-12000	250/Pail
13 (330)	SIPTP-13000	SIPLD-13000	250/Box
14 (356)	SIPTP-14000	SIPLD-14000	250/Box
15 (381)	SIPTP-15000	SIPLD-15000	250/Box
16 (406)	SIPTP-16000	SIPLD-16000	250/Box
18 (483)	SIPTP-18000	SIPLD-18000	250/Box

NOTE: Two T-30 Driver Bits included in each package

Length in. (mm)	SIPHD Part #	Pkg. Qty.
6 (152)	SIPHD-6000	500/Pail
8 (203)	SIPHD-8000	250/Pail
9-3/4 (248)	SIPHD-9750	250/Pail
11-3/4 (298)	SIPHD-11750	250/Pail
13-3/4 (349)	SIPHD-13750	250/Box

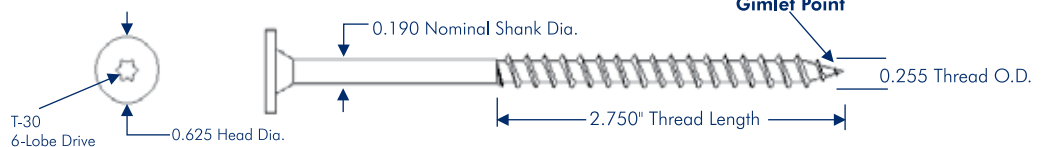
NOTE: Two T-30 Driver Bits included in each package



NOTE: All tests were conducted by an independent testing laboratory. Test results are offered only as a guide and are not guaranteed in any way by TRUFAST, LLC. *Head Pull-Thru*, *Withdrawal*, and *Lateral Load* data reflect average ultimate values.

FASTENER DIMENSIONS

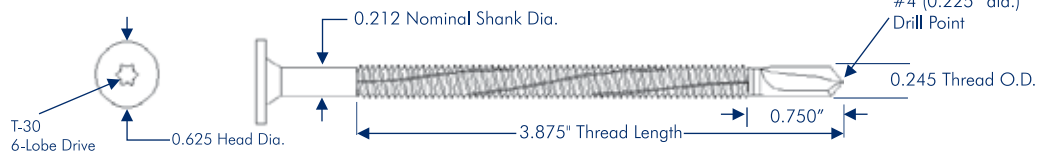
SIPTP THREAD POINT



SIPLD LIGHT DUTY DRILL POINT



SIPHD HEAVY DUTY DRILL POINT



PERFORMANCE DATA

Fastener	Tensile Strength	Shear Strength	Head Pull-Thru Values	
			7/16" OSB	SIP Panel
SIPTP	3380 lbf.	2900 lbf.	545 lbf.	630 lbf.
SIPLD	3380 lbf.	2900 lbf.	545 lbf.	630 lbf.
SIPHD	6000 lbf.	3400 lbf.	545 lbf.	630 lbf.

Withdrawal Values in Wood*

Specific Gravity	0.67	0.55	0.50	0.46	0.43	0.36	0.31
SIPTP & SIPLD:	1429	1173	1067	981	917	768	661

*Values are in lb/in. of thread penetration

Withdrawal Values in Steel

Type B Corrugated	22 ga	20 ga	18 ga		
SIPLD:	510 lbf	645 lbf	920 lbf		
Structural Steel	16 ga	13 ga	12 ga	3/16"	1/4"
SIPHD:	770 lbf	1130 lbf	1690 lbf	3100 lbf	4500 lbf

Lateral Load Resistance

Fastener	Main Member	Side Member	Load (lbf.)
SIPTP	SPF 2x4	SIP Panel	943
SIPLD	22 ga. Corrugated Steel	Nail Base	411
SIPLD	7/16" OSB	Nail Base	112
SIPHD	1/8" Structural Steel	SIP Panel	929



TRUFAST, LLC
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 Fax: 419-636-1784
 Email: sales@trufast.com
 www.trufast.com

ALTENLOH, BRINCK & CO Group





HANDRAIL

Model Number: HR120W

Location: Ramp

Size:

Length: 10"

Diameter: 1 1/2"

Available: Railing Dynamic, Inc.



RAILING DYNAMICS, INC.
For home, for life.®

COMPANY

PRODUCTS

SUPPORT

DEALERS

HAND RAIL

HOME / PRODUCTS / ENDURANCE RAILING / HAND RAIL / HR120W



Endurance
HAND RAIL™

HR120W

120" Vinyl Clad Aluminum Handrail - White

TO PURCHASE THIS PRODUCT
LOCATE OUR DEALERS

ADD TO WISHLIST

EMAIL A FRIEND

FEATURES

- Product Type: **Secondary Hand Rail**
- Warranty Type: **Lifetime - Limited**
- Color: **White**
- Material: **Aluminum Stiffener / Vinyl**

WHAT'S INCLUDED

- Vinyl hand rail lineal: **1**
- Aluminum hand rail stiffener: **1**
- Installation instructions: **1**



MORE DETAILS

120" Vinyl Clad Aluminum Handrail - White

ADD TO COMPARED PRODUCTS

VIEW MY COMPARED PRODUCTS (0)



180 DEGREE LOOP

Model: HRHLW

Location: Ramp

Available: Railing Dynamic, Inc.



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Endurance
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HRHLW

180° Return Loop - White

TO PURCHASE THIS PRODUCT
LOCATE OUR DEALERS

ADD TO WISHLIST

EMAIL A FRIEND

FEATURES

- Product Type: **Secondary Hand Rail**
- Warranty Type: **Lifetime - Limited**
- Color: **White**
- Material: **Aluminum Stiffener / Vinyl**

WHAT'S INCLUDED

- Vinyl 180° ADA return loop: **1**
- Aluminum hand rail stiffener: **2**



MORE DETAILS

180° Return Loop - White

ADD TO COMPARED PRODUCTS

VIEW MY COMPARED PRODUCTS (0)



90 DEGREE CORNER

Model: HRCNW

Location: Ramp

Available: Railing Dynamic, Inc.



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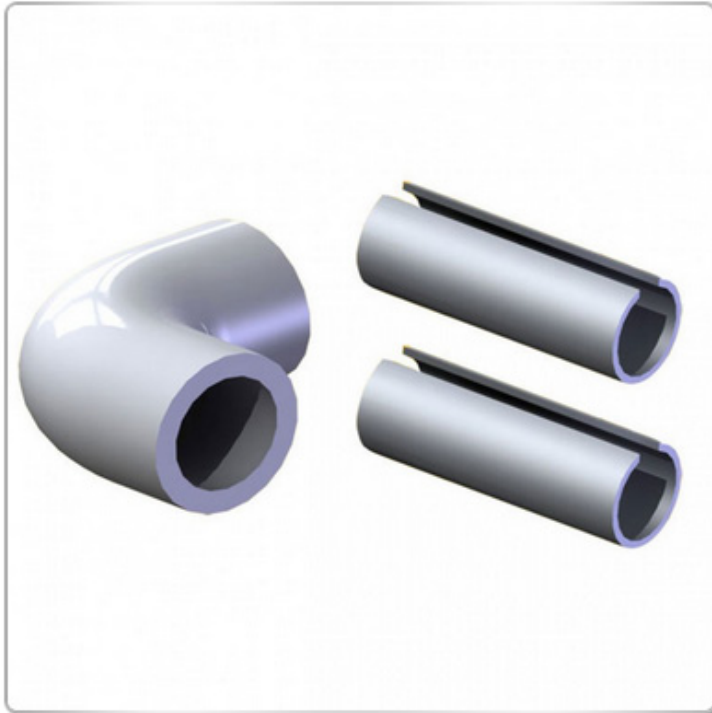
PRODUCTS

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Endurance
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HRCNW

90° Degree Corner - White

**TO PURCHASE THIS PRODUCT
LOCATE OUR DEALERS**

ADD TO WISHLIST

EMAIL A FRIEND

FEATURES

- Product Type: **Secondary Hand Rail**
- Warranty Type: **Lifetime - Limited**
- Color: **White**
- Material: **Powder Coated Aluminum / Vinyl**

WHAT'S INCLUDED

- Powder coated aluminum 90° corner: **1**
- Aluminum straight joiner: **2**



MORE DETAILS

90° Degree Corner - White

ADD TO COMPARED PRODUCTS

VIEW MY COMPARED PRODUCTS (0)



STRAIGHT RETURN

Model: HRSRW

Location: Ramp

Available: Railing Dynamic, Inc.



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HAND RAIL™

HRSRW

Straight Wall Return - White

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ADD TO WISHLIST

EMAIL A FRIEND

FEATURES

- Product Type: **Secondary Hand Rail**
- Warranty Type: **Lifetime - Limited**
- Color: **White**
- Material: **Cast Aluminum / Vinyl**

WHAT'S INCLUDED

- Aluminum straight wall return: **1**
- Vinyl flange cover: **1**



MORE DETAILS

Straight Wall Return - White

ADD TO COMPARED PRODUCTS

VIEW MY COMPARED PRODUCTS (0)



ADJUSTABLE JOINERS

Model: HRAJW

Location: Ramp

Available: Railing Dynamic, Inc.



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PRODUCTS

SUPPORT

DEALERS

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HOME / PRODUCTS / ENDURANCE RAILING / HAND RAIL / HRAJ



Endurance
HAND RAIL™

HRAJ

Handrail Adjustable Joiner

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EMAIL A FRIEND

FEATURES

- Product Type: **Secondary Hand Rail**
- Warranty Type: **Lifetime - Limited**
- Material: **Cast Aluminum**

WHAT'S INCLUDED

- Aluminum adjustable joiner (2 pc): 1
- Stainless steel assembly hardware: 1



MORE DETAILS

Handrail Adjustable Joiner



HRB MOUNTING BRACKET

Model: HRBW

Location: South and West Ramps

Finish: White

Available: Railing Dynamic, Inc



HRBW



Endurance
HAND RAIL™

HRBW

Mounting Bracket - White

TO PURCHASE THIS PRODUCT
LOCATE OUR DEALERS

ADD TO WISHLIST

EMAIL A FRIEND

FEATURES

- Product Type: **Secondary Hand Rail**
- Warranty Type: **Lifetime - Limited**
- Color: **White**
- Material: **Powder Coated Aluminum / Vinyl**

WHAT'S INCLUDED

- Powder coated aluminum mounting bracket: **1**
- Stainless steel hand rail attachment hardware: **1**
- Vinyl snap fit screw cover: **1**



ALUMINUM CORNER

Dimensions: 4" x 4" x 3/8"

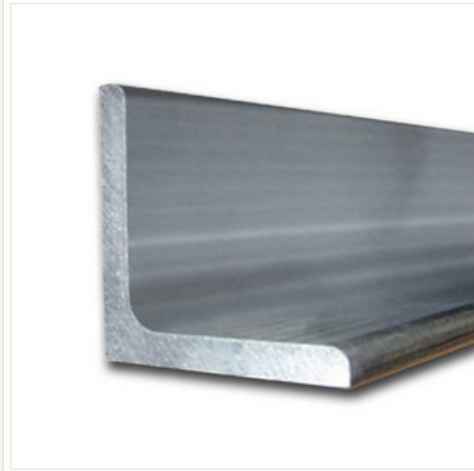
Location: Structural support for railings

Available: Capitol Steel

Need help or have questions? Use our **Live Chat** to get answers now!

- Categories**
- Aluminum**
- ▶ Aluminum Angle
 - ▶ Aluminum Channel
 - ▶ Aluminum Expanded
 - ▶ Aluminum Flat Bar
 - ▶ Aluminum Perforated
 - ▶ Aluminum Pipe
 - ▶ Aluminum Plate
 - ▶ Aluminum Round Rod
 - ▶ Aluminum Sheet
 - ▶ Aluminum Square Bar
 - ▶ Aluminum Tube - Round
 - ▶ Aluminum Tube - Rect
 - ▶ Aluminum Tube - Square
- Brass**
- ▶ Brass Flat Bar
 - ▶ Brass Hex Bar
 - ▶ Brass Round Rod
 - ▶ Brass Square Bar
- Bronze**
- ▶ Bronze Round Rod
 - ▶ Bronze Tube
- Copper**
- ▶ Copper Sheet
- Stainless Steel**
- ▶ Stainless Angle
 - ▶ Stainless Flat Bar
 - ▶ Stainless Hex Bar
 - ▶ Stainless Perforated
 - ▶ Stainless Pipe
 - ▶ Stainless Round Rod
 - ▶ Stainless Sheet
 - ▶ Stainless Square Bar
 - ▶ Stainless Threaded Rod
 - ▶ Stainless Tube - Round
 - ▶ Stainless Tube - Square

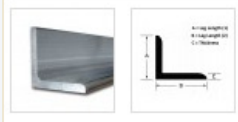
[Home](#) / 6061-T6 Aluminum Structural Angle 4" x 4" x 72" - (.375")



Double click on above image to view full picture



MORE VIEWS



6061-T6 Aluminum Structural Angle 4" x 4" x 72" - (.375")

Availability: In stock

Price: **\$78.68**

Qty: Add to Cart

-OR- Check out with PayPal
The safer, easier way to pay

▶ Material Description

6061 Structural Aluminum Angle has round corners on inside of the angle, it provides higher strength and is commonly used in structural applications as the name suggest. 6061 is one of the most common alloys of aluminum in use today. It combines workability, weldability, and corrosion resistance into one alloy with medium strength. Can be used for all types of applications. T6 is the most common temper available and offers good strength.

▶ Material Specifications

SKU	300005947.1
Alloy	N/A
Temper	N/A
Shape	Structural Angle
Leg Length (1)	4 inches
Leg Length (2)	4 inches
Thickness	3/8 inch
Length	72 inches
Package Quantity	1 piece



A36 STEEL

Thickness: 1/4"

Location: Transition between the end of the ramp and the ground

Available: Capitol Steel

1/4" x 4'W x 8'L ASTM A36 Steel Plate



General Information

Fastenal Part No. (SKU): 0953453

UNSPSC : 30102204 [↗](#)

Manufacturer: [Fastenal Approved Vendor](#)

Category: Raw Materials > Sheet Stock Material > Sheet Material



Product Details

Length: 8 ft

Material: Steel

Specification: ASTM A36

Thickness: 0.2500"

Type: Sheet Stock

Width: 4 ft

Product Weight: 326.016 lbs.



DIVISION 06 WOODS, PLASTICS, AND COMPOSITES



FLOOR JOIST AND RAFTERS

Model Number: Framer's Series M-12 by Weyerhaeuser

Location: In line Floor Framing

Dimensions:

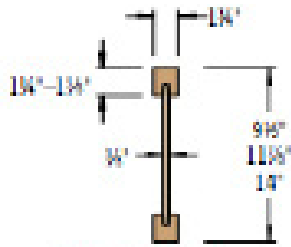
Length: 14'

Width: 11 1/4"

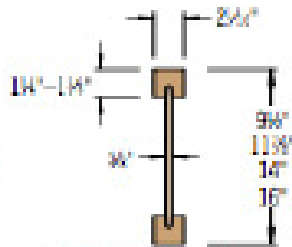
Height: 1 3/4"

Available: Weyerhaeuser

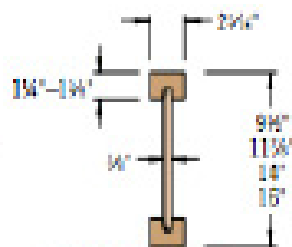
DESIGN PROPERTIES



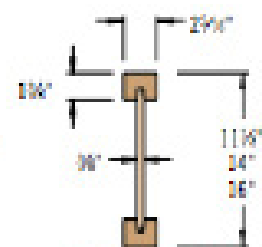
TJI® 110 Joists



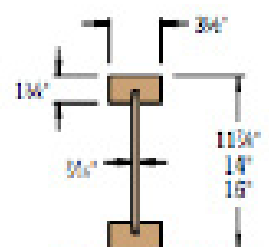
TJI® 210 Joists



TJI® 230 Joists



TJI® 360 Joists



TJI® 560 Joists

Design Properties (100% Load Duration)

Depth	TJI®	Basic Properties				Reaction Properties					
		Joist Weight (lbs/ft)	Maximum Resistive Moment ⁽¹⁾ (ft-lbs)	Joist Only EI x 10 ⁶ (in. ⁴ -lbs)	Maximum Vertical Shear (lbs)	1/4" End Reaction (lbs)	3/8" End Reaction (lbs)	3/8" Intermediate Reaction (lbs)		5/8" Intermediate Reaction (lbs)	
								No Web Stiffeners	With Web Stiffeners ⁽²⁾	No Web Stiffeners	With Web Stiffeners ⁽²⁾
9 1/8"	110	2.3	2,500	157	1,220	910	1,220	1,935	N.A.	2,350	N.A.
	210	2.6	3,000	186	1,330	1,005	1,330	2,145	N.A.	2,565	N.A.
	230	2.7	3,330	206	1,330	1,060	1,330	2,410	N.A.	2,790	N.A.
11 1/8"	110	2.5	3,160	267	1,560	910	1,375	1,935	2,295	2,350	2,705
	210	2.8	3,755	315	1,655	1,005	1,460	2,145	2,505	2,565	2,925
	230	3.0	4,215	347	1,655	1,060	1,485	2,410	2,765	2,790	3,150
	360	3.0	6,180	419	1,705	1,060	1,505	2,460	2,815	3,000	3,360
14"	560	4.0	9,500	636	2,050	1,265	1,725	3,000	3,475	3,455	3,930
	110	2.8	3,740	352	1,860	910	1,375	1,935	2,295	2,350	2,705
	210	3.1	4,490	462	1,945	1,005	1,460	2,145	2,505	2,565	2,925
	230	3.3	4,990	509	1,945	1,060	1,485	2,410	2,765	2,790	3,150
	360	3.3	7,335	612	1,955	1,060	1,505	2,460	2,815	3,000	3,360
16"	560	4.2	11,275	926	2,390	1,265	1,725	3,000	3,475	3,455	3,930
	210	3.3	5,340	629	2,190	1,005	1,460	2,145	2,505	2,565	2,925
	230	3.5	5,710	691	2,190	1,060	1,485	2,410	2,765	2,790	3,150
	360	3.5	8,405	800	2,190	1,060	1,505	2,460	2,815	3,000	3,360
560	4.5	12,925	1,252	2,710	1,265	1,725	3,000	3,475	3,455	3,930	

(1) Caution: Do not increase joist moment design properties by a repetitive member use factor.

(2) See detail W on page 6 for web stiffener requirements and calling information.

General Notes

- Design reaction includes all loads on the joist. Design shear is computed at the inside face of supports and includes all loads on the span(s). Allowable shear may sometimes be increased at interior supports in accordance with ICC-ES ESR-1153, and these increases are reflected in span tables.

- The following formulas approximate the uniform load deflection of Δ (inches):

For TJI® 110, 210, 230, and 360 Joists

$$\Delta = \frac{22.5 \cdot wL^4}{EI} + \frac{2.57 \cdot wL^2}{d \times 10^6}$$

For TJI® 560 Joists

$$\Delta = \frac{22.5 \cdot wL^4}{EI} + \frac{2.29 \cdot wL^2}{d \times 10^6}$$

w = uniform load in pounds per linear foot

L = span in feet

d = out-to-out depth of the joist in inches

EI = value from table above



SILL PLATES AND TOP PLATES

Model: Frammer Series by Weyerhaeuser

Location: Above and below wall studs

Dimensions:

Thickness: 1 3/4"

Width: 11 1/4"

Length: 14'

TREATED SILL PLATES, COLUMNS, AND STUDS

Featuring StrandGuard® TimberStrand® LSL

- Treated with zinc borate, using a proprietary process, for protection against insects and decay
- ICC ES accepted and meets AWPA treating standards for Use Category 2
- Treated throughout—no need to field treat after cutting or drilling
- Every piece is manufactured to be straight and true for fast installation and minimal waste
- Limited product warranty



TECHNICAL INFORMATION

Trus Joist® StrandGuard® TimberStrand® LSL Allowable Design Stresses (100% Load Duration)

		1.3E		1.5E	
		Beam Orientation	Plank Orientation	Beam Orientation	Plank Orientation
Modulus of elasticity	E	1.3×10^6 psi	1.3×10^6 psi	1.5×10^6 psi	1.5×10^6 psi
Adjusted modulus of elasticity ⁽¹⁾	E_{adj}	660,750 psi	660,750 psi	762,400 psi	762,400 psi
Flexural stress	F_b	1,700 psi ⁽²⁾	1,900 psi ⁽²⁾	2,250 psi ⁽²⁾	2,525 psi ⁽²⁾
Compression perpendicular to grain ⁽⁴⁾	$F_{c\perp}$	680 psi	625 psi ⁽³⁾	775 psi	625 psi ⁽³⁾
Compression parallel to grain	$F_{c\parallel}$	1,400 psi	1,400 psi	1,950 psi	1,950 psi
Horizontal shear parallel to grain	F_v	400 psi	150 psi	400 psi	150 psi

(1) Reference modulus of elasticity for beam stability and column stability calculations, per NDS® 2005.

(2) For 12" depth. For other depths, multiply by $(\frac{d}{12})^{0.8}$.

(3) Value shown is for thickness up to 3½".

(4) $F_{c\perp}$ may not be increased for duration of load.

(5) For sill plate applications only.

General Notes

- Zinc borate is an EPA-registered biocide.
- Accelerated testing (AWPA E12-94) indicates that adding zinc borate does not increase corrosivity. StrandGuard® treatment is less corrosive to fasteners and connectors than CCA or other copper-based alternatives.
- The StrandGuard® treatment process does not reduce design stresses for TimberStrand® LSL.
- For complete design and installation information regarding wall framing with TimberStrand® LSL, refer to the *Trus Joist® U.S. Wall Guide* for your region (Reorder TJ-9003 or TJ-9004).
- For complete design and installation information regarding TimberStrand® LSL columns, refer to the *Trus Joist® Beam, Header, and Column Specifier's Guide* (Reorder TJ-9000).

Connector Notes

Bolted Connections

- For bolts installed perpendicular to face and loaded parallel to grain, use a specific gravity of 0.50.
- For bolts installed perpendicular to face and loaded perpendicular to grain, use a specific gravity of 0.58.

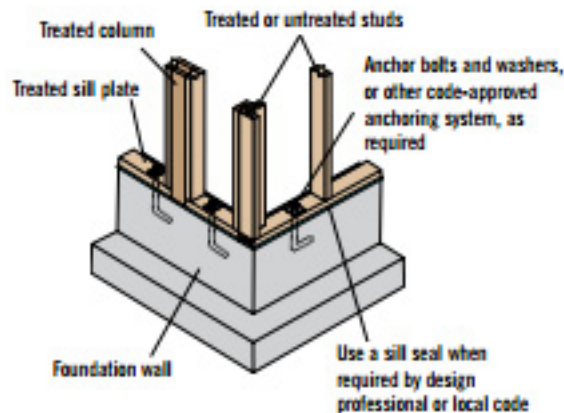
Nailed Connections

- For lateral nail capacity, use a specific gravity of 0.50.
- For withdrawal nail capacity, use a specific gravity of 0.42 in the edge and 0.50 in the face.

Shear Walls

- When StrandGuard® TimberStrand® LSL sill plates are used in shear-wall construction, use the specific gravity of the studs when determining the allowable shear.
- Minimum edge nail spacing for 2x sill plate: one row at 4" on-center.
- Minimum edge nail spacing for 3x sill plate: two rows at 4" on-center, staggered.

WARNING: Drilling, sawing, sanding or machining wood products generates wood dust, a substance known to the State of California to cause cancer. For more information on Proposition 65, visit www.wj.com/inform.



StrandGuard® TimberStrand® LSL framing materials are intended for use in aboveground, protected applications such as sill plates, columns, and studs. The American Wood Protection Association (AWPA) standards classify such applications as Use Category 2.

StrandGuard® TimberStrand® LSL may be supported by masonry or concrete foundations, but must not come into contact with the ground, nor can it be substituted for studs in a treated-wood foundation.

For complete warranty information, see the limited warranty for StrandGuard® TimberStrand® LSL (Reorder #TI-1005).

Product Storage

Protect products from sun and water



CAUTION:
Wrap is slippery
when wet or icy

Use support blocks
at 10' on-center to
keep products out of
mud and water

Code Evaluations:
See HUD MR 1265, ICC ES ESR-1387

Call your Weyerhaeuser representative today to order StrandGuard® TimberStrand® LSL. 1.888.453.8358

March 2012
Reorder TJ-8100

This document supersedes all previous versions. If this is more than one year old, contact your dealer or Weyerhaeuser rep.

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2 x4 WALL STUDS

Model: Framer Series M-12 by Weyerhaeuser

Location: Walls throughout house

Dimensions:

Thickness: 1 3/4"

Width: 3 1/2"

Length: 10'



WHY MAKE THE SWITCH TO FRAMER SERIES® LUMBER?

Here's why—

- Limited product warranty
- Crown edge clearly marked for fast installation
- Performs more consistently than ordinary lumber
- Helps ensure smooth, flat finished surfaces

The products in this guide are readily available through our nationwide network of distributors and dealers. For more information on other applications or other Weyerhaeuser products, contact your Weyerhaeuser representative.



STRAIGHT TALK ABOUT FRAMER SERIES® LUMBER

Weyerhaeuser's Framer Series® lumber is mechanically graded to virtually eliminate warping, and each board comes with the crown clearly marked to speed up installation. With lumber like this, framing goes up fast, crews won't spend valuable time culling, and there's less material waste when the job is done.

Each piece of Framer Series® lumber is performance tested to meet specific strength and density requirements. Because it's more stable than commodity boards, Framer Series® lumber is ideal for any application—even those where vertical-use-only products aren't allowed. That gives crews more flexibility at the job site and helps reduce the potential for red tags.

Only Framer Series® Lumber offers so many benefits:

- Limited warranty against warping
- Floors, walls, and ceilings stay flat and even
- Fewer callbacks to repair drywall cracks
- Crown edge clearly marked on each board
- Full lateral shear wall capacities—no species reduction needed
- Meets or exceeds all building code requirements for framing lumber
- Mold inhibitor helps material stay clean and bright, reducing product loss and callbacks

Available Sizes

Nominal Size	Lengths	Grade
2x4	8', 9', 10', 18', 20'	M-9
2x4	12' to 16', in 2' increments	M-12
2x6	8', 9', 10'	M-9
2x6	12' to 20', in 2' increments	M-12
2x8, 2x10, 2x12	8' to 20', in 2' increments	M-12

Allowable Design Stresses (100% Load Duration)

		M-9 Grade	M-12 Grade
Modulus of elasticity	E	1.4 x 10 ⁶ psi	1.6 x 10 ⁶ psi
Flexural stress	F _b	1,400 psi	1,600 psi
Tension stress	F _t	800 psi	850 psi
Compression perpendicular to grain	F _{c⊥}	565 psi	565 psi
Compression parallel to grain	F _{c∥}	1,600 psi	1,675 psi
Horizontal shear parallel to grain	F _v	175 psi	175 psi

- Design values based on Table 4C, 2005 NDS® Supplement.
- Use specific gravity of 0.55 when designing connections.
- M-9 values meet or exceed those of #2 SPF and M-12 values meet or exceed those of #2 Southern pine, making Framer Series® Lumber acceptable for use in any code-evaluated application that allows those products.

Maximum Wall Stud Spacing per IRC Table R602.3(5)

Stud Size	Bearing Walls					Non-Bearing Walls	
	Laterally unsupported stud height	Supporting roof and ceiling only	Supporting one floor, roof, and ceiling	Supporting two floors, roof and ceiling	Supporting one floor only	Laterally unsupported stud height	Maximum spacing
2x4	10'	24" o.c.	16" o.c.	—	24" o.c.	14'	24" o.c.
2x6	10'	24" o.c.	24" o.c.	16" o.c.	24" o.c.	20'	24" o.c.

- Listed heights are distances between points of lateral support placed perpendicular to the plane of the wall.

Framer Series® Lumber Property Comparison

iLevel's Framer Series lumber is mechanically strength graded to industry standards and is designed using values published in Table 4C the American Wood Council's *NDS® Supplement*. In many cases it is useful to the specifier or designer to understand how mechanically graded lumber design stresses compare with the common visual grades of lumber as well as to understand where direct substitution into existing designs is permissible.

Table 1: Comparison of Allowable Design Stresses - 100% Load Duration (psi)⁽¹⁾

Property	M-12 Framer Series	#2 Douglas fir ⁽²⁾	#2 Southern pine ⁽²⁾	M-9 Framer Series	#1 / #2 SPF ⁽²⁾	#2 Hem-Fir ⁽²⁾
Modulus of elasticity, E	1,600,000	1,600,000	1,600,000	1,400,000	1,400,000	1,300,000
Flexural stress, F _b	1,600	1350 / 900	1500 / 975	1,400	1312 / 875	1275 / 850
Tension stress, F _t	850	862 / 575	825 / 550	800	675 / 450	787 / 525
Compression perp. to grain, F _{cL}	565	625	565	565	425	405
Compression parallel to grain, F _c	1,675	1552 / 1350	1650 / 1450	1,600	1322 / 1150	1495 / 1300
Horizontal shear parallel to grain, F _v	175	180	175	175	135	150

(1) Design stresses based on Tables 4A, 4B and 4C of the 2005 *NDS® Supplement*.

(2) Flexural, tension and compression parallel to grain stresses are size dependent. Values for these stresses are tabulated as nominal 2x4 / 2x12 to indicate the range of design stresses. M-Grades are not size dependent.

Floor Joists

Floor joist spans for the species/grade combinations listed in Table 1 are provided in Table 2. M-12 Framer Series lumber has a maximum span greater than or equal to the alternative species/grades shown and can be substituted for any of these four species/grade combinations in uniformly loaded floor joist applications.

Table 2: Comparative Floor Joist Span Table - 100% Load Duration

Size	Species and Grade	12" o.c.	16" o.c.	19.2" o.c.	24" o.c.
2x8	M-12 Framer Series	14'-2"	12'-10"	12'-1"	11'-3"
	#2 Douglas fir	14'-2"	12'-9"	11'-8"	10'-5"
	#2 Southern pine	14'-2"	12'-10"	12'-1"	11'-0"
	#1 / #2 SPF	13'-6"	12'-3"	11'-6"	10'-3"
	#2 Hem-Fir	13'-2"	12'-0"	11'-3"	10'-2"
2x10	M-12 Framer Series	18'-0"	16'-5"	15'-5"	14'-4"
	#2 Douglas fir	18'-0"	15'-7"	14'-3"	12'-9"
	#2 Southern pine	18'-0"	16'-1"	14'-8"	13'-1"
	#1 / #2 SPF	17'-3"	15'-5"	14'-1"	12'-7"
	#2 Hem-Fir	16'-10"	15'-2"	13'-10"	12'-5"
2x12	M-12 Framer Series	21'-11"	19'-11"	18'-9"	17'-5"
	#2 Douglas fir	20'-11"	18'-1"	16'-6"	14'-9"
	#2 Southern pine	21'-9"	18'-10"	17'-2"	15'-5"
	#1 / #2 SPF	20'-7"	17'-10"	16'-3"	14'-7"
	#2 Hem-Fir	20'-4"	17'-7"	16'-1"	14'-4"

- Table is based on:
 - Uniform loads of 40 PSF live / 10 PSF dead
 - Deflection criteria of L/360 live load / L/240 total load
- Spans shown are horizontal clear distances between supports.
- Minimum bearing: 1½" on wood or steel, 3" on masonry. Bearing across full width is required.

Wall Framing

- M-9 and M-12 Framer Series lumber can be substituted for any species/grade combination of wall framing specified using the conventional construction provisions in IRC Table R602.3(5). For engineered applications where the designer of record has specified a species/grade, refer to Table 3. Framer Series products shown in table may replace any of the Species and Grade combinations listed below them.

Table 3: Stud Substitution Table

Species and Grade
M-12 Framer Series
#2 Douglas fir ⁽¹⁾
#2 Southern pine
M-9 Framer Series
#2 Hem-Fir
#1 / #2 SPF

- (1) All sizes require verification by the specifier where horizontal shear or compression perpendicular to grain are limiting design controls. Additionally, 2x4 sizes require verification where tension is a limiting design control.

Comparison of Design Values

iLevel's Framers Series® lumber and Weyerhaeuser Premium™ joist are mechanically strength graded and Weyerhaeuser Pro Series™ lumber is visually graded to industry standards and are designed using values published in the American Wood Council's NDS® Supplement. In many cases it is useful to the specifier or designer to understand how the design stresses of these three value-added products compare with common grades of lumber. Table 1 provides a comparison of design stresses and Table 2 provides a comparison of floor joist spans. For additional information, including additional floor, ceiling joist, and rafter span tables, download product literature from www.level.com.

Table 1: Allowable Design Stresses – 100% Load Duration (psi)

Property	M-29 Premium Joist ⁽¹⁾	#1 Southern pine ⁽²⁾⁽³⁾	M-12 Framers Series ⁽¹⁾⁽⁴⁾	#2 Douglas fir ⁽³⁾	#2 Southern pine ⁽²⁾⁽³⁾	M-9 Framers Series ⁽⁴⁾	#1 / #2 SPF ⁽³⁾	#2 Hem-Fir ⁽³⁾
Modulus of elasticity, E	1,700,000	1,700,000	1,600,000	1,600,000	1,600,000	1,400,000	1,400,000	1,300,000
Flexural stress, F _b	1550	1850 / 1250	1600	1350 / 900	1500 / 975	1400	1312 / 875	1275 / 850
Tension stress, F _t	850	1050 / 675	850	862 / 575	825 / 550	800	675 / 450	787 / 525
Compression perp. to grain, F _{cL}	565	565	565	625	565	565	425	405
Compression parallel to grain, F _c	1650	1850 / 1600	1675	1552 / 1350	1650 / 1450	1600	1322 / 1150	1495 / 1300
Horizontal shear parallel to grain, F _v	175	175	175	180	175	175	135	150

- (1) M-29 Premium Joist and M-12 Framers Series design stresses exceed #1 Southern pine for depths 2x8 and greater.
- (2) Pro Series Lumber can be ordered as either #1 or #2 Southern pine.
- (3) Flexural, tension and compression parallel to grain stresses are size dependent. Values for these stresses are tabulated as nominal 2x4 / 2x12 to indicate the range of design stresses. M-Grades are not size dependent.
- (4) M-12 Grade is 2x8, 2x10, 2x12 and longer length 2x4, 2x6. M-9 Grade is 2x4, 2x6 (lengths 10' and under). Refer to LB-4020 for details.

Table 2: Comparative Floor Joist Span Table – 100% Load Duration

Size	Species and Grade	12" o.c.	16" o.c.	19.2" o.c.	24" o.c.
2x8	M-29 Premium Joist	14'-5"	13'-1"	12'-4"	11'-5"
	#1 Southern pine	14'-5"	13'-1"	12'-4"	11'-5"
	M-12 Framers Series	14'-2"	12'-10"	12'-1"	11'-3"
	#2 Douglas fir	14'-2"	12'-9"	11'-8"	10'-5"
	#2 Southern pine	14'-2"	12'-10"	12'-1"	11'-0"
	#1 / #2 SPF	13'-6"	12'-3"	11'-6"	10'-3"
2x10	#2 Hem-Fir	13'-2"	12'-0"	11'-3"	10'-2"
	M-29 Premium Joist	18'-5"	16'-9"	15'-9"	14'-7"
	#1 Southern pine	18'-5"	16'-9"	15'-9"	14'-7"
	M-12 Framers Series	18'-0"	16'-5"	15'-5"	14'-4"
	#2 Douglas fir	18'-0"	15'-7"	14'-3"	12'-9"
	#2 Southern pine	18'-0"	16'-1"	14'-8"	13'-1"
2x12	#1 / #2 SPF	17'-3"	15'-5"	14'-1"	12'-7"
	#2 Hem-Fir	16'-10"	15'-2"	13'-10"	12'-5"
	M-29 Premium Joist	22'-5"	20'-4"	19'-2"	17'-9"
	#1 Southern pine	22'-5"	20'-4"	19'-2"	17'-5"
	M-12 Framers Series	21'-11"	19'-11"	18'-9"	17'-5"
	#2 Douglas fir	20'-11"	18'-1"	16'-6"	14'-9"
2x12	#2 Southern pine	21'-9"	18'-10"	17'-2"	15'-5"
	#1 / #2 SPF	20'-7"	17'-10"	16'-3"	14'-7"
	#2 Hem-Fir	20'-4"	17'-7"	16'-1"	14'-4"

General Notes:

- Table is based on:
 - Uniform loads of 40 PSF live / 10 PSF dead
 - Deflection criteria of L/360 live load / L/240 total load
- Spans shown are horizontal clear distances between supports.
- Minimum bearing: 1½" on wood or steel, 3" on masonry.
- Bearing across full width is required.



2 X 6 WALL STUDS

Model: Framer Series M-12 by Weyerhaeuser

Location: Partition wall between kitchen and bathroom

Dimensions:

Thickness: 1 3/4"

Width: 5 1/2"

Length: 10'



WHY MAKE THE SWITCH TO FRAMER SERIES® LUMBER?

Here's why—

- Limited product warranty
- Crown edge clearly marked for fast installation
- Performs more consistently than ordinary lumber
- Helps ensure smooth, flat finished surfaces

The products in this guide are readily available through our nationwide network of distributors and dealers. For more information on other applications or other Weyerhaeuser products, contact your Weyerhaeuser representative.



STRAIGHT TALK ABOUT FRAMER SERIES® LUMBER

Weyerhaeuser's Framer Series® lumber is mechanically graded to virtually eliminate warping, and each board comes with the crown clearly marked to speed up installation. With lumber like this, framing goes up fast, crews won't spend valuable time culling, and there's less material waste when the job is done.

Each piece of Framer Series® lumber is performance tested to meet specific strength and density requirements. Because it's more stable than commodity boards, Framer Series® lumber is ideal for any application—even those where vertical-use-only products aren't allowed. That gives crews more flexibility at the job site and helps reduce the potential for red tags.

Only Framer Series® Lumber offers so many benefits:

- Limited warranty against warping
- Floors, walls, and ceilings stay flat and even
- Fewer callbacks to repair drywall cracks
- Crown edge clearly marked on each board
- Full lateral shear wall capacities—no species reduction needed
- Meets or exceeds all building code requirements for framing lumber
- Mold inhibitor helps material stay clean and bright, reducing product loss and callbacks

Available Sizes

Nominal Size	Lengths	Grade
2x4	8', 9', 10', 18', 20'	M-9
2x4	12' to 16', in 2' increments	M-12
2x6	8', 9', 10'	M-9
2x6	12' to 20', in 2' increments	M-12
2x8, 2x10, 2x12	8' to 20', in 2' increments	M-12

Allowable Design Stresses (100% Load Duration)

		M-9 Grade	M-12 Grade
Modulus of elasticity	E =	1.4 x 10 ⁶ psi	1.6 x 10 ⁶ psi
Flexural stress	F _b =	1,400 psi	1,600 psi
Tension stress	F _t =	800 psi	850 psi
Compression perpendicular to grain	F _{c⊥} =	565 psi	565 psi
Compression parallel to grain	F _{c∥} =	1,600 psi	1,675 psi
Horizontal shear parallel to grain	F _v =	175 psi	175 psi

- Design values based on Table 4C, 2005 NDS® Supplement.
- Use specific gravity of 0.55 when designing connections.
- M-9 values meet or exceed those of #2 SPF and M-12 values meet or exceed those of #2 Southern pine, making Framer Series® Lumber acceptable for use in any code-evaluated application that allows those products.

Maximum Wall Stud Spacing per IRC Table R602.3(5)

Stud Size	Bearing Walls					Non-Bearing Walls	
	Laterally unsupported stud height	Supporting roof and ceiling only	Supporting one floor, roof, and ceiling	Supporting two floors, roof and ceiling	Supporting one floor only	Laterally unsupported stud height	Maximum spacing
2x4	10'	24" o.c.	16" o.c.	—	24" o.c.	14'	24" o.c.
2x6	10'	24" o.c.	24" o.c.	16" o.c.	24" o.c.	20'	24" o.c.

- Listed heights are distances between points of lateral support placed perpendicular to the plane of the wall.

Framer Series® Lumber Property Comparison

iLevel's Framer Series lumber is mechanically strength graded to industry standards and is designed using values published in Table 4C the American Wood Council's *NDS® Supplement*. In many cases it is useful to the specifier or designer to understand how mechanically graded lumber design stresses compare with the common visual grades of lumber as well as to understand where direct substitution into existing designs is permissible.

Table 1: Comparison of Allowable Design Stresses - 100% Load Duration (psi)⁽¹⁾

Property	M-12 Framer Series	#2 Douglas fir ⁽²⁾	#2 Southern pine ⁽²⁾	M-9 Framer Series	#1 / #2 SPF ⁽²⁾	#2 Hem-Fir ⁽²⁾
Modulus of elasticity, E	1,600,000	1,600,000	1,600,000	1,400,000	1,400,000	1,300,000
Flexural stress, F _b	1,600	1350 / 900	1500 / 975	1,400	1312 / 875	1275 / 850
Tension stress, F _t	850	862 / 575	825 / 550	800	675 / 450	787 / 525
Compression perp. to grain, F _{cL}	565	625	565	565	425	405
Compression parallel to grain, F _c	1,675	1552 / 1350	1650 / 1450	1,600	1322 / 1150	1495 / 1300
Horizontal shear parallel to grain, F _v	175	180	175	175	135	150

(1) Design stresses based on Tables 4A, 4B and 4C of the 2005 *NDS® Supplement*.

(2) Flexural, tension and compression parallel to grain stresses are size dependent. Values for these stresses are tabulated as nominal 2x4 / 2x12 to indicate the range of design stresses. M-Grades are not size dependent.

Floor Joists

Floor joist spans for the species/grade combinations listed in Table 1 are provided in Table 2. M-12 Framer Series lumber has a maximum span greater than or equal to the alternative species/grades shown and can be substituted for any of these four species/grade combinations in uniformly loaded floor joist applications.

Table 2: Comparative Floor Joist Span Table - 100% Load Duration

Size	Species and Grade	12" o.c.	16" o.c.	19.2" o.c.	24" o.c.
2x8	M-12 Framer Series	14'-2"	12'-10"	12'-1"	11'-3"
	#2 Douglas fir	14'-2"	12'-9"	11'-8"	10'-5"
	#2 Southern pine	14'-2"	12'-10"	12'-1"	11'-0"
	#1 / #2 SPF	13'-6"	12'-3"	11'-6"	10'-3"
	#2 Hem-Fir	13'-2"	12'-0"	11'-3"	10'-2"
2x10	M-12 Framer Series	18'-0"	16'-5"	15'-5"	14'-4"
	#2 Douglas fir	18'-0"	15'-7"	14'-3"	12'-9"
	#2 Southern pine	18'-0"	16'-1"	14'-8"	13'-1"
	#1 / #2 SPF	17'-3"	15'-5"	14'-1"	12'-7"
	#2 Hem-Fir	16'-10"	15'-2"	13'-10"	12'-5"
2x12	M-12 Framer Series	21'-11"	19'-11"	18'-9"	17'-5"
	#2 Douglas fir	20'-11"	18'-1"	16'-6"	14'-9"
	#2 Southern pine	21'-9"	18'-10"	17'-2"	15'-5"
	#1 / #2 SPF	20'-7"	17'-10"	16'-3"	14'-7"
	#2 Hem-Fir	20'-4"	17'-7"	16'-1"	14'-4"

- Table is based on:
 - Uniform loads of 40 PSF live / 10 PSF dead
 - Deflection criteria of L/360 live load / L/240 total load
- Spans shown are horizontal clear distances between supports.
- Minimum bearing: 1½" on wood or steel, 3" on masonry. Bearing across full width is required.

Wall Framing

- M-9 and M-12 Framer Series lumber can be substituted for any species/grade combination of wall framing specified using the conventional construction provisions in IRC Table R602.3(5). For engineered applications where the designer of record has specified a species/grade, refer to Table 3. Framer Series products shown in table may replace any of the Species and Grade combinations listed below them.

Table 3: Stud Substitution Table

Species and Grade
M-12 Framer Series
#2 Douglas fir ⁽¹⁾
#2 Southern pine
M-9 Framer Series
#2 Hem-Fir
#1 / #2 SPF

- (1) All sizes require verification by the specifier where horizontal shear or compression perpendicular to grain are limiting design controls. Additionally, 2x4 sizes require verification where tension is a limiting design control.



HQG-HURRIQUAKE- 2 1/2" X .113 HQ

Model: RH-S8DR113-HQG

Location: Floor system fasteners

Plastic Collated Galvanized Sheathing Nails

Dimensions: 2 1/2" x .113"

Available: Bostitch

Framing

- Framing Nailers
- 21° Plastic Collated Round Head Metal Connector Nails
- 33° Paper Collated Stick Framing Nails
- 35° Paper Collated Metal Connector Nails
- 28° Wire Collated Full Round Head Stick Framing Nails
- HurriQuake® 21° Plastic Collated Sheathing Nails

Related Products



F21PL - 21° Plastic Collated Framing Nailer



RH-S8DR113-HQ - HurriQuake® -- 5,000-Qty. 2-1/2" x .113 HQ

You are here: [Products](#) >> [Construction](#) >> [Framing](#) >> [HurriQuake® 21° Plastic Collated Sheathing Nails](#) >> [RH-S8DR113-HQG](#)

RH-S8DR113-HQG - HurriQuake® -- 5,000 Qty. 2-1/2" x .113 HQ Ring Shank 21° Plastic Collated Galvanized Sheathing Nail

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Features and Benefits

- Up to 2X the Resistance to High Winds - rated for hurricane wind conditions and gusts up to 170 MPH
- Up to 50% More Resistance to Earthquake Conditions - reduces the potential for major structural damage
- Easy-to-Identify-Head - marked for easy identification during code inspection
- Shear Shank Technology - screw shank fills voids in sheathing while smooth shank provides increased shear strength
- Deep Ring Technology delivers outstanding hold power
- Improved Plastic Collation drives nails more smoothly & reduces flagging to ensure nails sink flush
- Up to 25% Larger Effective Head Area - increases pull through resistance & decreases overdrive

[Interactive Showcase](#)

Product Details

Fastener Length	2-1/2"
Fastener Shank Diameter	.113
Finish	Galvanized
Fits Bostitch Tools	F21PL, N88RH, N88RH-2MCN
Point Style	Diamond
Quantity Per Item Pack	5,000
Shank Type	HQ Ring



[Warranty](#)



FRAMING NAILS

Model: S16D131-FH

Location: Walls throughout house

Dimensions: 3 1/2" x .131"

STANLEY

BOSTITCH

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Framing

[Framing Nailers](#)

[21° Plastic Collated Round Head Metal Connector Nails](#)

[33° Paper Collated Stick Framing Nails](#)

[35° Paper Collated Metal Connector Nails](#)

[28° Wire Collated Full Round Head Stick Framing Nails](#)

[HurriQuake® 21° Plastic Collated Sheathing Nails](#)

Related Products



F28WW - 28° Industrial Framing Nailer System

You are here: [Products](#) >> [Construction](#) >> [Framing](#) >> [28° Wire Collated Full Round Head Stick Framing Nails](#) >> [S16D131-FH](#)

S16D131-FH - 2,000-Qty 3-1/2" x .131 Smooth Shank 28° Wire Collated Full Round Head Stick Framing Nails

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[Warranty](#)

Features and Benefits

Product Details

Fastener Length	3-1/2"
Fastener Shank Diameter	.131
Finish	Coated
Fits Bostitch Tools	N79WW, N80SB, N86S, N88WWB, N100S, F28WW
Point Style	Diamond
Quantity Per Item Pack	2,000
Shank Type	Smooth

MORE STANLEY SITES:

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3/4" LEG 1 3/8" WIDE CROWN PACKAGING STAPLE

Model: SW90403

Location: Window Frames

Dimensions:

1 3/8" crown

3/4" leg

Finish: Galvanized

Available: Bostitch

Staples

You are here: [Products](#) >> [Industrial](#) >> [Staples](#) >> [1-3/8" Wide Crown Stick Packaging Staples .090 x .040](#) >> [SW90403--4](#)

Related Products



F84 - Low-volume Carton Closing



D16-2AD - 120-Magazine 7.1 Lbs. Air driven Carton Closer

[1 more](#)

SW90403--4 - 2,000-Pack 3/4" Leg 1-3/8" Wide Crown Stick Packaging Staple

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Features and Benefits

Product Details

Fastener Crown Length	1-3/8
Fastener Gauge	.090" x .040"
Finish	Galvanized
Fits Bostitch Tools	D16-2, D16-2AD, D60S, D60ADS, F84
Leg Length	3/4
Qty Case Per Skid	36
Qty Pack Per Case	10
Quantity Per Item Pack	2,000
Staple Wire Gauge	.090x.040

[Warranty](#)

Work Safely with Tools, Wear Safety Glasses.



2 X 8 SINGLE JOIST HANGERS

Model: SJQ28 ESR 1347

Dimensions:

Height: 7"

Width: 1 5/8"

Steel Gage Number: 20

Location: Fastening floor joists to rim boards

TABLE 1—SINGLE AND DOUBLE JOIST HANGERS SJK AND DJ SERIES
ALLOWABLE LOADS (POUNDS)⁵

MODEL	DIMENSIONS (INCHES)			STEEL GAGE NO.	NAIL SCHEDULE ¹		ALLOWABLE LOADS – SYP ² (LBS)			
	H	W	B		Joist	Header	Uplift ³ 160%	Gravity ⁴ 100%	Gravity ⁴ 115%	Gravity ⁴ 125%
SJQ24	3- ¹ / ₈	1- ⁵ / ₈	1- ¹ / ₂	20	2	4	394	492	566	615
SJQ26	4- ³ / ₈	1- ⁵ / ₈	1- ¹ / ₂	20	4	6	787	738	849	923
SJQ28	7	1- ⁵ / ₈	1- ¹ / ₂	20	6	8	1181	984	1132	1230
SJQ210	7- ⁷ / ₈	1- ⁵ / ₈	1- ¹ / ₂	20	6	10	1181	1230	1415	1538
DJ46	5- ¹ / ₂	3- ¹ / ₈	2	18	4	8	794	992	1100	1100
DJ48	7- ¹ / ₄	3- ¹ / ₈	2	18	6	12	1190	1488	1711	1860
DJ410	8- ¹ / ₂	3- ¹ / ₈	2	18	8	14	1587	1736	1996	2170

For SI: 1 inch = 25.4 mm, 1 lbf = 4.5 N.

¹Nails are 10d by 1-¹/₂ inch joist hanger nails complying with Section 3.8.3.

²Allowable loads are for hangers nailed into wood or structural composite lumber having an effective specific gravity of 0.55 (such as Southern Pine) or greater.

³Allowable uplift loads have been adjusted by a load duration factor C_D , of 1.6 (160%), corresponding to the typical duration of wind and earthquake loads. No further increases in allowable loads are permitted.

⁴Allowable gravity (bearing) loads have been adjusted by load duration factors, C_D , of 1.0 (100%), 1.15 (115%), and 1.25 (125%), corresponding to the typical durations of occupancy live loads, snow loads and construction loads, respectively. No further increases in allowable loads are permitted.

⁵Tabulated loads are without a 33% steel stress increase. Application of steel stress increase is not permitted.

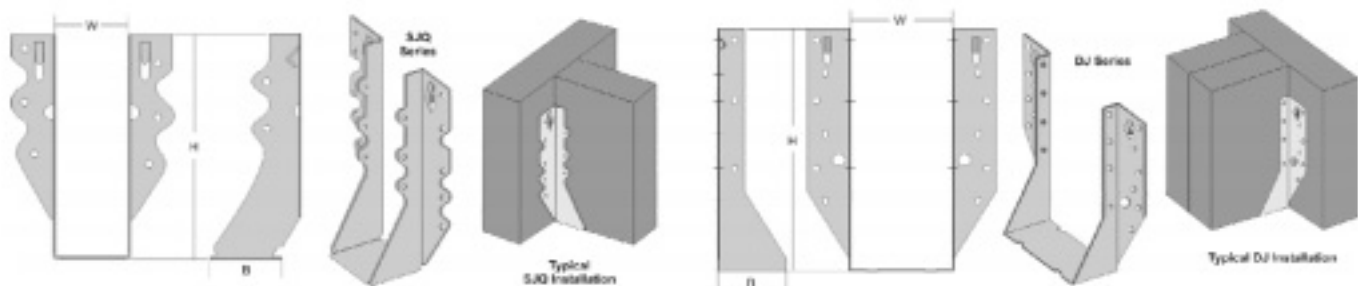


FIGURE 1—SJK AND DJ SERIES



2 X 8 DOUBLE JOIST HANGER

Model: DJ48Z

Dimensions:

Height: 7 1/4"

Width: 3 1/8"

Steel Gauge Number: 18

Location: Flooring system

**TABLE 1—SINGLE AND DOUBLE JOIST HANGERS SJQ AND DJ SERIES
ALLOWABLE LOADS (POUNDS)⁵**

MODEL	DIMENSIONS (INCHES)			STEEL GAGE NO.	NAIL SCHEDULE ¹		ALLOWABLE LOADS – SYP ² (LBS)			
	H	W	B		Joist	Header	Uplift ³ 160%	Gravity ⁴ 100%	Gravity ⁴ 115%	Gravity ⁴ 125%
SJQ24	3- ¹ / ₈	1- ⁵ / ₈	1- ¹ / ₂	20	2	4	394	492	566	615
SJQ26	4- ³ / ₈	1- ⁵ / ₈	1- ¹ / ₂	20	4	6	787	738	849	923
SJQ28	7	1- ⁵ / ₈	1- ¹ / ₂	20	6	8	1181	984	1132	1230
SJQ210	7- ⁷ / ₈	1- ⁵ / ₈	1- ¹ / ₂	20	6	10	1181	1230	1415	1538
DJ46	5- ¹ / ₂	3- ¹ / ₈	2	18	4	8	794	992	1100	1100
DJ48	7- ¹ / ₈	3- ¹ / ₈	2	18	6	12	1190	1488	1711	1860
DJ410	8- ¹ / ₂	3- ¹ / ₈	2	18	8	14	1587	1736	1996	2170

For SI: 1 inch = 25.4 mm, 1 lbf = 4.5 N.

¹Nails are 10d by 1-¹/₂ inch joist hanger nails complying with Section 3.8.3.

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⁵Tabulated loads are without a 33% steel stress increase. Application of steel stress increase is not permitted.

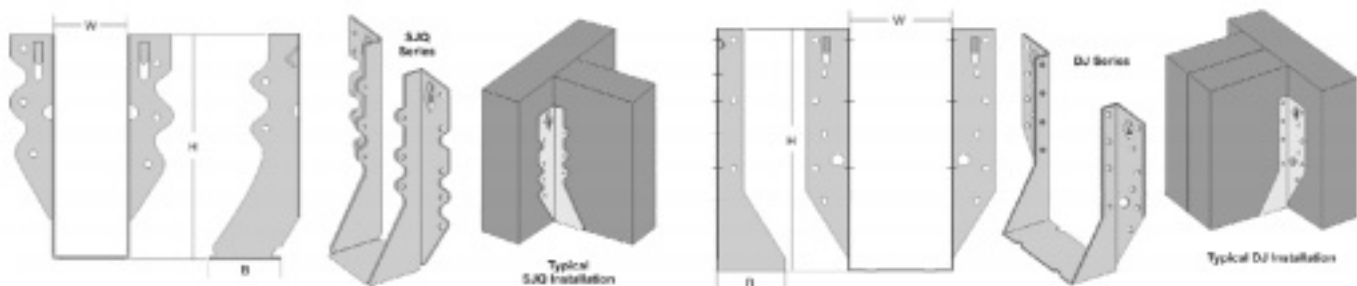


FIGURE 1—SJQ AND DJ SERIES



**BOSTITCH 1 1/2" X .131 35 STRAPSHOT PAPER COLLATED
METAL CONNECTOR NAILS**

Model: MC 131 x 1.5" (.131)

Dimensions:

Length: 1 1/2"

Diameter: .131

Finish: Bright, Heat Treated

Location: Attaching joist hangers to joists

Products

- Construction
- Industrial
- Hand Tools

Related Products



F33PT - 33° Paper Tape Framing Nailer



MCN150 - STRAPSHOT™ Metal Connector Nailer

You are here: [Products](#) >> [PT-MC13115-1M](#)

PT-MC13115-1M - 1,000-Qty. 1-1/2" x .131 35° STRAPSHOT™ Paper Collated Metal Connector Nails

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[View larger](#)

Features and Benefits

- Full Round Head - Identified
- Bend yield = 100,000 PSI
- For Metal Connector Applications

Product Details

Fastener Length	1-1/2"
Fastener Shank Diameter	.131
Finish	Bright, Heat Treated
Fits Bostitch Tools	F33PT, STRAPSHOT™ MCN-150, STRAPSHOT™ MCN-250
Fits Competitor Tools	Paslode 5250/65G PP, Hitachi NR 65AK
Point Style	Diamond
Quantity Per Item Pack	1,000
Shank Type	Smooth



[Warranty](#)

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1 1/8" OSB (ORIENTED STRAND BOARD): SUB FLOOR

Model Number: EDGE

Location: subfloor throughout

Dimensions:

Length: 4'

Width: 8'

Available: Weyerhaeuser



Weyerhaeuser OSB Sheathing

Weyerhaeuser Company
 PO Box 9777
 Federal Way, WA 98063-9777
<http://www.weyerhaeuser.com/Sustainability/Planet/Products/MSDS>

Emergency Phone: (253) 924-5000
 Additional Information: (253) 924-3865
 CHEMTREC: (800) 424-9300
 Revised Date: August 31, 2012

1. Product Identification

Product	
Weyerhaeuser OSB Sheathing	

Synonyms: Oriented Strand Board, OSB,

2. Hazardous Ingredients/Identity Information

Name	CAS#	Percent	Agency	Exposure Limits	Comments
Wood (wood dust, softwood and hardwood)	None	84-89	OSHA OSHA ACGIH	PEL-TWA 15 mg/m ³ (see footnote ^A below) PEL-TWA 5 mg/m ³ (see footnote ^A below) TLV-TWA 1 mg/m ³	Total dust (PNOR) Respirable dust fraction (PNOR) Inhalable fraction
Resin Solids: Polymeric phenol - formaldehyde ^B	9003-35-4	1-14	OSHA ACGIH	PEL-TWA 0.75 ppm PEL-STEL 2 ppm TLV-Ceiling 0.3 ppm	Free gaseous formaldehyde
Polymeric Diphenylmethane Diisocyanate ^C	9016-87-9	0-14	OSHA ACGIH	None None	
Paraffin wax	8002-74-2	0-2	OSHA ACGIH	PEL-TWA 2 mg/m ³ TLV-TWA 2 mg/m ³	Paraffin wax fume Paraffin wax fume

^A In *AFL-CIO v OSHA*, 965 F. 2d 962 (11th Cir. 1992), the Court overturned OSHA's 1989 Air Contaminants Rule, including the specific PEL's for wood dust that OSHA had established at that time.

The 1989 vacated PEL's were: 5 mg/m³ PEL-TWA and 10 mg/m³ STEL (15 min), all softwood and hardwood except Western Red Cedar. Wood dust is now regulated by OSHA as "Particulates Not Otherwise Regulated" (PNOR), which is also referred to as "nuisance dust". However, some states have incorporated the 1989 OSHA PEL's in their state plans.

Additionally, OSHA indicated that it may cite employers under the OSH Act general duty clause in appropriate circumstances for noncompliance with the 1989 PEL's.

^B These products may contain free formaldehyde (<0.1%, wt %), which may be released depending on concentration and environmental conditions. These panels contain no added urea-formaldehyde resins. Large scale chamber studies on similar materials conducted by the APA Engineered Wood Association have shown that the finished products off-gas levels below 0.1 ppm as well.

^C This ingredient is the polymerized form of MDI resin.

3. Hazard Identification

Primary Safety/Health Hazards:

Warning: OSB Sheathing dust may pose a combustible dust explosion hazard if dried and suspended in air in sufficient concentrations and in proximity to an ignition source. Users of this product should examine the potential to generate wood and organic resin dust during handling and processing and related combustibility hazards and controls. See additional comments in MSDS.

The primary health hazard posed by this product is thought to be due to exposure to airborne wood and resin dusts.

Appearance and Odor: Weyerhaeuser OSB Sheathing consists of a ligno cellulosic matrix of interlocking wood fibers having a slightly aromatic odor. The wood component of this product may consist of alder, aspen, beech, birch, cottonwood, fir, gum, hemlock, hickory, maple, oak, pecan, pine, poplar, spruce, and walnut.

Primary Route(s) of Exposure:

- Ingestion:
- Skin: Dust
- Inhalation: Dust
- Eyes: Dust

Medical Conditions Generally Aggravated by Exposure: Wood dust may aggravate pre-existing respiratory conditions or allergies.

Signs and Symptoms of Exposure:

Acute Health Hazards: Wood dust can cause eye irritation. Certain species of wood dust can elicit allergic contact dermatitis in sensitized individuals. Wood dust may cause respiratory irritation, nasal dryness, coughing, sneezing and wheezing as a result of inhalation. Formaldehyde may cause temporary irritation of skin, eyes, or respiratory system. Formaldehyde may cause sensitization in susceptible individuals.

Chronic Health Hazards: Wood dust, depending on the species, may cause allergic contact dermatitis and respiratory sensitization with prolonged, repetitive contact or exposure to elevated dust levels. Prolonged exposure to wood dust has been reported by some observers to be associated with nasal cancer. Additional information related to carcinogenicity for wood dust and formaldehyde is listed below.

Carcinogenicity Listing:

- NTP: Wood dust, Known Human Carcinogen. Formaldehyde, Known to be a Human Carcinogen.
- IARC Monographs: Wood dust, Group 1 - carcinogenic to humans. Formaldehyde, Group 1 - carcinogenic to humans.
- OSHA Regulated: Formaldehyde Gas

Wood Dust - NTP: According to its Report on Carcinogens, Twelfth Edition, NTP states, "Wood dust is known to be a human carcinogen based on sufficient evidence of carcinogenicity from studies in humans". An association between wood dust exposure and cancer of the nasal cavity has been observed in many case reports, cohort studies, and case-control studies that specifically addressed nasal cancer. Strong and consistent associations with cancer of the nasal cavities and paranasal sinuses were observed both in studies of people whose occupations are associated with wood dust exposure and in studies that directly estimated wood dust exposure. This classification is based primarily on increased risk in the occurrence of adenocarcinomas of the nasal cavities and paranasal sinuses associated with exposure to wood dust. The evaluation did not find sufficient evidence to associate cancers of the oropharynx, hypopharynx, lung, lymphatic and hematopoietic systems, stomach, colon or rectum with exposure to wood dust. There is inadequate evidence for the carcinogenicity of wood dust from studies in experimental animals according to NTP.

3. Hazard Identification (cont'd.)

Wood Dust: IARC – Group 1: Carcinogenic to humans; sufficient evidence of carcinogenicity. This classification is primarily based on studies showing an association between occupational exposure to wood dust and adenocarcinoma to the nasal cavities and paranasal sinuses. IARC did not find sufficient evidence of an association between occupational exposure to wood dust and cancers of the oropharynx, hypopharynx, lung, lymphatic and hematopoietic systems, stomach, colon or rectum.

Formaldehyde - NTP: According to its Report on Carcinogens, Twelfth Edition, NTP states, Formaldehyde (gas) is known to be a human carcinogen based on sufficient evidence of carcinogenicity from studies in humans and supporting data on mechanisms of carcinogenesis.

Formaldehyde: IARC - Group 1: Carcinogenic to humans, sufficient evidence of carcinogenicity. A working group of IARC has determined that there is sufficient evidence that formaldehyde causes nasopharyngeal cancer in humans, a rare cancer in developed countries and "strong but not sufficient evidence" for leukemia. However, numerous epidemiological studies have failed to demonstrate a relationship between formaldehyde exposure and nasal cancer or pulmonary diseases such as emphysema or lung cancer.

4. Emergency and First-Aid Procedures

Ingestion: Not applicable under normal use.

Eye Contact: Wood and resin dust may cause mechanical irritation. Treat dust in eye as foreign object. Flush with water to remove dust particles. Seek medical help if irritation persists.

Skin Contact: Wood dust of certain species can elicit allergic contact dermatitis in sensitized individuals, as well as mechanical irritation resulting in erythema and hives. Seek medical help if rash, irritation or dermatitis persists. Resin dust may also cause skin reactions in susceptible individuals.

Skin Absorption: Not known to occur under normal use.

Inhalation: Wood and resin dust may cause unpleasant obstruction in the nasal passages, resulting in dryness of nose, dry cough, sneezing and headaches. Remove to fresh air. Seek medical help if persistent irritation, severe coughing or breathing difficulty occurs.

5. Fire and Explosion Data

Flash Point (Method Used): NAP

Flammable Limits: LEL = See below under "Unusual Fire and Explosion Hazards" UEL= NAP

Extinguishing Media: Water, carbon dioxide, sand

Autoignition Temperature: Variable [typically 400°-500°F (204°-260°C)]

Special Firefighting Procedures: None

Unusual Fire and Explosion Hazards: Depending on moisture content and more importantly, particle diameter and airborne concentration, wood and resin dust may explode in the presence of an ignition source. Wood dust may similarly deflagrate (combustion without detonation like an explosion) if ignited in an open or loosely contained area. For wood dust, an airborne concentration of 40 grams (40,000 mg) of dust per cubic meter of air is often used as the LEL for wood dusts. Reference NFPA Standards 654 and 664 for guidance. Ventilation systems should be kept clean and precautions should be taken to prevent sparks or other ignition sources.

HMIS Rating (Scale 0-4): Health = 2* Fire = 1 Physical Hazard = 0

NFPA Rating (Scale 0-4): Health = 1 Fire = 1 Reactivity = 0

6. Accidental Release Measures

Steps to be Taken In Case Material Is Released or Spilled: Sweep or vacuum up for recovery and disposal. Avoid creating dusty conditions whenever feasible. Maintain good housekeeping to avoid accumulation of dried wood and resin dust on exposed surfaces. Dried wood and resin dust may pose a combustible dust hazard. Place recovered wood dust in a container for proper disposal.

7. Handling and Storage

Precautions to be Taken In Handling and Storage: Dried wood and resin dust may pose a combustible dust hazard. Keep away from ignition sources. Avoid eye contact. Avoid prolonged or repeated contact with skin. Avoid prolonged or repeated breathing of wood dust. These products may release some formaldehyde in gaseous form. Specific handling and storage conditions should be assessed to determine potential formaldehyde concentrations. Store in well-ventilated, cool, dry place away from open flame.

8. Exposure Control Measures, Personal Protection

Personal Protective Equipment:

RESPIRATORY PROTECTION – Use NIOSH approved filtering face piece respirator (“dust mask”) or higher levels of respiratory protection as indicated if there is a potential to exceed the exposure limits or for symptom relief or worker comfort. Use respiratory protection in accordance with regulatory requirements such as the OSHA respiratory protection standard 29 CFR 1910.134.

EYE PROTECTION – Approved goggles or tight fitting safety glasses are recommended when excessive exposures to dust may occur (e.g. during clean up) and when eye irritation may occur.

PROTECTIVE GLOVES – Cloth, canvas, or leather gloves are recommended to minimize potential slivers or mechanical irritation from handling product.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT – Outer garments which cover the arms may be desirable in extremely dusty areas.

WORK/HYGIENE PRACTICES – Follow good hygienic and housekeeping practices. Clean up areas where wood and resin dust settles to avoid excessive accumulation of this combustible material. Minimize compressed air blowdown or other practices that generate high airborne-dust concentrations.

Ventilation:

LOCAL EXHAUST – Provide local exhaust as needed so that exposure limits are met. Ventilation to control dust should be considered where potential explosive concentrations and ignition sources are present. The design and operation of any exhaust system should consider the possibility of explosive concentrations of wood dust within the system. See “SPECIAL” section below. Use of tool mounted exhaust systems should also be considered, especially when working in enclosed areas.

MECHANICAL (GENERAL) – Provide general ventilation in processing and storage areas so that exposure limits are met.

SPECIAL – Ensure that exhaust ventilation and material transport systems involved in handling this product contain explosion relief vents or suppression systems designed and operated in accordance with applicable standards if the operating conditions justify their use.

OTHER – Cutting & Machining of product should preferably be done outdoors or with adequate ventilation & containment.

9. Physical/Chemical Properties

Physical Description: OSB Sheathing consists of a ligno cellulosic matrix of interlocking wood fibers having a slightly aromatic odor. The wood component of these products may consist of alder, aspen, beech, birch, cottonwood, fir, gum, hemlock, hickory, maple, oak, pecan, pine, poplar, spruce, walnut, and/or western red cedar.

Boiling Point (@ 760 mm Hg):	NAP
Evaporation Rate (Butyl Acetate = 1):	NAP
Freezing Point:	NAP
Melting Point:	NAP
Molecular Formula:	NAP
Molecular Weight:	NAP
Oil-water Distribution Coefficient:	NAP
Odor Threshold:	NAV

9. Physical/Chemical Properties (cont'd.)

pH:	NAP
Solubility in Water (% by weight):	<0.1
Specific Gravity (H ₂ O = 1):	Variable; depends on wood species and moisture
Vapor Density (air = 1; 1 atm):	NAP
Vapor Pressure (mm Hg):	NAP
Viscosity:	NAP
% Volatile by Volume [@ 70°F (21°C)]:	0

10. Stability and Reactivity

Stability: Unstable Stable

Conditions to Avoid: Avoid open flame. Product may ignite at temperatures in excess of 400°F (204°C).

Incompatibility (Materials to Avoid): Avoid contact with oxidizing agents.

Hazardous Decomposition or By-Products: Thermal decomposition (i.e. smoldering, burning) can release carbon monoxide, oxides of nitrogen, carbon dioxide, aliphatic aldehydes including formaldehyde, resin acids, terpenes and polycyclic aromatic hydrocarbons. Natural decomposition of organic materials such as wood may produce toxic gases and an oxygen deficient atmosphere in enclosed or poorly ventilated areas. Spontaneous and rapid hazardous decomposition will not occur.

Hazardous Polymerization: May occur Will not occur

Sensitivity to Mechanical Impact: NAP

Sensitivity to Static Discharge: NAP

11. Toxicological Information

Wood dust (softwood or hardwood) Toxicity Data: No specific information available for product in purchased form. Individual component information is listed below.

Components:

Wood dust (softwood or hardwood)

Wood dust generated from sawing, sanding or machining the product – may cause nasal dryness, irritation, coughing and sinusitis. NTP and IARC classify wood dust as a human carcinogen (IARC Group 1). See Section 3 above.

Formaldehyde

Human inhalation TC_{Lo} of 17 mg/m³ for 30 minutes produced eye and pulmonary results; human inhalation TC_{Lp} of 300 ug/m³ produced nose and central nervous system results; LC₅₀ (rat, inhalation) = 1,000 mg/m³, 30 minutes; LC₅₀ (mice, inhalation) = 400 mg/m³, 2 hours. IARC classifies formaldehyde as a human carcinogen (IARC Group 1). NTP classifies formaldehyde as a Known Human Carcinogen. See Section 3 above.

Target Organs: Eyes, skin, respiratory system.

12. Ecological Information

Environmental Fate: The wood and resin portions of this product would be expected to be biodegradable.

Formaldehyde: Trace amounts of free formaldehyde may be released to the atmosphere and would be expected to be removed in the atmosphere by direct photolysis and oxidation by photochemically produced hydroxyl radicals (half-life of a few hours). In the aqueous phase formaldehyde biodegradation is expected to take place in a few days.

15. Regulatory Information (cont'd.)

Warning: Drilling, sawing, sanding or machining wood products generates **wood dust**, a substance known to the State of California to cause cancer. In addition, the paint and/or coatings on this product may contain **titanium dioxide**. Titanium dioxide (airborne, unbound particles of respirable size) is a substance known to the State of California to cause cancer.

NOTE: Titanium dioxide is a common pigment ingredient. Some OSB products contain titanium dioxide in the paint and/or coatings on the edges. However, titanium dioxide is not anticipated to be potentially released unless it is cut, ground or sanded. The titanium dioxide as supplied will remain bound in the material/paint/coating. Based on foreseeable exposure scenarios, Weyerhaeuser does not believe the potential titanium dioxide exposure will present a health risk. California's listing was based on the IARC Group 2B classification of titanium dioxide (Volume 93, 2010b) which included studies that showed lung cancer in experimental animals. Relevant human exposures have not shown an association between titanium dioxide exposure and cancer.

Pennsylvania – This product contains formaldehyde which, depending on temperature and humidity, may be emitted from the product. When cut or otherwise machined, the product may emit wood dust and titanium dioxide. The product may also contain paraffin wax. Formaldehyde, titanium dioxide, wood dust, and paraffin wax appear on Pennsylvania's Appendix A, Hazardous Substance Lists.

New Jersey – This product contains formaldehyde which, depending on temperature and humidity, may be emitted from the product. When cut or otherwise machined, the product may emit wood dust and titanium dioxide. Formaldehyde, titanium dioxide and wood dust are on the New Jersey Environmental Hazardous Substance List.

Minnesota – Minnesota Statutes, 1984, Sections 144.495 and 325F.181 do not apply to this product; these statutes apply to plywood, particleboard and MDF and other products manufactured with urea-formaldehyde resins.

SARA 313 Information: To the best of our knowledge, this product contains formaldehyde at de minimis concentrations (<0.1%) and is not subjected to the SARA Title III Section 313 supplier notification requirements.

SARA 311/312 Hazard Category: This product has been reviewed according to the EPA "Hazard Categories: promulgated under SARA Title III, Sections 311 and 312 and is considered, under applicable definitions, to meet the following categories:

An immediate (acute) health hazard	Yes
A delayed (chronic) health hazard	Yes
A corrosive hazard	No
A fire hazard	No
A reactivity hazard	No
A sudden release hazard	No

FDA: Not intended for use as a food additive or indirect food contact item.

WHMIS Classification: Controlled Product: D2A - wood dust and formaldehyde: IARC Group 1

16. Additional Information

Date Prepared: 11/04/2010

Date Revised: 08/31/2012

Prepared By: Weyerhaeuser Company Environment, Health, Safety and Sustainability

Weyerhaeuser MSDS available on: <http://www.weyerhaeuser.com/Sustainability/Planet/Products/MSDS>

User's Responsibility: The information contained in this Material Safety Data Sheet is based on the experience of occupational health and safety professionals and comes from sources believed to be accurate or otherwise technically correct. It is the user's responsibility to determine if the product is suitable for its proposed application(s) and to follow necessary safety precautions. The user has the responsibility to make sure that this MSDS is the most up-to-date issue.

16. Additional Information (cont'd.)

Definition of Common Terms:

ACGIH	= American Conference of Governmental Industrial Hygienists
AICS	= Australian Inventory of Chemical Substances
C	= Ceiling Limit
CAS#	= Chemical Abstracts System Number
DOT	= U. S. Department of Transportation
DSL	= Canada-Domestic Substance List
EC50	= Effective concentration that inhibits the endpoint to 50% of control population
ENCS	= Japanese Existing and New Chemical Substances List
EPA	= U.S. Environmental Protection Agency
HMIS	= Hazardous Materials Identification System
IARC	= International Agency for Research on Cancer
IATA	= International Air Transport Association
IMDG	= International Maritime Dangerous Goods
KECL	= South Korean Existing Chemicals List
LC50	= Concentration in air resulting in death to 50% of experimental animals
LCLo	= Lowest concentration in air resulting in death
LD50	= Administered dose resulting in death to 50% of experimental animals
LDLo	= Lowest dose resulting in death
LEL	= Lower Explosive Limit
LFL	= Lower Flammable Limit
NAP	= Not Applicable
NAV	= Not Available
NFPA	= National Fire Protection Association
NIOSH	= National Institute for Occupational Safety and Health
NPRI	= Canada- National Pollution Release Inventory
NTP	= National Toxicology Program
OSHA	= Occupational Safety and Health Administration
PEL	= Permissible Exposure Limit
RCRA	= Resource Conservation and Recovery Act
SARA	= Species at Risk Act
STEL	= Short-Term Exposure Limit (15 minutes)
STP	= Standard Temperature and Pressure
TCLo	= Lowest concentration in air resulting in a toxic effect
TDG	= Canada- Transportation of Dangerous Goods
TDLo	= Lowest dose resulting in a toxic effect
TLV	= Threshold Limit Value
TSCA	= Toxic Substance Control Act
TWA	= Time-Weighted Average (8 hours)
UFL	= Upper Flammable Limit
WHMIS	= Canada-Workplace Hazardous Materials Information System



GIVE YOURSELF AN EDGE ON EVERY JOB

25
YEAR
LIMITED WARRANTY

25 ANNS
GARANTIA
LIMITATA
25 ANNS
GARANTIA
LIMITATA

Weyerhaeuser Edge™ oriented strand board (OSB) floor panels help builders get an edge on their competition by delivering both the value and product reliability needed for solid, stable floors. Easily recognized by their green edge seal, each Edge™ panel is uniform in size to allow easy installation, minimal waste, and reduced callbacks. Edge™ floor panels are also backed by a limited 25-year warranty against delamination.

50
YEAR
LIMITED WARRANTY

50 ANNS
GARANTIA
LIMITATA
50 ANNS
GARANTIA
LIMITATA

Weyerhaeuser Edge Gold™ OSB has long been the quality builder's floor panel of choice for its outstanding performance and enhanced weather resistance. Engineered to start flat and stay flat, each panel is touch-sanded and marked with an easy-to-use fastening template for quick installation.

200
DAY
NO-SAND GUARANTEE

200 DNAS
NO SANDING
GUARANTEE
200 DNAS
NO SANDING
GUARANTEE

Edge Gold™ floor panel benefits include:

No delamination.
No sanding.
We guarantee it.

- Touch-sanded face for uniform thickness
- Limited 200-day no sand guarantee
- Limited 50-year structural warranty
- Stamped with fastener markings for fast nailing
- Bundles delivered face-up for easy handling on the job site
- Proprietary edge seal provides superior edge swell resistance

WHY USE WEYERHAEUSER EDGE™ AND EDGE GOLD™ FLOOR PANELS?

Here's why—

- Self-gapping, tongue-and-groove edges
- Easy installation—panels go down flat and stay flat
- Consistent, reliable performance
- Limited product warranties

The products in this guide are readily available through our nationwide network of distributors and dealers. For more information on other applications or other Weyerhaeuser products, contact your Weyerhaeuser representative.



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NOW A GOOD THING JUST GOT BETTER:

Introducing **DOWN PORE™** Self-Draining Technology

In some regions, Weyerhaeuser Edge Gold™ floor panels now include Down Pore™ technology, a patent-pending, self-draining feature that allows rainwater to drain from the floor. If your site sees a hard rain after Edge Gold™ flooring is installed, the water is channelled through the panel and off the joists below. No more sweeping off water, no more drilling holes in the floor to let it through, and less time spent waiting for flooring to dry before installing finish material.



DOWN PORE™
SELF-DRAINING
TECHNOLOGY

Available Sizes

Edge™ and Edge Gold™ floor panels are available at Weyerhaeuser Distribution Centers in standard sizes, and in the following performance classes:

Edge™ floor panels:
1½", 2½", 3½", and 1¾"

Edge Gold™ floor panels:
¾", 1½", 2½", and 1¾"

*Minimum quantities may be required for some orders.
Some thicknesses and Down Pore™ technology
may not be available in your region.*

Product Specifications⁽¹⁾

Edge™ and Edge Gold™ floor panels are manufactured in accordance with Voluntary Product Standard PS2, which is recognized by:

- The current and legacy codes of the International Code Council and its members (IBC, IRC, BOCA, UBC, SBCCI, and CABO).
- The National Fire Protection's NFPA 5000 code.
- U.S. Department of Housing and Urban Development (HUD/FHA).

(1) Down Pore™ drainage grooves do not affect the use of Edge Gold™ panels in fire-rated assemblies.

DESIGN PROPERTIES

In most applications, Edge™ and Edge Gold™ floor panels will be specified based on the span rating of the panel. However, in some uses, engineers will require actual design values to support application-specific engineering calculations. The Design Values table below provides industry-standard design values for OSB based on information in the International Building Code (IBC).

The panel design values do not need to be adjusted for panel grade or construction. However, they must be adjusted for duration of load (DOL) and creep when appropriate, and may also require other adjustments that are not shown in this guide. Refer to the current *ASD Manual for Engineered Wood Construction* for applications with elevated moisture or temperatures, applications that require preservative or fire-retardant treatment, or for panels less than 24" in width.

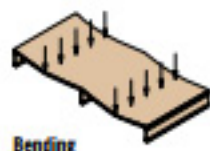
Geometric cross-sectional properties: To calculate the geometric cross-sectional properties for a specific Edge™ or Edge Gold™ panel, use the nominal thickness from the Design Values table below and assume a uniform rectangular cross section.

Creep: Under constant load, the deflection of wood-based products generally increases over time—a phenomenon known as creep. In typical applications, with relatively low dead loads, it is not necessary to consider creep in the design process. However, when the potential for creep exists—specifically, when a permanent or constant load will stress the panels to one-half or more of their design strength capacity—an adjustment to the deflection calculations should be made. For Edge™ or Edge Gold™ panels in dry-use conditions, apply the creep adjustment factor ($C_c = 0.50$) to the panel stiffness.

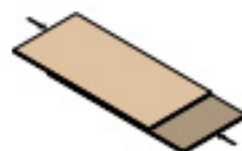
Design Values for Edge™ and Edge Gold™ Floor Panels (100% Load Duration)

	Span rating	=	20' o.c.		24' o.c.		32' o.c.		48' o.c.		
			Nominal thickness	Strength axis ⁽¹⁾	Primary	Secondary	Primary	Secondary	Primary	Secondary	Primary
			1 5/32", 3/4"		23/32"		1/4"		1 1/4"		
Bending	Moment capacity (lb-in./ft of width)	$F_b S$	575	250	770	385	1,050	685	1,900	1,200	
	Stiffness (lb-in. ² /ft of width)	EI	210,000	40,500	300,000	80,500	650,000	235,000	1,150,000	495,000	
Shear	Shear capacity in-the-plane (lb/ft of width)	$F_v (b/D)$	205	205	250	250	300	300	385	385	
	Rigidity through-the-thickness (lb/in. of panel depth)	$G_t A_t$	87,000	87,000	93,000	93,000	110,000	110,000	155,000	155,000	
	Shear capacity through-the-thickness (lb/in. of shear-resisting panel length)	$F_v A_t$	195	195	215	215	230	230	305	305	
Axial	Axial tension capacity (lb/ft of width)	$F_t A$	2,900	2,100	3,350	2,550	4,000	3,250	5,600	4,750	
	Axial compression capacity (lb/ft of width)	$F_c A$	4,200	4,000	5,000	4,300	6,300	6,200	8,100	6,750	
	Stiffness (lb/ft of width x10 ⁶)	EA	5.00	2.90	5.85	3.30	7.50	4.20	8.20	4.60	

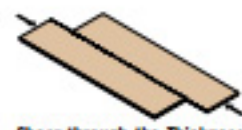
(1) The primary strength axis is the long direction of the panel unless otherwise noted.



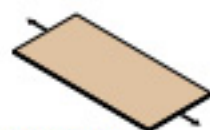
Bending



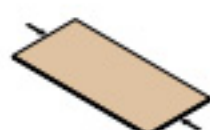
Shear-in-the-Plane (Rolling or Interlaminar Shear)



Shear-through-the-Thickness



Axial Tension



Axial Compression

General Notes

- Table is based on information from the International Building Code (IBC).
- Value must be adjusted for duration of load, creep, elevated moisture or temperature, applications that require preservative or fire-retardant treatment, or for panels less than 24" in width when appropriate. Refer to the current *Manual for Engineered Wood Construction*.
- Values do not need to be adjusted for panel grade or construction.

Nail or Screw Design Values

- Design values for nails or screws used with Edge™ and Edge Gold™ panels can be computed by engineers using the same 2005 NDS® procedures used for other structural wood products.
- For withdrawal, use equivalent Specific Gravity (SG) as follows: smooth- or screw-shank nails = 0.40, ring-shank nails = 0.70, wood screws = 0.45. Design values for nail or screw withdrawal resistance are shown in 2005 NDS® Table 11.2B (screws) and Table 11.2C (nails).
- For lateral resistance, use equivalent Specific Gravity (SG) = 0.50. Design values for nail or screw lateral resistance are found in 2005 NDS® Tables 11L (screws) and 11N (nails).

APPLICATION ADJUSTMENT FACTORS

Span Adjustments

	2-Span to 1-Span	3-Span to 1-Span
Deflection	0.42	0.53
Moment	1.00	0.80
Shear	1.25	1.20

- When adjusting uniform loads based on strength from the Allowable Uniform Loads table on page 4, use the span adjustment factor for moment.
- When adjusting uniform loads calculated from the equations on page 5, use the appropriate corresponding factor.

Duration of Load (C_D) (Applies to strength capacities)

Permanent load (over 10 years)	0.90
Occupancy live load	1.00
2 months, as for snow	1.15
7 days	1.25
Wind or earthquake	1.60
Impact	2.00

Creep Adjustment Factor (C_c) (For permanent loads)

Moisture Condition	OSB
Dry	0.50

- When a permanent or constant load will stress a panel to 1/2 or more of its design strength capacity, adjust the deflection calculation by applying the creep adjustment factor (C_c) to the panel stiffness (EI) found above.

SECTION PROPERTIES AND LOAD/SPAN TABLE

Panel Section Properties⁽¹⁾

		3/32"	1/8"	3/32"	1/4"	3/8"	1"	1 1/4"
Approximate weight (psf)	w	2.0	2.1	2.4	2.5	2.9	3.3	3.6
Nominal thickness (in.)	t	0.594	0.625	0.719	0.750	0.875	1.000	1.125
Area (in. ² /ft)	A	7.125	7.500	8.625	9.000	10.500	12.000	13.500
Moment of inertia (in. ⁴ /ft)	I	.209	.244	.371	.422	.670	1.000	1.424
Section modulus (in. ³ /ft)	S	.705	.781	1.033	1.125	1.531	2.000	2.531
Statical moment (in. ³ /ft)	Q	.529	.586	.775	.844	1.148	1.500	1.898
Shear constant (in. ² /ft)	Ib/Q	4.750	5.000	5.750	6.000	7.000	8.000	9.000

Edge™ and Edge Gold™ panels are intended for dry-use applications

(1) Properties based on rectangular cross section of 1' width.

Geometric properties are calculated on a per-foot-of-panel width basis. These properties may be used to find design stresses when required. To do so, divide the design capacity by the applicable section property. You may also calculate the geometric cross-sectional properties for a specific Edge™ or Edge Gold™ panel by using the nominal thickness from the table above and assuming a uniform rectangular cross section.

Allowable Uniform Loads (PSF) for Edge™ and Edge Gold™ Floor Panels (100% Load Duration)

Span Rating	Nominal Thickness	Load Calculation Based on ⁽¹⁾⁽²⁾	Span												
			Normal Orientation, Strength Axis Perpendicular to Supports									Strength Axis Parallel to Supports ⁽³⁾			
			12"	16"	19.2"	24"	30"	32"	36"	40"	48"	60"	12"	16"	24"
20" o.c.	3/32", 1/8"	Deflection	914	344	188	91	45	36	32	23	15		175	66	22
		Strength	390	270	188	120	77	68	43	35	24		210	118	42
24" o.c.	3/32"	Deflection	1,305	491	269	130	64	52	46	33	21	10	351	132	45
		Strength	476	345	250	160	102	90	57	46	32	20	323	181	65
32" o.c.	3/8"	Deflection	2,828	1,064	582	282	138	113	99	71	46	23	1,011	381	128
		Strength	571	414	339	218	139	122	77	63	44	28	570	321	114
48" o.c.	1 1/4"	Deflection	5,003	1,882	1,030	499	244	199	175	126	82	40	2,158	812	274
		Strength	733	531	435	342	256	225	142	115	80	51	733	531	204

(1) Deflection calculation based on L/360 deflection limit. The allowable load for other deflection limits can be computed as follows:

- for L/240 limit, multiply by 1.5
- for L/180 limit, multiply by 2.0
- for L/140 limit, divide by 1.5

(2) Strength calculation based on the minimum of bending or shear.

(3) Values may be increased for Structural 1 sheathing with strength axis parallel to supports. For values based on deflection, multiply by 1.60. For values based on strength, use the equations provided and Structural 1 sheathing design values.

General Notes

- Table is based on:
 - Uniform loads. See PS2 and local building codes for concentrated load and other requirements.
 - Untreated Exposure 1-rated panel in dry conditions.
 - Typical sheathing applications such as floors, walls, and roofs.
 - 2x supports for span configurations less than 48" on-center. Support width effects have been considered.
 - 4x supports for span configurations equal to or greater than 48" on-center. Support width effects have been considered for shear and deflection calculations. Moment calculations do not consider support width effects.
- For Strength Axis Perpendicular to Supports:
 - 3-span condition is assumed for spans of 32" or less.
 - 2-span condition is assumed for spans greater than 32".
 - 1-span condition requires the use of the span adjustment factor on page 3.
- For Strength Axis Parallel to Supports:
 - 3-span condition is assumed for spans of 16" or less.
 - 2-span condition is assumed for spans of 24".
 - 1-span condition requires the use of the span adjustment factor on page 3.

A Note About Floor Performance

Floor panels are an important component in creating a floor that feels good to customers. The span rating shown on a panel represents a structurally acceptable floor performance level. Floor performance can be enhanced to meet higher customer expectations in several ways:

- Consider using thicker panels.
- Glue and nail flooring for improved connections to help resist vibrations, minimize nail pops, and transfer loads more evenly. Weyerhaeuser recommends using solvent-based subfloor adhesives that meet ASTM D3498 (AFG-01) performance standards. When latex subfloor adhesive is required, careful selection is necessary due to a wide range of performance between brands.
- Use stiffer joists or a narrower joist spacing.

Choosing the optimal combination of these parameters can be difficult. To predict floor performance and evaluate the relationship between the cost and the "feel" of a floor, use Trus Joist™ TJ-Pro™ Ratings.

12. Ecological Information (cont'd.)

Polymeric MDI: The effects from a simulated accidental pollution event in a pond with polymeric MDI on different trophic levels of the aquatic ecosystem were investigated (Heimbach F. et.al., 1996). Neither monomeric MDI nor its potential reaction product MDA (4, 4'-diphenylmethanediamine) was detected in water or accumulated by fish. The MDI polymerized to inert polyurea on the sediment of the test ponds. This polymerization formed carbon dioxide, released as bubbles which floated to the water surface. There was no direct effect on the pelagic community (phytoplankton, zooplankton, fish, and macrophytes) of the test ponds. The atmospheric concentration of MDI arising from a release is naturally low on account of MDI's very low volatility. It is expected that airborne MDI will have a rather short half-life as a consequence of ready degradation to inorganic compounds by hydroxyl radicals present in the troposphere.

Environmental Toxicity: NAP for finished product.

Component: Formaldehyde

96 hr LC50 Fathead Minnow	24mg/L
96 hr LC50 Bluegill	0.10 mg/L
5 min EC50 Photobacterium phosphoreum	9mg/L
96 hr EC50 Water flea	20 mg/L

13. Disposal Considerations

Waste Disposal Method: If disposed of or discarded in its purchased form, incineration is preferable, if allowed. Dry land disposal is acceptable in most states. It is, however, the user's responsibility to determine at the time of disposal whether your product meets RCRA criteria for hazardous waste. Follow applicable federal, state, and local regulations.

14. Transport Information

Mode: (Air, Land, water) Not regulated as a hazardous material by the U.S. Department of Transportation. Not listed as a hazardous material in Canadian Transportation of Dangerous Goods (TDG).

Proper Shipping Name:	NAP
Hazard Class:	NAP
UN/NA ID Number:	NAP
Packing Group:	NAP
Information Reported for Product/Size:	NAP

15. Regulatory Information

TSCA: Phenol-formaldehyde resin, polymeric diphenylmethane diisocyanate, titanium dioxide and paraffin wax are on the TSCA inventory.

CERCLA: Formaldehyde (100lbs RQ) is on the CERCLA chemical substance inventory.

DSL: Formaldehyde, titanium dioxide, polymeric diphenylmethane diisocyanate and paraffin wax are on the DSL.

OSHA: Wood products are not hazardous under the criteria of the federal OSHA Hazard Communication Standard 29 CFR 1910.1200. However, wood dust generated by sawing, sanding or machining this product may be hazardous. Workplace exposure to formaldehyde is specifically regulated under 29 CFR 1910.1048.

STATE RIGHT-TO-KNOW:

California Prop 65 – This product contains formaldehyde, which depending on temperature and humidity, may be emitted from the product. Weyerhaeuser has evaluated formaldehyde emission rates from its products and have found these rates to be below the significant risk level. The user should determine whether formaldehyde emissions resulting from its site specific use, handling, ventilation design, capacity and final construction design for this product could exceed the safe harbor level.

CALCULATING UNIFORM LOADS

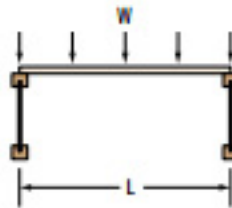
One-Span Equations

Uniform load equations based on:

$$\text{Moment Capacity } W_M = \frac{96F_b S}{L_M^2}$$

$$\text{Shear Capacity } W_V = \frac{24F_v (Ib/Q)}{L_V}$$

$$\text{Deflection } W_\Delta = \frac{L_M 921.6 EI}{L_V^3 R}$$



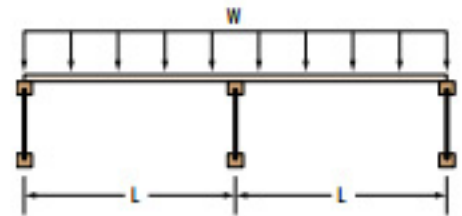
Two-Span Equations

Uniform load equations based on:

$$\text{Moment Capacity } W_M = \frac{96F_b S}{L_M^2}$$

$$\text{Shear Capacity } W_V = \frac{19.2F_v (Ib/Q)}{L_V}$$

$$\text{Deflection } W_\Delta = \frac{L_M 2220 EI}{L_V^3 R}$$



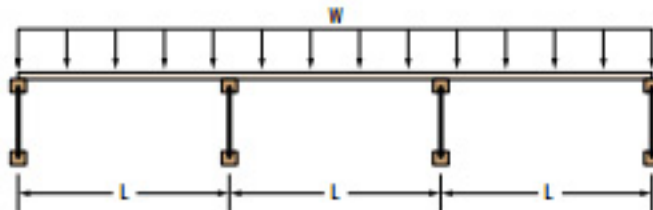
Three-Span Equations

Uniform load equations based on:

$$\text{Moment Capacity } W_M = \frac{120F_b S}{L_M^2}$$

$$\text{Shear Capacity } W_V = \frac{20F_v (Ib/Q)}{L_V}$$

$$\text{Deflection } W_\Delta = \frac{L_M 1743 EI}{L_V^3 R}$$



The equations above are based on one-way "beam" action. They are provided to help develop allowable uniform loads based on moment, shear, and deflection as applied to one-, two-, and three-span conditions. Loads derived from the equations provided are assumed to be applied over full-size panels in normal sheathing applications. The following definitions apply:

Δ deflection (in.)

EI design bending stiffness capacity (lb-in.²/ft)

$F_b S$ design moment capacity (lb-in./ft)

$F_v (Ib/Q)$ design shear capacity (lb/ft)

L span (in.)

L_M span, center-to-center of supports, used for moment calculation (in.)

L_V clear span, used for shear calculation (in.)

L_Δ clear span plus SW, used for deflection calculations (in.)

R denominator of chosen deflection limit. Example: deflection limit = $L/360$ then $R = 360$

SW support width factor:

– 0.25 for 2x nominal lumber

– 0.525 for 4x nominal lumber

– For additional information refer to the current *Manual for Engineered Wood Construction*

W uniform load (psf)

W_M uniform load based on moment capacity (psf)

W_V uniform load based on shear capacity (psf)

W_Δ uniform load based on deflection (psf)

Example Problem

Find the maximum allowable uniform load (psf) for 24" o.c. span-rated flooring over 16" on-center joists.

Assumptions

- 24" o.c. span-rated flooring
 - Full 4'x8' panel
 - Strength axis perpendicular to joists
 - Use 3-span equations
- Joist Spacing = 16" o.c.
- Joist Width = 1.5"
- Deflection = $L/360$

Locate panel design values for moment, shear, and stiffness on page 3.

Moment capacity (primary) = $F_b S = 770$ lb-in./ft of width

Shear capacity (in-the-plane) = $F_v (Ib/Q) = 250$ lb/ft of width

Stiffness = $EI = 300,000$ lb-in.²/ft of width

1 Calculate Allowable Uniform Load Based on Moment Capacity

$$W_M = \frac{120F_b S}{L_M^2}$$

Calculate appropriate span for moment (center-to-center), $L_M = 16"$

Using: $F_b S = 770$ lb-in./ft and $L_M = 16"$

$$W_M = \frac{120 \times 770}{16^2}$$

$$W_M = 367 \text{ psf}$$

2 Calculate Allowable Uniform Load Based on Shear Capacity

$$W_V = \frac{20F_v (Ib/Q)}{L_V}$$

Calculate appropriate span for shear (clear span), $L_V = 16" - 1.5" = 14.5"$

Using: $F_v (Ib/Q) = 250$ lb and $L_V = 14.5"$

$$W_V = \frac{20 \times 250}{14.5}$$

$$W_V = 345 \text{ psf}$$

3 Calculate Allowable Uniform Load Based on Deflection

$$W_\Delta = \frac{L_M 1743 EI}{L_V^3 R}$$

$SW = 0.25$ (from above)

Calculate appropriate span for deflection (clear span + SW),

$$L_\Delta = 14.5" + 0.25" = 14.75"$$

Using: $L_M = 16"$, $R = 360$, and

$EI = 300,000$ lb-in.²/ft

$$W_\Delta = \frac{(16 \times 1743 \times 300,000)}{(14.75^3 \times 360)}$$

$$W_\Delta = 491 \text{ psf}$$

4 Compare Calculated Allowable Uniform Loads

Calculated allowable uniform loads based on strength:

$W_M = 361$ psf

$W_V = 345$ psf

W_V controls

Calculated allowable uniform load based on deflection:

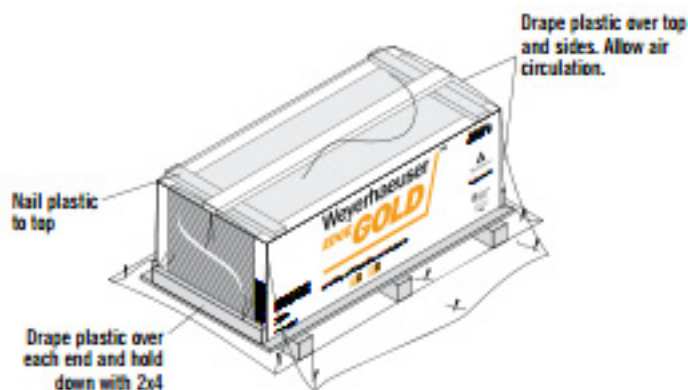
$$W_\Delta = 491 \text{ psf}$$

PRODUCT STORAGE AND HANDLING

Like any wood product, wood-based panels are at risk of fungal decay or rot if exposed to repeated wetting or high-moisture environments. Panels that are exposed to such conditions may deteriorate, lose strength, or support mold growth, so protection from these conditions must be provided.

Use a platform made from cull panels and scrap lumber supported by stickers that extend across the width of the stack, and keep panels at least 4" from the ground. Put one sticker in the center of the load and the others approximately 12" from each end. When covering the panels, drape plastic over the ends of the stack and secure it. Then drape plastic over the top and sides of the stack; stake it to the ground, pulling the ends away from the product to allow air circulation along the sides of the stack.

Handle Edge™ and Edge Gold™ panels in a flat orientation. Protect the edges and ends from damage, keep the load level, and lift the stack from the center.



Exposure 1 Bond Classification

Edge™ and Edge Gold™ panels are manufactured to an Exposure 1 bond classification. Exposure 1 panels are suitable for uses where they are not permanently exposed to the weather; they are intended to resist the effects of moisture on structural performance due to construction delays or other conditions of similar severity.

Edge™ and Edge Gold™ panels are intended for dry-use applications

WARNING: Drilling, sawing, sanding or machining wood products generates wood dust, a substance known to the State of California to cause cancer. For more information on Proposition 65, visit wy.com/inform.

PRODUCT WARRANTIES



Visit woodbywy.com/warranty for copies of these and other Weyerhaeuser product warranties.

Contact your local representative or dealer at:

CONTACT US

1.888.453.8358 • woodbywy.com



August 2012 • Reorder OSB-4000

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BOSTITCH WELDED WIRE COIL NAILS

Model Number: MGK 25BPBF

Location: Floor System Fasteners

Dimensions:

Thickness: .113"

Length: 2 1/2"

Available: Nail Gun Depot



Search

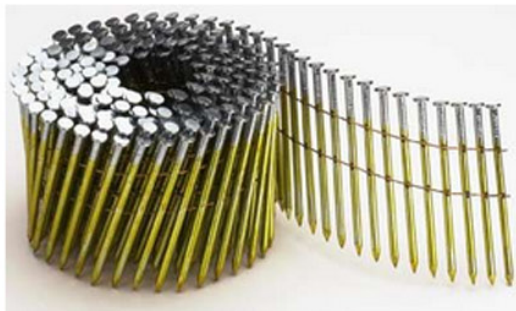
Advanced Search

Which Fasteners Fit My Tool?

- ### Products
- Nailers
 - Staplers
 - Corrugated Tools
 - Screwguns
 - Hog Ring Pliers
 - Rebar Tiers
 - Nails
 - Staples
 - Corrugated Fasteners
 - Screws
 - Hog Rings
 - Rebar Tie Wire
 - Scrails
 - Accessories
 - Air Compressors
 - Generators
 - Clearance Items

Nail Gun Depot > All Products > Brands > Hitachi > Nails > Framing and Pallet Nails - 15 Degree Coil Wire Welded > 2-1/2" x .113 Screw #MGK25BPBF

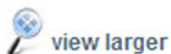
2-1/2" x .113 Screw #MGK25BPBF



Qty/Box: 5,000
Weight: 56lbs

\$41.13

Quantity



Like 79 Tweet 0 *Pinit*

2-1/2" x .113 Screw

Reviews



LVL [LAMINATED VENEER LUMBER] RIM JOIST AND CENTRAL BEAM

Location: Central Foundation

Dimensions:

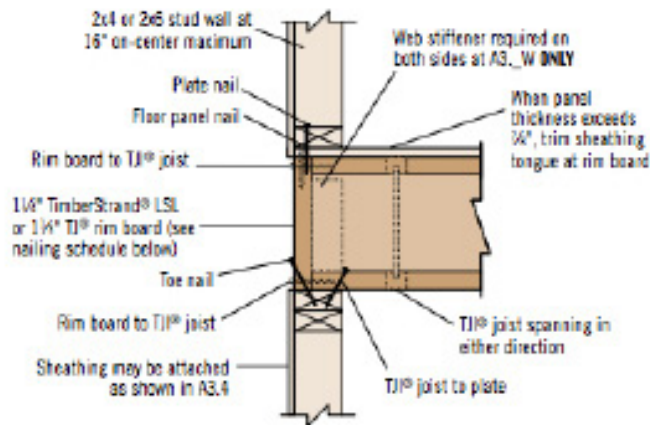
Thickness: 1 3/4"

Width: 11 1/4"

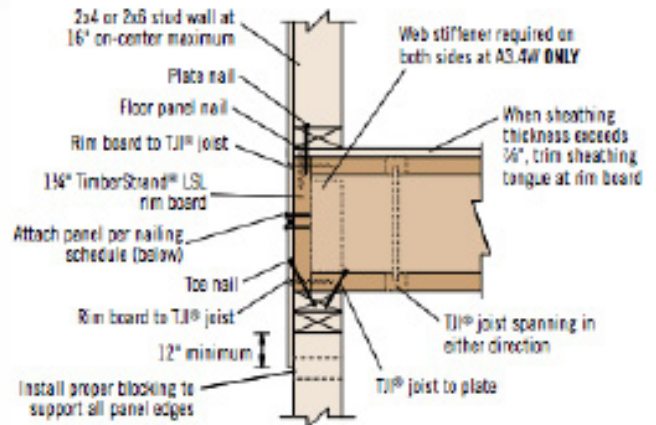
Length: 14'

Available: Weyerhaeuser

LATERAL DETAILS AND SPECIFICATIONS

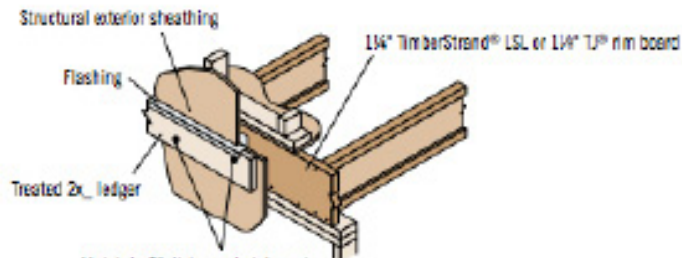


A3.1 A3.2 A3.3 A3.1 W A3.2 W A3.3 W



A3.4 A3.4 W

Exterior Deck Attachment



Maintain 2" distance (minimum) from edge of ledger to fastener. See fastener table on page 4.



Allowable lead per Lag Screw Capacities table on page 4

DESIGN PROPERTIES AND MATERIAL WEIGHTS

Allowable Design Stresses⁽¹⁾ (100% Load Duration)

		1 1/4" TimberStrand® LSL Rim Board ⁽²⁾	1 1/4" TJ® Rim Board ⁽³⁾
Modulus of elasticity	E	= 1.3 x 10 ⁶ psi	—
Adjusted modulus of elasticity	E _{adj}	= 660,750 ⁽⁴⁾	—
Shear modulus of elasticity	G	= 81,250 psi	—
Flexural stress	F _b	= 1,700 psi ⁽⁵⁾	—
Compression perpendicular to grain	F _{c⊥}	= 660 psi ⁽⁶⁾	—
Compression parallel to grain	F _{c∥}	= 1,400 psi	—
Horizontal shear parallel to grain	F _v	= 400 psi	—
Vertical load capacity		= 4,250 plf ⁽⁷⁾	4,000 plf ⁽⁷⁾

- (1) Unless otherwise noted, adjustment to the design stresses for duration of load are permitted in accordance with the applicable code.
- (2) 1 1/4" TimberStrand® LSL rim board is recognized by code as providing the lateral transfer capacity equivalent to 2" nominal Douglas fir-larch or southern pine in unblocked horizontal diaphragms.
- (3) 1 1/4" TJ® rim board is recognized as an acceptable rim board material for use in conventional construction; it has a maximum lateral transfer capacity of 180 plf.
- (4) Reference modulus of elasticity for beam stability calculations, per NDS® 2005.
- (5) For 12" depth. For other depths, multiply by $(\frac{d}{12})^{1.60}$.
- (6) F_{c⊥} shall not be increased for duration of load.
- (7) For depths up to 16". For 18" and 20" depths, capacity is 3,450 plf.

Approximate Weights of Rim Board

Depth	Weights (plf)	
	1 1/4" TimberStrand® LSL Rim Board	1 1/4" TJ® Rim Board
9 1/2"	3.5	2.8
11 1/4"	4.3	3.5
14"	5.1	4.2
16"	5.8	4.8
18"	6.7	—
20"	7.3	—

TimberStrand® LSL and TJ® rim board are intended for dry-use applications

NAILING RECOMMENDATIONS

Encloses cantilevered TJ® joists

Attach to each joist with two 10d (0.131" x 3") nails, one each at top and bottom flange.

Offers high vertical load transfer capacity. Replaces TJ® rim joists and blocking panels.

Vertical load transfer at bearing	1 1/4" Rim Board	1 1/4" Rim Board
		4,250 plf

Provides a solid surface for attachment of sheathing, siding, and deck ledgers

When attaching deck ledgers, locate bolts 2" minimum from top and bottom edges of rim board and deck ledger. Required bolt frequency varies by application and is dictated by specific deck geometry/loading. Bolt spacing limits match NDS® minimum recommendations.

Leg Screw Capacities

Fastener Size	Allowable Load ⁽¹⁾ (lbs)	
	1 1/4" Rim Board	1 1/4" Rim Board
3/8" lag bolt	400	N.A.
1/2" lag bolt	475	600

(1) Allowable load determined in accordance with AC 124.
* Corrosion-resistant fasteners required for wet-service applications.

TABLE 2—ALLOWABLE LOADS FOR THE U SERIES JOIST HANGERS

MODEL No.	DIMENSIONS ¹ (Inches)			FASTENERS ² (Quantity-Type)		ALLOWABLE LOADS ^{3,4,5} (lbs)						
	W	H	B	Header ⁶	Joist	Uplift ⁷ C ₁ = 1.0	Download					
							C ₂ = 1.0	C ₂ = 1.13	C ₂ = 1.25	C ₂ = 1.25		
U04	7 1/2	3 1/2	2	4	2-10d x 1 1/2	265	485	575	550	550	599	705
U08	17 1/2	4 1/2	2	6	4-10d x 1 1/2	585	725	855	830	830	899	1,055
U210	17 1/2	7 1/2	2	10	8-10d x 1 1/2	1,110	1,220	1,440	1,380	1,435	1,485	1,685
U214	17 1/2	10	2	12	8-10d x 1 1/2	1,110	1,465	1,730	1,655	1,665	1,775	2,110
U34	27 1/2	2 1/2	2	4	2-10d x 1 1/2	265	485	575	550	550	599	705
U38	27 1/2	6 1/2	2	6	4-10d x 1 1/2	585	675	1,150	1,105	1,365	1,185	1,410
U310	27 1/2	8 1/2	2	14	8-10d x 1 1/2	1,110	1,710	2,015	1,930	2,385	2,075	2,465
U314	27 1/2	10 1/2	2	18	8-10d x 1 1/2	1,110	1,660	2,305	2,210	2,615	2,375	2,815
U25-3	3 1/2	3	3	4	2-16d	265	485	575	550	550	599	705
U25-2	3 1/2	5	2	5	4-16d	585	575	1,130	1,105	1,365	1,185	1,410
U210-2	3 1/2	8 1/2	2	14	8-16d	1,110	1,760	2,015	1,930	2,365	2,075	2,465
U44	37 1/2	2 1/2	2	4	2-16d	265	485	575	550	550	599	705
U48	37 1/2	4 1/2	2	6	4-16d	585	575	1,130	1,105	1,365	1,185	1,410
U410	37 1/2	6 1/2	2	14	8-16d	1,110	1,710	2,015	1,930	2,365	2,075	2,465
U414	37 1/2	10	2	18	8-16d	1,110	1,660	2,305	2,210	2,615	2,375	2,815
U08-3	4 1/2	4 1/2	2	6	4-16d	585	575	1,150	1,105	1,365	1,185	1,410
U08	5 1/2	5	2	5	4-16d	585	575	1,130	1,105	1,365	1,185	1,410
U210	5 1/2	8 1/2	2	14	8-16d	1,110	1,710	2,015	1,930	2,365	2,075	2,465
U210-3	4 1/2	7 1/2	3	14	8-16d	1,110	1,710	2,015	1,930	2,365	2,075	2,465
U26R	27 1/2	3 1/2	2	4	2-10d x 1 1/2	265	485	575	550	550	599	705
U33R	27 1/2	6 1/2	2	6	4-10d x 1 1/2	585	675	1,150	1,105	1,365	1,185	1,410
U216R	27 1/2	8 1/2	2	14	8-10d x 1 1/2	1,110	1,710	2,015	1,930	2,365	2,075	2,465
U44R	4 1/2	2 1/2	2	4	2-16d	265	485	575	550	550	599	705
U48R	4 1/2	4 1/2	2	6	4-16d	585	575	1,150	1,105	1,365	1,185	1,410
U410R	4 1/2	6 1/2	2	14	8-16d	1,115	1,710	2,015	1,930	2,365	2,075	2,465
U08R	6	5	2	6	4-16d	585	575	1,130	1,105	1,365	1,185	1,410
U210R	6	8 1/2	2	14	8-16d	1,115	1,710	2,015	1,930	2,365	2,075	2,465

For B₁ 1 inch = 25.4 mm, 1 lb = 4.45 N.

¹Refer to Figure 2 (this page) for definitions of hanger nomenclature (W, H, B).

²Refer to Section 3.2.3 of this report for nail sizes and required minimum physical properties.

³Tabulated allowable loads must be selected based on direction of load as permitted by the applicable building code.

⁴U Series hangers provide torsional resistance, which is defined as a moment of not less than 75 pound-feet (334 N) from the depth of the joist at which the lateral movement of the top or bottom of the joist with respect to the vertical position of the joist is 0.125 inch (3.2 mm). The height, H, of the joist hanger must be at least 60 percent of the height of the joist unless additional lateral restraint is provided, as designed by others.

⁵The quantity of 16d or 18d common nails specified in the "Fasteners" column under "Header" is required to achieve the tabulated allowable loads shown in the Allowable Download "10d" or "16d" columns.

⁶Allowable uplift loads are for hangers installed with either 16d or 18d common nails into the supporting header/beam, and have been increased for wind or earthquake loading with no further increase allowed. The allowable uplift loads must be reduced when other load durations govern.

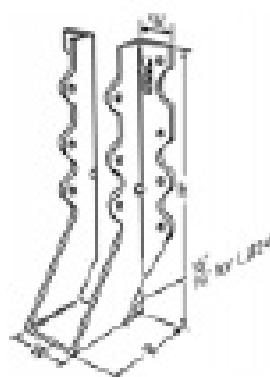


FIGURE 1—U SERIES HANGER
(See Table 1—Page 3)

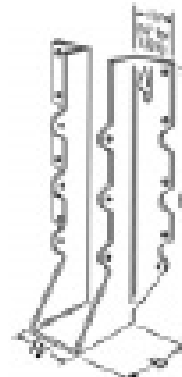


FIGURE 2—U SERIES HANGER
(See Table 2—above)



**WEATHERSHIELD 2" X 8" X 16' PRESSURE-TREATED
LUMBER**

Model Number: Framer Series M-12

Location: Floor and Roof Framing

Dimensions:

Height: 1 3/4"

Width: 11 1/4"

Length: 14'

Available: Weyerhaeuser

FRAMER SERIES™ LUMBER

Structural Framing Lumber with Predictable Performance

- Computerized Grading Virtually Eliminates Warp
- Comes with Crown Edge Clearly Marked
- Eliminates Field Culling
- Treated with Factory-Applied Mold Inhibitor
- More Stable and Consistent than Ordinary Lumber
- Limited Product Warranty





STRAIGHT TALK ABOUT FRAMER SERIES™ LUMBER

Weyerhaeuser’s Framers Series™ lumber is mechanically graded to virtually eliminate warping, and each board comes with the crown clearly marked to speed up installation. With lumber like this, framing goes up fast, crews won’t spend valuable time culling, and there’s less material waste when the job is done.

Each piece of Framers Series™ lumber is performance tested to meet specific strength and density requirements. Because it’s more stable than commodity boards, Framers Series™ lumber is ideal for any application—even those where vertical-use-only products aren’t allowed. That gives crews more flexibility at the job site and helps reduce the potential for red tags.

Only Framers Series™ Lumber offers so many benefits:

- Limited warranty against warping
- Floors, walls, and ceilings stay flat and even
- Fewer callbacks to repair drywall cracks
- Crown edge clearly marked on each board
- Full lateral shear wall capacities—no species reduction needed
- Meets or exceeds all building code requirements for framing lumber
- Mold inhibitor helps material stay clean and bright, reducing product loss and callbacks

WHY MAKE THE SWITCH TO FRAMER SERIES™ LUMBER?

Here’s why—

- Limited product warranty
- Crown edge clearly marked for fast installation
- Performs more consistently than ordinary lumber
- Helps ensure smooth, flat finished surfaces

The products in this guide are readily available through our nationwide network of distributors and dealers. For more information on other applications or other Weyerhaeuser products, contact your Weyerhaeuser representative.



Certified Sourcing
www.sfiprogram.org
SFI-00008

Available Sizes

Nominal Size	Lengths	Grade
2x4	8', 9', 10', 18', 20'	M-9
2x4	12' to 16', in 2' increments	M-12
2x6, 2x8, 2x10, 2x12	8' to 20', in 2' increments	M-12

Allowable Design Stresses (100% Load Duration)

		M-9 Grade	M-12 Grade
Modulus of elasticity	E =	1.4 x 10 ⁶ psi	1.6 x 10 ⁶ psi
Flexural stress	F _b =	1,400 psi	1,600 psi
Tension stress	F _t =	800 psi	850 psi
Compression perpendicular to grain	F _{c⊥} =	565 psi	565 psi
Compression parallel to grain	F _c =	1,600 psi	1,675 psi
Horizontal shear parallel to grain	F _v =	175 psi	175 psi

- Design values based on *Table 4C, 2005 NDS® Supplement*.
- Use specific gravity of 0.55 when designing connections.
- M-9 values meet or exceed those of #2 SPF and M-12 values meet or exceed those of #2 Southern Pine, making Framers Series™ Lumber acceptable for use in any code-evaluated application that allows those products.

Maximum Wall Stud Spacing per IRC Table R602.3(5)

Stud Size	Bearing Walls					Non-Bearing Walls	
	Laterally unsupported stud height	Supporting roof and ceiling only	Supporting one floor, roof, and ceiling	Supporting two floors, roof and ceiling	Supporting one floor only	Laterally unsupported stud height	Maximum spacing
2x4	10'	24" o.c.	16" o.c.	—	24" o.c.	14'	24" o.c.
2x6	10'	24" o.c.	24" o.c.	16" o.c.	24" o.c.	20'	24" o.c.

- Listed heights are distances between points of lateral support placed perpendicular to the plane of the wall.

FRAMER SERIES™ LUMBER SPAN AND LOAD TABLES

Maximum Floor Spans⁽¹⁾

Nominal Size	Width	Depth	40 psf Live Load, 10 psf Dead Load, L/360 ⁽²⁾				40 psf Live Load, 10 psf Dead Load, L/480				30 psf Live Load ⁽³⁾ , 10 psf Dead Load, L/360 ⁽²⁾				30 psf Live Load ⁽³⁾ , 10 psf Dead Load, L/480			
			12" o.c.	16" o.c.	19.2" o.c.	24" o.c.	12" o.c.	16" o.c.	19.2" o.c.	24" o.c.	12" o.c.	16" o.c.	19.2" o.c.	24" o.c.	12" o.c.	16" o.c.	19.2" o.c.	24" o.c.
2x8	1½"	7¼"	14'-2"	12'-10"	12'-1"	11'-3"	12'-10"	11'-8"	11'-0"	10'-2"	15'-7"	14'-2"	13'-4"	12'-4"	14'-2"	12'-10"	12'-1"	11'-3"
2x10	1½"	9¼"	18'-0"	16'-5"	15'-5"	14'-4"	16'-5"	14'-11"	14'-0"	13'-0"	19'-10"	18'-0"	17'-0"	15'-9"	18'-0"	16'-5"	15'-5"	14'-4"
2x12	1½"	11¼"	21'-11"	19'-11"	18'-9"	17'-5"	19'-11"	18'-1"	17'-0"	15'-10"	24'-2"	21'-11"	20'-8"	19'-2"	21'-11"	19'-11"	18'-9"	17'-5"

(1) Maximum available length is 20'.

(2) Minimum criteria per code. For stricter deflection criteria, use shorter spans or the L/480 spans.

(3) 30 psf live load is permitted in residential sleeping areas by some codes.

Maximum Rafter Spans⁽¹⁾

Nominal Size	Width	Depth	20 psf Live Load, 10 psf Dead Load, L/240 ⁽²⁾				30 psf Live Load, 10 psf Dead Load, L/240 ⁽²⁾			
			12" o.c.	16" o.c.	19.2" o.c.	24" o.c.	12" o.c.	16" o.c.	19.2" o.c.	24" o.c.
2x8	1½"	7¼"	20'-5"	18'-6"	17'-5"	16'-2"	17'-10"	16'-2"	15'-3"	14'-2"
2x10	1½"	9¼"	26'-0"	23'-8"	22'-3"	20'-8"	32'-9"	29'-8"	19'-5"	18'-0"
2x12	1½"	11¼"	31'-8"	28'-9"	27'-1"	25'-1"	27'-8"	25'-1"	23'-7"	21'-11"

(1) Maximum available length is 20'.

(2) Based on 115% duration of load (snow areas).

Maximum Ceiling Spans⁽¹⁾

Nominal Size	Width	Depth	20 psf Live Load, 10 psf Dead Load, L/240 ⁽²⁾				10 psf Live Load, 5 psf Dead Load, L/240 ⁽²⁾			
			12" o.c.	16" o.c.	19.2" o.c.	24" o.c.	12" o.c.	16" o.c.	19.2" o.c.	24" o.c.
2x8	1½"	7¼"	20'-5"	18'-6"	17'-5"	16'-2"	25'-8"	23'-4"	21'-11"	20'-5"
2x10	1½"	9¼"	26'-0"	23'-8"	22'-3"	20'-8"	32'-9"	29'-9"	28'-0"	26'-0"
2x12	1½"	11¼"	31'-8"	28'-9"	27'-1"	25'-1"	39'-10"	36'-2"	34'-1"	31'-8"

(1) Maximum available length is 20'.

(2) Based on 100% duration of load.

Joist, Beam, or Header Allowable Loads (PLF)

Clear Span ⁽¹⁾	Condition	1½" Width			3" Width (2-ply)			4½" Width (3-ply)			6" Width (4-ply)		
		2x8	2x10	2x12	2x8	2x10	2x12	2x8	2x10	2x12	2x8	2x10	2x12
4'	Total Load	799	1,180	1,556	1,599	2,361	3,113	2,548	3,542	4,670	3,397	4,723	6,227
	Live Load	799	1,180	1,556	1,599	2,361	3,113	2,548	3,542	4,670	3,397	4,723	6,227
	Min. End Bearing (in.)	3.0	3.0	4.5	3.0	3.0	4.5	3.0	3.0	4.5	3.0	3.0	4.5
6'	Total Load	372	591	849	744	1,183	1,698	1,277	2,023	2,660	1,702	2,698	3,547
	Live Load	372	591	849	744	1,183	1,698	1,277	2,023	2,660	1,702	2,698	3,547
	Min. End Bearing (in.)	1.5	3.0	4.5	1.5	3.0	4.5	3.0	3.0	4.5	3.0	3.0	4.5
8'	Total Load	211	340	496	423	681	992	729	1,170	1,700	972	1,561	2,267
	Live Load	211	340	496	423	681	992	637	1,170	1,700	849	1,561	2,267
	Min. End Bearing (in.)	1.5	3.0	3.0	1.5	3.0	3.0	1.5	3.0	3.0	1.5	3.0	3.0
10'	Total Load	135	219	322	271	439	644	468	757	1,108	624	1,009	1,477
	Live Load	110	219	322	221	439	644	330	676	1,108	440	902	1,477
	Min. End Bearing (in.)	1.5	1.5	3.0	1.5	1.5	3.0	1.5	3.0	3.0	1.5	3.0	3.0
12'	Total Load	93	152	224	187	305	449	282	526	775	376	702	1,033
	Live Load	64	132	224	128	265	449	193	396	703	257	528	938
	Min. End Bearing (in.)	1.5	1.5	3.0	1.5	1.5	3.0	1.5	1.5	3.0	1.5	1.5	3.0
14'	Total Load	58	111	165	117	223	330	175	367	570	234	489	760
	Live Load	40	84	149	81	168	299	122	251	447	163	335	597
	Min. End Bearing (in.)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	3.0	1.5	1.5	3.0
16'	Total Load	38	81	126	77	162	252	115	244	436	154	325	581
	Live Load	27	56	101	54	113	202	82	169	302	109	226	402
	Min. End Bearing (in.)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
18'	Total Load	26	56	99	52	112	198	78	169	308	105	225	411
	Live Load	19	39	71	38	79	142	57	119	213	77	159	284
	Min. End Bearing (in.)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
20'	Total Load	18	40	74	37	80	148	55	121	222	74	161	296
	Live Load	14	29	52	28	58	104	42	87	156	56	116	208
	Min. End Bearing (in.)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5

(1) Interpolation between spans is permitted.

General Notes for Floor, Rafter, and Ceiling Span Tables

- Table is based on M-12, Southern Pine design values (see page 2).
- Maximum available length is 20'.
- Joists must bear directly on beams, girders, ledgers, or loadbearing walls; or be supported by hangers or framing anchors.
- Spans shown are horizontal clear distances between supports, and assume uniformly loaded joists only.
- Minimum bearing:** 1½" on wood or steel, 3" on masonry. Bearing across full joist width is required.
- Provide lateral restraint at the end of each joist by fastening to a rim, band joist, header, or other member or by using full-height blocking between floor joist ends.

General Notes for Joist, Beam, or Header Load Table

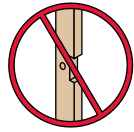
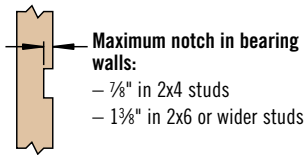
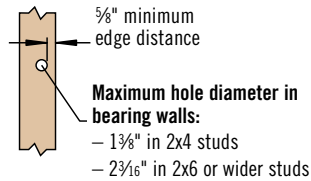
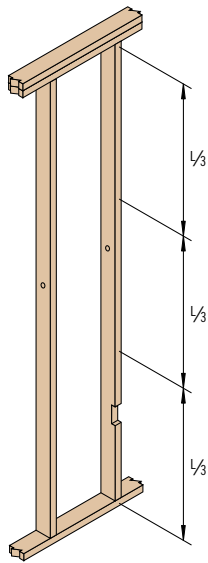
- Table is based on:
 - M-12, Southern Pine design values (see page 2)
 - Deflection criteria of L/240 total load, L/360 live load, and 100% duration of load
- Allowable loads shown are the maximum uniform loads (plf) that can be applied to the beam in addition to its own weight, provided that the minimum end-bearing requirements are met.
- Beams and girders must bear on load-bearing walls, piles, or concrete or masonry foundations.

For framing instructions, including recommended fastening schedules, please refer to the AWC Wood Frame Construction Manual or your applicable building code.

Framer Series™ lumber is intended for dry-use applications

FRAMER SERIES™ LUMBER ALLOWABLE HOLES AND NOTCHES

For Wall Framing

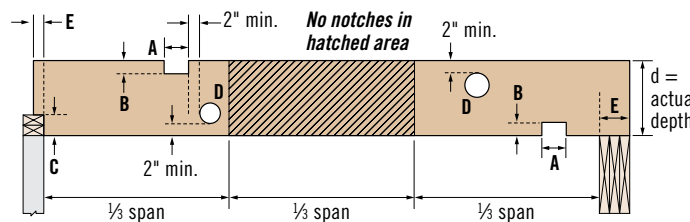


DO NOT cut a notch and a hole in the same cross section

General Notes

- If wall is non-bearing, or if studs are doubled (with no more than two studs in a row bored), maximum hole sizes may be increased to:
 - 2 1/16" diameter for 2x4 walls
 - 3 1/4" diameter for 2x6 or wider walls
- Holes may be drilled anywhere along the length of the stud or column but must be at least 5/8" from the edge.
- Notches may be cut anywhere except the middle 1/3 of the length of the stud or column.

For Joists, Beams, and Headers

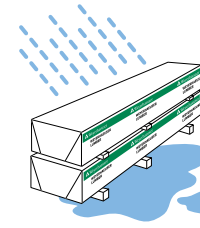


If the thickness of a built-up member is greater than 3 1/2", no notches are allowed on the tension side, except at ends.

Maximum Notch and Hole Sizes

Joist, Beam, or Header Nominal Size	A	B	C	D	E	
	Maximum Notch Length not to exceed d/3	Maximum Notch Depth not to exceed d/6	Maximum End Notch Depth not to exceed d/4	Maximum Hole Diameter not to exceed d/3	Wood or Steel	Masonry
2x8	2 3/8"	1 3/16"	1 13/16"	2 3/8"	1 1/2"	3"
2x10	3 1/16"	1 1/2"	2 5/16"	3 1/16"	1 1/2"	3"
2x12	3 3/4"	1 7/8"	2 13/16"	3 3/4"	1 1/2"	3"

Protect lumber from sun and water



CAUTION: Wrap is slippery when wet or icy

Use support blocks to keep bundles out of mud and water

Align stickers directly over support blocks

Contact your local representative or dealer at:

CONTACT US

1.888.453.8358 • woodbywy.com/contact



May 2013 • Reorder TJ-4020

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**WEATHERSHIELD 2" X 8" X 16' PRESSURE-TREATED
LUMBER**

Model Number: 255677

Location: Deck framing

Dimensions:

Height: 1/2"

Width: 7 1/4"

Length: 16'

Finish: Pressure treated



WeatherShield 2 in. x 8 in. x 16 ft. Pressure-Treated Lumber

Model # 255677 Store SKU # 255677

★★★★★ [Write The First Review](#)

\$17.97 /EA-Each

Quantity:

STORE EXCLUSIVE

 **PICK UP IN STORE**

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PRODUCT DESCRIPTION

The WeatherShield 2 x 8 x 16 Pressure-Treated Pine Lumber can be stained or painted to match your outdoor design scheme, providing a versatile material for use in and around the garden.

- Made of Southern yellow pine
- Pressure treatment helps protect against termites, fungal decay and rot
- Ideal for decks, raised beds, outdoor furniture, retaining walls, fences, picnic tables, planter boxes, walkways, sill plate and structural members
- Can be primed, painted or stained
- 2 in x 8 in. x 16 ft.
- Best warranty available on treated wood
- Note: Product may vary by store
- MFG Brand Name : WeatherShield
- MFG Model # : 255677
- MFG Part # : 255677

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SPECIFICATIONS

Actual product thickness (In.)	2	Actual product width (In.)	8.0
Aluminum compatible	Yes	Assembled Depth (In.)	192 In
Assembled Height (In.)	1.625 In	Assembled Width (In.)	7.625 In
Chemical retention (lb./cu. ft.)	.05	Contact Type Allowed	Above Ground
Fastener recommendation	Nails and other hardware should be hot-dipped zinc-coated or equally well protected material.	Item Package Type	No Package
Lumber quality	Premium	Manufacturer Warranty	Warranty information available at www.woimanizedwood.com
Nominal Length	192 In	Nominal Product H x W (In.)	2x8
Nominal Product Height (In.)	2	Nominal Product Length (ft.)	16
Nominal Width	8 In	Nominal product width (In.)	8.0
Portion of product made from wood (%)	100.0	Primary Specific Wood Species	Southern Yellow Longleaf Pine (US) (Pinus palustris)
Product Length (ft.)	16.0 ft	Product Length (In.)	192
Secondary Specific Wood Species	Southern Yellow Loblolly Pine (US) (Pinus taeda)	Texture	Smooth
Type of Pressure Treatment	CA - Copper Azole	Water Resistant	No

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CUSTOMER REVIEWS

Do you own this product? Be the first to rate it. Your feedback will help users like you to make informed decisions and will help us to improve our product offerings!



6 X 6 BLOCKING

Model Number: EDGE

Location: Foundation of House

Dimensions: 5 1/2" x 5 1/2"

Finish: Pressure Treated Lumber

Available: Weyerhaeuser

SPECIFICATIONS

Actual product thickness (in.)	5.5	Actual product width (in.)	5.5
Aluminum compatible	Yes	Assembled Depth (in.)	3 in
Assembled Height (in.)	42 in	Assembled Width (in.)	96 in
Chemical retention (lb./cu. ft.)	.16	Contact Type Allowed	Ground Contact
Fastener recommendation	Hot Dipped Galvanized or Stainless Steel	Item Package Type	No Package
Lumber quality	Premium	Manufacturer Warranty	Lifetime Limited Warranty Against Rot, Decay, and Termites
Nominal Length	96 in	Nominal Product H x W (in.)	6x6
Nominal Product Height (in.)	6	Nominal Product Length (ft.)	8
Nominal Width	6 in	Nominal product width (in.)	6
Portion of product made from wood (%)	100	Primary Specific Wood Species	Southern Yellow Loblolly Pine (US) (Pinus taeda)
Product Length (ft.)	8 ft.	Secondary Specific Wood Species	Southern Yellow Longleaf Pine (US) (Pinus palustris)
Texture	Smooth	Type of Pressure Treatment	MCA - Micronized Copper Azole
Water Resistant	No		



DEK-BLOCK PIERS FLOATING FOUNDATION SYSTEM

Location: Deck supports

Dimensions:

Height: 7 3/4"

Bottom Width: 11"

Top Width: 8"

Capacity: 42 lb per block

Material: Pre-formed Concrete

Floating Foundation Deck System

[Home](#)

[Free Deck Plans](#)

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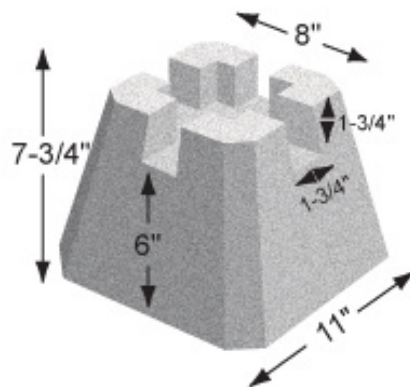
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Dek-Block® Pier Specifications

published by joezm on Tue, 06/12/2012 - 09:34

Dek-Block® piers are solid, pre-formed concrete foundation blocks designed specifically for the Floating Foundation Deck System.



1-3/4" wide x 1-3/4" deep slot accepts 2" thick (1-1/2" net) lumber horizontally.

3-3/4" square x 1-3/4" deep socket on Pier top accepts 4"x4" (3-1/2" x 3-1/2" net) posts vertically.

42-lb per block average.

Block accepts all lumber species and surfaced sizes currently manufactured in the U.S.

Blocks allow for lumber attachments in parallel and/or perpendicular configurations.

6" distance from bottom of block to bottom of lumber slot

Block porosity wicks moisture from slot/lumber to ground

Each block is manufactured from 5,000 psi concrete to ensure the greatest strength and durability.



CEDAR DECKING

Location: South and West exterior deck surface

Dimensions:

Thickness: 5/4"

Width: 6"

Length: 8'

Finish: Waterproofing

Available: Fontaine

TIMBER PRODUCTS | SIZES

Thickness and Width					
Nominal (inches)	Nominal (mm)	Rough (inches)	Rough (mm)	Dressed (inches)	Dressed (mm)
5	127	4¾	121	4½	114
6	152	5¾	146	5½	140
8	203	7¾	197	7½	191
10	254	9¾	248	9½	241
12	305	11¾	298	11½	292
Over 12	Over 305	¼ off	6mm off	½ off	13mm off

Note: Full sawn timbers have the same dimension as nominal.

Grade Classifications

Depending upon size, Western Red Cedar is classified as Light Framing, Structural Joists and Planks, Beams and Stringers, or Posts and Timbers. In general, the grades referred to herein are rough sawn.

Light Framing is lumber 2" to 4" (51mm to 102mm) thick and 2" to 4" (51mm to 102mm) wide either rough sawn or surfaced four sides (S4S).

Structural Joists and Planks are rectangular members 2" to 4" (51mm to 102mm) thick, 5" (127mm) and wider, either rough sawn or surfaced four sides (S4S).

Beams and Stringers are rectangular members, either rough sawn or surfaced, 5" (127mm) and thicker with width 2" (51mm) greater than thickness.

Posts and Timbers are square members, either rough sawn or surfaced, 5" (127mm) by 5" (127mm) and larger with width not more than 2" (51mm) greater than thickness.



1/2" PLYWOOD

Location: Under blocking

Dimensions:

Thickness: 1/2"

Width: 17 1/2"

Length: 2'

Available: Fontaine

Plum Creek AC Sanded Plywood

SPECS	<ul style="list-style-type: none"> • Slow growth inland Douglas Fir and Larch yield fine-grained, smooth faces • All Group 1, Struc 1 Species
FACES	<ul style="list-style-type: none"> • "A" grade veneer • Quality wood plugs or putty repairs, minimal use of polyurethane patch • 15 plug average assures the highest face quality • Fully sanded face
BACKS, CENTERS & CORES	<ul style="list-style-type: none"> • Plum Creek's High Integrity Ultra-Core™ construction features composed cross bands for tight core gap tolerance more stringent than APA and industry specs • One piece "C" grade or better center and back
CONSTRUCTION & THICKNESS	<p>Thickness Ply count</p> <p>1/4" 3 Ply</p> <p>3/8" 4 Ply</p> <p>1/2" 5 Ply</p> <p>5/8" 5 or 7 Ply</p> <p>3/4" 7 Ply</p> <ul style="list-style-type: none"> • Standard size 4' x 8' • Panel thickness to 1 1/2" • Solid long length to 102" • Scarfed panels to 16' • Tongue and groove available on 5/8" - 1 1/8" • Underlayment stamp available



A 36 STEEL ROD

Location: Foundation

Dimensions:

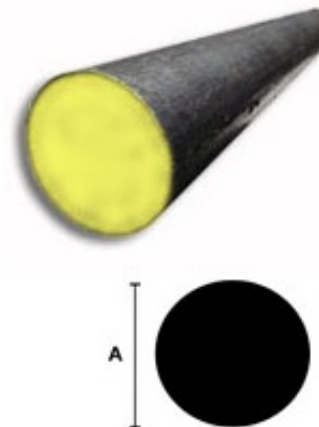
Diameter: 1"

Note: Anchor with nut and washer

HR Steel Round Bar

[Email Friend](#) 

Hot Rolled Steel Round, is widely used for all general fabrication and repairs in industrial maintenance, agricultural implements, transportation equipment, ornamental work, etc. HR Steel Rounds have a slightly grainy textured finish.



- **Specifications:** ASTM A36
- **AKA:** HR round, round bar
- **Applications:** frame work, braces, supports, shafts, axels, etc.
- **Workability:** Easy to Weld, Cut, Form, and Machine
- **Mechanical Properties:** Brinell = 112, Tensile = 58-80,000 +/-, Yield = 36,000 +/-
- **How is it Measured?** Diameter (A) X Length
- **Available Stock Sizes:** 2ft, 4ft, 6ft, 8ft, 10ft, 20ft or Cut to Size

Stock lengths may vary +/- 1/4"

Please call if you need specific lengths

NEW **Cut-to-Size Service** available on these items! Call 1-859-745-2650 for details.

Stock Number	Product Type	Item Size & Description (Inches)	Click! Arrow to Select Size	Qty	Select / Price
R114	HR CQ Steel Round	1/4 inch Dia. Round Bar	Select ... ▼	<input type="text" value="1"/>	<input type="button" value="Get Price"/>
R1516	HR CQ Steel Round	5/16 inch Dia. Round Bar	Select ... ▼	<input type="text" value="1"/>	<input type="button" value="Get Price"/>
R138	HR CQ Steel Round	3/8 inch Dia. Round Bar	Select ... ▼	<input type="text" value="1"/>	<input type="button" value="Get Price"/>
R112	Hot Rolled A-36 Steel Round	1/2 inch Dia. Round Bar	Select ... ▼	<input type="text" value="1"/>	<input type="button" value="Get Price"/>
R158	Hot Rolled A-36 Steel Round	5/8 inch Dia. Round Bar	Select ... ▼	<input type="text" value="1"/>	<input type="button" value="Get Price"/>
R134	Hot Rolled A-36 Steel Round	3/4 inch Dia. Round Bar	Select ... ▼	<input type="text" value="1"/>	<input type="button" value="Get Price"/>
R178	Hot Rolled A-36 Steel Round	7/8 inch Dia. Round Bar	Select ... ▼	<input type="text" value="1"/>	<input type="button" value="Get Price"/>
R11	Hot Rolled A-36 Steel Round	1 inch Dia. Round Bar	Select ... ▼	<input type="text" value="1"/>	<input type="button" value="Get Price"/>
R1114	Hot Rolled A-36 Steel Round	1-1/4 inch Dia. Round Bar	Select ... ▼	<input type="text" value="1"/>	<input type="button" value="Get Price"/>
R1112	Hot Rolled A-36 Steel Round	1-1/2 inch Dia. Round Bar	Select ... ▼	<input type="text" value="1"/>	<input type="button" value="Get Price"/>
R1134	Hot Rolled A-36 Steel Round	1-3/4 inch Dia. Round Bar	Select ... ▼	<input type="text" value="1"/>	<input type="button" value="Get Price"/>
R12	Hot Rolled A-36 Steel Round	2 inch Dia. Round Bar	Select ... ▼	<input type="text" value="1"/>	<input type="button" value="Get Price"/>
R1212	Hot Rolled A-36 Steel Round	2-1/2 inch Dia. Round Bar	Select ... ▼	<input type="text" value="1"/>	<input type="button" value="Get Price"/>
R13	Hot Rolled A-36 Steel Round	3 inch Dia. Round Bar	Select ... ▼	<input type="text" value="1"/>	<input type="button" value="Get Price"/>



12 GAUGE STRAP

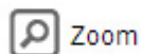
Location: Foundation

Dimensions:

Length: 6"

Width: 12"

Connected with 5/8" Lag bolts into 6 x6



Zoom

Simpson Strong-Tie 27 in. 12-Gauge Strap

Model #MST27 Internet #100374971 Store SKU #462713

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MSTD MARRIAGE STRAP

Model Number: MSTD4

Location: Foundation

Dimensions:

Length: 18"

Material Gauge: 16

Finish: Galvanized

Allowable Tension Loads: 3100

MSTD Marriage Strap



The MSTD marriage strap provides an overlapping, in-line splice between an **HTT** tension tie and a **CMSTC16** coiled strap for panelized-roof applications where the roof member adjacent to the wall is too short to develop the required load into the roof diaphragm. The MSTD provides continuity of load without the need to splice the CMSTC16 alongside the HTT which requires additional blocking. Use MSTD4 with HTT4 and MSTD5 with HTT5.

Material: 16 gauge

Finish: Galvanized (G90)

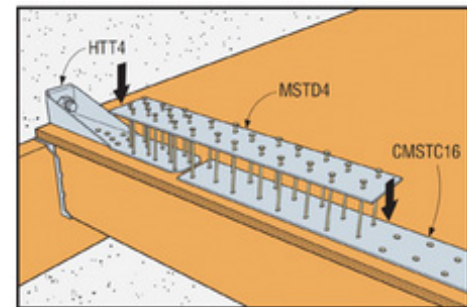
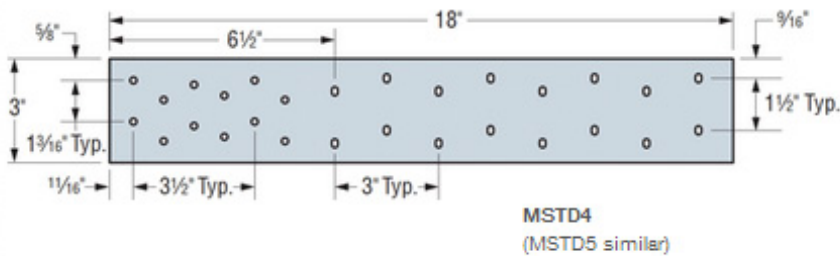
Installation:

- Use all specified fasteners. See **General Notes**.
- The CMSTC and HTT must be spliced end-to-end without any gap.
- Suitable for use with both 10d and 16d sinker nailing options for the **HTT** and **CMSTC** as specified per the Designer.
- To install:
 - Position HTT over the framing (do not install fasteners yet).
 - Align CMSTC16 with the end of the HTT.
 - Position MSTD over the two connectors so that nail holes align correctly.
 - Install specified fasteners, filling all nail holes.

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Typical MSTD4 Installation

Load Tables: See [code report listings](#) below

▲ top

Model No.	Total L	Tension Tie	Fasteners		Allowable Tension Loads
			CMSTC16	HTT	
MSTD4	18	HTT4	16 - 16d Sinker	12 - 16d Sinker	3100
MSTD5	27	HTT5	24 - 16d Sinker	18 - 16 Sinker	4545

1. Install on minimum 4x4 blocking.
2. 10d common nails may be substituted at 100% of table load.
3. Allowable tension loads include a load duration increase on the fasteners for wind or earthquake with no further increase allowed.
4. NAILS: 10d common = 0.148" dia. x 3" long, 16d sinker = 0.148" dia. x 3 1/4" long.



2 1/2" TAN TORQUE SCREWS

Model Number: T20
Location: Deck Fasteners
Dimensions: 2 1/2"
Finish: Tan

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Home: Search "2 1/2" torque screws":

Print

The Hillman Group 5 lbs #8 x 2-1/2-in Flat-Head Galvanized Dual Torque-Drive Deck Screws



The Hillman Group 5 lbs #8 x 2-1/2-in Flat-Head Galvanized Dual Torque-Drive Deck Screws

Item #: 438955 | Model #: 47370

★★★★★ Be the first to write a review!

\$66.67

Share Pin it Tweet 0 +1 0

[Description](#) | [Specifications](#) | [Reviews](#) | [Community Q&A](#)

Screw Thickness	#8
Thread Style	Coarse
Screw Length (Inches)	2.5
Head Type	Flat
Drive	Dual torque
Point Type	Standard
Use Location	Exterior

Materials Fastened	Wood to wood
Finish	Galvanized/Uncoated
Color/Finish Family	Gray/Silver
Material	Steel
Package Unit of Measurement	Pound(s)
Package Quantity	5.0

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The Hillman Group 5 lbs #8 x 2-1/2-in Flat-Head Galvanized Dual Torque-Drive Deck Screws **\$66.67**

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SIMPSON LU 210 JOIST HANGER

Model Number: LUC210Z

Location: Deck framing

Dimensions:

Thickness: 1 1/2"

Width: 1 9/16"

Length: 7 13/16"

Finish: galvanized

Available: Weyerhaeuser

LUC/LU/U/HU/HUC Standard Joist Hangers

LUCZ concealed flange hanger available for 2x6, 2x8, 2x10 and 2x12 lumber. Ideal for end of ledger/ header or post conditions, the LUCZ also provides cleaner lines for exposed conditions such as overhead decks.

See [Hanger tables](#). See [Hanger Options](#) for hanger modifications, which may result in reduced loads.

LU - Value engineered for strength and economy. Precision-formed - engineered for installation ease and design value.

U - The standard U hanger provides flexibility of joist to header installation. Versatile fastener selection with tested allowable loads.

HU/HUC - Most models have triangle and round holes. To achieve maximum loads, fill both round and triangle holes with common nails. These heavy-duty connectors are designed for schools and other structures requiring additional strength, longevity and safety factors.

Material: See [tables](#).

Finish: Galvanized. Some products available in [stainless steel or ZMAX® coating](#); see [Corrosion Information](#).

Installation:

- Use all specified fasteners. See [General Notes](#).
- HU/HUC— Can be installed filling round holes only, or filling round and triangle holes for maximum values.
- Joists sloped up to 1/4:12 achieve load tables.
- See [masonry or concrete](#) for installations.
- HU/HUC hangers can be welded to a steel member. Allowable loads are the lesser of the values in the [hanger tables](#) or the weld capacity - refer to technical bulletin [T-HUHUC-W](#).

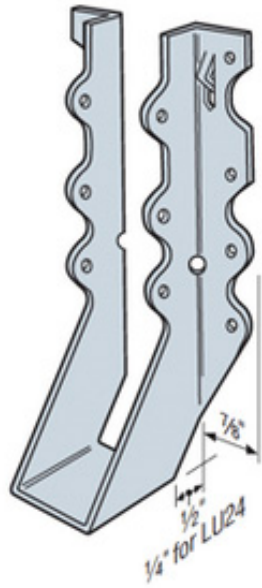


Some products may be installed with the Strong-Drive® SD Structural Connector screw - [click here for details](#)

Options:

- HU hangers available with the header flanges turned in for 2 5/16" width and larger, with no load reduction - order HUC hanger.
- See [Hanger Options](#), for sloped and/or skewed U/HU models, and HUC (concealed flange) models.
- HU only—Rough beam sizes available by special order.
- See [stocked U hanger rough sizes tables](#). Rough sizes are not available in 8x.
- Also see [LUS and HUS series](#).

Gallery:



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LUC210Z
(LUC26Z
Similar)



U210



HUC412
Concealed
Flanges

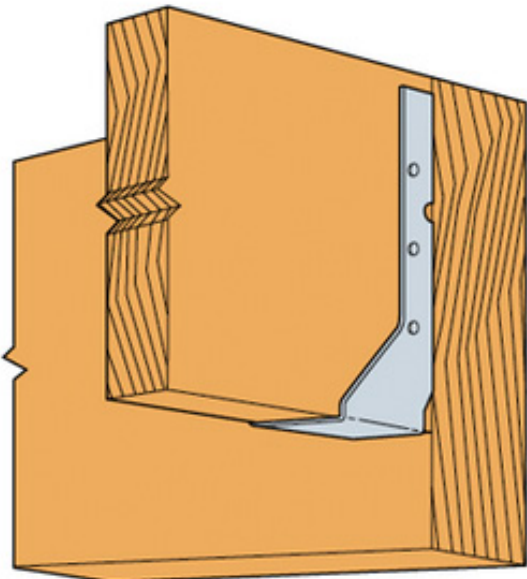


LU28
(except
LU Roughs)

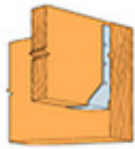
Model configurations may differ from those shown. Some HU models do not have triangle holes. [Contact Simpson Strong-Tie.](#)



HU214
Projection seat
on most
models for
maximum
bearing and
section
economy.



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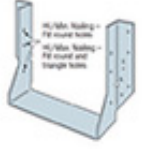
Typical LUCZ Installation



Typical HU Installation



Typical LU28 Installation



HU68

Load Values with SD Series Screws

These products are available with [additional corrosion protection](#). Additional products on this page may also be available with this option, [check with Simpson Strong-Tie](#) for details.

Model No.	Fasteners		Allowable Loads							
	Face	Joist	DF/SP				SPF/HF			
			Uplift (160)	Floor (100)	Snow (115)	Roof (125)	Uplift (160)	Floor (100)	Snow (115)	Roof (125)
LU24	4-SD9112	2-SD9112	340	685	725	725	290	450	515	560
LU26	6-SD9112	4-SD9112	915	1025	1030	1030	715	670	775	840
LUC26Z	6-SD9112	4-SD9112	865	1025	1180	1285	715	670	775	840
LUC26Z	6-SD10112	4-SD10112	915	1040	1195	1300	790	830	950	1035
LU28	8-SD9112	6-SD9112	995	1370	1380	1380	855	895	1030	1120
LU210	10-SD9112	6-SD9112	1150	1710	1965	2010	990	1120	1290	1400
LUC210Z	10-SD9112	6-SD9112	1605	1710	1965	2030	1075	1120	1290	1400
LUC210Z	10-SD10112	6-SD10112	1580	1730	1990	2165	1325	1380	1585	1725



DECK POST CONNECTORS

Model Number: DTT2Z

Location: South and West Deck Rail Posts

Anchor Diameter: 1/2"

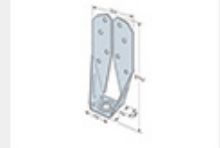
Dimensions: 3 1/4" x 6 15/16" x 1 5/8"

Fasteners: 8-SDS 1/4" x 2 1/2"

DTT2Z Deck Post Connectors



The DTT2Z is a safe, cost-effective way to attach deck-railing posts to the deck framing. Because the post is tied back into the deck joists, rather than to the rim joist alone, the connection is stronger than typical through-bolt installations and complies with IRC and IBC code requirements regarding handrail and guardrail post connections for decks. The DTT2Z also complies with the new IRC requirements for laterally tying the deck to the house. Additionally, the versatile DTT2Z is load rated as a [holddown for light-duty shearwalls and braced wall panel applications](#). The DTT2Z fastens easily to a single 2x joist or stud using [Simpson Strong-Tie® Strong-Drive® SDS screws](#) (included) and accepts a 1/2" machine bolt or anchor bolt.



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Solutions for Decks

The DTT2 is ideal for two critical deck connections:

Guardrail-Post Connection

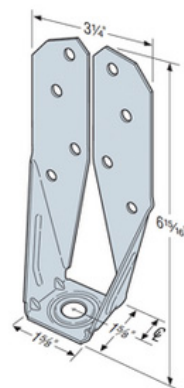
- Ties the guardrail post into deck framing
- Stronger and safer than nails, lag screws or bolts
- Meets provisions set in the International Residential Code® (IRC) for guardrail reinforcement (Table R301.5)
- Single post-to-deck connection tested for the concentrated load specified in ICC-ES acceptance criteria for Handrails and Guards (AC273)

Lateral-Load Connection

- Ties the deck into the house for a stronger, safer ledger connection
- Helps prevent a common type of deck failure
- Meets provisions set by the 2009 International Residential Code® (IRC) for lateral deck-to-house connections (R502.2.2.3)

The new DTT2SS is made from stainless steel for applications in higher exposure environments. Whether it's a deck guardrail post application or the lateral-load connection from the deck to the adjacent structure, the new stainless-steel DTT2SS is the best choice for seaside applications or those calling for more corrosive preservative-treated lumber formulations. It fastens to the framing members with stainless-steel Simpson Strong-Tie Strong-Drive SDS wood screws (included).

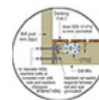
The new DTT2Z-SDS2.5 is our standard DTT2Z packaged with 2 1/2" Simpson Strong-Tie Strong-Drive SDS wood screws instead of the standard 1 1/2" fasteners. These longer screws allow the DTT2Z to achieve a load capacity in excess of 2100 lbs. when used as a holddown on double studs in a shearwall application. The DTT2Z-SDS2.5 is also suitable in deck applications when double 2x members are used for deck joists or blocking.



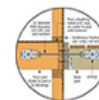
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DTT2Z (DTT2SS similar)



DTT2Z installed as a lateral connector for a deck guardrail post.



Typical Deck-to-House Lateral Load Connection

For more information on guardrail post connections, see technical bulletin [T-GRDRLPST](#).

For more information on lateral load connections, see technical bulletin [T-DECKLATLOAD](#).

Load Table: See [code report listings](#) below



These products are available with [additional corrosion protection](#). Additional products on this page may also be available with this option, [check with Simpson Strong-Tie](#) for details.

Model No.	ϕ	Anchor Diameter	Fasteners	Minimum Wood Member Thickness	Allowable Tension Load			
					DF/SP		SPF/HF	
					(100)	(160) ¹	(100)	(160) ¹
DTT2Z/DTT2SS	1 3/16	1/2	8-SDS 1/4"x1 1/2"	1 1/2	1825	1825	1440	1800
				3	2000	2145	1440	1835
DTT2Z-SDS2.5	1 3/16	1/2	8-SDS 1/4"x2 1/2"	3	2145	2145	2105	2105

1. The allowable loads have been increased 60% for wind or earthquake loading with no further increase allowed.
2. Load values are valid if the product is flush with the end of the framing member or installed away from the end.
3. The guardrail post illustration above addresses an outward force on the guardrail. An additional DTT2Z can be added at the lower bolt to address an inward force.



CARRIAGE BOLTS

Dimensions: 1/2" x 6"

Location: South and West Deck Rail Posts

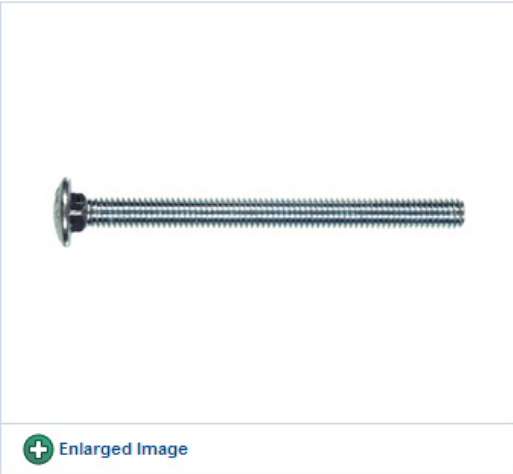
Finish: Galvanized

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Home: Project Pak 10-Count 1/2-in-13 x 6-in Zinc-Plated Carriage Bolts

Print



Project Pak 10-Count 1/2-in-13 x 6-in Zinc-Plated Carriage Bolts

Item #: 65424 | Model #: 492067

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\$14.25

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Description	Specifications	Reviews	Community Q&A
Fastener Callout Size	1/2-13 x 6"		
Bolt Diameter	1/2"		
Fastener Length (Inches)	6.0		
Bolt Thread Pitch	13		
Bolt Shank Size (Inches)	0.5		
Thread Style	Coarse		
Bolt Type	Carriage		
Length (Inches)	6.0		
Fastener Thread Type	Coarse		
Material		Steel	
Fastener Color/Finish		Zinc Plated	
Finish		Zinc-plated	
Fastener Head Style		Round	
Color/Finish Family		Gray/Silver	
Fastener Materials		Steel	
Package Unit of Measurement		Count	
Package Quantity		10.0	

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Project Pak 10-Count 1/2-in-13 x 6-in Zinc-Plated Carriage Bolts **\$14.25**

Subtotal: \$14.25

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GEORGIA PACIFIC PLYTANIUM PLYWOOD SHEATHING

Model Number: 255677
Location: Exterior of House
Dimensions:
 Thickness: 0.354"
Species: Southern Yellow Pine
Available: Georgia Pacific

Plytanium® plywood sheathing is ideal for residential and light commercial construction, and provides outstanding performance for walls and roofs. It adds proven performance and durability to new homes, room additions and renovations.

Available Sizes (Sized for 4' x 8')

Square Edge 3'-11¹/₂" (1.216 m) x 7'-11¹/₂" (2.435 m)

Building Code Performance Categories, Panel Thickness

- 3/8 CAT, 0.354" (8.99 mm)
- 15/32 CAT (3-ply), 0.451" (11.45 mm)
- 15/32 CAT (4-ply), 0.451" (11.45 mm)
- 19/32 CAT, 0.578" (14.68 mm)
- 23/32 CAT, 0.703" (17.85 mm)

Specifications

Length/Width Tolerance +0, -¹/₁₆" (+0, -1.6 mm)

Straightness Tolerance ±¹/₁₆" (±1.6 mm)

Squareness Tolerance ±¹/₈" (±3.2 mm)

Primary Species Southern Yellow Pine

Testing Agency APA®-The Engineered Wood Association

Classifications **Exposure 1** – Plywood suitable for uses not permanently exposed to the weather. Panels classified as Exposure 1 are intended to resist the effects of moisture on structural performance as may occur due to construction delays, or other conditions of similar severity.

Exterior – Plywood suitable for repeated wetting and redrying or long-term exposure to weather and other conditions of similar severity.

Code Fire Classification Class III or C

Flame Spread Rating 76-200, smoke-developed index <450

Building Code Compliance PS 1-09 or PS 2-10

Other Information

Forestry Certification Plytanium plywood panels are made from wood sourced through a system that is third-party certified to the Sustainable Forestry Initiative® procurement standard.

Green Building Programs See our Plytanium plywood *Sustainability Fact Sheet* available at www.builditbetter.com for more information on potential point contributions towards specific green building programs.

NAHB Green Approved Plytanium plywood has been "Green Approved" by the NAHB Research Center, which means you can be assured that Plytanium plywood complies with specific green practice criteria in the National Green Building Standard. See our product listing on www.GreenApprovedProducts.com for more information.



Product Warranty

Plytanium® plywood is covered by a Lifetime Limited Warranty. For terms and conditions, please refer to our Lifetime Limited Warranty available at www.builditbetter.com.

International Shipping

To prevent the introduction and spread of plant pests, *ISPM 15: International Standards for Phytosanitary Measures*, requires that internationally shipped solid wood pallets be debarked, treated with heat or fumigated with methyl bromide, and marked with a seal of compliance. **Pallets made with engineered wood, including Plytanium plywood, are exempt from ISPM 15 regulations.** This is because the process of manufacturing engineered wood destroys any live organisms in the wood. (Source: “Boxes, Crate and Reel Manufacturing,” www.PerformancePanels.com)

Formaldehyde Emissions

Plytanium plywood contains no added urea formaldehyde resins. PS 1 and PS 2 structural panels are exempt from testing by the California Air Resources Board (CARB) in the *Composite Wood Air Toxic Control Measure (ATCM)* and phenolic bonded structural panels are exempt from testing or monitoring by HUD in the *Manufactured Home Construction and Safety Standards*.

Manufacturing Locations

Location	APA Mill Number	Zip Code	Harvest Radius
Camden, TX	515	75934	90 miles
Corrigan, TX	516	75939	90 miles
Dudley, NC	348	28333	80 miles
Emporia, VA	230	23847	40 miles
Gurdon, AR	517	71743	60 miles
Madison, GA	404	30650	100 miles
Prosperity, SC	329	29127	80 miles
Taylorville, MS	282	39168	50 miles
Warm Springs, GA	324	31830	450 miles



1/2" PRESSURE TREATED PLYWOOD

Location: Underfloor of Floor System

Dimensions:

Thickness: 1/2"

Width: 8'

Length: 4'



Plywood

Weyerhaeuser Company
 PO Box 9777
 Federal Way, WA 98063-9777
<http://www.weyerhaeuser.com/Sustainability/MSDS>

Emergency Phone: (253) 924-5000
 Additional Information: (253) 924-3865
 CHEMTREC: (800) 424-9300
 Revised Date: September 27, 2010

1. Product Identification

Product	Manufacturing Location(s)
Plywood	USA: Zwolle, LA; Emerson, AR. Canada: None

2. Hazardous Ingredients/Identity Information

Name	CAS#	Percent	Agency	Exposure Limits	Comments
Wood (wood dust, softwood or hardwood)	None	84-99	OSHA	PEL-TWA 15 mg/m ³ (see footnote ^A below)	Total dust
			OSHA	PEL-TWA 5 mg/m ³ (see footnote ^A below)	Respirable dust fraction
			ACGIH	TLV-TWA 1 mg/m ³	Inhalable fraction
Phenol-formaldehyde resin solids ^B	9003-35-4	1-14	OSHA OSHA ACGIH	PEL-TWA 0.75 ppm PEL-STEL 2 ppm TLV-Ceiling 0.3 ppm	Free gaseous formaldehyde

^A In *AFL-CIO v OSHA*, 965 F. 2d 962 (11th Cir. 1992), the Court overturned OSHA's 1989 Air Contaminants Rule, including the specific PEL's for wood dust that OSHA had established at that time. The 1989 vacated PEL's were: 5 mg/m³ PEL-TWA and 10 mg/m³ STEL (15 min), all softwood and hardwood except Western Red Cedar. Wood dust is now regulated by OSHA as "Particulates Not Otherwise Regulated" (PNOR), which is also referred to as "nuisance dust". However, some states have incorporated the 1989 OSHA PEL's in their state plans. Additionally, OSHA indicated that it may cite employers under the OSH Act general duty clause in appropriate circumstances for noncompliance with the 1989 PEL's.

^B These products may contain free formaldehyde (<0.1%, wt %), which may be released depending on concentration and environmental conditions. These panels contain no added urea-formaldehyde resins. Large scale chamber studies on similar materials conducted by the APA Engineered Wood Association have shown that the finished products off-gas levels below 0.1 ppm as well.

3. Hazard Identification

Primary Safety/Health Hazards:

Warning: Plywood dust may pose a combustible dust explosion hazard if dried and suspended in air in sufficient concentrations and in proximity to an ignition source. Users of this product should examine the potential to generate wood and organic resin dust during handling and processing and related combustibility hazards and controls. See additional comments in MSDS.

3. Hazard Identification (cont'd.)

The primary health hazard posed by this product is thought to be due to exposure to airborne wood dust.

Appearance and Odor: Plywood is a 3 to 9 ply-veneer product with a slightly aromatic resinous odor and natural wood color.

Primary Route(s) of Exposure:

- Ingestion:
- Skin:
- Inhalation:
- Eye:

Medical Conditions Generally Aggravated by Exposure: Wood dust may aggravate pre-existing respiratory conditions or allergies.

Signs and Symptoms of Exposure:

Acute Health Hazards: Wood dust can cause eye irritation. Certain species of wood dust can elicit allergic contact dermatitis in sensitized individuals. Wood dust may cause respiratory irritation, nasal dryness, coughing, sneezing and wheezing as a result of inhalation. Formaldehyde may cause temporary irritation of skin, eyes, or respiratory system. Formaldehyde may cause sensitization in susceptible individuals.

Chronic Health Hazards: Wood dust, depending on the species, may cause allergic contact dermatitis and respiratory sensitization with prolonged, repetitive contact or exposure to elevated dust levels. Prolonged exposure to wood dust has been reported by some observers to be associated with nasal cancer. Additional information related to carcinogenicity for wood dust and formaldehyde is listed below.

Carcinogenicity Listing:

- NTP: Wood dust, Known Human Carcinogen. Formaldehyde, Reasonably Anticipated to be a Human Carcinogen.
- IARC Monographs: Wood dust, Group 1 - carcinogenic to humans. Formaldehyde, Group 1- carcinogenic to humans.
- OSHA Regulated: Formaldehyde Gas

Wood Dust - NTP: According to its Report on Carcinogens, Eleventh Edition, NTP states, "Wood dust is known to be a human carcinogen based on sufficient evidence of carcinogenicity from studies in humans". An association between wood dust exposure and cancer of the nasal cavity has been observed in many case reports, cohort studies, and case-control studies that specifically addressed nasal cancer. Strong and consistent associations with cancer of the nasal cavities and paranasal sinuses were observed both in studies of people whose occupations are associated with wood dust exposure and in studies that directly estimated wood dust exposure. This classification is based primarily on increased risk in the occurrence of adenocarcinomas of the nasal cavities and paranasal sinuses associated with exposure to wood dust. The evaluation did not find sufficient evidence to associate cancers of the oropharynx, hypopharynx, lung, lymphatic and hematopoietic systems, stomach, colon or rectum with exposure to wood dust. There is inadequate evidence for the carcinogenicity of wood dust from studies in experimental animals according to NTP.

Wood Dust: IARC – Group 1: Carcinogenic to humans; sufficient evidence of carcinogenicity. This classification is primarily based on studies showing an association between occupational exposure to wood dust and adenocarcinoma to the nasal cavities and paranasal sinuses. IARC did not find sufficient evidence of an association between occupational exposure to wood dust and cancers of the oropharynx, hypopharynx, lung, lymphatic and hematopoietic systems, stomach, colon or rectum.

Formaldehyde - NTP: According to its Report on Carcinogens, Eleventh Edition, NTP states, Formaldehyde (gas) is reasonably anticipated to be a human carcinogen based on limited evidence of carcinogenicity in humans and sufficient evidence of carcinogenicity in experimental animals.

3. Hazard Identification (cont'd.)

Formaldehyde: IARC - Group 1: Carcinogenic to humans, sufficient evidence of carcinogenicity. A working group of IARC has determined that there is sufficient evidence that formaldehyde causes nasopharyngeal cancer in humans, a rare cancer in developed countries and "strong but not sufficient evidence" for leukemia. However, numerous epidemiological studies have failed to demonstrate a relationship between formaldehyde exposure and nasal cancer or pulmonary diseases such as emphysema or lung cancer.

4. Emergency and First-Aid Procedures

Ingestion: Not applicable under normal use.

Eye Contact: Wood and resin dust may cause mechanical irritation. Treat dust in eye as foreign object. Flush with water to remove dust particles. Seek medical help if irritation persists.

Skin Contact: Wood dust of certain species can elicit allergic contact dermatitis in sensitized individuals, as well as mechanical irritation resulting in erythema and hives. Seek medical help if rash, irritation or dermatitis persists. Resin dust may also cause skin reactions in susceptible individuals.

Skin Absorption: Not known to occur under normal use.

Inhalation: Wood and resin dust may cause unpleasant obstruction in the nasal passages, resulting in dryness of nose, dry cough, sneezing and headaches. Remove to fresh air. Seek medical help if persistent irritation, severe coughing or breathing difficulty occurs.

Note to Physician: None

5. Fire and Explosion Data

Flash Point (Method Used): NAP

Flammable Limits: LFL = See below under "Unusual Fire and Explosion Hazards" UFL = NAP

Extinguishing Media: Water, carbon dioxide, sand

Autoignition Temperature: Variable [typically 400°-500°F (204°-260°C)]

Special Firefighting Procedures: None

Unusual Fire and Explosion Hazards: Depending on moisture content, and more importantly, particle diameter, wood dust may explode in the presence of an ignition source. For wood dust, an airborne concentration of 40 grams (40,000 mg) of dust per cubic meter of air is often used as the LEL. Reference NFPA Standards 654 and 664 for guidance.

HMIS Rating (Scale 0-4): Health = 2* Fire = 1 Physical Hazard = 0

NFPA Rating (Scale 0-4): Health = 1 Fire = 1 Reactivity = 0

6. Accidental Release Measures

Steps to be Taken In Case Material Is Released or Spilled: Sweep or vacuum up for recovery and disposal. Avoid creating dusty conditions whenever feasible. Maintain good housekeeping to avoid accumulation of dried wood and resin dust on exposed surfaces. Dried wood and resin dust may pose a combustible dust hazard. Place recovered wood dust in a container for proper disposal.

7. Handling and Storage

Precautions to be Taken In Handling and Storage: Dried wood and resin dust may pose a combustible dust hazard. Keep away from ignition sources. Avoid eye contact. Avoid prolonged or repeated contact with skin. Avoid prolonged or repeated breathing of wood dust. These products may release some formaldehyde in gaseous form.

7. Handling and Storage (cont'd.)

Specific handling and storage conditions should be assessed to determine potential formaldehyde concentrations. Store in well-ventilated, cool, dry place away from open flame.

8. Exposure Control Measures, Personal Protection

Personal Protective Equipment:

RESPIRATORY PROTECTION – Use NIOSH approved filtering face piece respirator ("dust mask") or higher levels of respiratory protection as indicated if there is a potential to exceed the exposure limits or for symptom relief or worker comfort. Use respiratory protection in accordance with regulatory requirements such as the OSHA respiratory protection standard 29 CFR 1910.134.

EYE PROTECTION – Approved goggles or tight fitting safety glasses are recommended when excessive exposures to dust may occur (e.g. during clean up) and when eye irritation may occur.

PROTECTIVE GLOVES – Cloth, canvas, or leather gloves are recommended to minimize potential slivers or mechanical irritation from handling product.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT – Outer garments which cover the arms may be desirable in extremely dusty areas.

WORK/HYGIENE PRACTICES – Follow good hygienic and housekeeping practices. Clean up areas where wood and resin dust settles to avoid excessive accumulation of this combustible material. Minimize compressed air blowdown or other practices that generate high airborne-dust concentrations.

Ventilation:

LOCAL EXHAUST – Provide local exhaust as needed so that exposure limits are met. Ventilation to control dust should be considered where potential explosive concentrations and ignition sources are present. The design and operation of any exhaust system should consider the possibility of explosive concentrations of wood dust within the system. See "SPECIAL" section below. Use of tool mounted exhaust systems should also be considered, especially when working in enclosed areas.

MECHANICAL (GENERAL) – Provide general ventilation in processing and storage areas so that exposure limits are met.

SPECIAL – Ensure that exhaust ventilation and material transport systems involved in handling this product contain explosion relief vents or suppression systems designed and operated in accordance with applicable standards if the operating conditions justify their use.

OTHER – Cutting & Machining of product should preferably be done outdoors or with adequate ventilation & containment.

9. Physical/Chemical Properties

Physical Description: Plywood is a 3 to 9 ply-veneer product with a slightly aromatic resinous odor and natural wood color.

Boiling Point (@ 760 mm Hg):	NAP
Evaporation Rate (Butyl Acetate = 1):	NAP
Freezing Point:	NAP
Melting Point:	NAP
Molecular Formula:	NAP
Molecular Weight:	NAP
Oil-water Distribution Coefficient:	NAP
Odor Threshold:	NAP
pH:	NAP
Solubility in Water (% by weight):	<0.1
Specific Gravity (H₂O = 1):	Variable; depends on wood species and moisture

9. Physical/Chemical Properties (cont'd.)

Vapor Density (air = 1; 1 atm):	NAP
Vapor Pressure (mm Hg):	NAP
Viscosity:	NAP
% Volatile by Volume [@ 70°F (21°C)]:	0

10. Stability and Reactivity

Stability: Unstable Stable

Conditions to Avoid: Avoid open flame. Product may ignite at temperatures in excess of 400°F (204°C).

Incompatibility (Materials to Avoid): Avoid contact with oxidizing agents.

Hazardous Decomposition or By-Products: Thermal decomposition (i.e. smoldering, burning) can release carbon monoxide, oxides of nitrogen, carbon dioxide, aliphatic aldehydes including formaldehyde, resin acids, terpenes and polycyclic aromatic hydrocarbons. Natural decomposition of organic materials such as wood may produce toxic gases and an oxygen deficient atmosphere in enclosed or poorly ventilated areas. Spontaneous and rapid hazardous decomposition will not occur.

Hazardous Polymerization: May occur Will not occur

Sensitivity to Mechanical Impact: NAP

Sensitivity to Static Discharge: NAP

11. Toxicological Information

Wood Dust Toxicity Data: No specific information available for product in purchased form. Individual component information is listed below.

Components:

Wood dust (softwood or hardwood)

Treated wood dust generated from sawing, sanding or machining the product – may cause nasal dryness, irritation, coughing and sinusitis. NTP and IARC classify wood dust as a human carcinogen (IARC Group 1). See Section 3 above.

Formaldehyde

Human inhalation TC_{Lo} of 17 mg/m³ for 30 minutes produced eye and pulmonary results; human inhalation TC_{Lo} of 300 ug/m³ produced nose and central nervous system results; LC_{50} (rat, inhalation) = 1,000 mg/m³, 30 minutes; LC_{50} (mice, inhalation) = 400 mg/m³, 2 hours. IARC classifies formaldehyde as a human carcinogen (IARC Group 1). NTP classifies formaldehyde as Reasonably Anticipated to be a Human Carcinogen. See Section 3 above.

Target Organs: Eyes, skin, respiratory system.

12. Ecological Information

Environmental Fate: The wood and resin portions of this product would be expected to be biodegradable.

Formaldehyde: Trace amounts of free formaldehyde may be released to the atmosphere and would be expected to be removed in the atmosphere by direct photolysis and oxidation by photochemically produced hydroxyl radicals (half-life of a few hours). In the aqueous phase formaldehyde biodegradation is expected to take place in a few days.

Environmental Toxicity: NAP for finished product.

Component: Formaldehyde

96 hr LC50 Fathead Minnow	24mg/L
96 hr LC50 Bluegill	0.10 mg/L
5 min EC50 Photobacterium phosphoreum	9mg/L
96 hr EC50 Water flea	20 mg/L

13. Disposal Considerations

Waste Disposal Method: If disposed of or discarded in its purchased form, incineration is preferable, if allowed. Dry land disposal is acceptable in most states. It is, however, the user's responsibility to determine at the time of disposal whether your product meets RCRA criteria for hazardous waste. Follow applicable federal, state, and local regulations.

14. Transport Information

Mode: (Air, Land, water) Not regulated as a hazardous material by the U.S. Department of Transportation. Not listed as a hazardous material in Canadian Transportation of Dangerous Goods (TDG).

Proper Shipping Name:	NAP
Hazard Class:	NAP
UN/NA ID Number:	NAP
Packing Group:	NAP
Information Reported for Product/Size:	NAP

15. Regulatory Information

TSCA: Phenol-formaldehyde resin is on the TSCA chemical substance inventory.

CERCLA: Formaldehyde (100lbs RQ) is on the CERCLA chemical substance inventory.

DSL: Formaldehyde is on the Canadian Domestic Substance List.

OSHA: Wood products are not hazardous under the criteria of the federal OSHA Hazard Communication Standard 29 CFR 1910.1200. However, wood and resin dust generated by sawing, sanding or machining this product may be hazardous. Workplace exposure to formaldehyde is specifically regulated under 29 CFR 1910.1048.

STATE RIGHT-TO-KNOW:

California Prop 65 – This product contains formaldehyde, which depending on temperature and humidity, may be emitted from the product. Weyerhaeuser has evaluated formaldehyde emission rates from its products and have found these rates to be below the significant risk level. The user should determine whether formaldehyde emissions resulting from its site specific use, handling, ventilation design, capacity and final construction design for this product could exceed the safe harbor level.

Warning: Drilling, sawing, sanding or machining wood products generates wood dust, a substance known to the State of California to cause cancer.

Pennsylvania – This product contains formaldehyde which, depending on temperature and humidity, may be emitted from the product. When cut or otherwise machined, the product may emit wood dust. Formaldehyde and wood dust appear on Pennsylvania's Appendix A, Hazardous Substance Lists.

New Jersey – This product contains formaldehyde, a substance which appears on New Jersey's Environmental Hazardous Substance List.

Minnesota – Minnesota Statutes, 1984, Sections 144.495 and 325F.181 do not apply to this product; these statutes apply to plywood, particleboard and MDF and other products manufactured with urea-formaldehyde resins.

SARA 313 Information: To the best of our knowledge, this product contains formaldehyde at de minimis concentrations (0.1%) and is not subjected to the SARA Title III Section 313 supplier notification requirements.

SARA 311/312 Hazard Category: This product has been reviewed according the EPA "Hazard Categories: promulgated under SARA Title III, Sections 311 and 312 and is considered, under applicable definitions, to meet the following categories:

15. Regulatory Information (cont'd.)

An immediate (acute) health hazard	Yes
A delayed (chronic) health hazard	Yes
A corrosive hazard	No
A fire hazard	No
A reactivity hazard	No
A sudden release hazard	No

FDA: Not intended for use as a food additive or indirect food contact item.

WHMIS Classification: Controlled Product: D2A - wood dust and formaldehyde: IARC Group 1

16. Additional Information

Date Prepared: 06/27/2008

Date Revised: 09/27/2010

Prepared By: Weyerhaeuser Company Environment, Health, Safety and Sustainability

Weyerhaeuser MSDS available on: <http://www.weyerhaeuser.com/Sustainability/MSDS>

User's Responsibility: The information contained in this Material Safety Data Sheet is based on the experience of occupational health and safety professionals and comes from sources believed to be accurate or otherwise technically correct. It is the user's responsibility to determine if the product is suitable for its proposed application(s) and to follow necessary safety precautions. The user has the responsibility to make sure that this MSDS is the most up-to-date issue.

Definition of Common Terms:

ACGIH	= American Conference of Governmental Industrial Hygienists
AICS	= Australian Inventory of Chemical Substances
C	= Ceiling Limit
CAS#	= Chemical Abstracts System Number
DOT	= U. S. Department of Transportation
DSL	= Domestic Substance List
EC50	= Effective concentration that inhibits the endpoint to 50% of control population
EINECS	= European Inventory of Existing Commercial Chemical Substances or European List of Notified Chemical Substances
ENCS	= Japanese Existing and New Chemical Substances List
EPA	= U.S. Environmental Protection Agency
HMIS	= Hazardous Materials Identification System
IARC	= International Agency for Research on Cancer
IATA	= International Air Transport Association
IMDG	= International Maritime Dangerous Goods
KECL	= South Korean Existing Chemicals List
LC50	= Concentration in air resulting in death to 50% of experimental animals
LCLo	= Lowest concentration in air resulting in death
LD50	= Administered dose resulting in death to 50% of experimental animals
LDLo	= Lowest dose resulting in death
LEL	= Lower Explosive Limit
LFL	= Lower Flammable Limit
MSHA	= Mine Safety and Health Administration
NAP	= Not Applicable
NAV	= Not Available
NFPA	= National Fire Protection Association
NIOSH	= National Institute for Occupational Safety and Health
NPRI	= Canadian National Pollution Release Inventory
NTP	= National Toxicology Program

16. Additional Information (cont'd.)

OSHA	= Occupational Safety and Health Administration
PEL	= Permissible Exposure Limit
RCRA	= Resource Conservation and Recovery Act
STEL	= Short-Term Exposure Limit (15 minutes)
STP	= Standard Temperature and Pressure
TCLo	= Lowest concentration in air resulting in a toxic effect
TDG	= Canadian Transportation of Dangerous Goods
TDLo	= Lowest dose resulting in a toxic effect
TLV	= Threshold Limit Value
TSCA	= Toxic Substance Control Act
TWA	= Time-Weighted Average (8 hours)
UFL	= Upper Flammable Limit
WHMIS	= Workplace Hazardous Materials Information System



3/4" MEDIUM DENSITY FIBERBOARD

Location: Skylight Frame Return

Dimensions:

Length: 96"

Width: 48"



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Enlarged Image

3/4 x 48 x 96 Premium MDF

Item #: 37461 | Model #: M31LW1249097

★★★★★ 4 reviews | Write a review

\$34.12

Product is sold in individual pieces; please review the product specifications for details

Share Pinterest Tweet 8 +1 102

Description Specifications Reviews Community Q&A

Nominal Thickness (Inches)	3/4	Actual Width (Inches)	49.0
Nominal Length (Inches)	96.0	Grade	Premium
Nominal Width (Inches)	48.0	CARB Compliant	Yes
Actual Thickness (Inches)	0.75	No Added Formaldehyde (NAF) Compliant	No
Actual Length (Inches)	97.0		

FREE Store Pickup
Your order can be available for pickup in Lowe's Of S Burlington, VT today.
[Change Store](#)

Lowe's Truck Delivery
Your order will be ready for delivery to you from your selected store.

Parcel Shipping
Unavailable for This Order
Sent by carriers like UPS, FedEx, USPS, etc.

3/4 x 48 x 96 Premium MDF \$34.12

Subtotal: \$34.12

Qty.:

Add to Cart

Save Item

Set a Reminder

Go to Your Account

Related Items



2 x 4 x 96 Kiln-Dried Whitewood Stud

★★★★★ \$2.57



1/4 x 4 x 8 Hardwood Underlayment Plywood



DIVISION 07 THERMAL AND MOISTURE PROTECTION



SOLITEX MENTO 1000 VAPOR BARRIER

Model: Pro Clima

Location: Exterior Walls of Main House behind rain screen

Dimensions:

Length: 164'

Width: 59"

Available: Four Seven Five

Price: \$0.37 per square foot

SOLITEX MENTO 1000



3-layer very vapor open, WRB, subroof- and rainscreen membrane for plywood, OSB and insulation-boards. Conforms to all AC38 requirements for weather resistive barriers.

Roll width	59" (1.5m)
Roll length	164' (50m)
Roll area:	807 square feet (150m ²)

Technical properties

- Air permeance 0.00004cfm/ft² – 100x better than the testing threshold
- Withstands temperatures between -40 F° and 194 F°
- Weather exposure: 3 months
- Water column over 32.8' (10m)
- Life Expectancy 60 year +
- 38 Perm (ASTM E96-B), Sd-value < 0.05m (DIN EN 12572)
- Thickness 15.5 mils (0.40mm)
- Tension resistance:
 - 205N/50mm parallel
 - 170N/50mm perpendicular (DIN 12311-1)
- Stretches up to 50% parallel, 50% perpendicular (DIN 12311-1)
- Tear resistance: 100N parallel, 100N perpendicular (DIN 12319-1)
- Resistance to nails/staple tearing out: 140N
- Color: dark gray

Technical Specs

Layer	Material
Cover fleece	2 layer polypropylene microfibre
Membrane	monolithic TEEE film
non-woven fabric	polypropylene microfibre

Four Seven Five
High Performance Building Supply
131 Union St. Brooklyn, NY 11231
info@foursevenfive.com
718-622-1600





INTELLO PLUS MOISTURE BARRIER

Location: Main House Roof

Dimensions:

Length: 164' 1/2"

Width: 59' 1/16"

Available: Four Seven Five

Price: \$0.34 per square foot

Products

Sealings

Inside

INTELLO

INTELLO PLUS

Outside

Bonding Agents

INTELLO PLUS®



pro clima INTELLO PLUS® is reinforced with robust PP fabric and may be used as a confining layer for all kinds of blown-in thermal insulating material. A transverse batten should be placed on the inside at a spacing of at most 50cm to take the weight of the insulating material. See pro clima system brochure for further details on insulation.

INTELLO PLUS® offers the same high potential for freedom from structural damage like INTELLO®.

bonding agents:

ORCON F

UNI TAPE

TESCON PROFIL

CONTEGA PV

Technical Details

vapour diffusion resistance coefficient:		37.500
water vapour transmission resistance:	sd	0,25m to >20m
	permeance	13,20 to 0,17 US perms
	mvtr	1,25MNs/g to 100MNs/g
thickness:		0,2mm
surface weight:		125g/m ²
breaking load:	MD	320N/5cm
	XD	280N/5cm
fire rating:		B2
membrane:		polyethylene copolymer
non-woven fabric:		polypropylene
reinforcement:		polypropylene
temperature resistance:		-40°C to +80°C
colour:		white
roll width:		1,50m
roll length:		20m or 50m
roll area:		30m ² or 75m ²
roll weight:		



NATIONAL FIBER DENSE PACK CELLULOSE INSULATION

Model Number: RDSLF9256

Location: Main House Exterior

Dimensions:

Length: 60'

Width: 2- 3/8"

Features:

Composition: 85% composed of post-consumer paper

Available: National Fiber through Huntington Homes

Price: \$2.28 per square foot



NATIONAL FIBER
CELL-PAK INSULATION

Professional Cellulose for Cellulose Professionals

Directions for Installing Dense Pack Cellulose behind Insulweb Netting

Equipment and Material Requirements

- o *Have Insulweb* netting in 8 foot (90105-8x375) or 9 foot (90105-9x375) widths x 375 feet long
- o Air compressor with a minimum of two air lines
- o Pneumatic staple gun, Spotnails model BS8016AF, (SBS8016AF) or equivalent with ½ in. crown by 5/16 in. long staples (S98005)
- o Installation wand, two-inch inside diameter by four-foot long aluminum (best, no static *Wall Tube*) or thin wall PVC 'central vac' tubing (ok, but some static *PVC-2"*) with end cut at a 45 degree angle
- o Aluminum insulation roller (*Wall Roller*)
- o A minimum of 50 feet of two-inch blowing hose (*2" Hose*) attached to the larger diameter blowing hose; total length not to exceed 150 feet.
- o Optional: Fabric adhesive or slightly thinned *Elmer's* white glue and two inch paint roller

Preparation

Any cavity taller than twelve feet in height should have cross bracing or fire stops at mid-height to help support the weight of the material and prevent settling. Maintain minimum code clearance to combustibles for non-UL rated electrical systems (including non-IC rated recessed lights), knob and tube wiring, or combustion appliance flues, vents or chimneys.

Procedure for Installing Netting in Exterior and Interior Walls Assemblies

1. Measure the length of the wall and add two feet to the measurements.
2. Cut one piece of netting for each wall.
3. Tack an upper corner of the Insulweb in place and pull tight and tack the other side. Repeat this procedure for the two bottom corners, taking care to stretch the material tightly without wrinkles.
4. If stapling, set regulator to 80 psi on the compressor. Staple along the top first, then move to the middle stud and work outwards left and right. If the fabric is not taught, than inset (lip stitch) staple ¼ inch on one or both sides of framing. Repeat procedure for each stud until the wall is completed. Staples should be no more than 1.5 inches apart.
5. If gluing, tack Insulweb to framing with staples and apply fabric adhesive with a two-inch roller through Insulweb to each wall stud and plate. Let glue dry at least two hours before insulating.
6. After two rooms are completely netted, one person can begin blowing material in the first netted room (assuming glue, if used, is dry).

- For sound attenuation, it is easiest to have drywall already installed on one side, netting the other side with Insulweb. Insulweb can be installed on both sides of the wall if, after insulating, a sheet of plywood bracing is temporarily held in place while the Insulweb is rolled flat on the opposite side of the wall.

Procedure for Installing Cellulose Insulation in Netted Wall Assemblies

- Poke the end of the two-inch installation wand through the center of the Insulweb. Insert wand to the bottom of the cavity and pull it back a couple of inches. If there are any obstructions, or if the density feels light in any area, the wand will need to be reinserted at different points in the cavity to achieve a uniform density.
- Using a machine capable of steady blower pressures of 3.5 psi or 80 wci, set the air control to maximum and open the feed gate to approximately 50% to achieve an installed density of 3.5 lbs/cuft.
- Begin blowing the first cavity. Retract the wand when the material stops flowing through the hose. Once the hose end reaches the opening in the netting, reinsert the wand to the top of the cavity and repeat as above until the cavity is completely filled, paying special attention to the top corners. The netting will tighten and bulge slightly as the hose is withdrawn. Using the coverage chart below, or National Fiber's Expanded Bag Coverage Chart, confirm bag count per square foot of wall area.

Framing Size	R-Value	Cavity Depth (Inches)	Coverage per Bag (Net SqFt)
2 x 4	13	3.5	24.6
2 x 6	20	5.5	15.2
2 x 8	27	7.5	10.9
2 x 10	35	9.5	8.3
2 x 12	42	11.5	6.7
2 x 14	49	13.5	5.6
2 x 16	57	15.5	4.7

- After blowing, check the density by pressing on the Insulweb with your hand in a number of spots. A properly filled cavity will have the feel of a firm mattress. If voids are observed, or any portion feels soft to the touch, reinsert the tube and add more material.
- Cavities having bulges will need to be rolled along the middle of each assembly with the insulation roller, so they don't interfere with the installation of the drywall.
- Cross bracing can create two separate cavities. Blow each cavity with separate entry holes.
- In overhead applications, the Insulweb should not be left exposed due to the potential for sagging of the fabric over time. It should be covered with drywall immediately after blowing (and rolling, as necessary).

For further information, please contact our Technical Manager, Bill Hulstrunk at technical@nationalfiber.com

Note: Bracketed, bold, italicized items are the National Fiber part numbers used for ordering.

Revised 06/12



NATIONAL FIBER
CEL-PAK INSULATION

Professional Cellulose for Cellulose Professionals

Cel-Pak Class 1 Cellulose Insulation

- SPECIFICATIONS -

National Fiber's Cel-Pak is a high quality, cellulose insulation for dense pack wall and ceiling applications. It is also installed as loose fill in flat attic areas in new construction and retrofit.

Cel-Pak is a premium, all-borate cellulose insulation. It is made almost primarily from over-issue news, which is the highest quality newsprint available. Our paper provides the best quality and fiber length for superior insulation. The quality of this newsprint and the purity and effectiveness of our special, all-borate chemical formulation, carefully blended in our state-of-the-art equipment, provide the optimum density for unsurpassed coverage and performance.

Cel-Pak's long, flexible fibers ensure void-free filling of the space to be insulated by sealing around wiring, plumbing, and other obstacles. This reduces air infiltration and results in a less drafty, more comfortable home.

ADVANTAGES OF CEL-PAK

- Low settled density provides superior coverage,
- Highly efficient thermal barrier (measured in R-value per inch),

**R-value means resistance to heat flow. The higher the R-value, the greater the insulating capacity*

R-Value per inch of blown-in insulation

Cel-Pak	3.8
Rockwool	2.9
Fiberglass	2.2

- Proven energy savings (conserves energy by reducing fuel consumption)
- Permanent fire resistance, with superior flame retardant qualities
- Significant sound barrier and moisture control (enhanced by dense fiber structure and naturally hygroscopic properties of the cellulose fiber)
- Contains no formaldehyde, asbestos or glass fibers
- Very clean (minimal dust)
- Highest recycled content of all common insulating materials, helping to preserve the environment

There are other factors to consider. The amount of insulation you need depends mainly on the climate you live in. In the Northeast, for example, R-38 is recommended for attics. Your energy savings also depend on the type and size of your home, your family size, and your comfort preferences.

To obtain the level of thermal insulation (R-Value) indicated, this insulation must be installed at the coverage rates shown in the chart below. Initial installed thicknesses were determined using a Krendl

2000 machine with shredder. Settings are not adjustable.

Average net weight 25 lbs

Net Coverage - Attics - 25 lbs. - Settled Density 1.40 lbs/cu.ft.					
R-Value @75°F	Initial Installed Thickness (in.)	Minimum Settled Thickness (in.)	Bags Per 1000 sq.ft. No joists	Net Coverage sq.ft./Bag No joists	Minimum Weight lb/sq.ft.
13	4.3	3.8	11.7	85.8	0.29
19	5.9	5.3	19.8	50.5	0.50
22	6.8	6.1	24.0	41.6	0.60
30	9.1	8.1	35.4	28.3	0.88
38	11.4	10.2	46.8	21.4	1.17
49	14.5	13.1	62.6	16.0	1.56
60	17.7	16.0	78.4	12.8	1.96
Net Coverage - Sidewalls - 25 lbs. - Settled Density 3.1 lbs/cu.ft.					
13	2 x 4	3.5	36.2	27.6	0.90
20	2 x 6	5.5	56.9	17.6	1.42

READ THIS BEFORE YOU BUY

What you should know about R-Values. The above chart shows the R-Value of this insulation. R means the resistance to heat flow. The higher the R-Value, the greater the insulating power. Compare insulation R-Values of cellulose with other insulating materials before you buy.

To get the indicated R-Value, it is essential that this insulation be installed properly. If you do it yourself, get instructions and follow them carefully. Instructions do not come with this package.



R & D Services Inc.
Classified
Cel-Pak Cellulose Insulation
Reference File: RDS-LF9256

This product meets the amended CPSC standard for flame resistance and corrosiveness of cellulose insulation.

Cel-Pak is periodically retested by R & D Services to assure compliance with Federal Specifications. In addition, we maintain a fully equipped on-site laboratory for monitoring product quality on a daily basis.

CPSP Standard HH-1-515E; 16CFR 1209

Meets ASTM C739 Class 1/A Building Material

Classified in accordance with the following ASTM C 739 characteristics

Flammability Characteristics

Critical Radiant Flux Greater than or Equal to 0.12 W/cm²
Smoldering Combustion Less Than or Equal to 15.0%

Environmental Characteristics

Corrosiveness Acceptable
Fungi resistance Acceptable

Physical Characteristics

Density (Settled) 1.4 lb/ft³
Thermal Resistance 3.8 R/in. (at 4 in.)

Moisture Vapor Sorption Acceptable
Odor Emission Acceptable



NATIONAL FIBER

Cel-Pak[®] Cellulose Insulation

MATERIAL SAFETY DATA SHEET

EFFECTIVE DATE: December 3, 2009

CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name:	Cel-Pak [®]	MANUFACTURER:	National Fiber
Chemical Formula:	(C ₁₁ H ₁₅ O ₅)•H ₃ BO ₃		50 Depot Street
Chemical Name/Synonyms:	Cellulose Insulation		Belchertown, MA 01007
Chemical Family:	Cellulose Treated With Inorganic Salts		413-283-8747
CAS Registry Number:	Not Established		EMERGENCY PHONE NUMBER:
TSCA Inventory Number:	Not Listed		National Fiber: 800-282-7711

Cel-Pak is a registered trademark of National Fiber

COMPOSITION/INFORMATION ON INGREDIENTS OSHA HAZARDS

Cel-Pak[®] cellulose insulation contains over 82 percent by weight newsprint processed into cellulose fiber, CAS No. 65996-61-4. This product contains less than 17 percent (%) by weight boric acid (H₃BO₃), CAS No. 10043-35-3. Boric acid is added for purposes of superior fire resistance and insecticide properties within the insulation. A small quantity of distillate mineral oil, CAS No. 6471-88-4, is added to the product for dust suppression and enhanced bonding of the fire retardant. Regarding information on the chronic and ecological toxicity of this product, we have reviewed the available medical and toxicological literature for 100% boric acid. Boric acid is hazardous under the OSHA Hazard Communication Standard based on animal chronic toxicity studies.

HAZARD IDENTIFICATION

EMERGENCY OVERVIEW:

Cel-Pak[®] is a gray, odorless cellulosic fiber insulation material. The product is not flammable, combustible, or explosive, and it presents no unusual hazard if involved in a fire. Cel-Pak[®] Insulation has low acute oral and even lower dermal toxicities. Care should be taken to minimize the amount of Cel-Pak[®] Insulation released to the environment to avoid ecological effects.

POTENTIAL ECOLOGICAL EFFECTS:

Large amounts of Cel-Pak[®] cellulose insulation can be harmful to boron-sensitive plants and other ecological systems.

POTENTIAL HEALTH EFFECTS:

Routes of Exposure: Inhalation is the most significant route of exposure in occupational and other settings. Dermal exposure is not usually a concern because Cel-Pak[®] cellulose insulation is not absorbed through intact skin.

Inhalation: Irritation of the nose and throat may occur from the inhalation of Cel-Pak insulation dust at levels greater than 2mg/m³ (ACGIH TLV).

Eye Contact: Eye contact with boric acid or dust associated with Cel-Pak can cause irritation, redness and pain.

Skin Contact: The boric acid in Cel-Pak can cause irritation to damaged skin. Prolonged contact with intact skin can cause dermatitis.

Ingestion: Cel-Pak[®] cellulose insulation is not intended for ingestion. Small amounts (e.g. less than 30mg of boric acid or 150mg of Cel-Pak) swallowed accidentally are not likely to cause effects; swallowing amounts larger than that may cause gastrointestinal symptoms. Also see Signs and Symptoms of Exposure below.

Cancer: Cel-Pak[®] cellulose insulation is not considered a carcinogen.

Signs and Symptoms of Exposure: Symptoms of accidental over-exposure to borate products have been associated with ingestion or by absorption through large areas of damaged skin. These may include nausea, vomiting, diarrhea, drowsiness, rash, headache, decrease in body temperature, reduction in blood pressure, renal (kidney) injury, cyanosis, coma, and death.

FIRST AID MEASURES

Inhalation: Prolonged exposure to dust levels in excess of regulatory limits should always be avoided. If irritation or difficulty in breathing occurs, move to fresh air. Seek medical attention if symptoms persist.

Eye Contact: Use eye wash fountain or fresh water to cleanse eye for several minutes. If irritation persists for more than 30 minutes, seek medical attention.

Skin Contact: In case of broken skin and irritation, wash area with soap and water. If irritation continues seek medical help.

Ingestion: Swallowing less than 30mg of boric acid or 150mg of Cel-Pak insulation is not likely to cause health effects. If larger amounts are swallowed induce vomiting as directed by a physician.

NOTE TO PHYSICIANS: Observation only is required for adult ingestion of a few grams of Cel-Pak[®] cellulose insulation. For ingestion in excess of larger amounts, maintain adequate kidney function and force fluids. Gastric lavage is recommended for symptomatic patients only. Hemodialysis should be reserved for massive acute ingestion or patients with renal failure. Boron analyses of urine or blood are only useful for documenting exposure and should not be used to evaluate severity of poisoning or to guide treatment.

Cel-Pak® Cellulose Insulation MSDS - Page 2

FIRE FIGHTING MEASURES

General Hazard: Cel-Pak® cellulose insulation is not flammable or explosive.

Extinguishing Media: Any fire extinguishing media may be used on nearby fires.

Flammability Classification (CPSC standard HH-1-515E; 16CFR 1209): Non-flammable solid.

Unusual Fire Hazard: None. However, material should not be installed where temperatures may exceed 180°F. Adequate clearance should be maintained around recessed lights, chimneys, and other heat producing equipment as specified in the National Fire Prevention Code.

ACCIDENTAL RELEASE MEASURES

General: Cel-Pak® cellulose insulation contains water-soluble inorganic salts that may cause damage to trees or vegetation by root absorption.

Spills: Vacuum, shovel or sweep up Cel-Pak® cellulose insulation and place in containers for disposal in accordance with applicable local regulations. No personal protective equipment is needed to clean up spills. Cel-Pak® Insulation is a non-hazardous waste when spilled or disposed of, as defined in the Resource Conservation and Recovery Act (RCRA) regulations (40 CFR 261).

HANDLING AND STORAGE

Storage Temperature: Ambient

Storage Pressure: Atmospheric

Special Sensitivity: None known

General: No special handling precautions are required, but dry, indoor storage is recommended. To maintain package integrity, bags should be handled on a "first-in first-out" basis. Good housekeeping procedures should be followed to minimize dust generation and accumulation.

TRANSPORTATION INFORMATION

Cel-Pak® cellulose insulation may be shipped normally as a non-hazardous material.

EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls: Use local exhaust ventilation to keep airborne concentrations of Cel-Pak® cellulose insulation dust below permissible exposure levels.

Personal Protection: Where airborne concentrations are expected to exceed exposure limits, NIOSH certified dust particulate respirators must be used. Eye goggles and gloves are not required for normal industrial exposures, but may be warranted if environment is excessively dusty.

Occupational Exposure Limits: Cel-Pak® cellulose insulation is listed/regulated by OSHA, Cal OSHA as "Particulate Not Otherwise Classified" or "Nuisance Dust".

OSHA: PEL*	15 mg/m ³ total dust and 5 mg/m ³ respirable dust
ACGIH: TLV**	2 mg/m ³
Cal OSHA: PEL*	10 mg/m ³

*PEL="Permissible Exposure Limit"

**TLV-"Threshold Limit Value"

PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Gray, odorless fiber	Boiling Point:	Not Applicable
Specific Gravity:	0.7 compressed	Melting Point:	Not Applicable
Vapor Pressure:	Negligible @ 20°C	Flash Point:	Not Applicable
Solubility in Water:	Fiber is not soluble; Chemical additive is soluble at the rate of 4.7% @ 20° C.	pH:	7.4 (2.0% solution @ 25°C)
		Viscosity:	Not Applicable

Information presented herein has been compiled from sources considered dependable and is accurate and reliable to the best of our knowledge and belief, but it is not guaranteed to be so. Nothing herein is to be construed as recommending any practice or any product in violation of any law or regulation. It is the user's responsibility to determine the suitability of any material for a specific purpose and adopt necessary safety precautions. We make no warranty as to results to be obtained in using any material and, since conditions or use are not under our control, we must necessarily disclaim all liability with respect to use of any material supplied by us.

For more information contact National Fiber: 800-282-7711



INSULWEB NETTING

Model: IW-1125

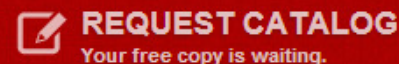
Dimensions:

Height: 10'

Length: 375'

Available: J&R Products

Price: \$226



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Insulweb 10' x 375'

Our Products: [Webbing & Netting](#) > [InsulWeb™](#)



SKU: IW-1125

Insulweb is 100% polypropylene and is ideal for spraying insulation against as well as many other applications. 10' x 375' roll.

This is our strongest spray fabric at 1.5 tensile strength.

Due to the length of the roll, this will ship via semi.

[MSDS](#)

Price: \$226.00

1

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All-1W

Insulweb #90100

Typical Physical Properties

Property	Unit of Measure	Typical Value	Test Method
Content		100% Polypropylene	
Color		White	
Weight	osy	1.25	ASTM D5261
Thickness	mils	12	ASTM D5199
Elongation	%	30.9 60.5	ASTM D5035
Tensile Strength			
Strip	lbs	28.1	ASTM D5035
Wide Width	lbs	115.7	ASTM D4595
Grab	lbs	52.6	ASTM D4632
Trap Tear Strength	lbs	23.6	ASTM D4533
Puncture Strength	lbs	14.75	ASTM D4833
Apparent Opening Size	mm	.768	ASTM D4751
Flow Rate @ 2" Head	gals/min/ft ²	319	ASTM D4491
Air Permeability	cfm	692	ASTM D737-961
Light Penetration	%	76.8	ASTM D6567
UV Resistance (Strength after 500 hrs)	%	91	ASTM D4355
Specific Gravity		.91	
Melting Point	°C	165	

Reviewed
03-14-2012

The information presented herein, while not guaranteed, is to the best of our knowledge true and accurate. Except when agreed to in writing for specific conditions of use, no warranty or guarantee expressed or implied is made regarding the performance of any product, since the manner of use and handling are beyond our control. Nothing contained herein is to be construed as permission or as a recommendation to infringe any patent. This information reflects typical properties and should not be considered as specifications.

Issue Date: 3/24/2009

Material Safety Data Sheet

Section 1 - Chemical Product and Company Identification

Product: Insulweb
Chemical Family: Thermoplastic Polyolefin

Emergency Phone Contact: Chemtrec (24 Hours)
Emergency Phone Number: 1-800-424-9300

Section 2 – Hazards Identification

Emergency Overview

None of the components in this material are considered hazardous.

Route of Exposure-Skin

Possible mechanical irritation.

Route of Exposure-Eye

Not expected to be a concern, given that this product is an inert solid.

Route of Exposure -Ingestion

Not Applicable

Route of Exposure-Inhalation

Not expected to be a concern, given that this product is an inert solid.

HMS Ratings*

Health: 0 Fire: 1 Reactivity: 0 Personal Protection: A

*See Section 16

Section 3 - Composition

CAS #	Component	Percent
9003-07-0	Polypropylene	100%

Component Information: This product is not hazardous according to the criteria specified in 29CFR 1910.1200 (Hazard Communication Standard). This product is considered an article and does not require an MSDS.

Issue Date: 3/24/2009

Section 4 - First Aid Measures

First Aid-Skin

Wash affected area with soap and water.

First Aid-Eye

Rinse eyes with water for at least 15 minutes. If irritation persists, contact a physician.

First Aid-Ingestion

Not Applicable

First Aid-Inhalation

Not Applicable

First Aid-Notes to Physician

No health conditions aggravated by exposure are identified. Contact the poison control center if any problem occurs.

Section 5 - Fire Fighting Measures

Flash Point: >329°C(625°F)

Method Used: Not Applicable

Auto Ignition: >357°C(675°F)

Flammability Classification: Not Applicable

Lower Explosive Limit (%): Not Applicable

Upper Explosive Limit (%): Not Applicable

General Fire Hazards

Solid material may burn upon extended exposure to open flames.

Hazardous Combustion Products

Upon decomposition this product may emit carbon dioxide, carbon monoxide and/or low molecular weight hydrocarbons.

Extinguishing Media

Water spray, foam, carbon dioxide, or dry chemical

Fire Fighting Equipment/Instructions

As in any fire, wear a self-contained breathing apparatus and full protective gear.

NFPA Ratings*

Health: 0 Fire: 1 Reactivity: 0

*See Section 16

Section 6 - Accidental Release Measures

Containment Procedures

Sweep waste fabric into a pile.

Clean-Up Procedures

Sweep waste fabric into a waste container and recycle, incinerate or landfill in conformity with local disposal regulations.

Evacuation Procedures

Not Applicable

Special Procedures

None

Section 7 - Handling and Storage

Handling Procedures

Avoid exposure to heat, sparks or open flames.

Issue Date: 3/24/2009

Storage Procedures

Store material in cool (below 140°F) warehouse that is equipped with a sprinkler system.
Ensure product is not stacked too high.
Store product off the floor to prevent water damage.

Section 8 - Exposure Controls/Personal Protection

Component Exposure Limits

Component	CAS	Exposure Limits
Polypropylene	9003-07-0	ACGIH: None Available OSHA: None Available

Engineering Controls

Normal room ventilation is usually adequate.

Personal Protective Equipment

Personal Protective Equipment-Eyes/Face

None usually required

Personal Protective Equipment-Skin

None usually required

Personal Protective Equipment-Respiratory

None usually required

Personal Protective Equipment-General

Follow individual plant safety rules.

Section 9 - Physical & Chemical Properties

Appearance:	White Fabric	Odor:	Essentially Odorless
Physical State:	Solid	pH:	Not Applicable
Vapor Pressure:	NIL	Evaporation Rate:	Not Applicable
Boiling Point:	Not Applicable	Melting Point:	>140°C
Solubility (H₂O):	Negligible	Specific Gravity:	0.88-0.99
Vapor Density:	Not Applicable	Percent Volatiles:	NIL
Packing Density:	Not Applicable		

Section 10 - Chemical Stability & Reactivity Information

Chemical Stability

Stable under ordinary conditions of use and storage.

Conditions to Avoid

Combustible when exposed to open flames.

Incompatibility

None Known

Hazardous Decomposition

Carbon monoxide, carbon dioxide and/or low molecular weight hydrocarbon may be emitted upon decomposition.

Hazardous Polymerization

Will not occur.

Issue Date: 3/24/2009

Section 11 - Toxicological Information

Acute and Chronic Toxicity

General Product Information

No components of this product are known to be hazardous according to the criteria specified in 29CFR1910.1200 (Hazard Communication Standard).

Component Analysis

Component	CAS	LD50/LC50
Polypropylene	9003-07-0	<p><u>Rat</u>; <u>LD 50</u>; <u>Route</u>: Intraperitoneal; <u>Dose</u>: >110mg/kg; <u>Toxic Effects</u>: lacrimation; Sense organs and special senses-ptosis; Behavioral-convulsions or effect on seizure threshold; <u>Reference</u>: Yakuri to Chiryo. Pharmacology and Therapeutics 14:1109, 1986</p> <p><u>LD50</u>; <u>Route</u>: Intravenous; <u>Dose</u>: >99mg/kg; <u>Toxic Effects</u>: Behavioral-tremor; Lungs, Thorax, or Respiration-cyanosis; Nutritional and Gross Metabolic-body temperature decrease; <u>Reference</u>: Yakuri to Chiryo. Pharmacology and Therapeutics 14:1109, 1986.</p>

Carcinogenicity

General Product Information

Product is considered non-hazardous.

Epidemiology

No information available.

Neurotoxicity

No information available.

Mutagenicity

No information available.

Teratogenicity

No information available.

Other Toxicological Information

Specific toxicity testing has not been performed on this product. Hazard evaluation is based on information from similar products, raw material data, and technical literature.

Section 12 - Ecological Information

Ecotoxicity

General product Information

No available information.

Environmental Fate

No available information.

Section 13 - Disposal Considerations

US EPA Waste Number & Descriptions

General Product Information

None identified.

Issue Date: 3/24/2009

Component Waste Numbers

No EPA Waste Numbers are applicable for this product's components

Disposal Instructions

Dispose of container and unused contents in accordance with federal, state and local requirements. Processing, use or contamination of this product may change the waste management options.

Section 14 - Transportation Information

Transportation Regulations

Product is not regulated for transportation.

Section 15 - Regulatory Information

US Federal Regulations

General Product Information

This material meets the criteria of 21CFR177.1520 of the FDA food contact regulations.

Component Analysis-Federal

Component	CAS #	SARA 302 (40CFR355 Appx A)	SARA 313 (40CFR372.65)	CERCLA (40CFR302.4)
Polypropylene	9003-07-0	No	No	No

State Regulations

General Product Information

Other state regulations may apply. Check individual state requirements.

Component Analysis-State

The following components appear on one or more of the following state hazardous substances list:

Component	CAS	CA	FL	MA	MN	NJ	PA
Polypropylene	9003-07-0	No	No	No	No	No	No

Component Analysis-WHMIS IDL

No components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List.

Additional Regulatory Information

Component Analysis-Inventory

Component	CAS	TSCA	DSL	EINECS
Polypropylene	9003-07-0	Yes	Yes	Yes (6-402)

Issue Date: 3/24/2009

Section 16 - Other Information

Other Information

Material for this MSDS was taken from MSDS's for raw materials

PERSONAL PROTECTION EQUIPMENT (PPE)

Personal Protection Equipment Code	Personal Protection Equipment
A	safety glasses
B	safety glasses and gloves
C	safety glasses, gloves and an apron
D	face shield, gloves and an apron

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM (HMIS) / NATIONAL FIRE PROTECTION AGENCY (NFPA)

Hazard Scale for HMIS / NFPA	HMIS / NFPA Explanation
0	Minimal
1	Slight
2	Moderate
3	Serious
4	Severe
*	Used by HMIS to depict a Chronic Hazard (designate a material as a carcinogen or for materials known to have an adverse effect given chronic exposure)

MSDS History

Format revised 10/03; Typographical errors corrected 1/10/05; Corrections made to Section 9 2/25/05; Updated contact information 8/29/05; Updated information and changed name 11/29/06; Updated formatting 6/22/07; Change contact name 8/13/07; Updated contact information and date 02/09/09; Add information about PPE/HMIS/NFPA 3/24/09

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This information and the product are furnished on the condition that the person receiving them shall make his or her own determination as to the suitability of the product for his particular purpose and on the condition that they assume the risk of his use thereof.

THIS PRODUCT IS CONSIDERED AN ARTICLE AND DOES NOT REQUIRE A MATERIAL SAFETY DATA SHEET (MSDS).



ROXUL TOP ROCK DD MINERAL WOOL INSULATION

Model: DD Plus

Location: Roof

Dimensions:

Length: 48"

Width: 48"

Thickness: 2"

Moisture Sorption: 0.15%

Compressive Strength (at 25%): 15 psi

General Product Information:

ROXUL[®] products are mineral wool fiber insulations made from basalt rock and slag. This combination results in a non-combustible product with a melting point of approximately 2150°F (1177°C), which gives it excellent fire resistance properties. ROXUL mineral wool is a water repellent yet vapor permeable material.

Description & Common Applications:

ROXUL TopRock[®] DD is a rigid mineral wool insulation board with a rigid upper surface for durability and enhanced strength. It is intended for commercial and industrial roof insulation applications and is suitable for both new building and re-roofing applications. TopRock[®] DD is intended for use with mechanically fastened or ballasted traditional and single ply membranes.

Compliance and Performance:

ASTM C 726	Standard Specification for Mineral Fiber Roof Insulation Boards	Complies
FM Approvals 4450/4470	Approval Standard for Single-Ply, Polymer-Modified Bitumen Sheet, Built-Up Roof (BUR) and Liquid Applied Roof Assemblies for use in Class 1 and Noncombustible Roof Deck Construction	Complies
FM Approvals 4470	NCC – (Noncombustible Core) Rated Roof Insulation	Complies
Fire Performance:		
NFPA 276	Standard Method of Fire Test for Determining the Heat Release Rate of Roofing Assemblies with Combustible Above-Deck Roofing Components	Class 1
CAN4-S114	Non-Combustibility in Building Materials	Non-Combustible
CAN/ULC-S107-03	Fire Tests of Roof Coverings	Class A
CAN/ULC-S126-06	Fire Spread Under Roof Deck Assemblies	Construction C7, C18, C28, C38
ASTM E 84 (UL 723)	Surface Burning Characteristics	Flame Spread = 0 Smoke Developed = 0
CAN/ULC S102	Surface Burning Characteristics	Flame Spread = 0 Smoke Developed = 5
UL 790 (ASTM E108)	Standard Test Methods for Fire Tests of Roof Coverings	Class A
UL 263 (ASTM E119)	See UL Roofing and Materials Directory for Assembly Details Fire Tests of Building Construction and Materials See UL Fire Resistance Directory at the following link for assembly details: http://database.ul.com/cgi-bin/XYV/template/LISCANADA/1FRAME/index.html P004, P213, P214, P225, P228, P230, P237, P238, P242, P245, P250, P254, P259, P404, P409, P501, P502, P504, P506, P508, P510, P512, P514, P701, P708, P710, P711, P718, P729, P732, P734, P735, P737, P740, P801, P810, P815, P828, P904, P909, P912, P915.	

Dimensional Stability:

ASTM C 356	Linear Shrinkage 24 Hrs. @ 1200°F (650°C)	0.71 %
ASTM D 2126	Linear change 7 days @ 40°F (-40°C) ambient RH	0.1 %
	Linear change 7 days @ 200°F (93°C) ambient RH	0.1 %
	Linear change 7 days @ 158°F (70°C) 97% RH	0.0 %

Hail Performance:

FM 4470	Test Standard for Susceptibility to Hail Damage	Class 1 – SH (Severe Hail)
FM 4473	Impact Resistance by Impacting with Freezer Ice Balls	Class 4
UL 2218	Impact Resistance of Prepared Roof Covering Materials	Class 4

Moisture Resistance:

ASTM C 1104	Water Vapor Sorption	0.15%
ASTM E 96	Water Vapor Transmission, Desiccant Method	2330 ng/Pa.s.m ² (41 Perm)
ASTM C 209	Water Absorption	<1.0%

Thermal Resistance:

ASTM C 518 (C 177)	Mean Temperature	R-value/inch	RSI value/25.4 mm
	25°F (-4°C)	4.3 hr. ft ² .F/Btu	0.74 m ² /K/W
	40°F (4°C)	4.2 hr. ft ² .F/Btu	0.72 m ² /K/W
	75°F (24°C)	3.8 hr. ft ² .F/Btu	0.68 m ² /K/W
	110°F (43°C)	3.6 hr. ft ² .F/Btu	0.64 m ² /K/W

Corrosive Resistance:

ASTM C 885	Corrosiveness to Steel	Non-corrosive
ASTM C 795 ***	Stainless Steel Stress Corrosion Specification as per Test Methods C871 and C892: U.S. Nuclear Regulatory Commission, Reg. Guide #1.36: U.S. Military Specifications MIL-I-24244 (all versions including B and C)	Non-corrosive

Acoustical Performance:

ASTM C423		CO-EFFICIENTS AT FREQUENCIES					
Thickness	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	NRC
2.0"	0.50	0.71	0.85	0.90	0.96	1.01	0.85

STC Values: Contact Roxul for further details

Compressive Strength:

ASTM C 165	at 10%	20 psi	(140 kPa)
(Top Layer)	at 25%	37 psi	(250 kPa)

Entire Board	at 10%	11 psi	(75 kPa)
	at 25%	15 psi	(105 kPa)

Point Load @ 5mm compression 30 psi (205 kPa)
EN 12430

Density:

ASTM C 612-09 – Actual		
Top Layer	13.75 lbs/ft ³	220 kg/m ³
Bottom Layer	10.0 lbs/ft ³	160 kg/m ³
Formed as a monolithic structure		

Dimensions:

48" (width) x 48" (length)
1219 mm (width) x 1219 mm (length)

Thickness:

Product thickness is available in 2" to 6" with 1/2" increments

For additional sizes, please contact Roxul at 1-800-265-6878



Note: As ROXUL Inc. has no control over installation design and workmanship, accessory materials or application conditions, ROXUL Inc. does not warranty the performance or results of any installation containing ROXUL Inc's. products. ROXUL Inc's. overall liability and the remedies available are limited by the general terms and conditions of sale. This warranty is in lieu of all other warranties and conditions expressed or implied, including the warranties of merchantability and fitness for a particular purpose.

Key Application Qualifiers:

- Does not require cover board
- Will not promote blistering
- Does not off gas
- Will not warp or cup
- Dimensionally stable
- High impact resistance
- Low moisture sorption
- Non-corrosive
- Fire resistant
- Made from natural & recycled materials

Limitations:

This product should not be exposed to weather during shipment, storage or installation. At the completion of a day's work, all exposed edges should be temporarily sealed by lapping roof membrane over them. The products are not intended for use as a structural roof deck or for use under heavy traffic areas.

On-Site Storage:

The factory packaging is intended for the protection of the insulation boards during transit and is not intended for job site protection against the elements. When product is stored outdoors, the plastic shroud must be slit and the insulation protected by a waterproof, breathable covering such as a tarpaulin. Insulation must be stored minimum 4 in. (102mm) above ground and kept on a solid flat surface.

Other ROXUL Products:

Please consult ROXUL for all your insulation needs. We have an extensive range of products for all applications from pipe insulation to commercial products to residential batts. ROXUL invites all inquiries and will act promptly to service all of your requirements.

***Provisions for lot testing may be required, consult manufacturer.

1. Identification:

- 1.1 Product Generic Name: Mineral Wool Insulation
- 1.2 Product Use: Commercial, Industrial and Residential Insulation
- 1.3 Products:
CavityRock®, ConRock®, CurtainRock®, Roxul DrainBoard®, Enerwrap®, Flexibatt®, RHM™, RHT®, AFB®, RoxulPlus®, RW®, Roxul Safe®, Roxul Safe'n'Sound™, Techton® 1200, Techton® 1200 Marine, TopRock®, SturdiRock®, Roxul FireWall™, RockBoard™
- 1.4 Company Address:
Roxul Inc.
551 Harrop Drive
Milton, Ontario
Canada
L9T 3H3
- 1.5 Web Site: www.roxul.com
- 1.6 If further information is required, please call or fax Roxul Inc.
Telephone: 1-800-265-6878 or 905-878-8474 Fax: 905-878-8077
-

2. Information on Ingredients:

<u>Ingredient Name</u>	<u>CAS Number</u>	<u>%</u>
Mineral Fiber	RN 65997-17-3	94-99
Cured Urea Extended Phenolic Formaldehyde Binder	25104-55-6	1-6

3. Hazards Identification:

- 3.1 Appearance and Odor: Grey, green fibrous batt or board.
- 3.2 Emergency Overview: Acrid smoke may be generated during a fire.
Exposure to dust may be irritating to the eyes, nose and throat.
- 3.3 Potential Health Effects:
- 3.3.1 Inhalation: Temporary mechanical irritation of the upper respiratory tract (scratchy throat, coughing, congestion) may result from exposures to dusts and fibers in excess of applicable exposure limits.
- 3.3.2 Skin Contact: Dusts and fibers may cause temporary mechanical irritation (itching) or redness to the skin.
- 3.3.3 Eye Contact: Dusts and fibers may cause temporary mechanical irritation (itching) or redness to the eyes.
- 3.3.4 Ingestion: Ingestion of this product is unlikely and not intended under normal conditions of use. Ingestion of this product may cause gastrointestinal irritation.
- 3.3.5 Existing Medical Conditions: Pre-existing chronic eye, skin and respiratory conditions may temporarily worsen due to exposure to dusts and fibers.
-

4. First-Aid Measures:

- 4.1 **Inhalation:** If irritation occurs, remove the affected person to fresh air. Drink water, and blow nose, to clear dusts and fibres from throat and nose. If irritation persists, consult a physician.
- 4.2 **Skin:** If irritation occurs, do not rub or scratch. Rinse under running water prior to washing with mild soap and water. Use a washcloth to help remove fibres. If irritation persists, consult a physician.
- 4.3 **Eyes:** If irritation occurs, flush eyes with plenty of water for at least 15 minutes. Do not rub the eyes. Consult a physician if irritation persists.
- 4.4 **Ingestion:** Ingestion of this product is unlikely and not intended under normal conditions of use. If it does occur, rinse mouth with plenty of water to help remove dust and fibres, and drink plenty of water to help reduce potential gastrointestinal irritation. Do not induce vomiting unless directed to do so by a physician.
-

5. Fire-Fighting Measures:

The products are non-combustible and do not pose a fire hazard. However, packaging material may burn.

- | | |
|--|---|
| 5.1. Suitable extinguishing media: | Water, foam, carbon dioxide or dry powder |
| 5.2. Extinguishing media which must not be used for safety reasons: | None |
| 5.3. Combustion products: | Carbon dioxide, carbon monoxide and trace gases |
| 5.4. Special protective equipment for fire-fighters: | Observe normal fire fighting procedures |
| 5.5. Flash point: None | Flash Point Method Used: Not Applicable |
| Upper Flammable Limit (UFL): Not Applicable | Lower Flammable Limit: Not Applicable |
| Autoignition: Not Applicable | Explosive Properties: Not Applicable |
-

6. Accidental Release Measures:

- 6.1 **Containment Procedures:** Pick up large pieces and scoop up dusts and fibers after they have settled out of air. These materials will disperse and settle along the bottom of waterways and ponds. It cannot easily be removed once it is waterborne, but is considered non-hazardous in water.
- 6.2 **Cleanup Procedures:** Use OSHA-recommended work practices and protective equipment as described in Section 8 of this Material Safety Data Sheet. Avoid generating airborne dusts and fibers during cleanup. Do not use compressed air. Vacuum dusts and fibers. Place material in an appropriate container for disposal as non-hazardous waste.
- 6.3 **Response Procedures:** Isolate area. Keep unnecessary personnel away. If dry methods or compressed air are used to collect dusts and fibers, all personnel in the area should wear OSHA-approved protective equipment (see Section 8 of this Material Safety Data Sheet).
-

7. Handling and Storage:

7.1 General Precautions:

- Utilize OSHA-recommended work practices and protective equipment when using the products (see Section 8 of this Material Safety Data Sheet).

7.2 Handling:

- Unpack material at application site to avoid unnecessary handling of product.
- Keep work areas clean. Avoid unnecessary handling of scrap material and debris by placing such materials in suitable containers, which should be kept as close to the work area as possible.
- Ensure good ventilation. Local exhaust ventilation may be required if the method of use produces dust levels which exceed applicable exposure limits (see Section 8 of this Material Safety Data Sheet).
- Avoid excessive eye and skin contact with dusts and fibers.
- Use recommended cleanup procedures to avoid buildup of dusts and fibers in the work area.

7.3 Storage:

- Keep material in original packaging until it is to be used.
- Store material to protect against adverse conditions including precipitation.

8. Exposure Controls/Personal Protection:

8.1 Exposure Guidelines:

8.1.1 General Product Information: Follow all applicable exposure limits. Local regulations may apply. Roxul recommends that users of the products adhere to the OSHA-recommended PEL of 1 f/cc TWA (fibers longer than 5 µm with diameters less than 3 µm). This recommended PEL, together with recommended work practices and personal protective equipment, were adopted in a Health and Safety Partnership Program (HSPP) agreement in 1999 between OSHA and the North American Insulation Manufacturers Association (NAIMA), of which Roxul is a member. Adherence to the OSHA-recommended PEL, work practices and protective equipment in the HSPP is expected to provide appropriate protection against all inhalation-related health risks that may be associated with exposures to mineral wool fibers (ACGIH 1997; NAIMA 1999; OSHA 1999; National Research Council 2000, IARC 2001), and to minimize eye and skin irritation.

8.1.2 Component Exposure Limits:

<u>Source</u>	<u>Legal or Recommended Exposure Limit</u>	<u>Exposure</u>
OSHA	1 f/cc TWA (recommended)	Synthetic Vitreous Fibers, > 5 µm length, < 3 µm diameter
ACGIH	1 f/cc TWA (threshold limit value - TLV)	Synthetic Vitreous Fibers, > 5 µm length, < 3 µm diameter
OSHA	15 mg/m ³ TWA-PEL (total particulate) 5 mg/m ³ TWA-PEL (respirable particulate)	Inert dust and particulates not otherwise regulated
ACGIH	10 mg/m ³ TWA-TLV (inhalable particulate) 3 mg/m ³ TWA-TLV (respirable particulate)	Particulates not otherwise classified, containing no asbestos and <1% crystalline silica

- 8.2 Equipment and Work Practices: Follow OSHA-recommended equipment and work practices. A complete copy of these practices can be obtained from Roxul Inc. (see Section 1 of this Material Safety Data Sheet), and is available on the OSHA website (<http://www.osha.gov/SLTC/syntheticmineralfibers>).
- 8.2.1 Follow OSHA-recommended safe handling practices listed in Section 7.2 above.
- 8.2.2 Where feasible, general dilution ventilation or local exhaust ventilation should be used as necessary to maintain exposures below applicable exposure limits. Dust collection systems should be used in cutting or machining operations and may be needed when using power tools.
- 8.2.3 Follow OSHA-recommended work practices when fabricating, installing or removing product.
- 8.3 Personal Protective Equipment:
- 8.3.1 Respiratory:
- 8.3.1.1 General:
If dust levels exceed applicable exposure limits, wear a NIOSH certified dust respirator with an efficiency rating of N95 or higher. Use disposable face masks complying with NIOSH respirator standards, such as a 3M Model 8210 (or 8710) (3M Model 9900 in high humidity environments) or equivalent. For exposures up to five times the established exposure limits use a quarter-mask respirator, rated N95 or higher; and for exposures up to ten times the established exposure limits use a half-mask respirator (e.g. MSA's DM-11, Rascal's Delta N95, 3M's 8210), rated N95 or higher. For exposures up to 50 times the established exposure limits use a full-face respirator, rated N99 or higher.
- 8.3.1.2 Specific Operations:
Wear a NIOSH certified dust respirator with an efficiency rating of N95 or higher, such as a 3M Model 8210 (or 8710) (3M Model 9900 in high humidity environments) or equivalent, when fabricating, installing or removing product.
- 8.3.2 Skin:
Wear loose fitting, long sleeved and long-legged clothing to prevent irritation. A head cover is also recommended, especially when working with material overhead. The use of suitable gloves is also recommended. Skin irritation cannot occur if there is no contact with the skin. Do not tape sleeves or pants at wrists or ankles. Remove fibers from the work clothes, before leaving work to reduce potential skin irritation. If working in a very dusty environment it is advisable to shower and change clothes
- 8.3.3 Eyes/Face:
Wear safety goggles or safety glasses with side shields.

9. Physical and Chemical Properties:

- | | |
|------------------------------------|-----------------------------------|
| 9.1 <u>Appearance:</u> | Grey, green fibrous batt or board |
| 9.2 <u>State:</u> | Solid |
| 9.3 <u>Odor:</u> | May have slight resin odour |
| 9.4 <u>Boiling point:</u> | n.a. |
| 9.5 <u>Melting point:</u> | Approximately 2150 °F (1177 °C) |
| 9.6 <u>Vapour pressure:</u> | n.a. |
| 9.7 <u>Vapour Density:</u> | n.a. |
| 9.8 <u>Specific Gravity:</u> | n.a. |
| 9.9 <u>Evaporation Rate:</u> | n.a. |
| 9.10 <u>Freezing Point:</u> | n.a. |
| 9.11 <u>Viscosity:</u> | n.a. |
| 9.12 <u>Solubility:</u> | Insoluble (H ₂ O) |
| 9.13 <u>Partition coefficient:</u> | n.a. |

n.a. = not applicable

Material Name: Mineral Wool Insulation

10. Stability and Reactivity:

- 10.1 Stability: Stable
- 10.2 Reactivity: Not reactive
- 10.3 Thermal decomposition products:
Primary combustion products of the cured urea extended phenolic formaldehyde binder, when heated above 390 °F (200 °C), are carbon monoxide, carbon dioxide, ammonia, water and trace amounts of formaldehyde. Other undetermined compounds could be released in trace quantities. Emission usually only occurs during the first heating. The released gases may be irritating to the eyes, nose and throat during initial heat-up. Use appropriate respirators (air supplied) particularly in tightly confined or poorly ventilated areas during initial heat-up.
- 10.4 Hazardous Polymerization: Will not occur
- 10.5 Incompatible Materials: This product reacts with hydrofluoric acid.
-

11. Toxicological Information:

- 11.1 Acute Toxicity:
Coarse fibers and dust from mineral wool products can cause temporary mechanical irritation (itching, redness) of the skin, and of the mucous membranes in the eyes and in the upper respiratory tract (nose and throat). The itching and possible inflammation are a mechanical reaction to dust and coarse fibers (of more than about 5 µm in diameter), and are not damaging in the way chemical irritants may be. They generally abate within a short time after the end of exposure. When products are handled continually, the skin itching generally diminishes.
- 11.2 Chronic Toxicity:
- 11.2.1 Summary: In October 2001, IARC completed a re-evaluation of respirable mineral wool fibers and classified them in Group 3 (not classifiable as to their carcinogenicity to humans). A summary of the most important scientific studies appears below:
- 11.2.2 Human Data:
- 11.2.2.1 The possible carcinogenic effects of exposure to mineral wool fibers has been evaluated in a number of epidemiological (human) studies. Most of this research, including large long-term studies of mineral wool production workers in the U.S. and Europe, has been sponsored or supported by the North American and International thermal insulation industries, including Roxul Inc. Published reports of the early results of these studies identified significantly elevated rates of respiratory cancer in several subcohorts of the worker populations under evaluation (e.g., Simonato et al. 1987; Enterline et al. 1987). However, the studies had several methodological limitations, including failure to control for confounding exposures to other possible causes of the elevated cancer risk, including tobacco use and occupational exposures to recognized carcinogens such as asbestos. For these reasons, the authors of these reports did not interpret the results as establishing an association between exposure to mineral wool fibers and an increased risk of cancer. Several of these earlier reports formed part of the basis for IARC's previous classification of mineral wool fibers in Group 2B (possibly carcinogenic to humans) (IARC 1987).
- 11.2.2.2 Follow-up studies, including case-control studies designed to exclude the contribution of confounding exposures to the cancer experience of the study populations, found no evidence that mineral wool fibers are associated with an increased cancer risk (Marsh et al. 1996; Wong, et al. 1991; Kjaerheim et al. 2001). In announcing the new Group 3 classification for mineral wool fibers, IARC stated: "Epidemiologic studies published during the 15 years since the previous IARC Monographs review of these fibers in 1988 provide no evidence of increased risks of lung cancer or of mesothelioma (cancer of the lining of the body cavities) from occupational exposures during manufacture of these materials" (IARC 2001).
- 11.2.3 Animal Data:
- 11.2.3.1 Several studies of intraperitoneal injection of high doses of mineral wool fibers have produced significant increases in the incidence of mesothelioma (IARC 2002). The intraperitoneal injection studies formed part of the basis for IARC's previous (IARC 1987) Group 2B classification for mineral wool fibers. Leading scientists agree that intraperitoneal injection studies (i.e., surgical implantation or injection into the chest or abdomen) are the least relevant type of animal study for evaluating potential human risk for fiber exposures, because such studies bypass the animals' natural defense mechanisms and involve a type and pattern of exposure (implantation of a high dose early in life) that

does not mimic human patterns of exposure (inhalation of much lower doses over a lifetime) (National Research Council 2000).

11.2.3.2 A well-designed long-term inhalation study in rats exposed to mineral wool fibers found no significant increase in lung tumor incidence, and no mesotheliomas (IARC 2002). Likewise, in two intratracheal instillation studies of mineral wool fibers, no significant increase in the incidence of lung tumors or mesotheliomas was found (IARC 2002). Inhalation studies are regarded as the most relevant type of animal data for evaluating potential human risk, and intratracheal instillation studies, while less relevant, are considered valuable for the initial screening of fibrous compounds (National Research Council 2000). Thus, evaluating all the available animal studies in conjunction with the human data, IARC's most recent review finds "inadequate evidence overall for any cancer risk" from mineral wool fibers (IARC 2001).

11.3 Evaluations of Potential Carcinogenicity:

<u>Source</u>	<u>Classification</u>	<u>Description</u>
IARC	Group 3	Not Classifiable as a Human Carcinogen
ACGIH	Group A3	Confirmed Animal Carcinogen with Unknown Relevance to Humans

12. **Ecological Information:**

- 12.1 Ecotoxicity: No data available for the products. The products are stable, are not expected to cause harm to animals, plants or fish, and have no other known adverse environmental effects.
- 12.2 Environmental Fate: No data available for the products.

13. **Disposal Considerations:**

13.1 US EPA Waste Number & Descriptions:

13.1.1 General Product Information: The products, as supplied, are not expected to be a characteristic hazardous waste under RCRA if discarded.

13.1.2 EPA Waste Numbers: No EPA Waste Numbers are applicable for this product's components.

- 13.2 Disposal Instructions: Product is not considered a hazardous waste. Dispose of waste material according to Federal, State, Provincial, and Local environmental regulations.

14. **Transport Information:**

- 14.1 General: No special precautions.
- 14.2 US DOT Information: This product is not classified as a hazardous material for transport.

15. **Regulatory Information:**

15.1 U.S. Regulations:

15.1.1 Toxic Substances Control Act (TSCA): All components in this product are listed, as required, on the US EPA TSCA inventory, or are not required to be listed

15.1.2 CERCLA: Includes mineral fiber emissions from facilities manufacturing or processing glass rock or slag fibers (or other mineral derived fibers) of average diameter 1 micrometer or less; Statutory RQ = 1 pound (.454 kg); no final RQ is being assigned to the generic or broad class (related to Fine mineral fibers).

15.1.3 Clean Air Act: Mineral wool fiber appears on the Clean Air Act-1990 Hazardous Air Pollutants List.

- 15.2 State and Local Regulations: State, Provincial, and Local regulations not identified in this Material Safety Data Sheet may apply.
- 15.3 WHMIS: The products have been classified in accordance with the hazard criteria of the Controlled Product Regulations and this Material Safety Data Sheet contains all the information required by the Controlled Product Regulations
- 15.3.1: WHMIS IDL: No components are listed on the IDL.
- 15.3.2: WHMIS Classification: No components are classified as controlled products.
-

16. Further Information:

16.1 Potential Health Effects:

IARC Monograph Man-made Vitreous Fibres, press release October 2001

Safety in the Use of Mineral and Synthetic Fibers, Occupational Safety and Health Series. International Labor Office (ILO).

Information about "Health and Safety Research on Rock and Slag-wool" can be obtained from the North American Insulation Manufacturers Association (NAIMA), 44 Canal Center Plaza, Suite 310, Alexandria, VA 22314, USA). Home-page: <http://www.naima.org>

16.2 Key/Legend:

ACGIH = American Conference of Governmental Industrial Hygienists; CAA = Clean Air Act; CAS = Chemical Abstracts Service; CERCLA = Comprehensive Environmental Response, Compensation and Liability Act; DOT = Department of Transportation; EPA = Environmental Protection Agency; HMIS = Hazardous Material Identification System; HSPP = Health and Safety Partnership Program; IARC = International Agency for Research on Cancer; MSDS = Material Safety Data Sheet; NAIMA = North American Insulation Manufacturers Association; NEPA = National Fire Protection Association; NIOSH = National Institute for Occupational Safety and Health; OSHA = Occupational Safety and Health Administration; PEL = Permissible Exposure Limit; RCRA = Resource Conservation and Recovery Act; RQ = Reportable Quantity; SVF = synthetic vitreous fibers; TSCA = Toxic Substance Control Act; TWA = time-weighted average; WHMIS = Workplace Hazardous Materials Information System.

16.3 References: Complete citations, or copies, of all references cited in this Material Safety Data Sheet can be obtained from Roxul Inc. (see Section 1).

16.4 Accuracy: The information contained herein is based upon data considered to be accurate. However, no warranty is expressed or implied regarding the accuracy of these data, the results to be obtained from the use thereof, or that any such use will not infringe upon any patent. This information is furnished as a guide only and upon the condition that the person receiving it shall make tests to determine the accuracy and suitability for his or her own purpose.



ROXULCOMFORT BOARD IS

Location: Exterior Walls

Dimensions:

Width: 24'

Length: 48'

Thickness: 2"

General Product Information:

ROXUL® products are mineral wool fibre insulations made from basalt rock and slag. This combination results in a non-combustible product with a melting point of approximately 2150°F (1177°C), which gives it excellent fire resistance properties. ROXUL mineral wool is a water repellent yet vapour permeable material.

Description & Common Applications:

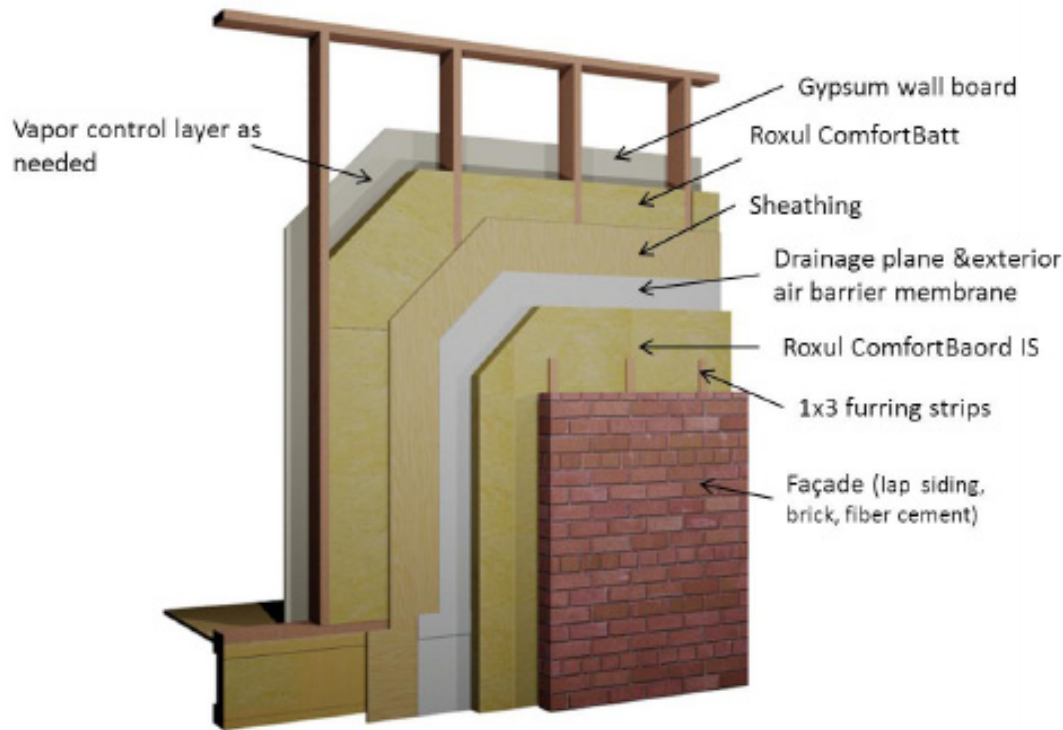
The ComfortBoard™ IS product is a rigid mineral wool insulation sheathing board that is non-combustible, water repellent, fire resistant and sound absorbent. This product is exterior non-structural insulation sheathing for high performance residential wall systems.

Compliance and Performance:

ASTM C 812 CANULG-S702	Mineral Fiber Block and Board Thermal Insulation Mineral Fibre Thermal Insulation for Buildings	Type III, Complies Type 1, Complies
Fire Performance:		
ASTM E 138 CANULG S114 ASTM E 84 (UL 723)	Behaviour of Materials at 750°C (1382°F) Test for Non-Combustibility Surface Burning Characteristics	Non-Combustible Non-Combustible Flame Spread = 5 Smoke Developed = 10
CANULG S102	Surface Burning Characteristics	Flame Spread = 5 Smoke Developed = 10
Moisture Resistance:		
ASTM C 1104	Moisture Sorption	0.05%
Water Vapour Permeance:		
ASTM E 91	Water Vapour Transmission, Desiccant Method	1788 ng/Pa.s.mg (30.9 perm)
Fungi Resistance		
ASTM C1338	Determination of Fungi Resistance	Passed
Thermal Resistance:		
ASTM C 518 (G 177)	R-value/inch @ 75°F RSI value/25.4 mm @ 24°C	4.0 hr·ft ² ·F/Btu ^{***} 0.72 m ² ·K/W
Corrosive Resistance:		
ASTM C 805 ASTM C 786 ^{****}	Corrosiveness to Steel Stainless Steel Stress Corrosion Specification as per Test Methods G871 and G882: U.S. Nuclear Regulatory Commission, Reg. Guide #1.36: U.S. Military Specifications MIL-424244 (all versions including B and C)	Pass Conforms

Acoustical Performance

Thickness	ASTM C423 CO-EFFICIENTS AT FREQUENCIES						MBC
	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	
1.5"	0.21	0.64	0.82	1.00	0.85	1.01	0.80
2.0"	0.43	0.78	0.90	0.97	0.97	1.00	0.80
3.0"	0.75	0.82	0.89	0.94	1.00	1.00	0.80



Compressive Strength:

ASTM C 165	at 10%	743 psf (35.6 kPa)
	at 25%	1269 psf (60.8 kPa)

Density:

ASTM C 612-00 – Actual	8.0 lbs/ft ³	128 kg/m ³
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Dimensions:

24" (width) x 48" (length)
 610 mm x 1219 mm

36" (width) x 48" (length)
 610 mm x 1219 mm

48" (width) x 96" (length)
 1219 mm x 2438 mm

Thickness:

Product is available in 1.25" 1.5" 2" 3"
 For additional sizes, please contact our customer service representatives.

Note:

As ROXUL Inc. has no control over installation design and workmanship, accessory materials or application conditions, ROXUL Inc. does not warrant the performance or results of any installation containing ROXUL Inc's. products. ROXUL Inc's. overall liability and the remedies available are limited by the general terms and conditions of sale. This warranty is in lieu of all other warranties and conditions expressed or implied, including the warranties of merchantability and fitness for a particular purpose.

Key Application Qualifiers:

- Good compressive strength
- Low moisture sorption
- Durability
- Fire resistance
- Excellent thermal resistance
- Non-corrosive
- Chemically inert
- CFC and HCFC free product and process
- Made from natural & recycled materials

Other ROXUL Products:

Please consult ROXUL for all your insulation needs. We have an extensive range of products for all applications from pipe insulation to commercial products to residential batts. ROXUL invites all inquiries and will act promptly to service all of your requirements.



HORIZONTAL ROUGH SAWN CEDAR

Location: Exterior of Wall

Dimensions:

Depth: 1"

Width: 6" / 8"

Finish: Benjamin Moore Exterior Finish Alkyd Translucent

Air Gap: 1/4"

Species: Cedar

Grade: #3 or better

Moisture Content: Kiln-Dried

Corner type: Weaved

Available: Fontaine Forestry & Millworks

Price: \$0.60 per board foot

TIMBER PRODUCTS | SIZES

Thickness and Width					
Nominal (inches)	Nominal (mm)	Rough (inches)	Rough (mm)	Dressed (inches)	Dressed (mm)
5	127	4¾	121	4½	114
6	152	5¾	146	5½	140
8	203	7¾	197	7½	191
10	254	9¾	248	9½	241
12	305	11¾	298	11½	292
Over 12	Over 305	¼ off	6mm off	½ off	13mm off

Note: Full sawn timbers have the same dimension as nominal.

Grade Classifications

Depending upon size, Western Red Cedar is classified as Light Framing, Structural Joists and Planks, Beams and Stringers, or Posts and Timbers. In general, the grades referred to herein are rough sawn.

Light Framing is lumber 2" to 4" (51mm to 102mm) thick and 2" to 4" (51mm to 102mm) wide either rough sawn or surfaced four sides (S4S).

Structural Joists and Planks are rectangular members 2" to 4" (51mm to 102mm) thick, 5" (127mm) and wider, either rough sawn or surfaced four sides (S4S).

Beams and Stringers are rectangular members, either rough sawn or surfaced, 5" (127mm) and thicker with width 2" (51mm) greater than thickness.

Posts and Timbers are square members, either rough sawn or surfaced, 5" (127mm) by 5" (127mm) and larger with width not more than 2" (51mm) greater than thickness.



PRESSURE TREATED FURRING STRIPS

Location: Exterior of Wall

Dimensions:

Depth: 3/4"

Width: 2 1/2"

Species: Eastern Hemlock

Grade: #3

Moisture content: Kiln-dried

Available: Fontaine Forestry & Millworks



nyle L200 DRY KILN SYSTEMS

Affordable – Easy to Operate – Unbeatable quality

A quality lumber drying system is easier and more affordable than you might think.

If you think high quality lumber drying is too complicated or expensive for your small operation, you're in for a pleasant surprise with Nyle's L200 models. Now you can dry your own lumber down to 6-8% moisture content for pennies per board foot. Kiln dried lumber typically sells for a third more than green lumber. Nearly all lumber must be kiln dried before use and most customers will simply not buy lumber that has not been kiln dried.

L200

The L200 is a compact, high performance dry-kiln system. It will dry up to 4,000 board feet of 4/4 (1" thick dead green oak right-off-the-saw hardwood) in approximately 4 to 5 weeks. It can dry up to 2,500 board feet of 1" green softwood or fast drying hard wood in approximately 1-2 weeks.

You can set the pitch or sterilize the load with the included auxiliary heater. The L200 has a precise control system that requires just a few minutes of daily monitoring with a thermostat with remote sensor, repeat cycle compressor timer, switches and indicator lights.

The L200 kit includes auxiliary heating, two circulating fans, controls, prewired electric panel, over temperature vents and manual. This kit provides you with everything you need to get going (including building plans) except the building itself. Additional fans and a power vent system are available.

L200M

The L200M takes the next step in kiln control. This is the successful L200 dry kiln, but with an enhanced control including a computer that displays temperature and humidity by the most accurate method known, wet bulb and dry bulb sensing. It also includes four wood moisture probes that are inserted into the lumber inside the kiln, even in the center of the stack! Then the moisture content can be read at the controller and the drying cycle more accurately monitored. The final moisture content can be set and the system will automatically shut off when the probes indicate

the moisture content has reached the desired level. Prevent over-drying. Save time by making sure the moisture content is dropping every day. Be more efficient and accurate.

The quality features that make Nyle the world leader in lumber drying:

- Heat Pump technology for maximum energy efficiency: Uses 40% - 60% less energy than conventional kilns
- Corrosion resistant aluminum cabinets and extra long life specially coated dehumidification coils
- Precision control systems
- Famed Nyle customer support

 North Road
technologies

To order, call (207) 989 4335 or toll free: (800) 777 6953; email us at info@northrd.com; or look us up at www.northrd.com or www.nyle.com. Nyle is part of North Road Technologies.



Features and Specifications:

Load Capacity	1,500-2,500 board feet for softwoods and fast drying hardwood 4,000 board feet for slow drying hardwoods such as Oak
Nominal Water Removal	250 Lbs (114 kg.) per 24 hours
Drying Time	4/4 green oak 65% to 8%, approximately 35 days 4/4 green pine 80% to 8%, approximately 12 days
Operation Costs	Green oak 65% to 6%, approximately 450 kwh per 1,000 board feet Green pine 80% to 10% - 12%, approximately 250 kwh per 1,000 board feet
Operating Temperature Range	70° - 120° F (21° - 49°c) during the drying process
Pitch setting temperature	Auxiliary heater can be used to set the pitch, sterilize the load (kill any bugs), and for preheat
Compressor Nominal HP	2 HP
Internal Blower Motor HP	¼ HP / 1000 cfm
Auxiliary Electric Heat	4,000 watts
Circulating Fans *	Two included: 16" (40 cm.) diameter; ¼ hp; 1,500 cfm *
Over Temperature Vents	Two manual included (powered vents optional)
Power Requirements	220 v. single phase, 50hz. or 60hz. (40 amp)
Warranty	One Year on material and workmanship. See complete warranty form for details.
Shipping Weight	380 lbs

* Nyle offers a wide variety of fan sizes and construction. Sizes and types can be altered to fit your specific job requirement.

Questions? Call the Nyle experts for straight answers!

At North Road/Nyle, you get the straight answers you need from the same professionals that design and build your systems. We'll give you information on drying methods, answer your questions about servicing and maintaining the equipment, and provide expert advice in designing and building your kiln chamber. When you talk to a North Road/Nyle expert, you're talking to someone who knows lumber drying and dehumidification systems from the ground up, someone who really understands the business.

We are the largest manufacturer of dehumidification drying systems in North America and we are dedicated to giving you the answers you need, whether it is your first call or if you have owned your system for 20 years.

So call us today and find out what real customer service is all about. Dial (207) 989 4335 or toll free: (800) 777 6953; or look us up at www.northrdt.com.



North Road Technologies LLC

(888) 316-2057

www.northrdt.com

info@northrdt.com





GRIP-RITE 2 1/2" 8D GALVANIZED PATIO AND DECK NAILS

Model: 8HGRSPD5

Location: Decking

Dimensions:

Length: 2 1/2"

Hot Galvanized

Available: Home Depot

Grip-Rite 2-1/2 in. 8D Galvanized Patio and Deck Nails (5 lb. Pack)


Model # 8HGRSPD5 Store SKU # 928702

★★★★★ [Write The First Review](#) ↗

[View Local Store Pricing](#)

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[Product Description](#) ▾ | [Specifications](#) ▾ | [Customer Reviews](#) ▾ | [More Info](#) ▾ | [Shipping Options](#) ▾

PRODUCT DESCRIPTION

The Grip-Rite 2-1/2 in. 8D Galvanized Patio and Deck Nails (5 lb. Pack) are designed for use in deck and patio construction applications. The nails offer corrosion resistance.

- Use for decks and patios
- Corrosion resistant
- 2-1/2 in. long
- Hot galvanized
- Ring shank for great holding power
- Includes approximately 530 nails
- MFG Brand Name : Grip-Rite
- MFG Model # : 8HGRSPD5
- MFG Part # : 8HGRSPD5

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SPECIFICATIONS

Assembled Depth (in.)	4.5 in	Assembled Height (in.)	4.5 in
Assembled Width (in.)	5.75 in	Color Family	Metallics
Manufacturer Warranty	No	Package Quantity	530
Product Depth (in.)	4.5	Product Height (in.)	4.5
Product Weight (lb.)	5	Product Width (in.)	5.75

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FIRESTONE THERMOPLASTIC POLYOLEFIN [TPO] MEMBRANE

Model: UltraPly TPO

Location: Roof

Dimensions:

Length: 12'4"

Thickness: 0.060"

Color: White

Available: Firestone

TECHNICAL INFORMATION SHEET

UltraPly™ TPO

TIS #201



Description:

Firestone UltraPly™ TPO is a flexible Thermoplastic Polyolefin roofing membrane that is produced with polyester weft-inserted reinforcement. This heat weldable TPO membrane is available in 45 mil (1.1 mm) and 60 mil (1.5 mm) thicknesses in 8' (2.4 m), 10' (3 m) and 12'4" (3.76 m) widths. The colors available are white, tan or gray. This reflective membrane is suitable for a variety of low slope applications.

Preparation of Substrate:

1. Substrates must be clean, dry, smooth, and free of sharp edges, fins, loose or foreign materials, oil, grease, and other materials that may damage the membrane.
2. All roughened surfaces that can damage the membrane shall be repaired as specified to offer a smooth substrate.
3. All surface voids greater than 1/4" (6.3 mm) wide shall be properly filled with an acceptable fill material.

Method of Application:

1. Firestone UltraPly TPO membrane is installed as continuous roofing or waterproofing layer on the roof. Rolls are overlapped (side laps and end laps) prior to the heat welding of the seam areas.
2. Install the UltraPly TPO Roofing System in accordance with current Firestone UltraPly TPO specifications, details and workmanship requirements.

Storage:

- Store away from sources of punctures and physical damage.
- Assure that structural decking will support the loads incurred by material when stored on rooftop. The deck load limitations should be specified by the project designer.
- Store away from ignition sources as membrane will burn when exposed to open flame.

Precautions:

- Exercise caution when lifting, moving, transporting, storing or handling membrane rolls to avoid sources of punctures and possible physical damage.
- Contact your Technical Coordinator at 1-800-428-4511 for specific recommendations regarding chemical or waste product compatibility with Firestone UltraPly TPO Membrane.
- Refer to Material Safety Data Sheets (MSDS) for safety information

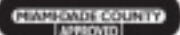
Packaging:	Widths	Lengths	Weight
.045" UltraPly TPO and	5'(1.5 m)	100' (30.5 m)/200'(61 m)	0.23 lb/sf (2.1 kg/m ²)
.060" UltraPly TPO	8' (2.4m)	100' (30.5 m)/200'(61 m)	0.31 lb/sf (2.9 kg/m ²)
	10' (3.05 m)	100' (30.5 m)/200'(61 m)	
	12'4" (3.76 m)	100' (30.5 m)/200'(61 m)	

Compliance:

Post Consumer Recycled Content: 0%
 Pre Consumer Recycled Content: 15%
 Manufacturing Location: Wellford, SC
 Tusculumbia, AL




CCMC 13348-R



TECHNICAL INFORMATION SHEET

Physical Properties:	ASTM D 6878 Specification	Units	Performance Minimum	Typical Values 45 mil	Typical Values 60 mil
Overall Thickness	D 751	In(mm)	0.039(1)	0.045 (1.14)±10%	0.060(1.5)±10%
Coating over Scrim	D 7635	In(mm)	0.015(1)	0.017(0.44)	0.021(0.54)
Breaking Strength	D 751 Grab Method	Lb(N)	220(975)	340(1,510)	390(1,730)
Elongation at Reinforcement Break	D 751 Grab Method	%	15	25	25
Tearing Strength	D 751	Lb(N)	55(245)	120(530)	120(530)
Brittleness Point	D 2137	*F(*C)	-40(-40)	Pass	Pass
Ozone Resistance, No cracks	D 1149	---	Pass	Pass	Pass
Properties after Heat Aging	D 573	*F(*C)	670 h @ 240°F (116°C)		
Retention of Breaking Strength	D 751 Grab Method	%	90, minimum	> 90	>90
Retention of Elongation at Break	D 751 Grab Method	%	90, minimum	>90	>90
Retention of Tearing Strength	D 751	%	60, minimum	>60	>60
Weight of Change	D 1204, 6h at 158°F (70°C)	%	±1, maximum	<1	<1
Linear Dimension Change	D 471	%	±1, maximum	<1	<1
Water Absorption		%	±3, maximum	<3	<3
Weather Resistance, 80°C Black Panel, no cracking, crazing when wrapped around a 3" mandrel and inspected at 7x magnification	G 155,	kJ/m ²	10,080, minimum	>20,160	>20,160
Puncture Resistance	FTM 101C, Method 2031	---		265(1,180)	300(1,300)
Dynamic Puncture Resistance MD	D 5635	---		Pass (20 J)	Pass (40 J)
Dynamic Puncture Resistance CD	D 5635	---		Pass (35 J)	Pass (50 J)
Static Puncture Resistance	D 5602	---		Pass (25 kg)	Pass (25 kg)

Reflectivity:	Initial	Weathered	#
 Solar Reflectance	0.79	0.68	
Thermal Emittance	0.85	0.83	
SRI	98	81	
Rated Product ID			0008
Licensed Manufacturer ID			0608
Classification	Production Line		

Compliance:	Test Method	White	Tan	Gray	Energy Star*	White	Tan
Solar Reflectance	ASTM E903	0.81	0.63	0.37	Initial Solar Reflectance	0.79	0.60
Thermal Emittance	ASTM E408	0.95	0.95	0.95	Aged Solar Reflectance (3 years) Cleaned prior to aged test?	0.78	0.54
Solar Reflectance Index (SRI)	ASTM E1980	102	77	43	Initial Emittance	0.85	0.81

Please Contact your Firestone Technical Coordinator at 1-800-428-4511 for further information.

This sheet is meant to highlight Firestone products and specifications and is subject to change without notice. Firestone takes responsibility for furnishing quality materials which meet published Firestone product specifications. Neither Firestone nor its representatives practice architecture. Firestone offers no opinion on and expressly disclaims any responsibility for the soundness of any structure. Firestone accepts no liability for structural failure or resultant damages. Consult a competent structural engineer prior to installation if the structural soundness or structural ability to properly support a planned installation is in question. No Firestone representative is authorized to vary this disclaimer.



*ENERGY STAR is only valid in the United States

Firestone Building Products Company, LLC

Material Safety Data Sheet

August 15, 2011

Page: 1

SECTION 1: PRODUCT IDENTIFICATION

Product Name: Firestone UltraPly™ TPO Membrane

Chemical Name / Synonym: UltraPly™ TPO Thermoplastic Membrane (White, Tan, Gray), UltraPly™ TPO XR Thermoplastic Membrane (White, Tan, Gray), UltraPly™ TPO (MD) Thermoplastic Membrane (White, Tan, Gray), UltraPly™ TPO Reinforced Cover Strip (White, Tan, Gray), UltraPly™ TPO Reinforced Curb Corners (White, Tan, Gray), TPO18" Curb Flashing (White, Tan, Gray); UltraPly™ TPO Custom Accessories (White, Tan, Gray); UltraPly™ TPO Reinforced Split Pipe Boots (White, Tan, Gray); UltraPly™ TPO SA Membrane; UltraPly™ TPO HS; UltraPly™ TPO Walkway Pad

Chemical Family: Thermoplastic Polyolefin

24-Hour Emergency Phone: (800) 424-9300 CHEMTREC

Manufacturer's Name: Firestone Building Products Company, LLC

Manufacturer's Address: 250 West 96th Street, Indianapolis, IN 46260

NFPA Hazard Rating: Health 1, Flammability 1, Reactivity 0

HMIS Hazard Rating: Health 0, Flammability 1, Reactivity 0

SECTION 2: CHEMICAL COMPOSITION

Chemical Name:	Common Name:	CAS #:	% (by wt)	Exposure Limits:
Nonhazardous as per 29 CFR 1910.1200.	None	None	100	None Established

SECTION 3: HAZARD IDENTIFICATION

Primary Route of Exposure: None

Signs and Symptoms of Exposure: No known adverse effects

Medical Conditions Aggravated by Exposure: None known

Chronic Effects: No known adverse effects

Carcinogenicity: None

SECTION 4: FIRST AID MEASURES

First Aid Procedures: No special action necessary.

SECTION 5: FIRE FIGHTING PROCEDURES

Suitable Extinguishing Media: Carbon dioxide, foam, sand/earth, or dry chemicals.

Hazardous Combustion Products: Carbon dioxide and carbon monoxide, oxides of nitrogen, sulfur dioxide, partially burned carbon.

Recommended Fire Fighting Procedures: Wear impermeable protective clothing and self-contained breathing apparatus. Toxic fumes and vapors may be evolved.

Firestone Building Products Company, LLC
Material Safety Data Sheet

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Unusual Fire and Explosion Hazards:	None known
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SECTION 6: PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to Be Taken in Case Material is Released or Spilled:	Not Applicable
Precautions to Be Taken in Handling and Storing:	No special handling precautions. Store where materials are not exposed to excessive heat, cold or moisture.

SECTION 7: EXPOSURE CONTROLS / PERSONAL PROTECTION

Ventilation:	Store and use in well ventilated areas.
Respiratory Protection:	None required
Eye Protection:	None required
Skin Protection:	None required
Other:	None
Work / Hygienic Practices:	Wash exposed skin prior to eating, drinking or smoking and at the end of each shift. Wash contaminated clothing prior to reuse.

SECTION 8: PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor:	Black and white sheet, white and gray sheet, tan and gray sheet, gray and gray sheet, white sheet with fleece back membrane, white sheet, grey sheet, or tan sheet. Essentially no odor.		
Flash Point:	Not Applicable	Lower Explosive Limit:	None
Method Used:	Not Applicable	Upper Explosive Limit:	None
Evaporation Rate:	Not Applicable	Boiling Point:	None
pH (undiluted product):	Not Applicable	Melting Point:	Unknown
Solubility in Water:	Insoluble	Specific Gravity:	0.94
Vapor Density:	Not Applicable	Percent Volatile:	Unknown
Vapor Pressure:	Not Applicable		

SECTION 9: STABILITY AND REACTIVITY

Thermal Stability:	Stable
Hazardous Polymerization:	Will not occur
Conditions to Avoid:	None known

SECTION 10: TRANSPORTATION

Regulatory Agency:	Not Regulated
Proper Shipping Name:	Not Applicable
Hazard Classification:	Not Applicable
Identification Number:	Not Applicable
Labels Required:	Not Applicable
Other Requirements:	Not Applicable

Firestone Building Products Company, LLC
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SECTION 11: MISCELLANEOUS INFORMATION

Additional Comments:	This product is considered an article as per 29 CFR 1910.1200 and is, therefore, exempt from the requirements of the Hazard Communication standard.
Date of Previous MSDS:	June 10, 2011
Changes Since Previous MSDS:	Additional product added under section 1.
Telephone Number for Additional Information:	(317) 575-7190

DISCLAIMER

The information contained herein is based on data considered accurate which has been obtained from other companies and organizations. However, no warranty or representation is expressed or implied that the information, is accurate, complete or representative. Firestone Building Products Company, LLC assumes no responsibility for injury to the buyer, the buyer's employees, or any third persons, if reasonable safety procedures are not followed. Additionally, Firestone Building Products Company, LLC assumes no responsibility for injury to buyer, the buyer's employees, or any third persons caused by abnormal use of this material, even if reasonable safety procedures are followed.



DENSDECK ROOF BOARD

Location: Roof

Nominal Thickness: 1/2"

Dimensions:

Width: 4' \pm 1/8"

Length: 8' \pm 1/4"

Weight: 1.2 lbs./sq. ft.

Surfacing: Fiberglass mat

Available: Georgia-Pacific Canada

DensDeck® Roof Boards

CONSTRUCTION

- Dens® Fiberglass Mat Gypsum Panels
- DensArmor Plus® Interior Panels
- DensDeck® Roof Boards
 - ▶ DensDeck® Prime Roof Board
 - DensDeck® Roof Board
 - DensDeck® DuraGuard Roof Board

- DensGlass® Sheathing
- DensGlass® Shaftliner
- DensGuard® Tile Backer
- DensShield® Tile Backer
- Joint Treatment Systems
- Textures
- ToughRock® Gypsum Boards and Drywall
- Produits de Gypse (FRAN-Canada)
- Productos de Yeso (ESP-US)
- Interactive Product Guide
- Manufacturing Gypsum Board

INDUSTRIAL

- Fire Door Components
- Industrial Plaster

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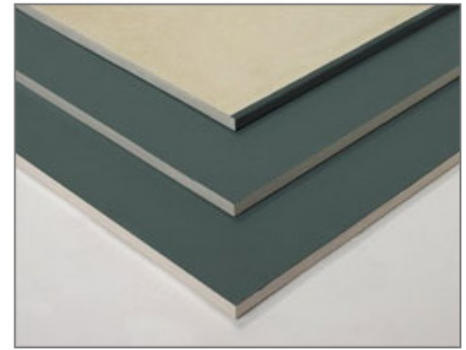
DensDeck® Prime Roof Board

DensDeck® Prime Roof Board, with fiberglass mats and a noncombustible* gypsum core, is enhanced with a green-colored, non-asphaltic coating to allow adhesive to be spread more uniformly. The result is a stronger, more consistent bond.

DensDeck Prime is the perfect cover board for cold mastic, torch applied modified bitumen and adhered single-ply systems. It reduces the amount of mastic or adhesive needed, achieving a more economical installation. It may also eliminate the need for field primer** and may reduce the number of fasteners required to achieve high wind uplift values.

This fiberglass mat gypsum roof board is ideal as a component in sustainable, energy-efficient photovoltaic (solar), vegetative and cool roofing systems. DensDeck Prime roof boards are manufactured in many locations across the United States and Canada, and may contribute to LEED® Materials and Resources certification points.

Approved by leading roofing system manufacturers and consultants, DensDeck Prime roof board can add high performance and long life beyond what the membrane manufacturer's warranty will cover.



Get a Preview
[View Product Diagrams](#)

Manufacturer

Georgia-Pacific Gypsum LLC Georgia-Pacific Canada LP
 133 Peachtree Street 2180 Meadowvale Boulevard, Suite 200
 Atlanta, GA 30303 Mississauga, ON L5N 5S3
 Technical Service Hotline: 1-800-225-6119

Description

DensDeck® Prime Roof Board is an exceptional fire barrier, thermal barrier and recovery board used in various commercial roofing systems. The product features a pre-primed surface to make the bond even stronger. The DensDeck design employs fiberglass mats front and back that are embedded into a gypsum core, providing excellent fire resistance and wind uplift properties. The unique construction of DensDeck Prime Roof Board provides superior flute spanning and will help stiffen and stabilize the roof deck. Additionally, DensDeck Prime Roof Board has been shown to withstand delamination, deterioration and jobsite damage more effectively than roofing membrane substrates such as paper-faced gypsum board, fiberboard and perlite insulation. DensDeck Prime Roof Board is resistant to the growth of mold when tested as manufactured, per ASTM D 3273.

Primary Uses

Roof system manufacturers and designers have found DensDeck Prime Roof Board to be compatible with many types of roofing systems, including: modified asphalt, single-ply, metal systems, recover board, as well as an overlayment for polyisocyanurate and polystyrene insulation. DensDeck Prime Roof Board can also be used as a form board for poured gypsum concrete deck in roof applications as well as a substrate for spray foam roofing systems. 1/2" (12.7 mm) and 5/8" (15.9 mm) DensDeck Prime Roof Board may also be used in vertical applications as a backer board or liner for the roof side of parapet walls.

DensDeck Prime Roof Board may allow the bonding of cold mastic modified bitumen and torching directly to the surface. *Consult with the system manufacturer for recommendations on this application.*

DensDeck Prime Roof Board is the preferred substrate for vapor retarders.

Standards and Code Approvals

DensDeck Prime Roof Boards are manufactured to meet ASTM C 1177 and have the following approvals:

- Florida Product Approval Code FL 1250
- Miami-Dade County, Florida NOA 08-0908.10

Recommendations and Limitations

DensDeck Prime Roof Boards are manufactured to act with a properly designed roof system following good roofing practices. The actual use of DensDeck Prime Roof Board as a roofing component in any system or assembly is the responsibility of the roofing system's design authority. Consult with the appropriate system manufacturer and/or design authority for system and assembly specifications and instructions on applying other products to DensDeck Prime Roof Board. Georgia-Pacific does not warrant and is not responsible for any systems or assemblies utilizing DensDeck Prime Roof Board or any component in such systems or assemblies other than DensDeck Prime Roof Board.

The need for a separator sheet between the DensDeck Prime Roof Board and the roofing membrane must be determined by the roof membrane manufacturer or roofing system designer.

Confirm any priming requirements with the membrane manufacturer. When applying solvent-based adhesives or primers, allow sufficient time for the solvent to flash off to avoid damage to roofing components.

DensDeck Prime Roof Boards should not be subjected to abnormal or excessive loads

or foot traffic, such as, but not limited to, use on plaza decks or under steel-wheeled equipment that may fracture or damage the panels. Provide suitable roofing system protection when required.

When using DensDeck Prime Roof Boards for hot-mopped applications, Georgia-Pacific recommends maximum asphalt application temperatures for Type III asphalt of 425°F (218°C) to 450°F (232°C). Application temperatures above these recommended temperatures may adversely affect roof system performance. For application temperatures in excess of 450°F (232°C) and for mopping of type IV asphalt, ribbon or spot mopping or the installation of a perforated base sheet are recommended methods of bonding asphalt in lieu of full mopping. Consult and follow the roofing system manufacturer's specifications for full mopping applications and temperature requirements.

When using DensDeck Prime Roof Board as a substrate for torch applications, ensure that the product is dry and that the proper torching technique is used. Limit the heat to the DensDeck Prime Roof Board. Maintain a majority of the torch flame directly on the roll.

Conditions beyond the control of Georgia-Pacific, such as weather conditions, dew, leaks, application temperatures and techniques may cause adverse effects with roofing systems.

Moisture Management

DensDeck Prime Roof Boards, like other components used in roofing systems, must be protected from exposure to moisture before, during and after installation.

Remove the plastic packaging from all DensDeck Prime Roof Board immediately upon receipt of delivery. Failure to remove the plastic packaging may result in entrapment of condensation or moisture. DensDeck Prime Roof Board stored outside must be stored level and off the ground and protected by a breathable waterproof covering. Provide means for air circulation around and under stored bundles of DensDeck Prime Roof Board. DensDeck Prime Roof Board must be covered the same day as installed.

Avoid application of DensDeck Prime Roof Boards during rain, heavy fog and any other conditions that may deposit moisture on the surface, and avoid the overuse of non-vented, direct-fired heaters during winter months. When roofing systems are installed on new poured concrete or light weight concrete decks or when re-roofing over a wet existing concrete deck, a venting base sheet or vapor retarder should be installed above the concrete to retard the migration of water from the concrete into the roof assembly. Always consult the roofing system manufacturer or design authority for specific instructions for applying other products to DensDeck Prime Roof Boards.

Moisture vapor movement by convection must be eliminated, and the flow of water by gravity through imperfections in the roof system must be controlled. After a leak has occurred, no condensation on the upper surface of the system should be tolerated, and the water introduced by the leak must be dissipated to the building interior in a minimum amount of time.

Although DensDeck Prime Roof Boards are engineered with fiberglass facings and high density gypsum cores, the presence of free moisture can have a detrimental effect on the performance of the product and the installation of roofing membranes. For example, hot asphalt applications can blister; torched modified bitumen may not properly bond; and adhesives for single ply membranes may not dry properly. Moisture accumulation may also significantly decrease wind uplift and vertical pull resistance in the system or assembly. DensDeck Prime Roof Boards containing excessive free moisture content may need to be evaluated for structural stability to assure wind uplift performance.

Fire Resistance Classifications

DensDeck Prime Roof Boards are excellent fire barriers over combustible and noncombustible roof decks, including steel decks.

Submittal Approvals

Job Name _____

Contractor _____

Date _____

continued →

UL 790 Classification. DensDeck Prime Roof Boards have been classified by Underwriters Laboratories (UL) for use as a fire barrier over combustible and noncombustible decks in accordance with the ANSI/UL 790 test standard. The UL classification includes a comprehensive Class A, B or C rating. For additional information concerning the UL 790 classification, consult the UL Certification Directory.

UL 1256 Classification. DensDeck® Prime Roof Boards have also been classified by UL in roof deck constructions for internal (under deck) fire exposure in accordance with the ANSI/UL 1256 Steiner Tunnel test. For additional information concerning the UL 1256 classification, consult the UL Certification Directory.

FM Class 1 Approvals. DensDeck Prime Roof Boards are included in numerous roofing assemblies with a Factory Mutual (FM) Class 1 fire rating. 1/4" (6.4 mm) DensDeck Prime Roof Boards have passed testing under the FM Calorimeter Standard 4450 and have been approved by FM as such for insulated steel deck roofs when installed according to the conditions identified by FM. For more information concerning FM Approvals and FM Class 1 assemblies with DensDeck Prime Roof Boards, consult FM or RoofNav®.

Type X. 5/8" (15.9 mm) DensDeck® Prime Fireguard® Roof Boards are manufactured to meet the "Type X" requirements of ASTM C 1177 for increased fire resistance beyond regular gypsum board.

UL Fire Resistance Ratings. 5/8" (15.9 mm) DensDeck Prime Fireguard Roof Boards are designated as **Type DD** by UL and included in assembly designs investigated by UL for hourly fire resistance ratings. 5/8" (15.9 mm) DensDeck Prime Fireguard Roof Boards may also replace any unclassified 5/8" (15.9 mm) gypsum board in an assembly in the UL Fire Resistance Directory under the prefix "P".

Flame Spread and Smoke Developed. When tested in accordance with ASTM E 84, DensDeck Prime Roof Boards had Flame Spread 0, Smoke Developed 0.

Wind Uplift

DensDeck Prime Roof Boards are included in numerous assemblies evaluated by FM or other independent laboratories for wind uplift performance. For information concerning such assemblies, please visit www.roofnav.com.

Physical Properties

Properties	1/4" (6.4 mm)	1/2" (12.7 mm)	5/8" (15.9 mm)
Thickness, nominal	1/4" (6.4 mm) ± 1/16" (1.6 mm)	1/2" (12.7 mm) ± 1/32" (.8 mm)	5/8" (15.9 mm) ± 1/32" (.8 mm)
Width, standard	4' (1219 mm) ± 1/8" (3 mm)	4' (1219 mm) ± 1/8" (3 mm)	4' (1219 mm) ± 1/8" (3 mm)
Length, standard	4' (1219 mm) and 8' (2438 mm) ± 1/4" (6.4 mm)	4' (1219 mm) and 8' (2438 mm) ± 1/4" (6.4 mm)	4' (1219 mm) and 8' (2438 mm) ± 1/4" (6.4 mm)
Weight, nominal, lbs./sq. ft. (Kg/m ²)	1.2 (5.9)	2.0 (9.8)	2.6 (12.7)
Surfacing	Fiberglass mat with non-asphaltic coating	Fiberglass mat with non-asphaltic coating	Fiberglass mat with non-asphaltic coating
Flexural Strength ¹ , parallel, lbf. min. (N)	40 (178)	80 (356)	100 (444)
Flute Spansability ⁴	2-5/8" (66.7 mm)	5" (127 mm)	8" (203 mm)
Permeance ² , perms (ng/Pa·S·m ²)	>50 (>2850)	>35 (>1995)	>32 (>1624)
R Value ³ , ft ² ·°F·hr/BTU (m ² ·K/W)	.28	.56	.67
Linear Variation with Change in Temp., in/in °F (mm/mm/°C)	8.5 x 10 ⁻⁶ (15.3 x 10 ⁻⁶)	8.5 x 10 ⁻⁶ (15.3 x 10 ⁻⁶)	8.5 x 10 ⁻⁶ (15.3 x 10 ⁻⁶)
Linear Variation with Change in Moisture	6.25 x 10 ⁻⁶	6.25 x 10 ⁻⁶	6.25 x 10 ⁻⁶
Water Absorption ⁵ , % max	10.0	10.0	10.0
Compressive Strength ⁶ , psi nominal	900	900	900
Surface Water Absorption, grams, nominal	≤2.0	≤2.0	≤2.0
Flame Spread, Smoke Developed (ASTM E 84)	0/0	0/0	0/0
Bending Radius	5' (1524 mm)	8' (2438 mm)	12' (3658 mm)

1. Tested in accordance with ASTM C 473 method B.

2. Tested in accordance with ASTM E 661.

3. Tested in accordance with ASTM E 96 (dry cup method).

4. Tested in accordance with ASTM C 518 (heat flow meter).

5. Tested in accordance with ASTM C 1177.

6. Tested in accordance with ASTM C 473.



U.S.A. — Georgia-Pacific Gypsum LLC
 Canada — Georgia-Pacific Canada LP

SALES INFORMATION AND ORDER PLACEMENT

U.S.A. Midwest: 1-800-876-4746 West: 1-800-824-7503
 South: 1-800-327-2344 Northeast: 1-800-947-4497

CANADA Canada Toll Free: 1-800-367-6823
 Quebec Toll Free: 1-800-361-0486

TECHNICAL INFORMATION

U.S.A. and Canada: 1-800-225-6119
www.gpgypsum.com

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WARRANTIES, REMEDIES AND TERMS OF SALE For current warranty information for this product, please go to www.gpgypsum.com and select the product for warranty information. All sales of this product by Georgia-Pacific are subject to our Terms of Sale available at www.gpgypsum.com.

UPDATES AND CURRENT INFORMATION The information in this document may change without notice. Visit our website at www.gpgypsum.com for updates and current information.

CAUTION For product fire, safety and use information, go to www.gp.com/safetyinfo or call 1-800-225-6119.

HANDLING AND USE—CAUTION This product contains fiberglass facings which may cause skin irritation. Dust and fibers produced during the handling and installation of the

product may cause skin, eye and respiratory tract irritation. Avoid breathing dust and minimize contact with skin and eyes. Wear long sleeve shirts, long pants and eye protection. Always maintain adequate ventilation. Use a dust mask or NIOSH/MSHA approved respirator as appropriate in dusty or poorly ventilated areas.

FIRE SAFETY CAUTION Passing a fire test in a controlled laboratory setting and/or certifying or labeling a product as having a one-hour, two-hour, or any other fire resistance or protection rating and, therefore, as acceptable for use in certain fire rated assemblies/systems, does not mean that either a particular assembly/system incorporating the product, or any given piece of the product itself, will necessarily provide one-hour fire resistance, two-hour fire resistance, or any other specified fire resistance or protection in an actual fire. In the event of an actual fire, you should immediately take any and all actions necessary for your safety and the safety of others without regard for any fire rating of any product or assembly/system.



ULTRAPLY BONDING ADHESIVE

Model: W56T-PO3005

Location: Roof

Color: Yellow

Available: Firestone

TECHNICAL INFORMATION SHEET

UltraPly™ Bonding Adhesive

TIS # 808

ITEM NUMBER: W56TPO3005

Description:

Firestone UltraPly™ Bonding Adhesive is a solvent based contact adhesive designed specifically for bonding Firestone UltraPly TPO membranes to approved insulations in addition to wood, metal, masonry and other acceptable substrates.

Note: Not for use in adhering UltraPly TPO XR membranes.



Method of Application:

1. Surfaces to receive Firestone UltraPly Bonding Adhesive must be clean, smooth, dry, and free of sharp edges, loose and foreign materials, oil, grease, and other contaminants.
2. Stir the adhesive thoroughly to achieve a uniform mix with no sediment on the bottom and no marbling evident before and during use.
3. Apply UltraPly Bonding Adhesive at about the same time to both the exposed underside of the sheet and the substrate to which it will be adhered so as to allow approximately the same drying time. Apply UltraPly Bonding Adhesive evenly avoiding areas of accumulation.
4. Apply the UltraPly Bonding Adhesive with a solvent resistant paint roller, and roll the adhesive onto the mating surfaces. When applying UltraPly Bonding Adhesive, ensure complete uniform coverage of both surfaces that will be adhered. **Care must be taken not to apply Bonding Adhesive over seam areas.**
5. UltraPly Bonding Adhesive can be dispensed by means of power rollers or industrial spray equipment. Other equipment may be used as recommended by the manufacturer for application of this adhesive.
Note: Spray applied bonding adhesive requires back-rolling with 9" (228.6 mm) wide solvent resistant roller (medium nap) to insure 100% coverage of the adhesive on the substrate and membrane.
6. Allow Bonding Adhesive to flash off until tacky. Touch down on the Bonding Adhesive surface with a clean, dry finger to be certain that the adhesive does not string. As you are touching the adhesive, pushing straight down to check for stringing, also push forward on the adhesive at an angle to ensure that the adhesive solvents have flashed off and are ready throughout its thickness. If either motion exposes wet areas or sticking when the finger is lifted, then it is not ready for mating. Flash off time will vary depending on ambient conditions.
7. Starting at the fold, roll the previously coated portion of the sheet into the coated substrate slowly and evenly so as to minimize wrinkles.
8. To ensure proper contact, compress the bonded half of the sheet to the substrate with a stiff push broom using heavy pressure immediately after mating.

Storage:

- Shelf life of one year can be expected if stored in original sealed container at temperatures between 60 °F - 80 °F (16 °C - 27 °C). If exposed to lower temperatures, restore to room temperature prior to use.
- Shelf life will be shortened if exposed to elevated temperatures for a prolonged period of time.
- Store in original unopened containers at temperatures between 60 °F - 80 °F (16 °C - 27 °C) until ready for use.
- For optimum results, rotate your stock to ensure stored material has not exceeded the shelf life of one year.

Precautions:

- Review applicable Material Safety Data Sheet prior to using.
- Flammable. Keep away from fire and open flame and other possible ignition sources during storage and use. Do not smoke when using.
- Harmful or fatal if swallowed.
- Avoid prolonged inhalation.
- Avoid prolonged contact with skin. Gloves should be worn (OSHA approved).
- Avoid eye contact by wearing safety goggles with side shields.
- Thinning is not allowed.
- Do not use for splicing.
- Do not use with EPDM or XR membranes.
- Use only in well ventilated areas.
- Cover tightly when not in use.

TECHNICAL INFORMATION SHEET

- Recommended cleaner is Toluene (while fluid).

Compliance:

Post Consumer Recycled Content: 0%
Pre Consumer Recycled Content: 0%
Manufacturing Location: South Bend, IN



Packaging:

Pail:	5 Gallon (18.9 L)
Weight:	≈41 lbs (18.6 kg)
Coverage:	A coverage rate of 45 - 60 ft ² per gallon (1.10 – 1.47 m ² per liter) may be obtained depending on the substrate. Some insulation surfaces are more uneven and porous and will result in a lower coverage rate while smooth non-porous substrates will result in higher coverage rates. Rates are based on roller application to both mating surfaces. Very porous substrates (rough wood, concrete block) may require <u>two</u> coats of Bonding Adhesive, to ensure proper adhesion. This can be determined by testing a small area. Check by adhering a small piece of membrane to the porous substrate to verify the bonding strength.

Physical Properties:

Minimum Performance

Base:	A blend of Polychloroprene and SBR rubbers
Color:	Yellow
Solvents:	A blend of Acetone, Hexane, Toluene and Xylene
Viscosity:	3,300-3,800 cps, with R.V.F. spindle @ 10 rpm
Weight/Gallon:	6.6-7.4 lb/gal
Specific Gravity:	0.7909-0.8868
V.O.C. Content:	5.282 lb/gal (633 g/L)

Approved Power Equipment:

Garlock 25ST Roller Boss Power Roller

4 hp Honda Engine, 4 CFM Compressor, 25 gal pressurized supply tank (20 gal for material; 60-80 psi), Up to 100 psi rating, 2 – 3/4" x 30' supply hoses with swivels, 2 – 18" roller head assemblies

Garlock 2120 Commander Sprayer

18 hp Kohler Engine, 4500 psi Rating, 5 Gallon per Minute Flow, 1200 psi Pressure (minimum), Pump Displacement 45:1, GPM Rating: up to 5 gpm, 3/4" x 100' hose, 2" Intake pipe with screen, 5 or 55 gal drum containers, Graco Spray Tips: .023 to .031 diameter hose

Garlock Twin Gun Airless Sprayer

6.5 hp Honda Engine, 3000 psi Rating, Pump Displacement 30:1, GPM Rating: up to 1 gpm, Up to 400' of single 3/8" diameter hose, Up to 200' of dual 3/8" diameter hose, 3/4" Intake pipe with screen, 5 or 55 gal drum containers, Bulk tank containers, Graco Spray Tips: .019 to .025 diameter hose (1850 psi operating pressure)

Graco Spray Equipment:

P70EC4-70 – 70:1 Xtreme Sprayer Package w/Heavy Duty car, Hopper package, w/NXT motor and Data Track, Xtreme-Duty high pressure hose, 3/8" x 50', 7250 psi, with 3/4" x 6' whip hose, XTR-7 applicator with XHD821-825 tips.

Please Contact your Firestone Technical Coordinator at 1-800-428-4511 for further information.

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Firestone Building Products Company

Material Safety Data Sheet

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SECTION 7: EXPOSURE CONTROLS / PERSONAL PROTECTION

Ventilation:	Use with ventilation sufficient to prevent exceeding recommended exposure limits or build up of explosive concentrations of vapor in air.
Respiratory Protection:	If personal exposure concentrations cannot be maintained below the appropriate exposure limits using engineering controls, a NIOSH approved respirator may be appropriate based on employer-determined exposure levels.
Eye Protection:	The use of safety glasses with side shields when pouring or applying this product may be warranted.
Skin Protection:	The use of polyvinyl alcohol, nitrile rubber, or neoprene gloves when handling this product to avoid prolonged skin contact may be warranted.
Other:	Not required.
Work / Hygienic Practices:	Wash exposed skin prior to eating, drinking or smoking and at the end of each shift. Wash contaminated clothing prior to reuse.

SECTION 8: PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor:	Yellow amber liquid. Strong Aromatic Odor		
Flash Point:	-18° C	Lower Explosive Limit:	1%
Method Used:	Tagliabue closed tester	Upper Explosive Limit:	12.8%
Evaporation Rate:	1.9-9.5 (Ether=1)	Boiling Point:	131-288° F
pH (undiluted product):	Unknown	Melting Point:	Not Applicable
Solubility in Water:	Insoluble	Specific Gravity:	0.844 (Water=1)
Vapor Density:	2-4 (Air=1)	Percent Volatile:	76.4% @70° F
Vapor Pressure:	9.5-185 mm Hg @ 68° F	VOC:	5.28 lbs/gal or 633 gm/L

SECTION 9: STABILITY AND REACTIVITY

Thermal Stability:	Stable
Hazardous Polymerization:	Will not occur
Conditions to Avoid:	Avoid flames, sparks or other sources of ignition. Incompatible with acids, alkalies and strong oxidizing agents.

SECTION 10: TRANSPORTATION

Regulatory Agency:	U.S.A., DOT, IMO
Proper Shipping Name:	Adhesives
Hazard Classification:	3
Identification Number:	UN1133
Packing Group:	II
Labels Required:	Flammable Liquid
Other Requirements:	49 CFR 172.101Adhesives, UN1133, IMDG Class 3.2, Pg. 3174,Flash Point -18° C

Firestone Building Products Company

Material Safety Data Sheet

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SECTION 4: FIRST AID MEASURES

First Aid Procedures: If this material contacts the eyes, hold eyelids open and flush immediately with a gentle stream of water for at least 15 minutes, preferably at an eyewash fountain. Get medical attention. In case of skin contact, clean with rubbing alcohol first, followed immediately by washing affected area with soap and water. In case of inhalation, remove to fresh uncontaminated air. Administer oxygen if breathing is labored. Give artificial respiration if breathing has stopped. Get medical attention immediately if oxygen or artificial respiration are administered. In case of accidental ingestion, do not induce vomiting. Get medical attention and advise the physician of the nature of the material.

SECTION 5: FIRE FIGHTING PROCEDURES

Suitable Extinguishing Media: Foam, carbon dioxide, dry chemical, and vaporizing liquid type extinguishing agents may all be suitable for extinguishing fires involving this product. Water may be ineffective, but should be used to keep fire-exposed containers cool. If a leak or spill has ignited, use water to disperse the vapors and to protect men attempting to stop a leak. Water spray may be used to flush spills away from exposures.

Hazardous Combustion Products: Oxides of carbon and nitrogen, trace of hydrochloric acid and irritating fumes.

Recommended Fire Fighting Procedures: Wear impermeable protective clothing and self-contained breathing apparatus. Toxic fumes and vapors may be evolved. Minimize the breathing of gases, vapors, fumes or decomposition products. Use supplied-air breathing equipment for enclosed or confined spaces or as otherwise needed.

Unusual Fire and Explosion Hazards: This product is volatile and gives off invisible vapors. Either the liquid or vapor may settle in low areas or travel some distance along the ground or surface to ignition sources where they may ignite or explode.

SECTION 6: PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to Be Taken in Case Material is Released or Spilled: Shut off and eliminate all ignition sources. Keep people away. Recover free product. Add sand, earth or other suitable absorbent to spill area. Minimize breathing vapors. Minimize skin contact. Ventilate confined spaces. Open all windows and doors. Keep product clear of sewers, water, or extensive land areas. Assure conformity with applicable government regulations. Continue to observe precautions for volatile, flammable vapors from absorbed material.

Precautions to Be Taken in Handling and Storing: Keep away from heat, sparks, and open flames. Keep containers closed. Vapors of this material are heavier than air and will collect in low or confined areas. Containers, even those that have been emptied, can contain explosive vapors. Do not cut, drill, grind, weld or perform similar operations near containers. Static electricity may accumulate and create a fire hazard. Ground fixed equipment. Bond and ground all transfer containers and equipment.

Firestone Building Products Company

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SECTION 7: EXPOSURE CONTROLS / PERSONAL PROTECTION

Ventilation:	Use with ventilation sufficient to prevent exceeding recommended exposure limits or build up of explosive concentrations of vapor in air.
Respiratory Protection:	If personal exposure concentrations cannot be maintained below the appropriate exposure limits using engineering controls, a NIOSH approved respirator may be appropriate based on employer-determined exposure levels.
Eye Protection:	The use of safety glasses with side shields when pouring or applying this product may be warranted.
Skin Protection:	The use of polyvinyl alcohol, nitrile rubber, or neoprene gloves when handling this product to avoid prolonged skin contact may be warranted.
Other:	Not required.
Work / Hygienic Practices:	Wash exposed skin prior to eating, drinking or smoking and at the end of each shift. Wash contaminated clothing prior to reuse.

SECTION 8: PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor:	Yellow amber liquid. Strong Aromatic Odor		
Flash Point:	-18° C	Lower Explosive Limit:	1%
Method Used:	Tagliabue closed tester	Upper Explosive Limit:	12.8%
Evaporation Rate:	1.9-9.5 (Ether=1)	Boiling Point:	131-288° F
pH (undiluted product):	Unknown	Melting Point:	Not Applicable
Solubility in Water:	Insoluble	Specific Gravity:	0.844 (Water=1)
Vapor Density:	2-4 (Air=1)	Percent Volatile:	76.4% @70° F
Vapor Pressure:	9.5-185 mm Hg @ 68° F	VOC:	5.28 lbs/gal or 633 gm/L

SECTION 9: STABILITY AND REACTIVITY

Thermal Stability:	Stable
Hazardous Polymerization:	Will not occur
Conditions to Avoid:	Avoid flames, sparks or other sources of ignition. Incompatible with acids, alkalies and strong oxidizing agents.

SECTION 10: TRANSPORTATION

Regulatory Agency:	U.S.A., DOT, IMO
Proper Shipping Name:	Adhesives
Hazard Classification:	3
Identification Number:	UN1133
Packing Group:	II
Labels Required:	Flammable Liquid
Other Requirements:	49 CFR 172.101Adhesives, UN1133, IMDG Class 3.2, Pg. 3174,Flash Point -18° C

**Firestone Building Products Company
Material Safety Data Sheet**

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SECTION 11: MISCELLANEOUS INFORMATION

Additional Comments:	None
Date of Previous MSDS:	May 18, 2009
Changes Since Previous MSDS:	Chemical composition in section 2.
Telephone Number for Additional Information:	(317) 575-7190

DISCLAIMER

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ULTRAPLY TPO UNIVERSAL PIPE FLASHING

Model: W56TPO301U
Clamp: Stainless steel
Pipe Flange: 13" diameter
Location: Roof
Thickness: 0.055"-0.075"
Available: Firestone

UltraPly™ TPO Universal and Large Pipe Flashing

Firestone Item Number:

Universal:	W56TPO301U (white) W56TPOG01U (gray)
Large:	W56TPO3013 (white) W56TPOG013 (gray)

1. Description

Firestone UltraPly TPO Pipe Flashings are specifically designed to be used in roofing applications for flashing of round penetrations. Each pipe boot will fit various penetrations and shall be cut at the correct place to insure a tight fit before installation.

2. Preparation

Penetration shall be clean of prior flashings or foreign material.

3. Application

Select the pipe boot size that corresponds to the outside diameter of the penetration to be flashed. Cut out a circle on the outside of a level ring of the pipe boot that is smaller than the penetration. Cut the extra material from the pipe boot base around the indented circle. Heat weld the boot into place and install the clamp and sealant per current UltraPly TPO specifications.

4. Coverage

1 piece per penetration.

5. Characteristics

Physical	■ Material	Thermoplastic Polyolefin (FPO)
	■ Colour	White or gray
	■ Sizes	Universal (25.4 mm to 152.4 mm) Large (152.4 mm to 203.2 mm)

6. Packaging / Storage / Shelf Life

Pipe Boot Size	O/D of Penetration	Pieces per Carton
Universal	25.4 mm to 152.4 mm	10
Large	152.4 mm to 203.2 mm	10

NOTE: Clamps are included (All stainless steel - quick release – worm gear type).

Storage: Store material in its original unopened packaging away from sources of physical damage or chemical contamination.

Shelf life: Unlimited.

7. Precautions

Exercise caution when lifting, moving, transporting, storing or handling Firestone TPO Universal and Large Pipe Flashing to avoid sources of punctures, physical damage or chemical contamination. Refer to Material Safety Data Sheets for all applicable components of UltraPly TPO Systems.



TECHNICAL INFORMATION SHEET

ReflexEON™ Universal Pipe Boot

TIS #214

Item Numbers:

White W56TPS4013

Description:

Firestone ReflexEON Universal Pipe Boots use a patented formulation to increase the long-term reflectivity and cleanliness of the pipe flashings. The thermoplastic polyolefin is a flexible non-reinforced membrane and is specifically designed to be used in roofing applications. Each pipe boot will fit various round penetrations and shall be cut at the correct place to insure a tight fit before installation.

Method of Application:

1. Penetration shall be clean of prior flashings or foreign material.
2. Select the pipe boot size that corresponds to the outside diameter of the penetration to be flashed.
3. Cut out a circle on the outside of a level ring of the pipe boot that is smaller than the penetration.
4. Cut the extra material from the pipe boot base around the indented circle.
5. Heat-weld the boot into place and install the clamp and sealant per current ReflexEON TPO specifications. Care should be given during the heat welding process in order to prevent heat build up that could burn or damage the ReflexEON molded pipe flashing or membrane.


Storage:

- Store material in its original unopened packaging away from sources of physical damage or chemical contamination.

Precautions:

- Refer to Material Safety Data Sheet for ReflexEON TPO systems.

Packaging:

Units per Carton	10 with 10 rings included
-------------------------	---------------------------

Compliance:

Post Consumer Recycled Content:	0%
Pre Consumer Recycled Content:	0%
Manufacturing Location:	Beneserville, IL; Wellford, SC

Product Data:

Material	Thermoplastic Polyolefin (TPO)
Colors	ReflexEON White
Size	Universal – Fits 1" to 6 3/4" (25.4 mm x 171.45 mm)
Clamp	All stainless steel - quick release - worm gear type

Fits the Pipe Outside Diameters listed below:

1.000" - 1.375"	25.4 mm - 34.9 mm
1.625" - 1.875"	41.3 mm - 47.6 mm
2.000" - 2.625"	50.8 mm - 66.7 mm
2.750" - 3.625"	69.8 mm - 92.1 mm
4.000" - 4.500"	102.0 mm - 114.0 mm
5.000" - 5.563"	127.0 mm - 141.0 mm
6.000" - 6.875"	152.4 mm - 174.6 mm

Please Contact your Firestone Technical Coordinator at 1-800-428-4511 for further information.

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Firestone Building Products Company, LLC

Material Safety Data Sheet

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SECTION 1: PRODUCT IDENTIFICATION

Product Name: UltraPly™ TPO Series

Chemical Name / Synonym: TPO Inside/Outside Corner (White, Tan, Gray), UltraPly™ TPO T-Joint Cover (White, Tan, Gray), UltraPly™ TPO Universal Pipe Flashing (White, Tan, Gray), UltraPly™ TPO Unsupported Flashing (White, Tan, Gray), UltraPly™ TPO Large Pipe Flashing (White, Tan, Gray), UltraPly™ TPO Small Pipe Flashing (White, Tan, Gray), UltraPly™ TPO Coated Metal (White, Tan, Gray)

Chemical Family: Mixture

24-Hour Emergency Phone: (800) 424-9300 CHEMTREC

Manufacturer's Name: Firestone Building Products Company, LLC

Manufacturer's Address: 250 West 96th Street, Indianapolis, IN 46260

NFPA Hazard Rating: Health 1, Flammability 1, Reactivity 0

HMS Hazard Rating: Health 0, Flammability 1, Reactivity 0

SECTION 2: CHEMICAL COMPOSITION

Chemical Name:	Common Name:	CAS #:	% (by wt)	Exposure Limits:
Nonhazardous as per 29 CFR 1910.1200.	None	None	100	None Established

SECTION 3: HAZARD IDENTIFICATION

Primary Route of Exposure: None

Signs and Symptoms of Exposure: No known adverse effects

Medical Conditions Aggravated by Exposure: None known

Chronic Effects: No known adverse effects

Carcinogenicity: None

SECTION 4: FIRST AID MEASURES

First Aid Procedures: No special action necessary.

SECTION 5: FIRE FIGHTING PROCEDURES

Suitable Extinguishing Media: Carbon dioxide, foam, sand/earth, or dry chemicals.

Hazardous Combustion Products: Carbon dioxide and carbon monoxide, oxides of nitrogen, sulfur dioxide, partially burned carbon.

Recommended Fire Fighting Procedures: Wear impermeable protective clothing and self-contained breathing apparatus. Toxic fumes and vapors may be evolved.

Unusual Fire and Explosion Hazards: None known

Firestone Building Products Company, LLC
Material Safety Data Sheet

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SECTION 6: PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to Be Taken in Case Material is Released or Spilled:	Not Applicable
Precautions to Be Taken in Handling and Storing:	No special handling precautions. Store where materials are not exposed to excessive heat, cold or moisture.

SECTION 7: EXPOSURE CONTROLS / PERSONAL PROTECTION

Ventilation:	Store and use in well ventilated areas.
Respiratory Protection:	None required
Eye Protection:	None required
Skin Protection:	None required
Other:	None
Work / Hygienic Practices:	Wash exposed skin prior to eating, drinking or smoking and at the end of each shift. Wash contaminated clothing prior to reuse.

SECTION 8: PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor:	White, tan or gray in color. Essentially no odor.		
Flash Point:	Not Applicable	Lower Explosive Limit:	None
Method Used:	Not Applicable	Upper Explosive Limit:	None
Evaporation Rate:	Not Applicable	Boiling Point:	None
pH (undiluted product):	Not Applicable	Melting Point:	Unknown
Solubility in Water:	Insoluble	Specific Gravity:	Unknown
Vapor Density:	Not Applicable	Percent Volatile:	Unknown
Vapor Pressure:	Not Applicable		

SECTION 9: STABILITY AND REACTIVITY

Thermal Stability:	Stable
Hazardous Polymerization:	Will not occur
Conditions to Avoid:	None known

SECTION 10: TRANSPORTATION

Regulatory Agency:	Not Regulated
Proper Shipping Name:	Not Applicable
Hazard Classification:	Not Applicable
Identification Number:	Not Applicable
Labels Required:	Not Applicable
Other Requirements:	Not Applicable

Firestone Building Products Company, LLC
Material Safety Data Sheet

January 11, 2012

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SECTION 11: MISCELLANEOUS INFORMATION

Additional Comments:	This product is considered an article as per 29 CFR 1910.1200 and is, therefore, exempt from the requirements of the Hazard Communication standard.
Date of Previous MSDS:	March 10, 2009
Changes Since Previous MSDS:	Review only.
Telephone Number for Additional Information:	(317) 575-7190

DISCLAIMER

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UNA-EDGE METAL EDGE SYSTEM [DRIP-FLASHING]

Finish: Aluminum or galvanized steel

Pipe Flange: 13" diameter

Location: Roof

Available: Firestone

TECHNICAL INFORMATION SHEET

UNA-Edge DE DripEdge System

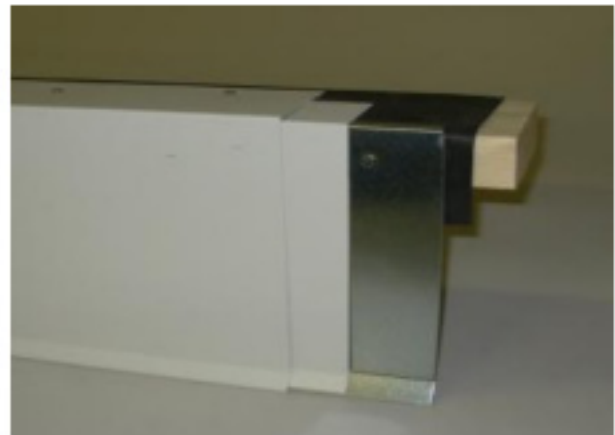
TIS #2071

ITEM NUMBER:

SYSTEM (COMPLETE) (LF)	W6EDE1SYST
CLEAT (LF)	W6EDE1CLET
COVER (LF)	W6EDE1COVR
SPLICES (EA)	W6EDE1SPLC
NAILS (CT 500)	W6EUE1NAIL

Description:

The Firestone UNA-Edge DE DripEdge System combines ease of installation with high quality materials. The UNA-Edge DE System can be used with all Firestone roofing systems as specified in Firestone Specifications and Details. The UNA-Edge DE system has the added benefit of being both ANSI/SPRI ES-1 and FM 4435 tested. Firestone also offers sheet metal, gravelstops, copings, counterflashing, scuppers and other components in a variety of shapes and sizes. Contact your Firestone Sales Representative for additional information.



Method of Application:

1. Refer to the UNA-Edge DE Application Instructions and details.

Physical Characteristics:

1. Can be used with all Firestone Roofing Systems.
2. All fasteners are supplied with each order.
3. 20-year finish warranty on Kynar® coating.

Packaging

1. UNA-Edge DE cover – 10' sections in cartons or crates depending on job, includes nails
2. Cleat - 10' sections in carton or crates depending on the job size, includes nails.
3. Splice plates – One 6" wide splice plate per 10' section plus one extra for every 100 lf or fraction thereof.

Storage:

- Store in original unopened containers protected from the weather.

Kynar® is a registered trademark of Arkema, Inc.

LEED Information:	Steel	Aluminum
Post Consumer Recycled Content:	23%	Varies
Pre Consumer Recycled Content:	7.3%	Varies
Manufacturing Location:	Anoka, MN	

ANSI/SPRI ES-1 Test Results:	Height (Max. Ft)	Wind (Max. mph)
Based on Category III/IV, Exposure D	60	120
	120	110
	250	90

FM 4435 Tested

TECHNICAL INFORMATION SHEET

Physical Properties:

<i>DE material:</i>	<i>Mill finish aluminum, aluminum with Kynar finish or anodized aluminum, G-90 galvanized steel with or without Kynar finish Also available in UltraPly TPO coated metal (24 ga steel only).</i>
<i>Gauge:</i>	<i>Aluminum: .040" (1.0 mm) or .050" (1.2mm) Steel: 24 ga. (.64 mm) or 22 ga. (.76 mm)</i>
<i>Face Heights:</i>	<i>Maximum rated system: 8" (203.2 mm)</i>
<i>Cleat:</i>	<i>20 gauge (.91 mm) galvanized steel</i>
<i>Splice plates:</i>	<i>Cover matching in either 24ga (.64 mm) G-90 steel or .032" (.81 mm) aluminum</i>
<i>Fasteners:</i>	<i>Cleat and Cover: 5d SS 1-3/4" annular ring common nails</i>

Please Contact your Firestone Technical Coordinator at 1-800-428-4511 for further information.

This sheet is meant to highlight Firestone products and specifications and is subject to change without notice. Firestone takes responsibility for furnishing quality materials which meet published Firestone product specifications. Neither Firestone nor its representatives practice architecture. Firestone offers no opinion on and expressly disclaims any responsibility for the soundness of any structure. Firestone accepts no liability for structural failure or resultant damages. Consult a competent structural engineer prior to installation if the structural soundness or structural ability to properly support a planned installation is in question. No Firestone representative is authorized to vary this disclaimer.



ALUMINUM DRIP EDGE FLASHING

Model Number: 68020

Location: Windows above Comfort-board Insulation

Dimensions:

Length: 50'

Width: 20"

Finish: Aluminum

Available: Home Depot

Price: \$46.75

My Store Location: **Williston #4501** (Change) Local Ad

Help | My Account (Sign In or Register)

SHOP BY DEPARTMENT

SEARCH ALL

aluminum flashing

GO

CART

MY LIST

Home > Search Results for "aluminum

Share Email Print



Zoom

Amerimax Home Products 20 in. x 50 ft. Aluminum Drip Edge Flashing

Model # 68020 Store SKU # 268909

★★★★★ (1) Write a Review

\$46.75 /EA-Each

Quantity:

STORE EXCLUSIVE

PICK UP IN STORE

+ ADD TO MY LIST

CUSTOMERS WHO VIEWED THIS ITEM PURCHASED...



\$11.99

BOEN
2 in. x 100 ft. Metal Flex
Corner Tape

Not yet rated

+ ADD TO CART



\$189.00

Stanley
1800 psi 1.4 GPM
Electric Pressure
Washer with High

★★★★★ (294)

+ ADD TO CART



\$1,439.10
~~Was \$1,599.00~~

LG Electronics
3.6 cu. ft. DOE High-
Efficiency All-in-One
Washer

★★★★★ (125)

+ ADD TO CART



Product Description | Specifications | Customer Reviews | More Info | Shipping Options

PRODUCT DESCRIPTION

Weather-proof your roof with 20 in. x 50 ft. Amerimax Aluminum Drip Edge Flashing. The flashing is easy to bend, cut and shape for most roofing projects.

- Rust-resistant aluminum
- Protects and covers the edges of your roof
- Easy to bend, cut and shape for most roofing projects
- Mill finish
- Note: Product may vary by store.
- MFG Brand Name : Amerimax Home Products
- MFG Model # : 68020
- MFG Part # : 68020

Return To Top

SPECIFICATIONS

Assembled Depth (in.)	5.5 in	Assembled Height (in.)	20 in
Assembled Width (in.)	5.5 in	Commercial / Residential	Residential
Finish Family	Unfinished	Gauge	0.0092
Item Package Type	No Package	Manufacturer Warranty	No
Material	Aluminum	Product Depth (in.)	5.5
Product Height (in.)	20	Product Weight (lb.)	10
Product Width (in.)	5.5 in	Roofing Product Type	Roll Flashing
Type	Metal	Unrolled height (ft.)	1.67
Unrolled length (ft.)	50		

Return To Top



PRE-ASSEMBLED HD FASTENERS WITH HD SEAM PLATES

Model Number:TPO3103

Dimensions:

Diameter: 3" round plate

Available: Firestone

**UltraPly™ TPO
 Flashing and Accessories**

Product	Item Code			Size	Packaging	Weight	Approx. Coverage Rates	Price (US \$)	
	White W56...	Tan W56...	Gray W56...						
UltraPly TPO Coated Metal	TPO3023	TPOT023	TPOG023	4' x 10' sheet	10 sheets/pallet	67 lb/sheet	---	\$235/sheet	
UltraPly TPO Walkway Pad	TPO3024	---	---	0.156" thick	30' x 50' roll	0.59 balesq ft	125 sq ft	\$4.40/sq ft	
UltraPly TPO X-Tread Walkway Pad (white)	TPO301X			0.540" thick	30' x 30' roll	1.3 balesq ft	75 sq ft	12.60/sq ft	
UltraPly TPO 8" Cover Strip - .860	TPO3058	TPOT058	TPOG058	8" x 50'	2 rolls/cdn	23 lb/cdn	100 lin ft	\$185/cdn	
UltraPly TPO Inside/Outside Molded Corners	TPO301C	TPOT01C	TPOG01C	---	20 corners/cdn	8 lb/cdn	---	\$160/cdn	
UltraPly TPO T-Joint Covers	TPO3014	TPOT014	TPOG014	4" x 4"	100/cdn	4 lb/cdn	---	\$63/cdn	
UltraPly TPO Universal Pipe Flashing	TPO301U	TPOT01U	TPOG01U	1" to 6"	10 boots & 10 clamps/cdn	15 lb/cdn	---	\$310/cdn	
UltraPly TPO Large Pipe Flashing	TPO3013	TPOT013	TPOG013	6" to 8"	10 boots & 10 clamps/cdn	16 lb/cdn	---	\$320/cdn	
UltraPly TPO Split Pipe Boots	Small	TPO3583	TPOT583	TPOG583	1" to 3"	10 boots & 10 clamps/cdn	8 lb/cdn	---	\$315/cdn
	Medium	TPO3586	TPOT586	TPOG586	3" to 5 1/2"	10 boots & 10 clamps/cdn	10 lb/cdn	---	\$340/cdn
	Large	TPO3589	TPOT589	TPOG589	5 1/2" to 8"	10 boots & 10 clamps/cdn	14 lb/cdn	---	\$450/cdn
UltraPly TPO Penetration Pockets	TPO301P	TPOT01P	TPOG01P	---	6 Pockets/roll	7 lb/cdn	---	\$200/cdn	
UltraPly TPO Reinforced Curb Corners	TPO3C07	TPOTC07	TPOGC07	7"	12 corners/cdn	7 lb/cdn	3 curbs	\$305/cdn	
	TPO3C13	TPOTC13	TPOGC13	13"	12 corners/cdn	11 lb/cdn	3 curbs	\$320/cdn	
	TPO3C19	TPOTC19	TPOGC19	19"	12 corners/cdn	16 lb/cdn	3 curbs	\$350/cdn	
	TPO3C25	TPOTC25	TPOGC25	25"	12 corners/cdn	20 lb/cdn	3 curbs	\$375/cdn	
	TPO3C31	TPOTC31	TPOGC31	31"	12 corners/cdn	24 lb/cdn	3 curbs	\$390/cdn	
	TPO3C37	TPOTC37	TPOGC37	37"	12 corners/cdn	29 lb/cdn	3 curbs	\$410/cdn	
UltraPly TPO Unsupported Flashing - .060	TPO3017	TPOT017	TPOG017	24"	50' roll	30 rolls/pallet	20 lb/roll	\$335/roll	
UltraPly TPO 18" Curb Flashing	TPO3018	---	---	18"	50' roll	45 rolls/pallet	25 lb/roll	\$100/roll	

**UltraPly QuickSeam™
 Flashing and Accessories**

Product	Item Code			Size	Packaging	Weight	Approx. Coverage Rates	Price (US \$)
	White W56...	Tan W56...	Gray W56...					
UltraPly QuickSeam RMA Strip	TPO3010	---	---	10' x 100'	1 roll/cdn	32 lb/cdn	100 lin ft	\$295/cdn
UltraPly QuickSeam RPF Strip	TPO3071	---	---	6"	2 rolls/cdn	34 lb/cdn	200 lin ft	\$385/cdn
UltraPly TPO 5/8" QuickSeam Flashing	TPO3017	TPOT017	TPOG017	5/8" x 100'	2 rolls/cdn	30 lb/cdn	200 lin ft	\$530/cdn
UltraPly TPO 3/4" QuickSeam Flashing	TPO3019	TPOT019	TPOG019	3/4" x 100'	1 roll/cdn	26 lb/cdn	100 lin ft	\$485/cdn
UltraPly QuickSeam Pipe Boot	TPO3033	---	---	1" to 6 1/2"	10 boots & 10 clamps/cdn	15 lb/cdn	---	\$370/cdn
UltraPly QuickSeam Outside Corner	TPO3031	---	---	---	20 corners/cdn	8 lb/cdn	---	\$635/cdn
UltraPly QuickSeam T-Joint Covers	TPO3034	---	---	4" x 4"	100/cdn	4 lb/cdn	---	\$370/cdn

Subject to change without notice.



TESCON PROFILE- DOUBLE SPLIT WINDOW TAPE

Location: Main House

Dimensions:

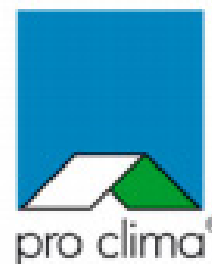
Length: 98' 5"

Width: 2 3/8"

Available: Four Seven Five

Price: \$53 a roll

TESCON PROFIL



Airtight/Waterproof tape with release paper – interior and exterior

Technical properties

- Adhesion by solvent-and plasticizer-free, age-resistant, water-resistant solid adhesive acrylic - waterproof
- Minimum application temp: 15 F°
- Bonding withstands temperatures between -40 F° and 194 F°
- Weather exposure: 3 months
- Shelf live: 24 months (dry and cool)
- Very low VOC content
- Color: dark blue
- High initial adhesion strength
- For air-tight sealing according DIN 4108-7

Roll width	2-3/8" (60mm)
Roll length	98'-5" (30m)

Technical Specs

Layer	Material
Carrying membrane	Special Polypropylene fabric
Reinforcement	Mesh
Adhesive	Solid Acrylic
Release paper (2 strips)	Single slit siliconized PE-Foil: app. 1/2"- 1 5/8" (app. 12 / 48 mm)
Release paper (3 strips)	Double slit siliconized PE-Foil: app. 1/2"- 7/8" – 1" (app. 12 / 23/ 25 mm)

Products

Air-Sealing System

[Window Tapes](#)

[Interior Tapes](#)

[Exterior Tapes](#)

[Sheathing/SIP Tapes](#)

[Air/Vapor Control Layer](#)

[House Wraps & WRBs](#)

[Duct & Pipe Airsealing](#)

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[Lightway Solar Tubes](#)

Mechanicals

[Lunos HRV Ventilation](#)

Quality Control

[PHPP/Energy Modeling](#)

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[Construction Details](#)

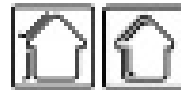
Window Tapes



TESCOON Profil- Double Split

\$53.00

A flexible waterproof airtight sealing tape with split release paper to make airtight connections of corners, windows and uneven surfaces. Suitable for interior and exterior use.



Good for Exterior and Interior use.

- To make airtight tape connections at windows, doors, wood framing (joist, beams, studs) corners, skylights, OSB, Plywood junctions, PE-sheets, air-barriers and intelligent vapor retarders.
- Segmented Siliconized PE release paper. Allowing you to "activate" a single part of the adhesive surface and to seal corners step by step.
- Made of flexible polypropylene creating an excellent bond with uneven substrates.
- Ensures added protection against piercing in corners due to its high elasticity.
- Waterproof
- UV resistant – withstands a minimum of 3 months of exposure
- Cost from \$0.48 per L.F.

• Roll width: 2-3/8" (60mm)

• Roll length: 98'-5" (30m)

[Product Specification \(PDF\)](#)

[Application Guide \(PDF\)](#)

AC 38 Test data:

- Air permeance 0.00004cfm/ft² (limit is 0.004cfm/ft²)
- Dry breaking force (ASTM D5034) – 73.3 (MD) and 58.5 (XMD)
- Passes AATCC 127 for water resistance per AC 38
- Over 38 Perms (ASTM E96-B), Sd-value < 0.05m (DIN EN 12572)
- Low temperature flexibility AC38 – pass
- Ultraviolet Exposure AC38 – pass
- Accelerated aging AC38 - pass

ASTM E84 (flames spread & smoke density)

- Flame spread : 0 (pass <100)
- Smoke development: 85 (pass <450)

Class A per NFPA No. 101

Four Seven Five
High Performance Building Supply
131 Union St. Brooklyn, NY 11231
info@foursevenfive.com
718-622-1600





TESCON VANA TAPE

Location: Main House

Dimensions:

Length: 98' 5"

Width: 2 3/8"

Available: Four Seven Five

Price: \$42 a roll

TESCON VANA



Airtight/Waterproof tape with release paper – interior and exterior

Technical properties

- Adhesion by solvent-and plasticizer-free, age-resistant, water-resistant solid adhesive acrylic - waterproof
- Minimum application temp: 15 F°
- Bonding withstands temperatures between -40 F° and 194 F°
- Weather exposure: 3 months
- Shelf life: 24 months (dry and cool)
- Very low VOC content
- Color: dark blue
- High initial adhesion strength
- Perm rating: 8 (Sd value 0.4m)
- Doesn't lose adhesion even in high humidity construction environments (during stucco/plaster work)
- The tape forms itself to slightly uneven substrates. The fabric and the adhesive can be molded around imperfections, making a tight and durable connection
- For air-tight sealing according DIN 4108-7

Roll width	2-6/16" (60mm)
Roll length	98'-5" (30m)

Technical Specs

Layer	Material
Carrying membrane	Special Polypropylene fabric
Reinforcement	Mesh
Adhesive	Solid Acrylic
Release paper	Siliconized release paper

Products

Air-Sealing System

- [Window Tapes](#)
- [Interior Tapes](#)
- [Exterior Tapes](#)
- [Sheathing/SIP Tapes](#)
- [Air/Vapor Control Layer](#)
- [House Wraps & WRBs](#)
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Openings

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- [Lightway Solar Tubes](#)

Mechanicals

- [Lunos HRV Ventilation](#)

Quality Control

- [PHPP/Energy Modeling](#)

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- [Construction Details](#)
- [Returns and refunds](#)

Manufacturers

- [Fakro](#)
- [Pro Clima](#)
- [Lunos](#)
- [Gutex](#)
- [Schöck](#)

Social Media



Exterior Tapes



TESCON Vana

\$42.00

All purpose interior and exterior grade air-sealing tape with high initial strength and superb adhesion quality.



Good for Exterior and Interior use.

- Permanent airtight bonds of overlaps between sheets of intelligent vapor retarders, airbarriers, Polyethelene sheets, PA, PP, Aluminium foil, exterior membranes and WRB.
 - Durable. Seals joints airtight between wood based panels (such as smooth OSB)
 - In combination with TESCON Primers adheres to porous wood panels, concrete sheetrock and brick.
 - UV resistant – withstands a minimum of 3 months of exposure
 - 60+ year life expectancy
 - Very high tensile strength
 - Air-tight tape forms itself to slightly uneven substrates
 - Waterproof tape and adhesion
 - Cost from \$0.36 per L.F.
-
- Roll width: 2-3/8" (60mm)
 - Roll length: 98'-5" (30m)

[Product Specification \(PDF\)](#)
[Application Guide \(PDF\)](#)

Related Products



Use in conjunction with INTELLO Plus for a long lasting smart air barrier.



Use TESCON #1 in applications that require ultimate flex with strong adhesion.

Quantity Discounts		
1-9	10-19	20+
\$42.00	\$39.00	\$36.00

Add to Cart:

[ADD TO ORDER](#)



L 4 X 3 X 1/4 ALUMINUM

Model: 12340

Location: Roof Gutter

Dimensions:

Length: 20'

Thickness: 1/4"

Height: 4"

Width: 3"

Available: Alumnium Distributing, Inc.

Item # 12340, Structural Unequal Angle (6061-T6)

Structural Unequal Angle (6061-T6)

The following specifications cover Aluminum 6061

6061 Aluminum is, by most any measure, the most commonly used aluminum alloy. It is specified in most any application due to its strength, heat treatability, comparatively easy machining, and weldability. If that were not enough, it is also capable of being anodized, adding a layer of protection for finished parts. The main alloy ingredients of 6061 aluminum are magnesium and silicon.

6061-T6 Aluminum

Physical and Mechanical Properties

Ultimate Tensile Strength, psi : 45,000

Yield Strength, psi : 40,000

Brinell Hardness : 95

Rockwell Hardness : B60

Chemistry

Aluminum (Al) : 95.8 - 98.6%

Chromium (Cr) : 0.04 - 0.35%

Copper (Cu) : 0.15 - 0.40%

Iron (Fe) : 0.007

Magnesium (Mg) : 0.8 - 1.2%

Manganese (Mn) : 0.15% max

Silicon (Si) : 0.4 - 0.8%

Zinc (Zn) : 0.25%

QQ A-200/8 (Extruded Shapes)

Chemistry Data :

Aluminum : Balance

Chromium : 0.04 - 0.35

Copper : 0.15 - 0.4

Iron : 0 - 0.7

Magnesium : 0.8 - 1.2

Manganese : 0.15 max

Other : 0.15 max

Remainder Each : 0.05 max

Silicon : 0.4 - 0.8

Titanium : 0.15 max

Zinc : 0.25 max

Principal Design Features

Probably the most commonly available, heat treatable aluminum alloy.

Applications

Commonly used in the manufacture of heavy-duty structures requiring good corrosion resistance, truck and marine components, railroad cars, furniture, tank fittings, general structural and high pressure applications, wire products, and in pipelines.

Machinability

Machinability in the harder T 4 and T6 tempers is good. It is notably less easy to machine in the annealed temper.

Forming

Easily cold worked and formed in the annealed condition. Stamping, bending, spinning, deep drawing are all readily accomplished using standard methods.

Welding

The alloy has very good welding characteristics and may be welded by all of the common welding techniques. Gas metal arc (MIG) or adequate time to give for thorough heating and the normal cooling. Precipitation hardening is done at 380-500°F (190-260°C) followed by 350°F for 8 hours and air cooling sections. Use alloy 4043 filler wire for best results, although a decrease in T 6 properties will result.

SPECIFICATIONS

3 x 4 x 1/4

Length	25 ft
WT/ FT	1.988



DIVISION 08 OPENINGS



PRESTIGE FRONT DOOR

Model Number: WSI-01

Location: Exterior Doors

Dimensions:

Length: 92' 11/16"

Width: 41'

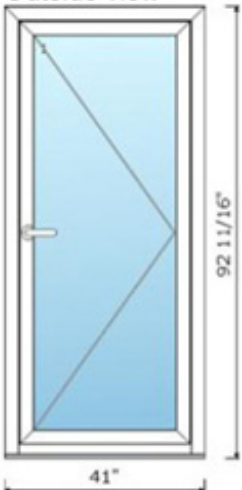
Finish: White

Available:

Price: 1889.85

8 WS1-01

Outside view



System: PRESTIGE FRONT DOORS OUT

Color (inside/outside): White/White

Filler:

1: GrudSel4+16H+Grud4+14H+GrudSel4, Triple glazed unit with 1 tempered glass and 2 tempered-low-emissivity Ug = 0.106

Sash: 1: Doorstep: ALIUMINUM

Lock: 3-point key-operated lock with latch

Handle: Door handle 35/2200, white

Accessories:

- Lock cylinder 50/50 - 1.00 unit

Dimension	Area				Price, USD	Quantity, Qnt	Total
1041 x 2354	2.5 m2				1888.85	1	1888.85



WALL MOUNT SLIDING DOOR HARDWARE

Model Number: 2610F72B or equal
Location: Bathroom, Master Bedroom
Length: 72"
Finish: Bronze
Available: A. Johnson Hardware

2610FB Bronze Wall Mount Sliding Door Hardware

[wall mount hardware index](#)



APPLICATION: INTERIOR, COMMERCIAL/RESIDENTIAL

MAXIMUM DOOR WEIGHT: 200lbs. [91kg.]

DOOR THICKNESS: 1" [25mm] to 1-3/4" [44mm]

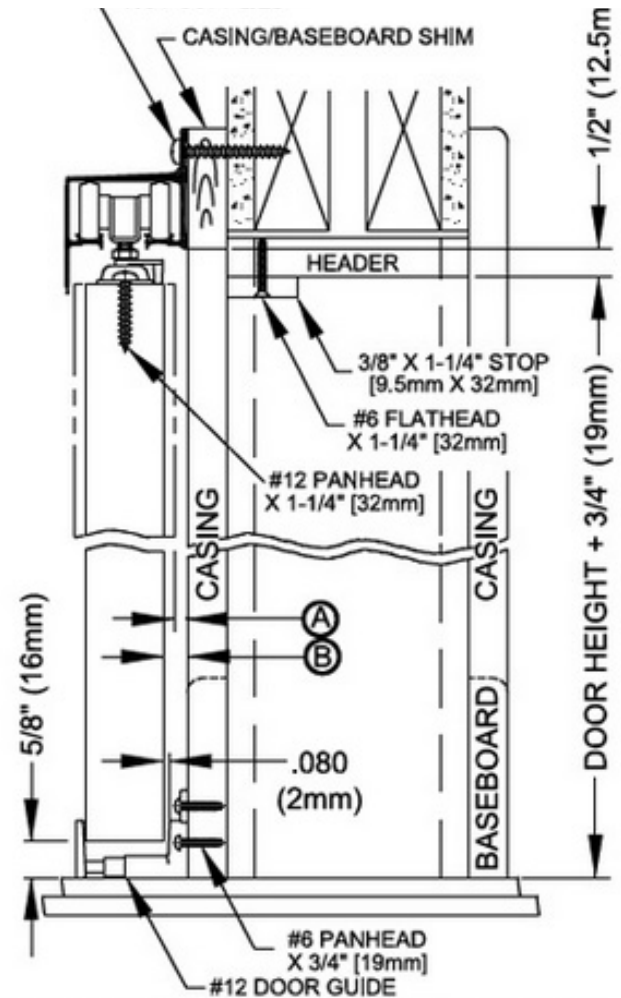
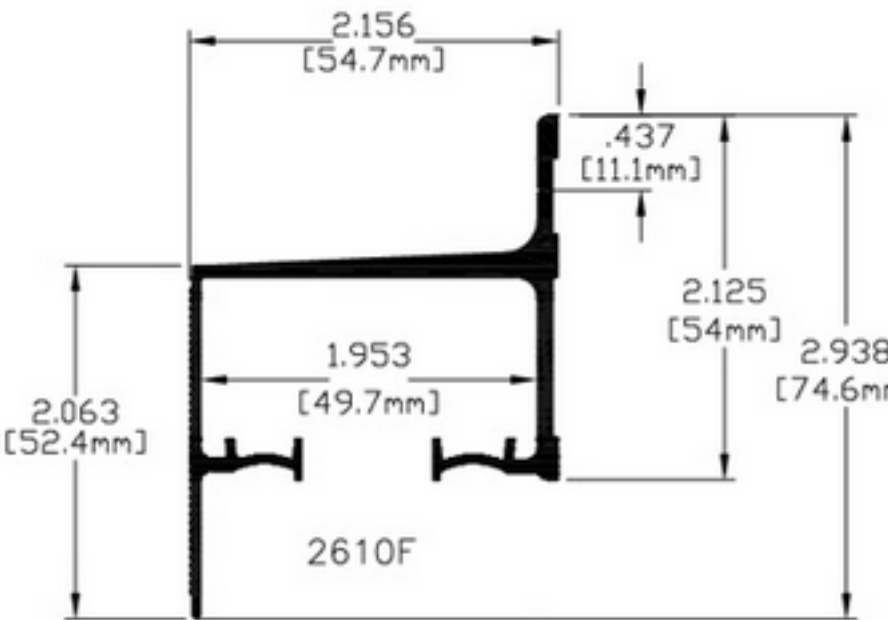
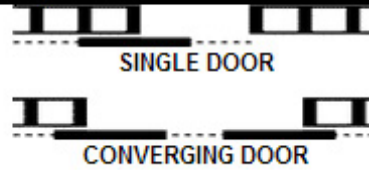


Click on images to enlarge

The 2610FB is a versatile and easy to install wall mounted sliding door hardware set featuring a dark bronze anodized track. The 2610FB is ideally suited for application where the installation of a Pocket Door is not structurally possible or not cost effective. Possible applications include closets, storage rooms or anywhere space is limited and a wall mounted sliding door will suit. The 2610FB is for interior use only and not suited for external applications.

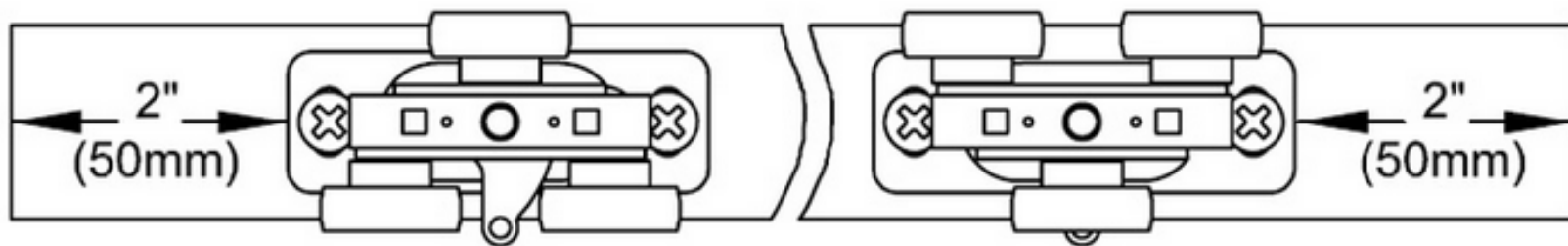


2610FB Installation Examples



GAP BETWEEN 1-3/4" (45mm) DOOR AND CASING IS 1/4" (6.4mm)

GAP BETWEEN 1-3/8" (35mm) DOOR AND CASING IS 7/16" (11mm)





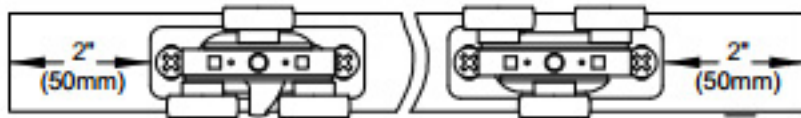
INSTRUCTIONS

FOR ONE 1-3/8" (35mm)
OR 1-3/4" (45mm)
DOOR UP TO 125 LBS.

2610F SERIES WALL MOUNT OPEN POCKET SINGLE DOOR

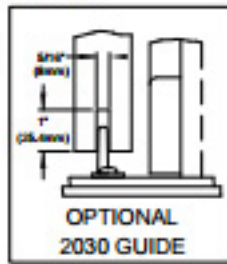
www.johnsonhardware.com

- Prepare opening to dimensions shown (or if existing opening, size door to fit).
- Mount track to wall. Drill holes in upper flange of track at stud locations, or where a solid anchor is assured. **TRACK MUST BE PERFECTLY LEVEL**, or door will not stay in position. Fasten 1/2" (12.5mm) above header.
- Casing/Baseboard shim will be required behind track flange if Casing and Baseboard is applied around opening.
- Dismantle #12 Guide and fasten base to jamb at floor.
- Insert hanger wheels into track. Alternate 2 wheel side of hanger so that 3 wheels are on each track leg for even weight distribution. Measure 2" (50mm) in from each edge. Fasten hanger plates on center with #12 X 1-1/4" (32mm) pan head screws. Make sure both lock tabs are on the non-fascia side.



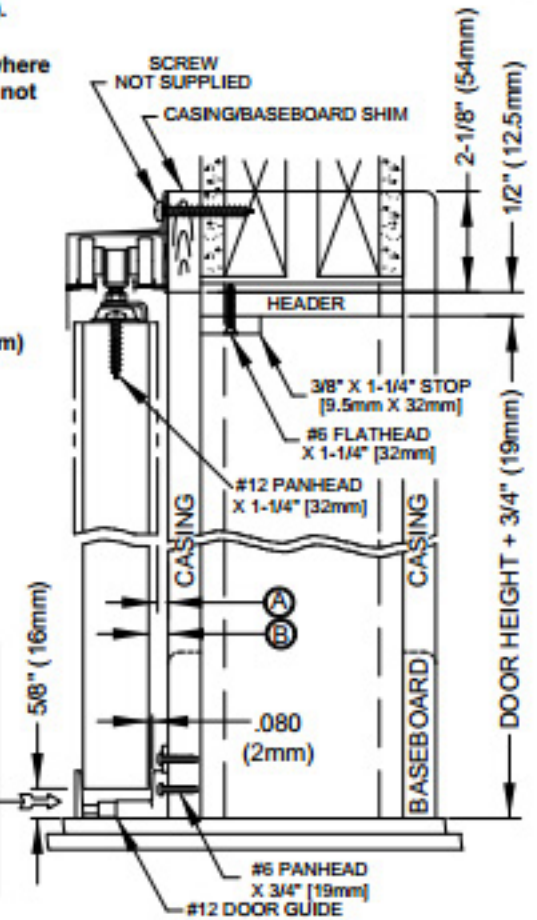
ALTERNATE WHEEL POSITIONS IN TRACK FOR EVEN WEIGHT DISTRIBUTION

- Hold door in opening and slip pivot pin into slot in door plate. When both pivots are seated, lock in place with locking tab. Reinsert front part of #12 Guide into base and move in until a slight clearance is obtained. Fasten Guide together with two screws.
- Position door over opening until desired closure is obtained and back edge of door is still in #12 Guide. Fasten one 1155 STOP to limit door travel. Open door until door is flush with jamb face and fasten other 1155 STOP to limit opening travel of door.



OPTIONAL
2030 GUIDE

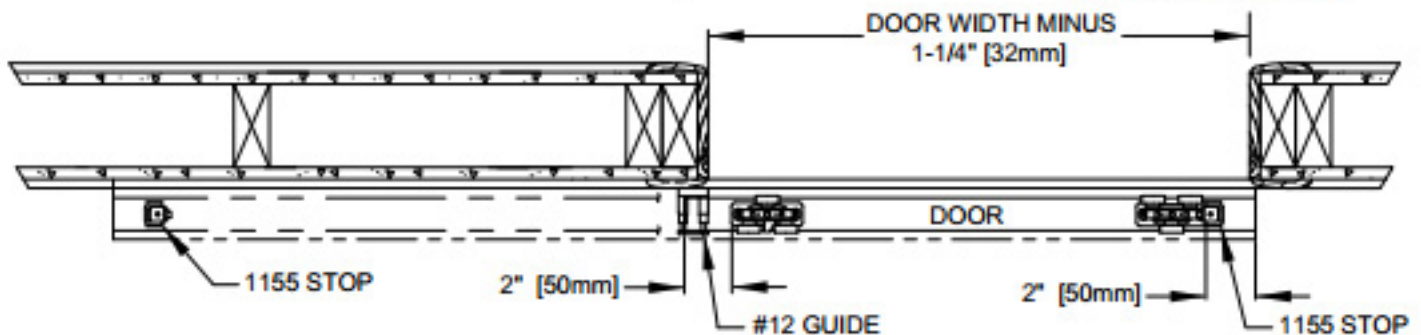
- Drill door 36" (914mm) from floor to fit pulls, and install.
- Trim around opening as desired.
- Attach 3/8" X 1-1/4" (9.5mm X 32mm) stop (not included) at edge of header with #6 X 1-1/4" (32mm) flat head screws.
- If required for alignment, adjust hangers with wrench.
- Snap on 2680 Endcaps.



- (A) GAP BETWEEN 1-3/4" (45mm) DOOR AND CASING IS 1/4" (6.4mm)
- (B) GAP BETWEEN 1-3/8" (35mm) DOOR AND CASING IS 7/16" (11mm)



SNAP ON 2680 ENDCAPS



PLEASE CALL 1-800-837-5664 IF PARTS ARE MISSING / DO NOT RETURN TO PLACE OF PURCHASE

IN2610FP

L.E. JOHNSON PRODUCTS, INC. - 2100 STERLING AVE. - ELKHART, IN 46516 - (574) 293-5664

Rev. 09/12

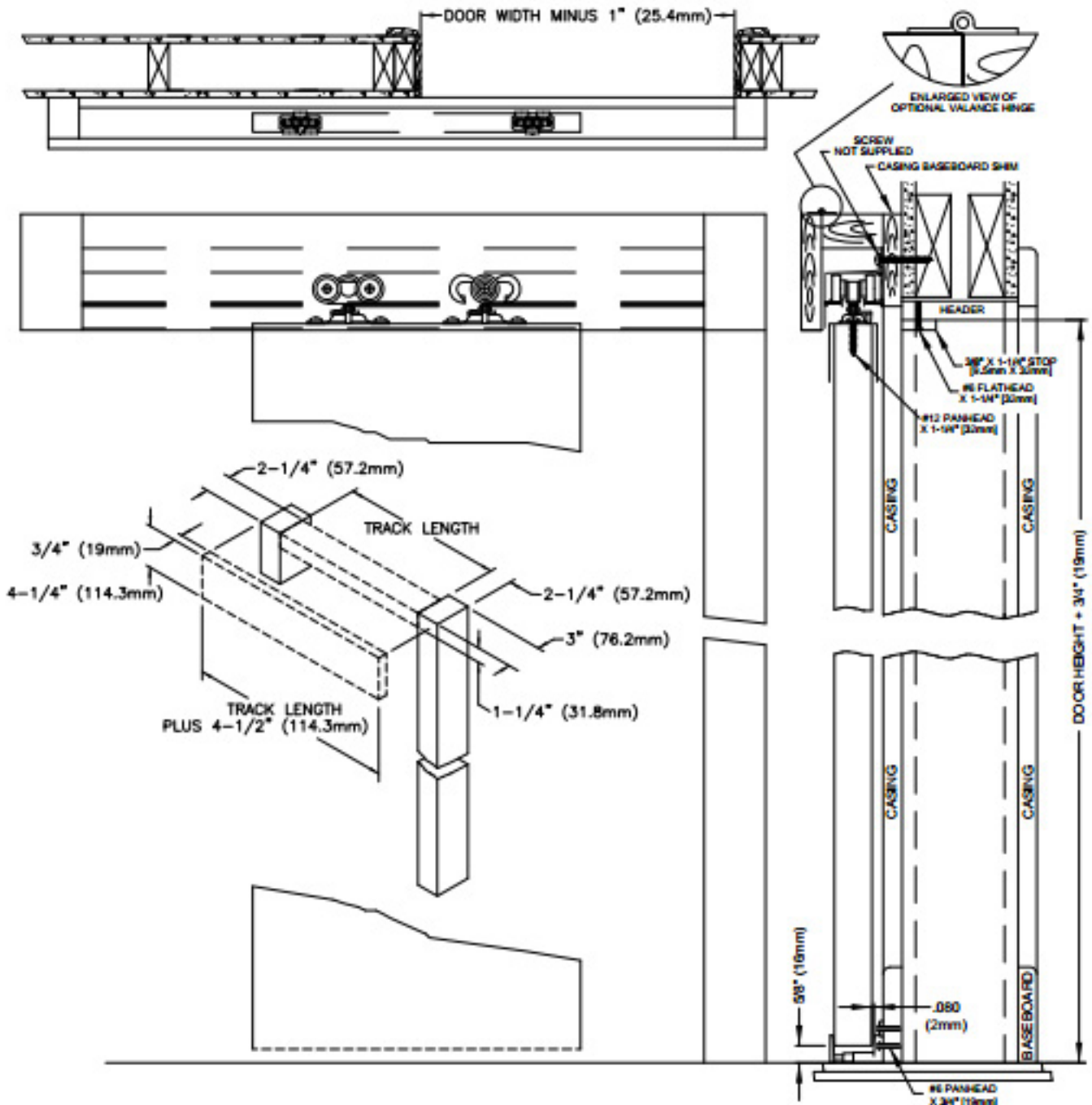
INSTRUCTION SHEET IS SUBJECT TO CHANGE



www.johnsonhardware.com

INSTRUCTIONS

2610F SERIES VALANCE & JAMB PROFILE





100SD SLIDING BYPASS DOOR HARDWARE

Model: 100602DR

Location: Master Bedroom Closet Door

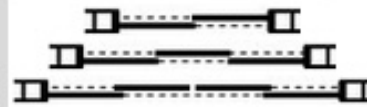
Dimensions:

Length: 60"

Available: A. Johnson Hardware

100SD Sliding Bypass Door Hardware

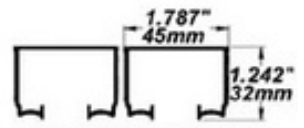
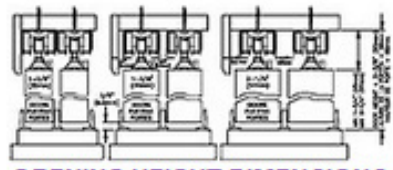
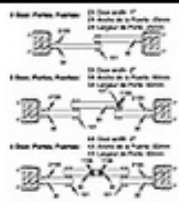
APPLICATION: INTERIOR, COMMERCIAL/RESIDENTIAL
MINIMUM DOOR THICKNESS: 1-3/8" [35mm]
MAXIMUM DOOR WEIGHT: 200lbs [91kg] EACH



The 100SD is a highly adaptable sliding door hardware set designed for high-end residential or light commercial applications where quality, trouble-free operation and long life is a necessity. 100SD hardware sets fit most standard door sizes and opening widths or can be ordered by the piece for custom installations.



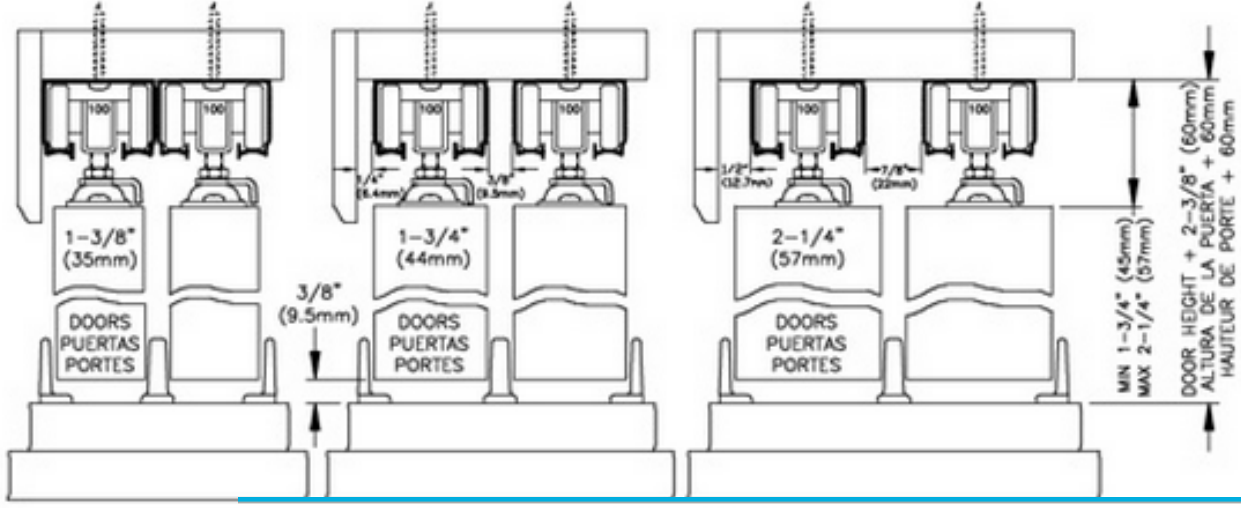
100SD Technical Information



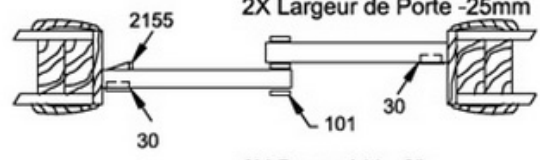
OPENING WIDTH DIMENSIONS

OPENING HEIGHT DIMENSIONS

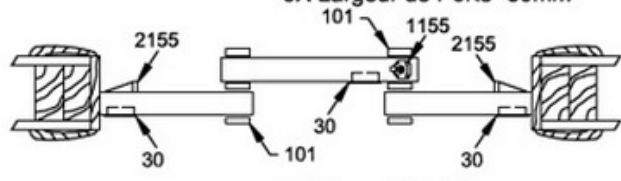
TRACK DIMENSIONS



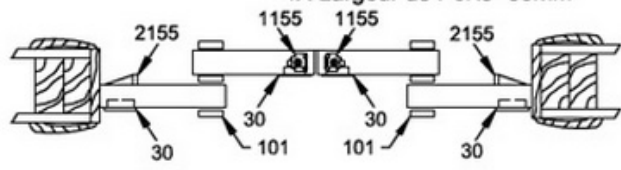
2 Door, Puertas, Puertas: 2X Door width -1"
 2X Ancho de la Puerta -25mm
 2X Largeur de Porte -25mm



3 Door, Puertas, Puertas: 3X Door width -2"
 3X Ancho de la Puerta -50mm
 3X Largeur de Porte -50mm



4 Door, Puertas, Puertas: 4X Door width -2"
 4X Ancho de la Puerta -50mm
 4X Largeur de Porte -50mm





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INSTRUCTIONS

100SD SERIES SLIDING DOOR HARDWARE

Minimum Door Thickness 1" (25mm)
 Maximum Door Weight 200lbs. (91kg).
 Grosor de la puerta mínimo 25mm
 Peso de la Puerta Máximo 91kg.
 Épaisseur minimale de la porte 25mm
 Poids maximal de la porte 91kg.

PREPARE OPENING CAREFULLY: MAKE SURE CORNERS ARE SQUARE, HEADER IS LEVEL AND JAMBS ARE STRAIGHT.

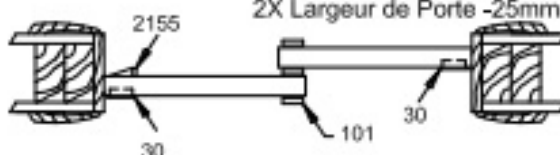
PREPARE LA ABERTURA CON CUIDADO: ASEGÚRESE QUE LAS ESQUINAS, ESTÉN EN ESCUADRA, QUE LA CABECERA ESTE NIVELADA, Y QUE LAS JAMBAS ESTÉN RECTAS.

PREPAREZ L'OUVERTURE AVEC PRECAUTION: ASSUREZ VOUS QUE LES COINS SONT A ANGLE DROIT, QUE LE LINTEAU EST A NIVEAU ET QUE LES MONTANTS SONT DROITS.

2 Door, Portes, Puertas: 2X Door width -1"
 2X Ancho de la Puerta -25mm
 2X Largeur de Porte -25mm

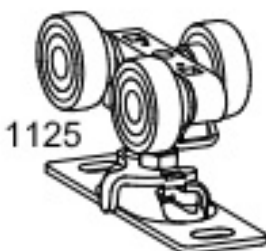


100

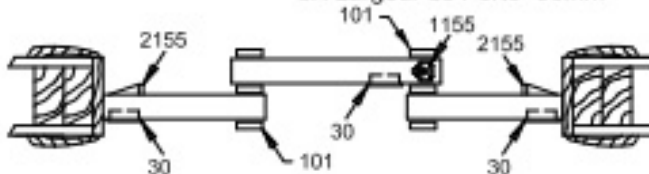


1155

3 Door, Portes, Puertas: 3X Door width -2"
 3X Ancho de la Puerta -50mm
 3X Largeur de Porte -50mm



1125

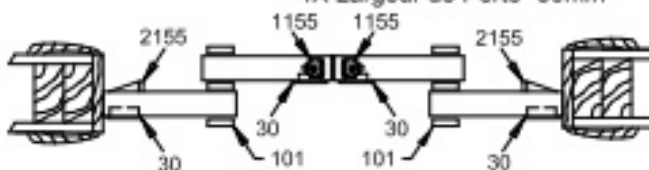


2155

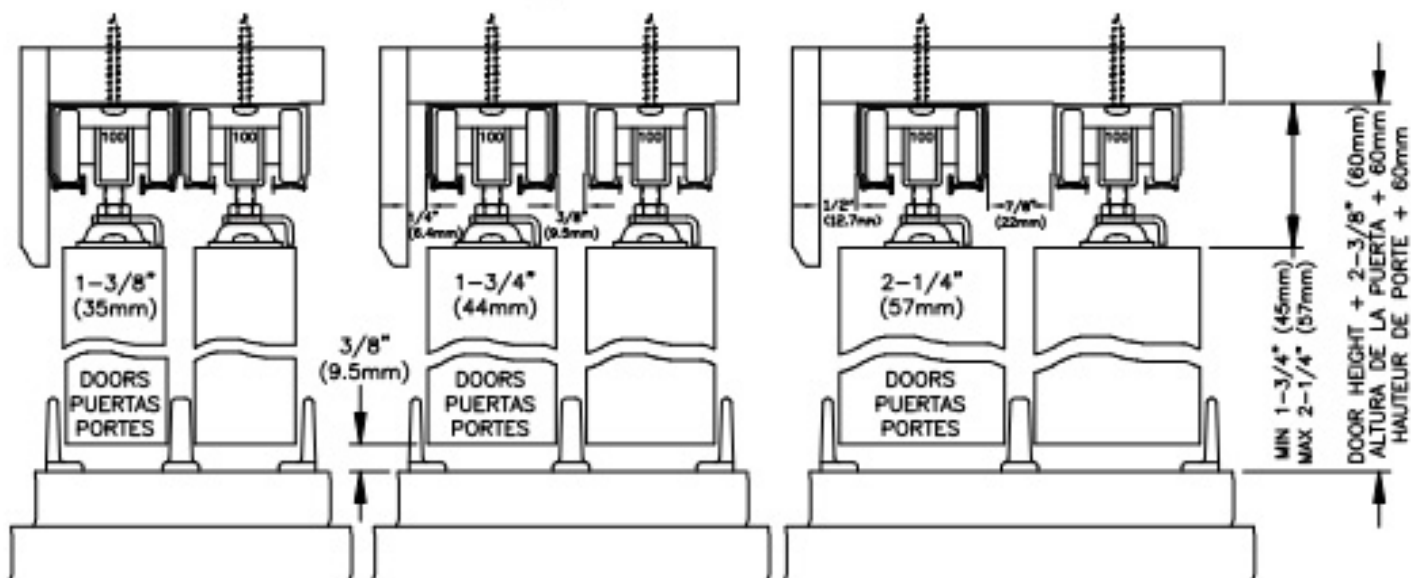
4 Door, Portes, Puertas: 4X Door width -2"
 4X Ancho de la Puerta -50mm
 4X Largeur de Porte -50mm



1712



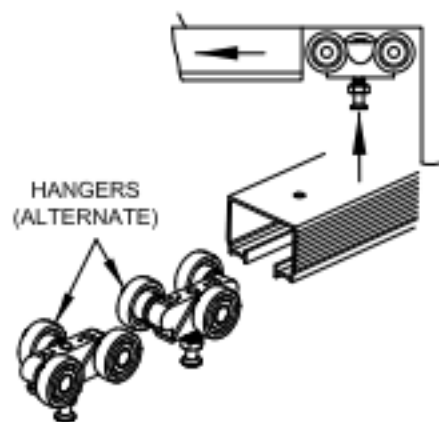
101



- 1 MOUNT TRACK TO HEADER:** Cut track to fit opening, insert 1125 Hangers and 1155 Stop (3 or 4 door openings only) into track and mount to header with 1-1/4" (32mm) pan head screws.

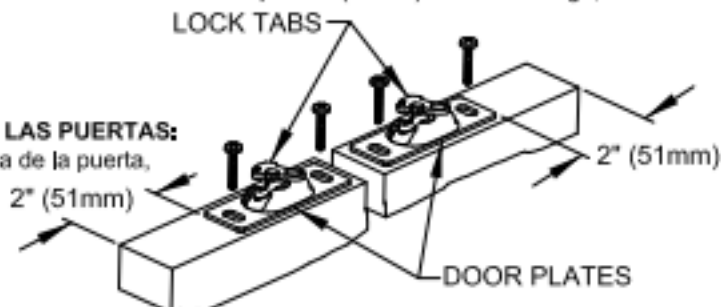
COLOQUE EL RIEL EN LA CABECERA: Corte el riel para que quepa en la abertura, inserte los Colgadores 1125 y el Freno 1155 (sólo para aberturas de 3 o 4 puertas) en el riel e instalelos en la cabecera con tornillos de cabeza redonda de 32mm.

MONTEZ LA GLISSIERE AU GUIDE: Coupez la glissière à la dimension de l'ouverture, insérez les Roulettes 1125 et le Stop 1155 (3 ou 4 ouvertures de porte seulement) dans la glissière et montez au guide en utilisant des vls à pan de 32mm.



- 2 MOUNT HANGER PLATES TO DOOR:** Fasten Door Plates to top of 2" (50mm) from each edge, on center line of door.

MONTAJE DE LAS PLACAS DE COLGAR EN LAS PUERTAS: Sujete las placas de la puerta a la parte de arriba de la puerta, a 50mm de cada borde, en el centro.

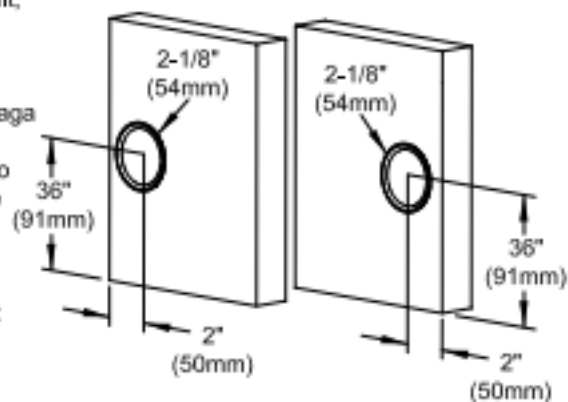


MONTEZ LES PLAQUES DE ROULETTES A LA PORTE: Fixez les plaques sur le dessus de la porte, à 50mm de chaque coin, au centre.

- 3 DRILL HOLES AND INSTALL PULLS:** #30 (2-1/8" (54mm) dia.) Pulls are furnished as standard. Bore 2-1/8" (54mm) hole through front of panel, snap pull into place. (If hole is a bit too large for a snug fit, wrap tape around rear of pull to enlarge.)

HAGA ORIFICIOS E INSTALE LOS TIRADORES: #30 (de 54mm de dia.) Los tiradores se proporcionan como elemento estándar. Haga un orificio de 54mm que atraviese la parte de enfrente del panel, haga que el tirador quede en su lugar como con resorte. (Si el orificio es demasiado grande para que quede ajustado, envuelva la parte de atrás del tirador con cinta para agrandarlo.)

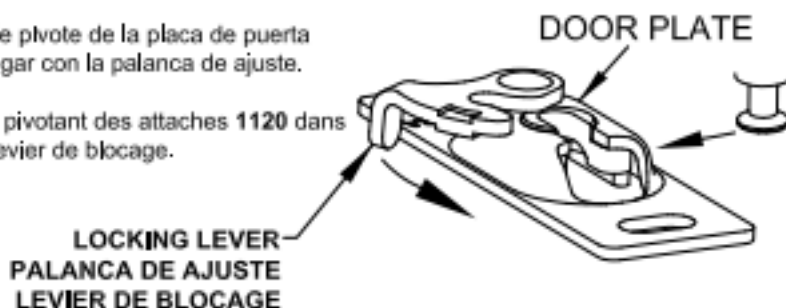
PERCEZ DES TROUS ET INSTALLEZ LES POIGNEES: #30 (54mm de diamètre). Les poignées fournies sont standard. Creusez un trou de 54mm à travers le panneau frontal. Fixez les poignées en place. (Si le trou est trop large pour un montage à frottement doux, enveloppez l'arrière de la poignée dans un ruban pour l'élargir.)



- 4 HANG DOORS:** Insert 1120 Door Plate's pivot pin into 1125 Hanger. Lock into place with locking lever.

INSTALE LA PUERTA: Coloque el perno de pivote de la placa de puerta 1120 en el Colgador 1125. Ajustelo en su lugar con la palanca de ajuste.

ACCROCHEZ LES PORTES: Insérez l'axe pivotant des attaches 1120 dans les roulettes 1125. Fixez sur place avec le levier de blocage.



- 5 ATTACH DOOR GUIDE:** Move both doors to one side of jamb. Place Door Guides **101** between doors and align doors with jamb. Attach door guides to floor with 1-1/4" (32mm) screw. Push doors to opposite jamb and put 1-1/4" (32mm) screw in other end of guides.

COLOQUE LA GUIA DE LA PUERTA: Mueva las dos puertas hacia un lado de la jamba. Coloque la Guia de la Puerta **101** entre las puertas y logre que las puertas queden alineadas con la jamba. Coloque la guía de la puerta en el piso con dos tornillos de 32mm. Mueva las puertas hacia la jamba del lado opuesto y coloque un tornillo de 32mm en el otro extremo de la guía.

ATTACHEZ LE GUIDE DE LA PORTE: Déplacez les deux portes vers un côté du montant. Placez le guide de la porte **101** entre les portes et alignez avec le montant. Attachez le guide de la porte au sol avec deux vis de 32mm. Poussez les portes vers le montant à l'opposé et attachez l'autre bout du guide avec une vis de 32mm.



- 6 ADJUST HANGERS,** If necessary, to plumb doors with jambs.

ADJUST LOS COLGADORES, si es necesario, para que las puertas queden a plomo con las jambas.

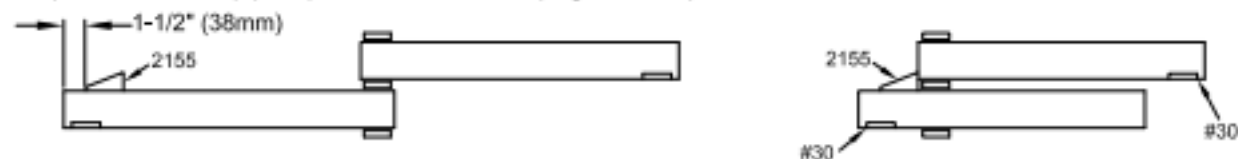
AJUSTEZ LES ROULETTES, si nécessaire, pour mettre à plomb les portes et les montants.



- 7 INSTALL 2155:** Attach **2155** Stop on rear of front door 1-1/2" (38mm) from jamb edge, 1/2" (13mm) from top (Hollow core) or 40" (1m) from bottom (Solid core doors). **Note:** If other than the **#30** pull is used, adjust location of stop to allow for access to rear door pull.

INSTALE EL 2155: Coloque el Freno **2155** en la parte de atrás de la puerta de enfrente a 38mm del borde de la jamba, a 13mm del borde de arriba (para puertas huecas) o a 1m del borde de abajo (para puertas sólidas). **Nota:** si se usa un tirado que no sea el **#30**, ajuste la ubicación del tope para permitir acceso al tirador trasero de la puerta.

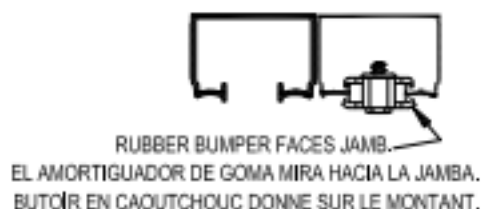
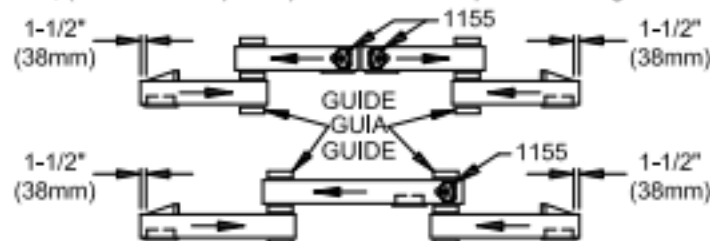
INSTALLEZ 2155: Attachez le Stop **2155** à l'arrière de la porte de devant à 38mm du côté du montant, 13mm du haut (Noyau Creux) ou 1m du bas (Portes à Noyau Solide). **Note:** Si une autre poignée est utilisée que **#30**, ajustez l'emplacement du stop pour permettre l'accès à la poignée de la porte arrière.



- 8 3 AND 4 DOOR 1155 STOP:** (3 door opening) Attach the **1155** Stop on rear track to the right of the center door, (4 door opening) Attach the **1155** Stops to the rear track in the center of the opening.

FRENO 1155 PARA 3 Y 4 PUERTAS: (aberturas de 3 puertas) Coloque el Freno **1155** en el riel de atrás a la derecha de la puerta central, (abertura de 4 puertas) Coloque los Frenos **1155** en el riel de atrás en el centro de la abertura.

3 ET 4 PORTES STOP 1155: (ouverture à 3 portes) Attachez le stop **1155** sur la glissière arrière à droite de la porte du centre, (ouverture à 4 portes) Attachez les Stops **1155** à la glissière arrière au centre de l'ouverture.



BOTTOM TRACK - THRESHOLD

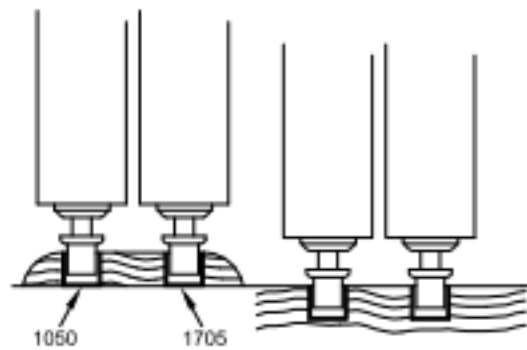
If desired, a bottom track may be used instead of the guide furnished. It may be used as a surface mount or imbedded in a routed out recess in the floor.

RIEL INFERIOR - UMBRAL

Si se desea, se puede usar un riel inferior en vez de la guía proporcionada. Se puede usar como soporte en la superficie o ser colocado en un canal empotrado en el piso.

GLISSIERE DU BAS - SEUIL

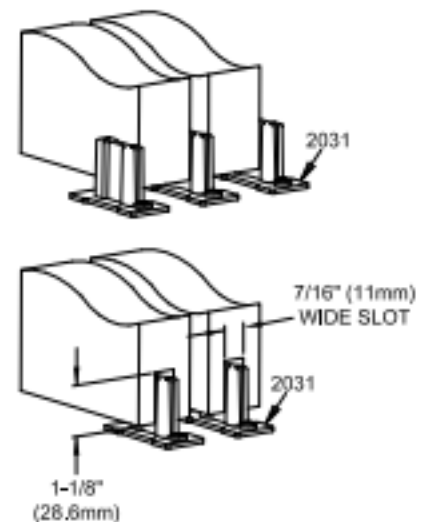
Si on le desire une glissière du bas peut être substituée au guide fourni. Elle peut être utilisée comme surface de montage ou comme retrait dans le sol.



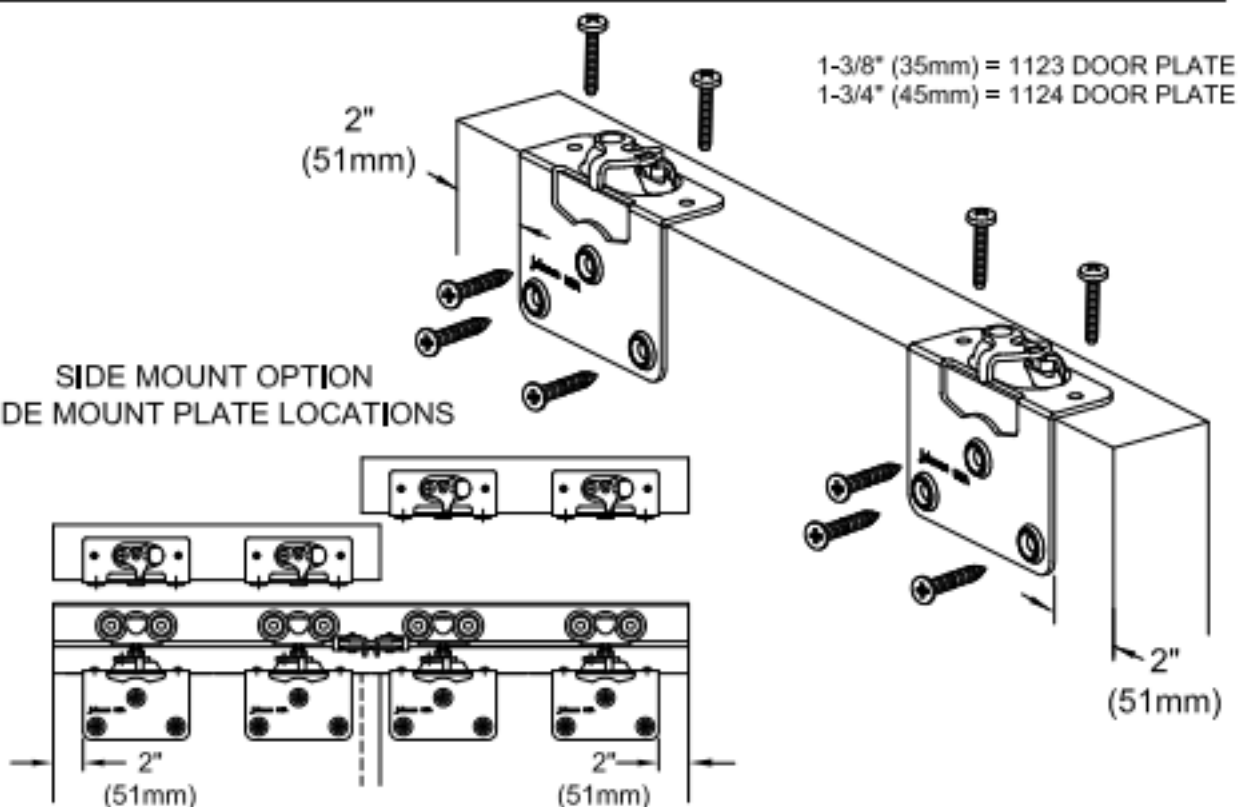
Optional Heavy Duty 2031 Door Guide may be used in place of the 101 Guides as shown in Step 5. Another option is to route a groove in the doors.

Se puede usar la Guía de puerta extrafuerte 2031, opcional, en lugar de las Guías 101, como se muestra en el Paso 5. Otra opción es hacer una ranura en las puertas.

Guide de porte 2031 solide, optionnel, peut être utilisé à la place des guides 101 comme illustré à l'étape 5. L'autre option est de diriger une rainure dans les portes.



SIDE MOUNT OPTION SIDE MOUNT PLATE LOCATIONS





5/4" X 6" TONGUE AND GROOVE PINE DECKING BOARDS

Location: Bathroom, Bedrooms
Finish: Vermont Natural Coatings
Species: Pine
Grade: #3 or better



AMERICAN INSTITUTE OF TIMBER CONSTRUCTION

7012 South Revere Parkway, Suite 140 • Englewood, Colorado 80112-3932 • Telephone: 303-792-9559

AITC 112-93

STANDARD FOR TONGUE-AND-GROOVE HEAVY TIMBER ROOF DECKING

Adopted as Recommendations April 21, 1993
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3. Sizes and Patterns.....	2
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6. Applications.....	5
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8. Weights of Installed Decking.....	8
9. Allowable Loads.....	9

1. INTRODUCTION

- 1.1 This Standard applies to sawn tongue-and-groove decking only and does not apply to laminated, panelized or other special decking systems. This standard covers species, sizes, patterns, lengths, moisture content, application, specifications, weights, applicable unit stresses, allowable loads and slope conversion values for heavy timber roof decking in nominal 2, 3, and 4 inch thickness, using single or double tongues and grooves.
- 1.2 Heavy timber roof decking is a specialty lumber product, constituting an important part of modern timber construction, which can be used for many applications to provide an all-wood appearance. Nominal three and four inch thick roof decking is especially well adapted for use with glued laminated arches and girders and is easily and quickly erected. To be suitable for purposes intended, heavy timber roof decking must be well manufactured to a low moisture content as described herein.
- 1.3 The lumber used in heavy timber roof decking shall be graded in accordance with the grading rules under which the species is customarily graded. The standard grading and dressing rules referenced in this Standard are:
 - (a) "Standard Grading Rules for Northeastern Lumber," 1991, Northeastern Lumber Manufacturers Association, 272 Tuttle Rd., PO Box 87A, Cumberland Center, ME 04021 (NELMA)
 - (b) "Standard Specifications for Grades of California Redwood Lumber," April 1992, Edition, Redwood Inspection Service, 405 Enfrente Dr., Suite 200, Novato, CA 94949 (RIS)

2 AITC Timber Construction Standards

- (c) "Standard Grading Rules For Southern Pine Lumber," 1991, Southern Pine Inspection Bureau, 4709 Scenic Highway, Pensacola, FL 32504 (SPIB)
- (d) "Standard Grading Rules for West Coast Lumber, No. 17," Effective September 1, 1991, West Coast Lumber Inspection Bureau, P.O. Box 23145, Portland, OR 97223 (WCLIB)
- (e) "Standard Grading Rules for Western Lumber," Effective September 1, 1991, Western Wood Products Association, 522 SW Fifth, Yeon Building, Portland, OR 97204 (WWPA)
- (f) "NLGA Standard Grading Rules for Canadian Lumber," Effective September 1, 1991, National Lumber Grades Authority, 260-1055 W. Hastings St., Vancouver B.C. V6E 2E9, Canada (a Canadian Agency) (NLGA)

Copies of these grading rules may be obtained from the respective grading rule agencies.

- 1.4 Moisture content requirements of the regional lumber grading rules may differ from this Standard. Unless their Standard is followed in all requirements, the product will not conform with this Standard.

2. SPECIES

- 2.1 The species usually available and currently used in this product, as well as the regional inspection agencies under which decking lumber is ordinarily graded, are given in Table 1.

3. SIZES AND PATTERNS

- 3.1 TWO INCH DECKING. The standard size is 2 x 6 inch and 2 x 8 inch, nominal, dressed at the moisture content specified herein to the actual size and V-grooved pattern shown in Figure 1. Other thicknesses and widths are also available. See regional grading rules listed in paragraph 1.3 for dimensions for individual species.
- 3.2 THREE AND FOUR INCH DECKING. Standard sizes are 3 x 6 inch and 4 x 6 inch, nominal, at the moisture content specified herein. Figures 2 and 3 provide typical dimensions for 3 x 6 inch and 4 x 6 inch nominal decking, respectively, illustrating a V-joint pattern. Other thicknesses and widths may be available.
- 3.3 Other patterns are available, including grooved, striated and eased joint. The regional grading rules agencies indicated in paragraph 1.3 should be contacted for further details concerning specific patterns and sizes.

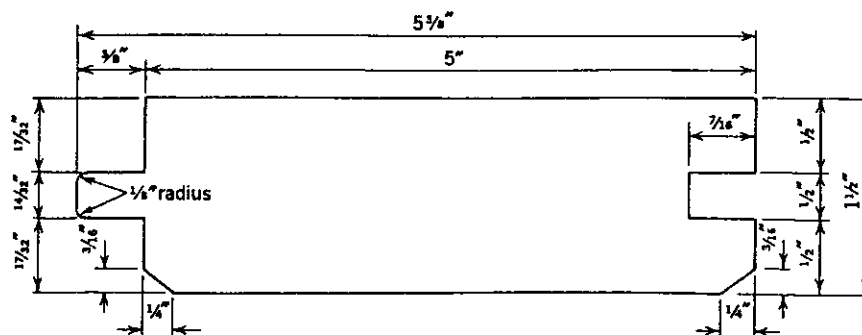


Figure 1. 2 x Nominal V-Joint Pattern. (See regional grading rules listed in paragraph 1.3 for dimensions for individual species.)

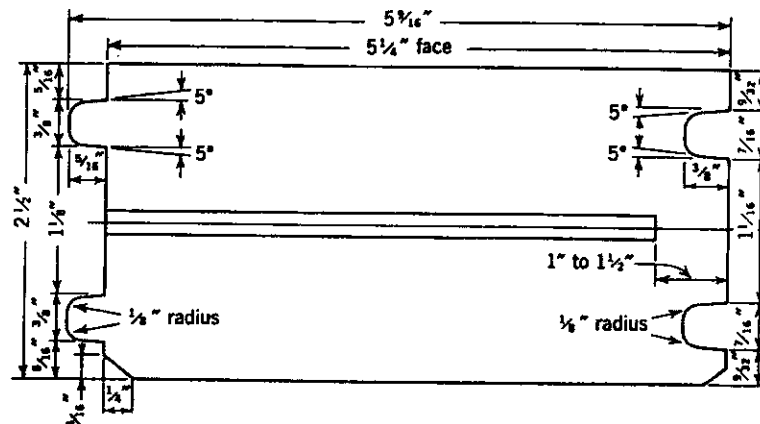


Figure 2. 3 x 6 inch, Nominal V-Joint Pattern. Note: Profile dimensions apply to all patterns. (See regional grading rules in paragraph 1.3 for dimensions for individual species.)

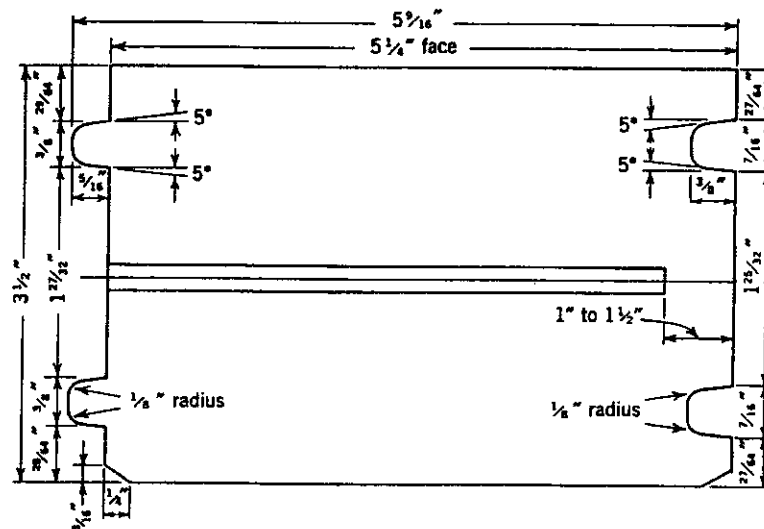


Figure 3. 4 x 6 inch Nominal V-Joint Pattern. Note: Profile dimensions apply to all patterns. (See regional grading rules in paragraph 1.3 for dimensions for individual species.)

4. LENGTHS

- 4.1 Decking pieces may be of specified length or may be random length. All layup arrangements except controlled random layup require that the specifier indicate the required lengths.
- 4.2 If pieces are for controlled random layup, odd or even lengths are permitted, and the minimum lengths based on fpm percentages shall be as follows:
 - 4.2.1 Two Inch Decking
 - * Not less than 40% to be 14 ft and longer
 - * Not more than 10% to be less than 10 ft
 - * Not more than 1% to be 4 to 5 ft
 - * Minimum length is limited to 75% of the span length (i.e., for 8 ft support spacing, 6 ft)
 - 4.2.2 Three Inch Decking
 - * Not less than 40% to be 14 ft and longer with at least 20% equal to or greater in length than the maximum span.
 - * Not more than 10% to be less than 10 ft
 - * Not more than 1% to be 4 to 5 ft

TABLE 1
HEAVY TIMBER DECK SPECIES

Species	Grading Rules Under Which Graded	Paragraph Number of Grading Rules Under Which Graded ^a	
		Select Quality ^b	Commercial Quality ^c
Cedar, Northern White Cedars, Western Cedars, Western (North) Coast Species	NELMA WWPA, WCLIB NLGA (Canadian) NLGA (Canadian)	15.1 55.11, 127-b 127-b 127-b	15.2 55.12, 127-c 127-c 127-c
Douglas Fir-Larch Douglas Fir-Larch (North) Douglas Fir (South) Fir, Balsam	WWPA, WCLIB NLGA (Canadian) WWPA NELMA	55.11, 127-b 127-b 55.11 15.1	55.12, 127-c 127-c 55.12 15.2
Hem-Fir Hem-Fir (North) Hemlock, Eastern-Tamarack Hemlock, Eastern-Tamarack (North)	WWPA, WCLIB NLGA (Canadian) NELMA NLGA (Canadian)	55.11, 127-b 127-b 15.1 127-b	55.12, 127-c 127-c 15.2 127-c
Hemlock, Western Hemlock, Western (North) Northern Species	WCLIB NLGA (Canadian) NLGA (Canadian)	127-b 127-b 127-b	127-c 127-c 127-c
Pine, Eastern White Pine, Eastern White (North) Pine, Northern	NELMA NLGA (Canadian) NELMA	15.1 127-b 15.1	15.2 127-c 15.2
Pine, Ponderosa Pine, Red Pine, Southern ^{d,e} Pine, Western White	NLGA (Canadian) NLGA (Canadian) SPIB NLGA (Canadian)	127-b 127-b 412 127-b	127-c 127-c 413 127-c
Redwood, California SPF, South Spruce, Coast Sitka Spruce, Eastern Spruce-Pine-Fir Spruce, Sitka Western Woods	RIS NELMA, WWPA NLGA (Canadian) NELMA NLGA (Canadian) WCLIB WWPA	315 15.1, 55.11 127-b 15.1 127-b 127-b 55.11	316 15.2, 55.12 127-c 15.2 127-c 127-c 55.12

^a When species may be graded under WCLIB and WWPA rules, the first paragraph number is for WWPA and the second for WCLIB rules.

^b Select quality grades are as follows for the grading rules indicated:

WCLIB;	Select Dex	SPIB;	Select Decking
WWPA;	Selected Decking	RIS;	Select Decking
NELMA;	Selected Decking	NLGA;	Select Decking

^c Commercial quality grades are as follows for the grading rules indicated:

WCLIB;	Commercial Dex	SPIB;	Commercial Decking
WWPA;	Commercial Decking	RIS;	Commercial Decking
NELMA;	Commercial Decking	NLGA;	Commercial Decking

^d Southern Pine decking is also available in the following grades:

Dense Standard Decking, para. 411; Dense Select Decking, para. 412.1; and Dense Commercial Decking, para. 413.1

^e Southern Pine is limited to the botanical species of longleaf, slash, shortleaf and loblolly. Lumber cut from trees of this species is classified as "Southern Pine" in the SPIB Grading Rules.

4.2.3 Four Inch Decking

- * Not less than 25% to be 16 ft and longer with at least 20% equal to or greater in length than the maximum span
- * Not less than 50% to be 15 ft and longer
- * Not more than 10% to be 5 to 10 ft
- * Not more than 1% to be 4 to 5 ft

5. MOISTURE CONTENT

- 5.1 TWO INCH DECKING. The maximum moisture content shall be 15%.
- 5.2 THREE AND FOUR INCH DECKING. The maximum moisture content shall be 19%.
- 5.3 Moisture content shall be determined by such methods as will assure these limitations.

6. APPLICATION

- 6.1 Tongue-and-groove wood decking is to be installed with tongues up on sloped or pitched roofs, and outward in direction of laying on flat roofs. It is to be laid with pattern faces down and exposed on the underside.
- 6.2 Each piece shall be square-end trim. When random lengths are furnished, each piece must be square-end trimmed across the face so that at least 90% of the pieces will be within 3/64 inches of square. The vertical end cut may vary from square to the bevel cut shown in Figure 4.

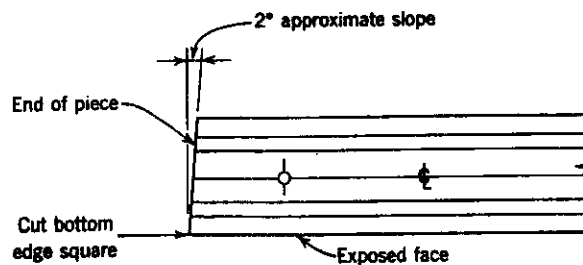


Figure 4. Beveled End Cut. (Beveled end cut is optional.)

6.3 NAILING SCHEDULES

- 6.3.1 Two Inch Decking. Each piece shall be toenailed through the tongue and face nailed with one nail per support, using 16d common nails.
- 6.3.2 Three and Four Inch Decking. Each piece should be toenailed at each support with one 40d nail and face nailed with one 60d nail. Courses shall be spiked to each other with 8 inch spikes at intervals not to exceed 30 inches through predrilled edge holes and with one spike at a distance not exceeding 10 inches from each piece. See figure 5 for drilling details.

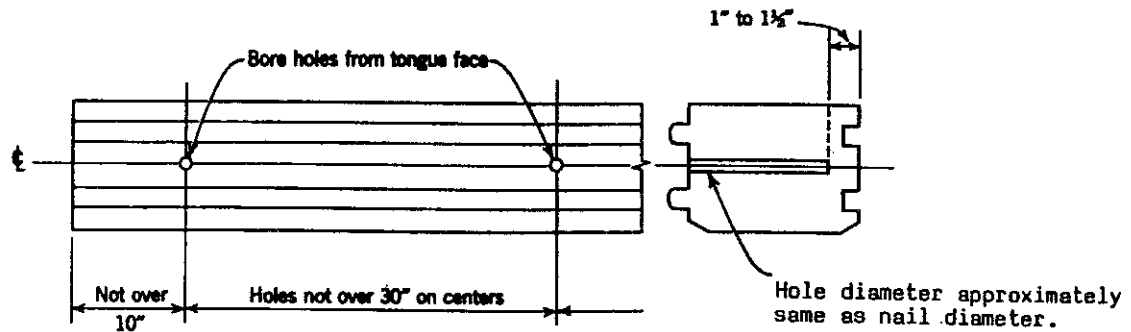


Figure 5. Boring Detail. Locate end holes not over 10 inches from end of piece.

6.4 Heavy timber decking may be installed in any of the following arrangements:

6.4.1 Simple Span. All pieces supported on two supports.

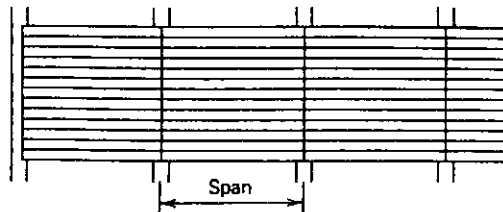


Figure 6. Simple Span Layout

6.4.2 Controlled Random Layout. This arrangement is applicable to 4 or more supports (3 or more spans). (With less than 4 supports, a special pattern requiring specified lengths must be used.) Joints in the same general line (within 6 inches of being in line each way) shall be separated by at least two intervening courses. In the end bays each piece must rest on at least one support and must continue over the first inner support for at least 2 ft. For 3 and 4 inch decking in the interior bays, occasional pieces not resting over a support may occur provided the ends of the adjacent pieces in the same course are continued for at least 2 ft over the next support. This condition shall not occur more than once in every 6 courses in each interior bay.

6.4.2.1 Two Inch Decking. There shall be a minimum distance of 2 ft between end joints in adjacent courses. To provide lateral restraint for the supporting member, the pieces in at least the first and second courses must bear on at least two supports with end joints in these two courses occurring in alternate supports. A maximum of seven intervening courses is allowed before this pattern is repeated. If some other provision, such as plywood overlayment, is made to provide continuity, this pattern is not necessary.

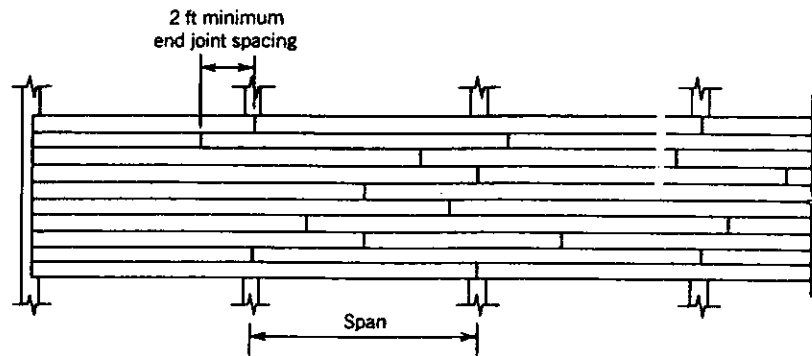


Figure 7. Controlled Random Layup. (Two inch decking)

6.4.2.2 Three and Four Inch Decking. There shall be a minimum distance of 4 ft between end joints in adjacent courses.

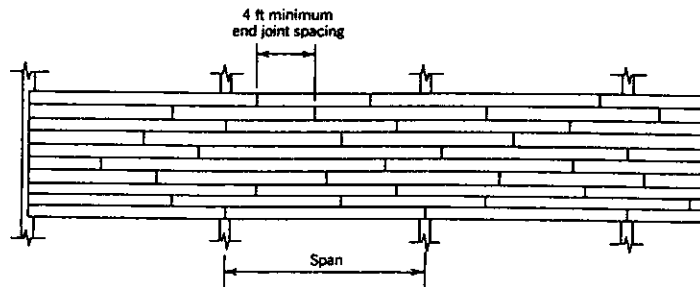


Figure 8. Controlled Random Layup. (Three & Four inch decking)

6.4.3 Cantilever Spans With Controlled Random Layup. When the overhang does not exceed 1-1/2 ft, 2 ft and 3 ft for nominal 2 inch, 3 inch, and 4 inch thick decking, no special considerations for layup are necessary. The maximum cantilever length for controlled random layup is limited to 0.3 times the length of the first adjacent interior span. For cantilever overhangs exceeding the normal overhang, but not exceeding the maximum, a structural fascia should be fastened to each decking piece to maintain a continuously straight roof line. Also, there shall be no end joints in the cantilevered portion or within 1/2 the span ($L/2$) of the outer support.

6.4.4 Cantilevered Pieces Intermixed. This arrangement is applicable to 4 or more supports (3 or more spans). Pieces in the starter course and every third course are simple span. Pieces in other courses are cantilevered over the supports with end joints at alternate quarter or third points of the spans, and each piece rests on at least one support. A tie between supports is provided by the simple span courses of the arrangement.

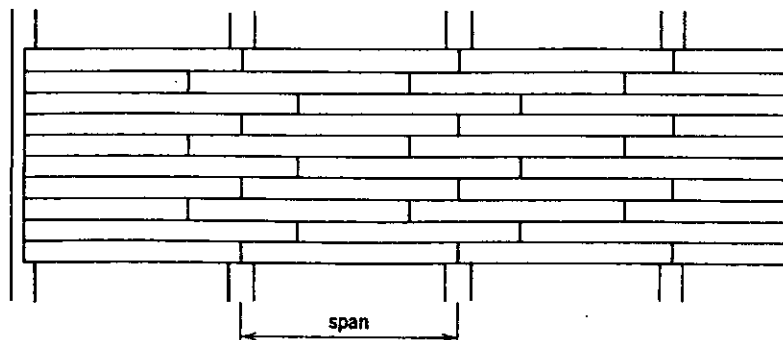


Figure 9. Cantilevered Pieces Intermixed Layup.

- 6.4.5 Combination Simple and Two-Span Continuous. Alternate pieces in end spans are simple span; adjacent pieces are two-span continuous. End joints are staggered in adjacent courses and occur over support.

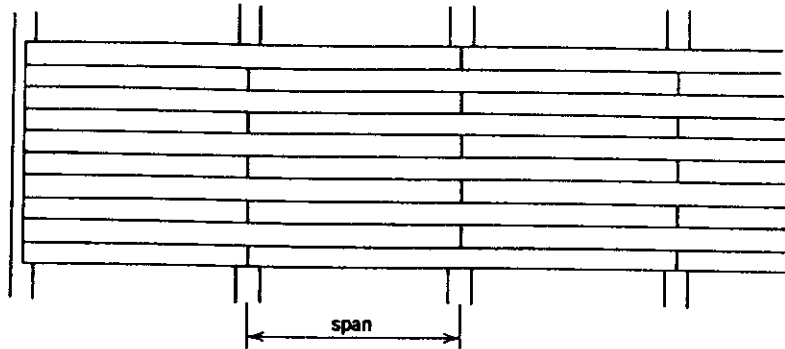


Figure 10. Combination Simple and Two-Span Continuous Layout.

- 6.4.6 Two-Span Continuous. All pieces are supported on three supports. All end joints occur in line on every other support.

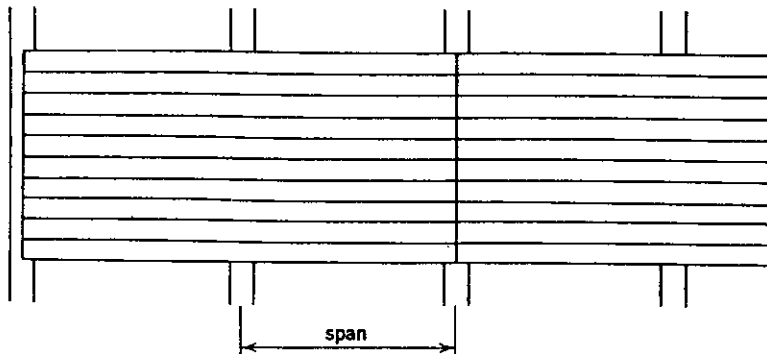


Figure 11. Two-span Continuous Layout.

7. SPECIFICATIONS

- 7.1 The specifications for tongue-and-groove decking for the various species as well as inspection and shipping provisions shall be as specified in the standard grading rules under which the species is graded and shall be subject to such other provisions of the standard grading rules as may be applicable. (See paragraph 1.3).
- 7.2 **SELECT QUALITY.** Decking of this quality is recommended for construction for which good strength and fine appearance are desired. Knots and other natural characteristics of specified limitations are permitted.
- 7.3 **COMMERCIAL QUALITY.** Decking of this quality is recommended and customarily used for the same purposes served by the higher quality when appearance requirements are less critical.

8. WEIGHTS OF INSTALLED DECKING (See Table 2, page 10)

9. ALLOWABLE LOADS

9.1 Allowable loads for heavy timber decking may be determined by entering Tables 4 through 8 with the appropriate bending stress and modulus of elasticity values, and using the lower of the tabulated load values from the tables for the nominal thickness and span under consideration. Bending stress and modulus of elasticity values for wood decking species, as recommended by the regional lumber rules-writing agency by which the species is graded, are given in Table 3.

9.2 Allowable loads given in Tables 4 through 8 are for the simple span and controlled random layup arrangements illustrated under paragraph 6.3.1 and 6.3.2.

9.3 CONTROLLED RANDOM LAYUP LOAD VALUES

9.3.1 Two Inch Decking. The allowable loads for controlled random layup, limited by bending, for 2 inch nominal thickness decking as given in Table 4, are based on the standard engineering formula for a three-equal-span, continuous, uniformly-loaded member; however, only 2/3 of the moment of inertia for the cross section was used in calculating the loads. Loads limited by deflection as given in Table 5, are for the maximum deflections in the end spans.

9.3.2 Three and Four Inch Decking. The allowable loads for controlled random layup of 3 and 4 inch nominal thickness decking as given in Tables 6 through 8, are based on the standard engineering formula for a three-equal-span, continuous, uniformly-loaded member; however, only 80% of the moment of inertia for the cross section was used in calculating the loads. Loads limited by deflection, as given in Tables 7 and 8, are for the maximum deflections in the end spans.

9.3.3 The percentage adjustments in moment of inertia discussed in 9.3.1 and 9.3.2 take into account the differences between continuous decking without joints and the controlled random layup of decking as specified herein. The factors of 2/3 for 2 inch and 80% for 3 and 4 inch decking were selected after careful evaluation of tests and previous experience.

9.3.4 When controlled random layup as specified herein is used for unequal spans, non-uniform loading, cantilever action, or conditions other than covered herein by the tabulated values, the same adjustment factors should be applied to the moment of inertia used in standard engineering formulas representing the actual conditions of load and span.

9.4 The allowable load given in Tables 4 and 5 are based on a maximum moisture content of 15% for 2 inch decking. The allowable loads given in Tables 6 through 8 are based on a maximum moisture content of 19% for 3 and 4 inch decking. If the maximum moisture content is limited to 15% for 3 and 4 inches decking, the allowable bending stress valued given in Table 7 may be multiplied by 1.08 and the modulus elasticity values in Tables 7 and 8 may be multiplied by 1.05.

TABLE 2
WEIGHTS OF INSTALLED HEAVY TIMBER DECKING
IN POUNDS PER SQUARE FOOT OF ROOF SURFACE^a

Species	THICKNESS			
	1-1/2 in. net ^b (2 in. nom.)	2-1/2 in. net ^c (3 in. nom.)	3-1/2 in. net (4 in. nom.)	Agency ^d
Cedar, Northern White	2.7	4.5	6.3	1
Cedars, Western ^d	3.0	4.9	6.9	3,4
Cedars, Western (North) ^e	2.9	4.8	6.7	2
Coast Species ^e	3.9	6.4	9.0	2
Douglas Fir-Larch ^d	4.3	7.2	10.1	3,4
Douglas Fir-Larch (North) ^e	4.4	7.3	10.3	2
Douglas Fir (South)	4.1	6.9	9.6	3
Fir, Balsam	3.2	5.4	7.5	1
Hem-Fir ^e	3.7	6.1	8.6	3,4
Hem-Fir (North) ^e	3.8	6.3	8.8	2
Hemlock, Eastern-Tamarack ^e	3.8	6.3	8.8	1
Hemlock, Eastern-Tamarack (North) ^{d,e}	4.0	6.7	9.4	2
Hemlock, Western	4.0	6.7	9.4	4
Northern Species ^f	2.9-5.3	4.8-8.8	6.7-12.4	2
Pine, Eastern White	3.3	5.5	7.7	1
Pine, Eastern White (North)	3.4	5.7	8.0	2
Pine, Northern ^f	3.8-4.5	6.3-7.5	8.8-10.5	1
Pine, Ponderosa	4.1	6.9	9.6	2
Pine, Red	3.7	6.1	8.6	2
Pine, Southern ^e	4.6	7.6	10.7	5
Pine, Western White	3.4	5.7	8.0	2
Redwood, California	3.7	6.1	8.6	6
SPF, South	3.7	6.1	8.6	1,3
Spruce, Coast Sitka	3.3	5.5	7.7	2
Spruce, Eastern	3.6	6.0	8.4	1
Spruce-Pine-Fir ^f	3.0-4.0	5.1-6.7	7.1-9.4	2
Spruce, Sitka	3.6	6.0	8.4	4
Western Woods ^f	2.9-4.6	4.8-7.6	6.7-10.7	3

^a All weights given in Table 2 are based on volume at 14% moisture content rounded to the nearest 0.1 lb. These weights may be reduced by 2% where 15 % maximum moisture content is specified (which is an average of 12% M.C.).

^b For a net thickness of 1-7/16 in., multiply tabulated weights by a factor of 0.958.

^c For a net thickness of 2-5/8 in., multiply tabulated weights by a factor of 1.05.

^d Species listed are as graded by the following grading rules agencies: NELMA (1), NLGA (Canadian) (2), WWPA (3), WCLIB (4), SPIB (5), and RIS (6).

^e Weights given for this species grouping are based on the weighted average of the standing timber volume. Lumber from some areas or species within the group may vary slightly from the average.

^f Weights given for this species grouping are the range of weights for species that could be included.

- 9.5 Allowable load values given in Tables 4 and 6 are based on normal duration of loading. If decking is used for purposes where other durations of load control, increase the tabulated values by multiplying by the appropriate duration of load factor C_D as follows:

0.9	for permanent load;
1.15	for 2 months duration, as for snow;
1.25	for 7 days duration;
1.6	for wind or earthquake; or
2.0	for impact

These increases are not cumulative.

- 9.6 The allowable load tables are for total uniformly distributed vertical loads, including dead and live, in pounds per square foot on a horizontal roof surface. When roofs have only a moderate slope (3 in 12 or less), dead and live load may be added together without adjustment for slope of roof.
- 9.7 For steeper sloping roofs, it is customary to adjust the load so as to express them in terms of square feet of roof surface. (See Figures 12 and 13.) For example, 10 lb dead load (6.7 lb for deck and 3.3 lb for roofing) is the vertical load of one square foot of sloping roof surface. Snow load is usually expressed in pounds per square foot of the horizontal projection of the sloping roof surface. Therefore, the vertical snow load must be converted to the vertical psf load of sloping roof surface. For example, a 60 psf snow load on the horizontal projection is equivalent to a vertical load of 46 psf on a 10 in 12 sloping roof surface. This combined with 10 psf dead load results in a total vertical load of 56 psf on the 10 in 12 sloping roof surface. The 56 psf total vertical load may then be converted to two components, one perpendicular or normal to the roof surface, and one parallel to the roof surface. In the example, the vertical load of 56 psf is equivalent to a component perpendicular to the roof of 43 psf and a component parallel to the roof of 37 psf.
- 9.8 Where decking is installed with the longitudinal axis parallel to the slope, the component perpendicular to the roof surface will produce bending and deflection; the parallel component will produce compression. The design value for compression parallel to grain may be taken as that of No. 2 structural joists and planks grade for the species. The decking must be designed for bending and axial stresses as well as deflection.
- 9.9 Where decking is installed with the longitudinal axis perpendicular to the slope, the load component perpendicular to the roof surface produces bending and deflection; the parallel load component, as may be induced by wind forces, is transferred by diaphragm action.

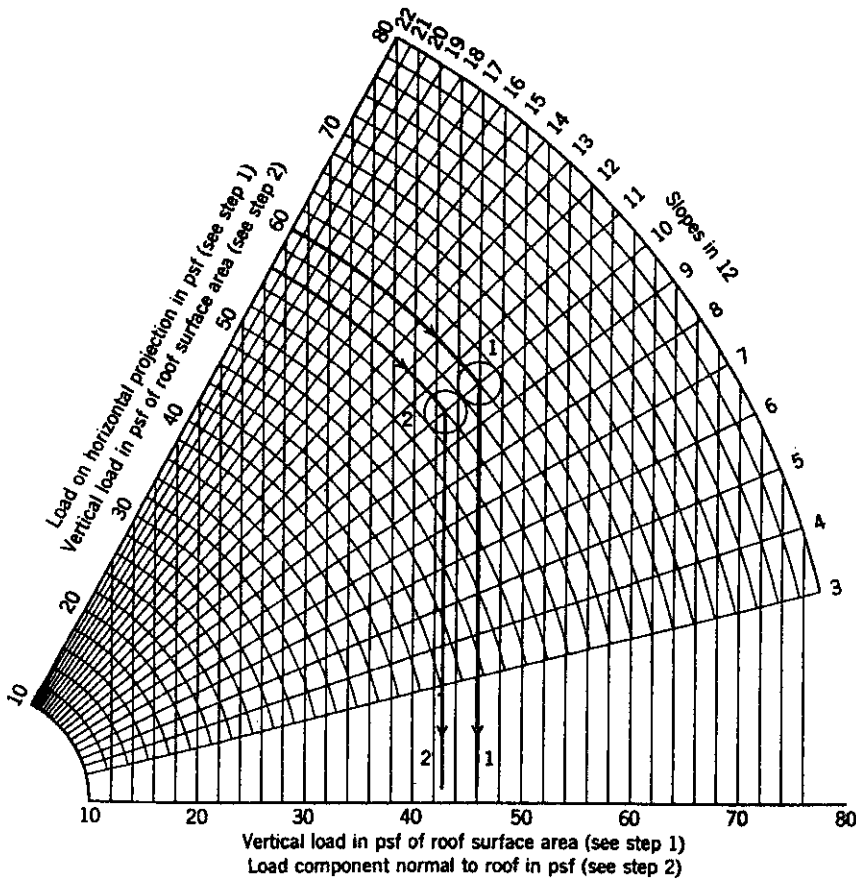


Figure 12. LOAD CONVERSION
 Example: 60 psf live load and 10 psf dead load on 10 in 12 slope. Step 1: 60 psf live load on horizontal projection equals 46 psf on roof surface areas. Vertical load on 10 in 12 roof slope. Step 2: 10 psf on roof surface area for dead load plus 46 psf on roof surface area live load, equals 56 psf on roof surface area combined load acting vertically; 56 psf on roof surface area vertical total load equals 43 psf normal to roof slope which causes bending and deflection.

Figure 13. SPAN CONVERSION
 Example: 25 ft horizontal span equals 28 ft slope span when slope is 6 in 12. Use 28 ft in determining board footage.

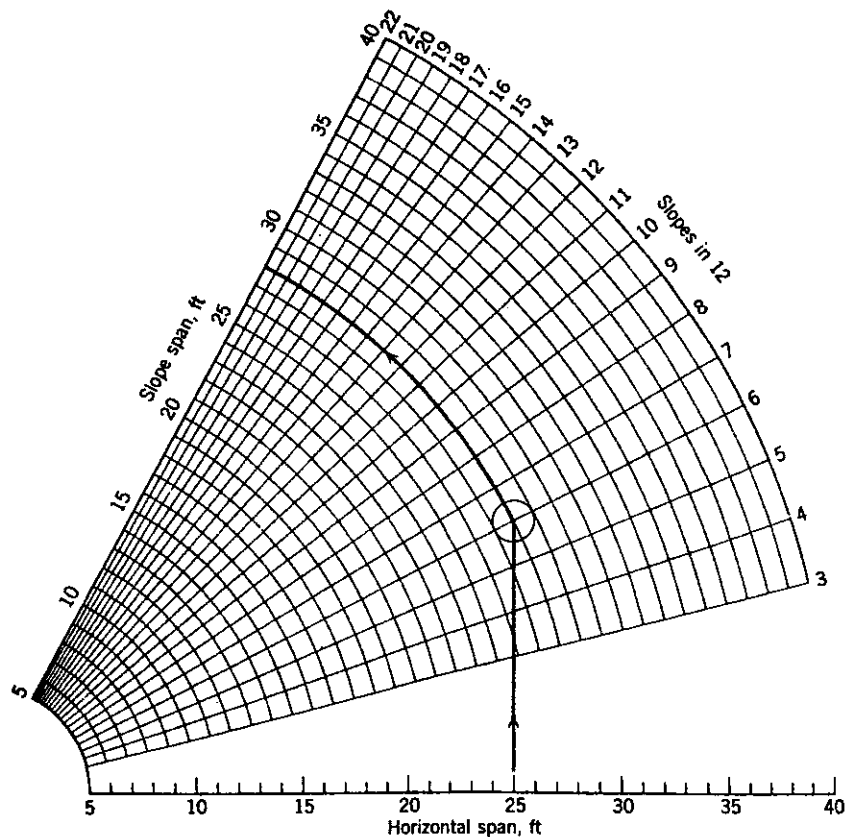


TABLE 3
BENDING STRESS AND MODULUS OF ELASTICITY
VALUES FOR HEAVY TIMBER DECKING SPECIES^a

Species	Select Quality		Commercial Quality		Agency ^d
	Bending Stress ^b psi	Modulus of Elasticity ^c psi	Bending Stress ^b psi	Modulus of Elasticity ^c psi	
Cedar, Northern White	1100	800,000	950	700,000	1
Cedars, Western	1450	1,100,000	1200	1,000,000	3,4
Cedars, Western (North)	1400	1,100,000	1200	1,000,000	2
Coast Species	1450	1,500,000	1200	1,400,000	2
Douglas Fir-Larch	2000	1,800,000	1650	1,700,000	3,4
Douglas Fir-Larch (North)	2000	1,800,000	1650	1,700,000	2
Douglas Fir (South)	1900	1,400,000	1600	1,300,000	3
Fir, Balsam	1650	1,500,000	1400	1,300,000	1
Hem-Fir	1600	1,500,000	1350	1,400,000	3,4
Hem-Fir (North)	1500	1,500,000	1300	1,400,000	2
Hemlock, Eastern-Tamarack	1700	1,300,000	1450	1,100,000	1
Hemlock, Eastern-Tamarack (North)	1700	1,300,000	1450	1,100,000	2
Hemlock, Western	1750	1,600,000	1450	1,400,000	4
Hemlock, Western (North)	1750	1,600,000	1450	1,400,000	2
Northern Species	1050	1,100,000	875	1,000,000	2
Pine, Eastern White	1300	1,200,000	1100	1,100,000	1
Pine, Eastern White (North)	1050	1,200,000	875	1,100,000	2
Pine, Northern	1550	1,400,000	1300	1,300,000	1
Pine, Ponderosa	1450	1,300,000	1250	1,100,000	2
Pine, Red	1350	1,300,000	1100	1,200,000	2
Pine, Southern	1650	1,600,000	1650	1,600,000	5
Pine, Western White	1300	1,400,000	1050	1,300,000	2
Redwood, California	1700	1,100,000	1350	1,000,000	6
SPF, South	1350	1,400,000	1100	1,200,000	1,3
Spruce, Coast Sitka	1450	1,700,000	1200	1,500,000	2
Spruce, Eastern	1300	1,500,000	1100	1,400,000	1
Spruce-Pine-Fir	1400	1,500,000	1150	1,300,000	2
Spruce, Sitka	1500	1,500,000	1250	1,300,000	4
Western Woods	1300	1,200,000	1100	1,100,000	3

^a The design values in bending (F_b), except for Redwood, are based on decking 4 in. thick. For other thicknesses, multiply by the size factor, C_F , as follows:

Thickness	C_F
2 in.	1.70
3 in.	1.04

Design values for visually graded decking are those recommended by the regional lumber rules writing agencies. These values are used on decking that is used where the moisture content in-service will not exceed 19%. When the moisture content in-service exceeds 19% for an extended period of time, the tabular design values shall be multiplied by the wet service factor, C_M , as follows:

C_M		
F_b	F_{cL}	E
0.85*	0.67	0.9

* When (F_b) (C_F) < 1150 psi, $C_M = 1.0$ for bending.

^b Repetitive member use values.

^c The tabulated values for modulus of elasticity are the average for the species grouping. For information concerning coefficient of variation of modulus of elasticity, see the appropriate grading rules for the species.

^d Stresses listed are as assigned by the following grading rules agencies: NELMA (1), NLGA (Canadian) (2), WWPA (3), WCLIB (4), SPIB (5), and RIS (6).

^e If specified as "close grain", California Redwood select decking is assigned a bending stress value of 1850 psi and a modulus of elasticity value of 1,400,000 psi when used at 19% M.C.

TABLE 4
TWO INCH NOMINAL THICKNESS^a
ALLOWABLE ROOF LOAD LIMITED BY BENDING

Bending Stress, psi	Allowable Uniformly Distributed Total Roof Load ^{b,c,d,e} , psf													
	Simple Span, ft							Controlled Random Layup Span, ft						
	6	7	8	9	10	11	12	6	7	8	9	10	11	12
875	73	54	41	32	26	22	18	61	45	34	27	22	18	15
950	79	58	44	35	28	24	20	66	48	37	29	24	20	16
1000	83	61	47	37	30	25	21	69	51	39	31	25	21	17
1050	88	64	49	39	32	26	22	73	54	41	32	26	22	18
1100	92	67	52	41	33	27	23	76	56	43	34	28	23	19
1150	96	70	54	42	34	28	24	80	59	45	35	29	24	20
1200	100	73	56	44	36	30	25	83	61	47	37	30	25	21
1250	104	76	58	46	38	31	26	87	64	49	39	31	26	22
1300	108	80	61	48	39	32	27	90	66	51	40	32	27	22
1350	112	83	63	50	40	33	28	94	69	53	42	34	28	23
1400	117	86	66	52	42	35	29	97	71	55	43	35	29	24
1450	121	89	68	54	44	36	30	101	74	57	45	36	30	25
1500	125	92	70	56	45	37	31	104	76	58	46	38	31	26
1550	129	95	73	57	46	38	32	108	79	60	48	39	32	27
1600	133	98	75	59	48	40	33	111	82	62	49	40	33	28
1650	138	101	77	61	50	41	34	114	84	64	51	41	34	29
1700	142	104	80	63	51	42	35	118	87	66	52	42	35	30
1750	146	107	82	65	52	43	36	122	89	68	54	44	36	30
1900	158	116	89	70	57	47	40	132	97	74	59	48	39	33
2000	167	122	94	74	60	50	42	139	102	78	62	50	41	35

- ^a Based on 1-1/2 in. net thickness. To determine allowable loads for 1-7/16 in. net thickness, multiply tabulated values by 0.918.
- ^b To determine allowable uniformly distributed total roof loads for other span conditions, use simple span load values for combination simple span and two-span continuous, and two-span continuous layups; and use controlled random layup road values for cantilevered pieces intermixed layup.
- ^c Duration of load, $C_D = 1.0$ used in this table. For other durations of load, adjust by the appropriate factor.
- ^d No increase for size effect has been applied ($C_F = 1.00$). F_b values have been previously adjusted.
- ^e Dry conditions of use.

TABLE 5
TWO INCH NOMINAL THICKNESS^a
ALLOWABLE ROOF LOAD LIMITED BY DEFLECTION

Modulus of Elasticity psi	Deflection Limit ^b	Allowable Uniformly Distributed Total Roof Load ^{c,d} , psf											
		Simple Span, ft					Controlled Random Layup Span, ft						
		6	7	8	9	10	6	7	8	9	10	11	12
700,000	<i>ℓ</i> /180	32	20	14	10	7	42	27	18	12	9	7	5
	<i>ℓ</i> /240	24	15	10	7	5	32	20	13	9	7	5	4
800,000	<i>ℓ</i> /180	37	23	16	11	8	48	30	20	14	10	8	6
	<i>ℓ</i> /240	28	17	12	8	8	36	23	15	11	8	6	4
900,000	<i>ℓ</i> /180	42	26	18	12	9	54	34	23	16	12	9	7
	<i>ℓ</i> /240	31	20	13	9	7	41	26	17	12	9	7	5
1,000,000	<i>ℓ</i> /180	46	29	20	14	10	60	38	25	18	13	10	8
	<i>ℓ</i> /240	35	22	15	12	8	45	28	19	13	10	7	6
1,100,000	<i>ℓ</i> /180	51	32	21	15	11	66	42	28	20	14	11	8
	<i>ℓ</i> /240	38	24	16	11	8	50	31	21	15	11	8	6
1,200,000	<i>ℓ</i> /180	56	35	23	16	12	72	46	30	21	16	12	9
	<i>ℓ</i> /240	42	26	18	12	9	54	34	23	16	12	9	7
1,300,000	<i>ℓ</i> /180	60	38	25	18	13	78	49	33	23	17	13	10
	<i>ℓ</i> /240	45	28	19	13	10	59	37	25	17	13	10	7
1,400,000	<i>ℓ</i> /180	65	41	27	19	14	84	53	36	25	18	14	10
	<i>ℓ</i> /240	49	31	20	14	10	63	40	27	19	13	10	8
1,500,000	<i>ℓ</i> /180	69	44	29	20	15	90	57	38	27	20	15	11
	<i>ℓ</i> /240	52	33	22	15	11	68	43	29	20	15	11	8
1,600,000	<i>ℓ</i> /180	74	47	31	22	16	96	61	41	28	21	16	12
	<i>ℓ</i> /240	56	35	23	16	12	72	46	30	21	16	12	9
1,700,000	<i>ℓ</i> /180	79	50	33	23	17	102	64	43	30	22	17	13
	<i>ℓ</i> /240	59	37	25	17	13	77	48	32	23	17	12	10
1,800,000	<i>ℓ</i> /180	83	52	35	25	18	108	68	46	32	23	18	14
	<i>ℓ</i> /240	62	39	26	18	14	81	51	34	24	18	13	10

^a Based on 1-1/2 in. net thickness. To determine allowable loads for 1-7/16 in. net thickness, multiply tabulated value by 0.880.

^b For a deflection limit *ℓ*/360, use 1/2 the tabulated value for a deflection limit of *ℓ*/180.

^c To determine allowable uniformly distributed total roof loads for other span conditions, multiply controlled random layup load values by the following factors:

Cantilevered pieces intermixed;	1.05
Combination simple span and two-span continuous;	1.31
Two-span continuous;	1.85

^d Dry conditions of use.

TABLE 6
THREE AND FOUR INCH NOMINAL THICKNESS
ALLOWABLE ROOF LOAD LIMITED BY BENDING
SIMPLE SPAN AND CONTROLLED RANDOM LAYUPS (3 or more spans)

Bending Stress psi	Allowable Uniformly Distributed Total Roof Load ^{a, c, e, f, g} , psf																									
	3 inch Nominal Thickness ^b										4 inch Nominal Thickness ^d															
	Span, ft										Span, ft															
	8	9	10	11	12	13	14	15	16	17	18	19	20	8	9	10	11	12	13	14	15	16	17	18	19	20
875	114	90	73	60	51	43	37	32	28	25	22	20	18	223	176	143	118	99	84	73	64	56	49	44	40	36
950	124	98	79	65	55	47	40	35	31	27	24	22	20	242	192	155	128	108	92	79	69	61	54	48	43	39
1000	130	103	83	69	58	49	42	37	32	29	26	23	21	255	202	163	135	113	97	83	72	64	56	50	45	41
1050	137	108	88	72	61	52	45	39	34	30	27	24	22	268	212	172	142	119	101	88	76	67	59	53	48	43
1100	143	113	92	76	64	54	47	41	36	32	28	25	23	281	222	180	148	125	106	92	80	70	62	55	50	45
1150	150	118	96	79	66	57	49	42	37	33	30	26	24	293	232	188	155	130	111	96	83	73	65	58	52	47
1200	156	123	100	83	69	59	51	44	39	35	31	28	25	306	242	196	162	136	116	100	87	76	68	60	54	49
1250	163	129	104	86	72	62	53	46	41	36	32	29	26	319	252	204	169	142	121	104	91	80	71	63	56	51
1300	169	134	108	90	75	64	55	48	42	37	33	30	27	332	262	212	175	147	126	108	94	83	73	66	59	53
1350	176	139	112	93	78	66	57	50	44	39	35	31	28	344	272	220	182	153	130	112	98	86	76	68	61	55
1400	182	144	117	96	81	69	60	52	46	40	36	32	29	357	282	229	189	159	135	117	102	89	79	70	63	57
1450	189	149	121	100	84	71	62	54	47	42	37	33	30	370	292	237	196	164	140	121	105	92	82	73	66	59
1500	195	154	125	103	87	74	64	56	49	43	38	35	31	383	302	245	202	170	145	125	109	96	85	76	68	61
1550	202	159	129	107	90	76	66	57	50	45	40	36	32	396	312	253	209	176	150	129	112	99	88	78	70	63
1600	208	165	133	110	92	79	68	59	52	46	41	37	33	408	323	261	216	181	155	133	116	102	90	81	72	65
1650	215	170	138	114	95	81	70	61	54	48	42	38	34	421	333	270	223	187	159	138	120	105	93	83	75	67
1700	221	175	142	117	98	84	72	63	55	49	44	39	35	434	343	278	229	193	164	142	123	108	96	86	77	69
1750	228	180	146	120	101	86	74	65	57	50	45	40	36	447	353	286	236	198	169	146	127	112	99	88	79	71
1900	247	195	158	131	110	94	81	70	62	55	49	44	40	485	383	310	256	216	184	158	138	121	107	96	86	78
2000	260	206	167	138	116	99	85	74	65	58	51	46	42	510	403	327	270	227	193	167	145	128	113	101	90	82

- ^a These load values may also be used for cantilevered pieces intermixed, combination simple span and two-span continuous, and two-span continuous layups.
- ^b 2-1/2 in. net thickness. To determine allowable loads for 2-5/8 in. net thickness, multiply tabulated loads by 1.10.
- ^c All spans to the right of the double line require special ordering of additional long lengths to assure that at least 20% of the decking is equal to the span length or longer.
- ^d 3-1/2 in. net thickness.
- ^e Duration of load, $C_D = 1.0$ used in this table. For other durations of load, adjust by the appropriate factor.
- ^f No increase for size effect has been applied ($C_F = 1.00$). F_b values have been previously adjusted.
- ^g Dry conditions of use.

TABLE 7
THREE AND FOUR INCH NOMINAL THICKNESS
ALLOWABLE ROOF LOAD LIMITED BY DEFLECTION
SIMPLE SPAN LAYUP

Modulus of Elasticity, psi	Deflection Limit ^a	Allowable Uniformly Distributed Total Roof Load ^d , psf																					
		3 inch Thickness ^b , Span, ft										4 inch Thickness ^c , Span, ft											
		8	9	10	11	12	13	14	15	16	16	17	18	19	20	20	21	22	23	24	25		
700,000	<i>l</i> /180	63	44	32	24	19	15	12	10	8	174	122	89	67	51	40	32	26	22	18	15	13	11
	<i>l</i> /240	47	33	24	18	14	11	9	7	6	130	91	67	50	38	30	24	20	16	14	11	10	8
800,000	<i>l</i> /180	72	51	37	28	21	17	13	11	9	198	139	102	76	59	46	37	30	25	21	17	15	13
	<i>l</i> /240	54	38	28	21	16	13	10	8	7	149	104	76	57	44	35	28	22	19	16	13	11	10
900,000	<i>l</i> /180	81	57	42	31	24	19	15	12	10	223	157	114	86	66	52	42	34	28	23	20	17	14
	<i>l</i> /240	61	43	31	23	18	14	11	9	8	167	118	86	64	50	39	31	25	21	17	15	13	11
1,000,000	<i>l</i> /180	90	64	46	35	27	21	17	14	11	248	174	127	95	74	58	46	38	31	26	22	19	16
	<i>l</i> /240	68	48	35	26	20	16	13	10	8	186	131	95	72	55	43	35	28	23	19	16	14	12
1,100,000	<i>l</i> /180	99	70	51	38	29	23	19	15	12	273	192	140	105	81	64	51	41	34	28	24	20	17
	<i>l</i> /240	75	52	38	29	22	17	14	11	9	205	144	105	79	61	48	38	31	26	21	18	15	13
1,200,000	<i>l</i> /180	108	76	56	42	32	25	20	16	14	298	209	153	114	88	69	56	45	37	31	26	22	19
	<i>l</i> /240	81	57	42	31	24	19	15	12	10	223	157	114	86	66	52	42	34	28	23	20	17	14
1,300,000	<i>l</i> /180	117	83	60	45	35	27	22	18	15	322	227	165	124	96	75	60	49	40	34	28	24	21
	<i>l</i> /240	88	62	45	34	26	21	16	13	11	142	170	124	93	72	56	45	37	30	25	21	18	15
1,400,000	<i>l</i> /180	127	89	65	49	38	30	24	19	16	347	244	178	134	103	81	65	53	43	36	30	26	22
	<i>l</i> /240	95	67	49	37	28	22	18	14	12	261	183	133	100	77	61	49	40	33	27	23	19	17
1,500,000	<i>l</i> /180	136	95	69	52	40	32	25	21	17	372	261	191	143	110	87	69	56	47	39	33	28	24
	<i>l</i> /240	102	71	52	39	30	24	19	15	13	279	196	143	107	83	65	52	42	35	29	25	21	18
1,600,000	<i>l</i> /180	145	102	74	56	43	34	27	22	18	397	279	203	153	118	93	74	60	50	41	35	30	25
	<i>l</i> /240	109	76	56	42	32	25	20	16	14	298	209	152	115	88	69	56	45	37	31	26	22	19
1,700,000	<i>l</i> /180	154	108	79	59	46	36	29	23	19	422	296	216	162	125	98	79	64	53	44	37	31	27
	<i>l</i> /240	115	81	59	44	34	27	22	17	14	316	222	162	122	94	74	59	48	40	33	28	24	20
1,800,000	<i>l</i> /180	163	114	83	63	48	38	30	25	20	446	314	229	172	132	104	83	68	56	47	39	33	29
	<i>l</i> /240	122	86	62	47	36	28	23	19	15	335	235	172	129	99	78	62	51	42	35	29	25	21

^a For a deflection limit of *l*/360, use 1/2 the tabulated value for a deflection limit of *l*/180.

^b 2-1/2 in. net thickness. To determine allowable loads for 2-5/8 in. net thickness, multiply tabulated loads by 1.147.

^c 3-1/2 in. net thickness.

^d Dry conditions of use.

TABLE 8
THREE AND FOUR INCH NOMINAL THICKNESS
ALLOWABLE ROOF LOAD LIMITED BY DEFLECTION
CONTROLLED RANDOM LAYUP (3 or more spans)

Modulus of Elasticity, psi	Deflection Limit ^b	Allowable Uniformly Distributed Total Roof Load ^{a, f} , psf																									
		3 inch Nominal Thickness ^c										4 inch Nominal Thickness ^e															
		Span, ft ^d										Span, ft ^d															
		8	9	10	11	12	13	14	15	16	17	18	19	20	8	9	10	11	12	13	14	15	16	17	18	19	20
700,000	<i>ℓ</i> /180	96	67	49	37	28	22	18	14	12	10	8	7	6	262	184	134	101	78	61	49	40	33	27	23	20	17
	<i>ℓ</i> /240	72	50	37	28	21	17	13	11	9	7	6	5	4	197	138	100	76	58	46	37	30	24	20	17	15	12
800,000	<i>ℓ</i> /180	109	77	56	42	32	25	20	16	14	11	10	8	7	300	210	154	115	89	70	56	45	37	31	26	22	19
	<i>ℓ</i> /240	82	58	42	32	24	19	15	12	10	8	7	6	5	225	158	115	86	67	52	42	34	28	23	20	17	14
900,000	<i>ℓ</i> /180	123	86	63	47	36	29	23	19	15	13	11	9	8	337	237	173	130	100	79	63	51	42	35	30	25	22
	<i>ℓ</i> /240	92	65	47	35	27	21	17	14	12	10	8	7	6	253	178	129	97	75	59	47	38	32	26	22	19	16
1,000,000	<i>ℓ</i> /180	136	96	70	52	40	32	25	21	17	14	12	10	9	374	263	192	144	111	87	70	57	47	39	33	28	24
	<i>ℓ</i> /240	102	72	52	39	30	24	19	16	13	11	9	8	7	281	197	144	108	83	65	52	43	35	29	25	21	18
1,100,000	<i>ℓ</i> /180	150	105	77	58	44	35	28	23	19	16	13	11	10	412	289	211	158	122	96	77	63	52	43	36	31	26
	<i>ℓ</i> /240	113	79	58	43	33	26	21	17	14	12	10	8	7	309	217	158	119	92	72	58	47	39	32	27	23	20
1,200,000	<i>ℓ</i> /180	164	115	84	63	49	38	31	25	20	17	14	12	10	449	316	230	173	133	105	84	68	56	47	39	34	29
	<i>ℓ</i> /240	123	86	63	47	36	29	23	19	15	13	11	9	8	337	237	173	130	100	79	63	51	42	35	30	25	22
1,300,000	<i>ℓ</i> /180	177	125	91	68	53	41	33	27	22	18	16	13	11	487	342	249	187	144	114	91	74	61	51	43	36	31
	<i>ℓ</i> /240	133	93	68	51	39	31	25	20	17	14	12	10	9	365	256	187	140	108	85	68	55	46	38	32	27	23
1,400,000	<i>ℓ</i> /180	191	134	98	73	57	45	36	29	24	20	17	14	12	524	368	269	202	155	122	98	80	66	55	46	39	34
	<i>ℓ</i> /240	143	101	73	55	42	33	27	22	18	15	13	11	9	393	276	201	151	117	92	73	60	49	41	35	29	25
1,500,000	<i>ℓ</i> /180	205	144	105	79	61	48	38	31	26	21	18	15	13	562	395	288	216	166	131	105	85	70	59	49	42	36
	<i>ℓ</i> /240	154	108	79	59	46	36	29	23	19	16	13	11	10	421	296	216	162	125	98	79	64	53	44	37	31	27
1,600,000	<i>ℓ</i> /180	218	153	112	84	65	51	41	33	27	23	19	16	14	599	421	307	230	178	140	112	91	75	62	53	45	38
	<i>ℓ</i> /240	164	115	84	63	49	38	31	25	20	17	14	12	10	449	316	230	173	133	105	84	68	56	47	39	34	29
1,700,000	<i>ℓ</i> /180	232	163	119	89	69	54	43	35	29	24	20	17	15	636	447	326	245	189	148	119	97	80	66	56	48	41
	<i>ℓ</i> /240	174	122	89	67	52	41	32	26	22	18	15	13	11	478	335	245	184	142	111	89	72	60	50	42	36	31
1,800,000	<i>ℓ</i> /180	246	173	126	94	73	57	46	37	31	26	22	18	16	674	474	345	259	200	157	126	102	84	70	59	50	43
	<i>ℓ</i> /240	184	129	94	71	55	43	34	28	23	19	16	14	12	506	355	259	195	150	118	94	77	63	53	44	38	32

- ^a To determine allowable uniformly distributed total roof for other span conditions, multiply controlled random layup load values by the following factors: cantilevered pieces intermixed, multiply by 0.90; combination simple span and two-span continuous, multiply by 1.13; two-span continuous, multiply by 1.59.
- ^b For a deflection limit of *ℓ*/360, use 1/2 the tabulated value for a deflection limit of *ℓ*/180.
- ^c 2-1/2 in. net thickness. To determine allowable loads for 2-5/8 in. net thickness, multiply tabulated loads by 1.16.
- ^d All spans to the right of the double line require special ordering of additional long lengths to assure that at least 20% of the decking equal to the span length or longer.
- ^e 3-1/2 in. net thickness.
- ^f Dry conditions of use.

**THE AMERICAN INSTITUTE
OF TIMBER CONSTRUCTION**

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Englewood, CO 80112
303-792-9559



1" X 4" DIMENSIONED LUMBER

Location: Master Bedroom Closet
Height: 24 1/2"



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PRODUCT OVERVIEW

Provide you with the perfect solution for all your project needs. These boards combine the highest grade available in the market with unsurpassed quality of finish, making them ideal for any interior application. These boards have no knots, so every part of the board is useable with no need for wasteful, annoying cutting, meaning great value for money. The knot-free surface allows for easy finishing, whether painting, staining or varnishing your project. Radiata Pine is well known for its excellent workability, easy nailing/screwing, glue holding and superb paint finish. Originally from Monterey, California, Radiata Pine is today sourced from commercially grown tree farms in New Zealand. These forests are FSC certified, meaning they are managed on a completely renewable basis.

California residents: see [Proposition 65 Information](#).

- Environmentally friendly - fsc certified, tree farmed, pruned radiata pine
- Superior quality clear, moulding quality finish on 4 sides. No wane, twist, cupping or bowing
- Uses interior trim/mouldings, furniture, wainscoting, shelving, hobby/crafts, picture frames
- Easy to use easy to cut, nail and glue. Takes paints and stains beautifully
- Note: Product may vary by store.
- MFG Model # : 922220
- MFG Part # : 922220

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SPECIFICATIONS

Actual product thickness (in.)	.75	Actual product width (in.)	3.5
Assembled Depth (in.)	1 in	Assembled Height (in.)	72 in
Assembled Width (in.)	4 in	Manufacturer Warranty	none
Nominal Length	72 in	Nominal Product H x W (in.)	1x4
Nominal Product Height (in.)	1	Nominal Product Length (ft.)	6
Nominal Width	4 in	Nominal product width (in.)	4
Portion of product made from wood (%)	100	Primed	No
Product Length (ft.)	6 ft	Product Length (in.)	72 in
Texture	Smooth	Water Resistant	No

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CUSTOMERS WHO VIEWED THIS ITEM PURCHASED...



\$19.73

Deck-Tite Decking and Outdoor Screw #9 x 2-1/2 in. (4.5mm x

[\(not yet rated\)](#)

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\$69.97

Rustix Woodbrix 3 in. x 8 in. Unfinished Antique Blend North Eastern

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\$22.16

Deck-Tite Decking and Outdoor Screw #9 x 3 in. (4.5mm x 75mm)

★★★★★ (1)



INTUS WINDOWS

Model Number: WE1-02

Location: Bathroom

Model Number: WW1-01

Location: Bedrooms and Living Room

Model Number: WW1-02

Location: Office

Model Number: WE1-03

Location: Kitchen

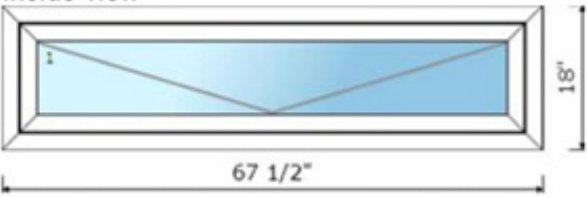
Model Number: WS1-03

Location: Living Room

7 WE1-02

Window

Inside view



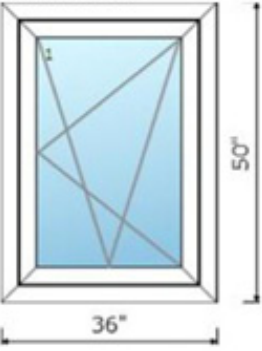
System: EFORTE
Fittings: MACO
Frame: INOUTIC passive house window profile
Color (inside/outside): White/White
Filler:
 1: CG4x16HxF4x16HxCG4, Triple glazed unit with 2 low-emissivity 1.0 glass, Ug = 0.088
Sash: 1: Tilt
Accessories:
 - Connect profile KP14/KP14, white - 2.21 m

Dimension	Area		Price, USD	Quantity, Qnt	Total
1715 x 457	0.8 m2		589.88	1	589.88

4 WW1-01

Window

Inside view



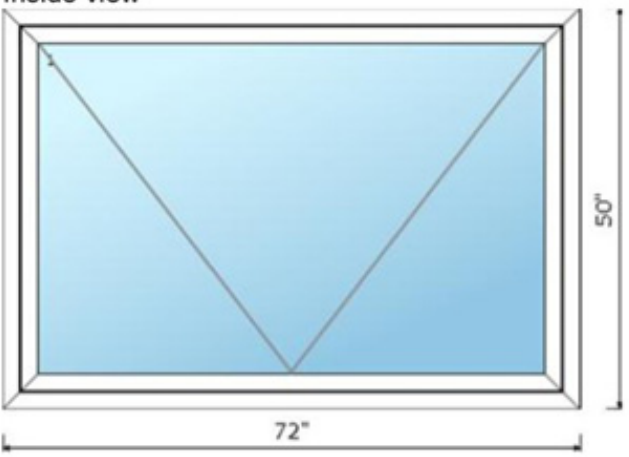
System: EFORTE
Fittings: MACO
Frame: INOUTIC passive house window profile
Color (inside/outside): White/White
Filler:
 1: CG4x16HxF4x16HxCG4, Triple glazed unit with 2 low-emissivity 1.0 glass, Ug = 0.088
Sash: 1: Tilt & turn

Dimension	Area		Price, USD	Quantity, Qnt	Total
914 x 1270	1.2 m2		463.57	1	463.57

5 WW1-02

Window

Inside view

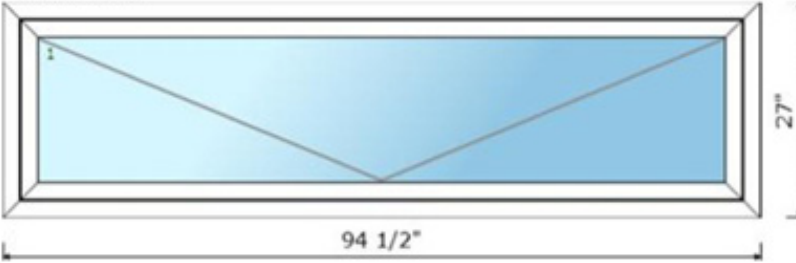


System: EFORTE
Fittings: MACO
Frame: INOUTIC passive house window profile
Color (inside/outside): White/White
Filler:
 1: CG4x16HxF4x16HxCG4, Triple glazed unit with 2 low-emissivity 1.0 glass, Ug = 0.088
Sash: 1: Tilt

Dimension	Area		Price, USD	Quantity, Qnt	Total
1829 x 1270	2.3 m2		731.89	1	731.89

2 WE1-03

Inside view



Window

System: EFORTE
Fittings: MACO
Frame: INOUTIC passive house window profile
Color (inside/outside): White/White
Filler:
 1: CG4x16HxF4x16HxCG4, Triple glazed unit with 2 low-emissivity 1.0 glass, Ug = 0.088
Sash: 1: Tilt
**Window width reduced, over max width limit
 95 1/2 x 27**

Dimension	Area	Price, USD	Quantity, Qnt	Total
2400 x 686	1.7 m2	621.35	1	621.35

3 WS1-03

Inside view



Window

System: EFORTE
Fittings: MACO
Frame: INOUTIC passive house window profile
Color (inside/outside): White/White
Filler:
 1: Sel6x18HxF4x16HxSel6, Triple glazed unit with 2 low-emissivity glass, Ug = 0.088

Dimension	Area	Price, USD	Quantity, Qnt	Total
2972 x 2007	6.0 m2	1650.60	1	1650.60



EFW FLAT ROOF SYSTEM

Model number: FTT U6

Location: East Module

Dimension: 1' 9 21/32" x 3' 2 19/32"

Available: 475 Building Supply



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→ flat roof system EFW



Description

The EFW Flat Roof System makes it possible to install windows on flat or very low-pitched roofs. The system elevates the installation angle of the window by 15°, and can be used for installation of opening or non-opening windows. It is normally used to install single windows in the slope of the roof. Windows can also be installed in combinations with a minimum distance of 30 cm between them.

This flashing is intended to be used with flat roof coverings such as asphalt with a thickness of up to 8 mm (2x4 mm) and roofing felt.

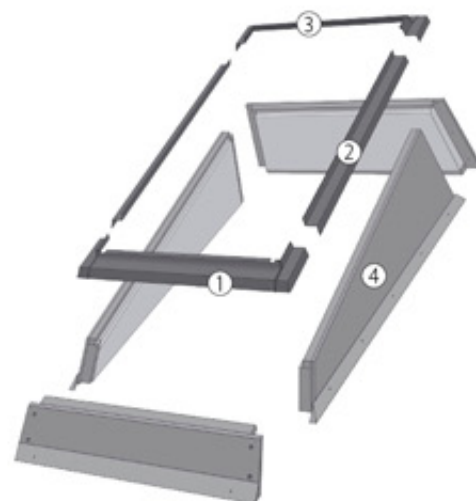
Can be used on roofs with pitches between 0° and 15°

Constituents of the system:

The EFW system is made up of two basic elements: a wooden housing with insulation material bonded to it, and flashing to join the window to the housing. Brackets for installing the window are included. After installing the wooden housing, it should be properly sealed and fixed to the existing roof covering.

Flashing elements:

1. bottom part of the flashing
2. side parts
3. top part of the flashing
4. wooden insulated curb





DIVISION 09 FINISHES



GOLD BOND GYPSUM WALLBOARD FIRESHIELD TYPE X

Location: Interior Walls

Dimensions:

Width: 4'

Length: 8'

Thickness:

5/8" for exterior wall

5/8" for the ceiling

1/2" for the partitions

Available: Gold Bond

GOLD BOND® BRAND XP® FIRE-SHIELD® GYPSUM BOARD

MANUFACTURER

National Gypsum Company
2001 Rexford Road
Charlotte, NC 28211
(704) 365-7300

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(1-800-628-4662)

Fax: 1-800-FAX NGC1
(1-800-329-6421)

Internet Home Page:
nationalgypsum.com
nationalgypsum.com/espanol
09 29 00/NGC BuyLine: 1100

DESCRIPTION

Gold Bond® BRAND XP® Fire-Shield® Gypsum Board with Sporgard™* was developed as an improved moisture resistant board, offering the same advantages of a traditional moisture resistant board with added mold resistance in the core and paper. XP Fire-Shield Gypsum Board panels consist of a specially treated, fire-resistant, Type X gypsum core encased in a heavy mold/mildew/moisture resistant, 100% recycled, National Gypsum's original PURPLE™ paper on the face side and a heavy mold/mildew/moisture resistant, 100% recycled gray paper on the back side.

XP Fire-Shield Gypsum Board was designed to provide extra protection against mold and mildew compared to standard gypsum board products. The face paper is folded around the long edges to reinforce and protect the core, and the ends are square-cut and finished smooth. Long edges of the panels are tapered.

Tapered edges allow joints to be reinforced with ProForm® BRAND Joint Tape and concealed with ProForm® BRAND Ready Mix or ProForm® BRAND Quick Set Setting Compounds. For optimum mold and mildew performance, ProForm® BRAND XP® Ready Mix is recommended for use.

XP Fire-Shield Gypsum Board features a Type X core to provide additional fire resistance ratings when used in tested systems.

Gold Bond XP Fire-Shield C Gypsum Board Panels have a specially formulated Type X core to achieve superior performance when used in specific fire-rated assemblies where the weight and number of gypsum board layers are a concern.

BASIC USES

1/2" Fire-Shield C - For single- or multi-layer construction in fire-tested assemblies.

5/8" Fire-Shield - For single- or multi-layer drywall construction. The greater thickness provides increased resistance to fire and reduced sound transmission.

5/8" Fire-Shield C - For single- or multi-layer drywall construction. The specially formulated Type X core achieves superior performance when used in specific assemblies.

ADVANTAGES

- Resists the growth of mold per ASTM G 21 with a score of 0, the best possible score.
- Resists the growth of mold per ASTM D 3273 with a score of 10, the best possible score.
- Can be used on ceilings.
- Lightweight, cost-efficient material that readily accepts a wide range of decorative finishes.

- XP Fire-Shield Gypsum Board is moisture resistant and can be used as a tile backer board in dry areas or areas with limited water exposure such as toilet/sink areas and wall and ceiling areas above tile in tubs and showers.

- The gypsum core will not support combustion or transmit temperatures greatly in excess of 212°F (100°C) until completely calcined, a slow process.

- UL Classified for fire resistance, surface burning characteristics and noncombustibility.

- Scores and snaps easily, no special handling requirements.

- Less than 5% water absorption per ASTM C 473.

GREENGUARD CERTIFIED

XP Fire-Shield Gypsum Board is GREENGUARD Children & Schools™ Certified for indoor air quality.



MOLD AND MILDEW RESISTANCE

XP Fire-Shield Gypsum Board products were designed to provide extra protection against mold and mildew compared to standard gypsum board products. When tested

by an independent laboratory, XP Fire-Shield Gypsum Board products received the highest possible ratings on ASTM G 21 and ASTM D 3273.

No material can be considered "mold-proof," nor is it certain that any material will resist mold or mildew indefinitely. When used in conjunction with good design, handling and construction practices, XP Fire-Shield Gypsum Board products can provide increased mold resistance versus standard gypsum board products. As with any building material, avoiding water exposure during handling, storage and installation, and after installation is complete, is the best way to avoid the formation of mold or mildew.

LIMITATIONS

- For interior use only.
- Exposure to excessive or continuous moisture and extreme temperatures should be avoided. XP Fire-Shield Gypsum Board is not recommended where it will be exposed to temperatures exceeding 125°F (52°C) for extended periods of time.
- XP Fire-Shield Gypsum Board should not be used as a backer board directly behind

(Continued next page)

Job Name _____

Contractor _____ Date _____

Submittal Approvals: (Stamps or Signatures)

tile and wall panels in tub and shower areas.

- XP Fire-Shield Gypsum Board should not be used in areas subject to constant and/or excessive moisture and high humidity such as gang showers, saunas, steam rooms and swimming pool enclosures. PermaBase® BRAND Cement Board is recommended for these areas.
- Maximum framing spacing for ceiling applications not to exceed 16" o.c. for installation parallel to framing and maximum 24" o.c. for installation perpendicular to framing. On ceilings to receive hand- or spray-applied water-based texture material, XP Fire-Shield Gypsum Board products are to be installed perpendicular to framing.
- Installing XP Fire-Shield Gypsum Board panels over an insulating blanket, installed continuously across the face of the framing members, is not recommended. Blankets should be recessed and flanges attached to the sides of the studs or joists.
- XP Fire-Shield Gypsum Board must be stored off the ground and under cover. Sufficient risers must be used to assure support for the entire length of the gypsum board to prevent sagging.
- XP Fire-Shield Gypsum Board must be kept dry to minimize the potential for mold growth. Adequate care should be taken while transporting, storing, applying and maintaining gypsum board. For additional information, refer to the Gypsum Association publication, "Guidelines for the Prevention of Mold Growth on Gypsum Board" (GA-238-03), which is available at www.gypsum.org under the "Download Free Gypsum Association Publications" section.

COMPOSITION & MATERIALS

XP Fire-Shield Gypsum Board is a manufactured panel with a Type X gypsum core encased with paper. Fire-Shield core gypsum board also contains various aggregates such as fiberglass to enhance the fire-resistive qualities. XP Fire-Shield Gypsum Board contains no asbestos.

ACCESSORIES

- Fasteners: drywall screws, nails or adhesives
- ProForm Joint Tape
- ProForm Ready Mix or ProForm Quick Set/Quick Set Lite Setting Compound
- Cornerbead, trims, casing beads
- Furring channels
- E-Z Strip control joints or .093 zinc control joints

TECHNICAL DATA

PHYSICAL PROPERTIES	
Thickness, nominal	1/2" Type C (12.7 mm)
Thickness, nominal	5/8" Type X (15.9 mm)
Width, nominal	4' (1219 mm)
Length, standard	8' - 12' (2438 mm - 3657 mm)
Weight, lbs./sq.ft., nominal	1/2" Type C - 1.95
Weight, lbs./sq.ft., nominal	5/8" Type X - 2.4
Weight, lbs./sq.ft., nominal	5/8" Type C - 2.4
Edges	Squared or Tapered
Surface Burning Characteristics (per ASTM E 84)	Flame spread: 15 Smoke developed: 0
Water Absorption (per ASTM C 473)	<5%
Mold Resistance (per ASTM D 3273)	10
Mold Resistance (per ASTM G 21)	0
Permeability (per ASTM E 96)	32*

*Not classified a vapor barrier

APPLICABLE STANDARDS AND REFERENCES

ASTM C 1396
ASTM C 840
ASTM D 3273
ASTM G 21
ASTM C 473
Gypsum Association GA-216
Gypsum Association GA-214
Gypsum Association GA-801
Federal Specification SS-L-30D Type VII (Grade X)
National Gypsum Company, <i>Gypsum Construction Guide</i>

FIRE RESISTANCE RATINGS

Fire resistance ratings represent the results of tests on assemblies made up of specific materials in a specific configuration. When selecting construction designs to meet certain fire resistance requirements, caution must be used to insure that each component of the assembly is the one specified in the test. Further, precaution should be taken that assembly procedures are in accordance with those of the tested assembly. (For copies of specific tests, call 1-800-NATIONAL. For fire safety information, see www.nationalgypsum.com)

UL CORE DESIGNATION

1/2" XP Fire-Shield C: FSMR-C
5/8" XP Fire-Shield: FSW-3
5/8" XP Fire-Shield C: FSMR-C

INSTALLATION

RECOMMENDATIONS

Installation of XP Fire-Shield Gypsum Board should be consistent with methods described in the standards and references noted.

GRIDMARX®

XP Fire-Shield Gypsum Board comes standard with GridMarX guide marks printed on the paper surface. These guide marks align with standard building dimensions and help to quickly identify fastener lines for stud and joist framing. Using GridMarX, accurate cuts

can be made without having to draw lines. The use of GridMarX also provides quick identification and uniform nail/screw patterns.

GridMarX guide marks run the machine direction of the board at five points in 4" increments. Marks run along the edge in both tapers and at 16", 24" and 32" in the field of the board. The marks cover easily with no bleed-through using standard paint products.

Vertical Application - In a vertical application, GridMarX serve as a **guide mark** to help identify the exact location of framing members behind the gypsum board, eliminating the need for field-applied vertical lines.

Horizontal Application - In a horizontal application, GridMarX serve as a **reference mark** to help identify the location of framing members behind the gypsum board. (If framing member is located 2" to the right of the GridMarX at the top edge of the board, it will be located 2" to the right down the face of the board.)

DECORATION

For best painting results, all surfaces, including joint compound, should be clean, dust-free and not glossy. To improve fastener and joint concealment, a coat of high quality drywall primer is recommended to equalize the absorption between surface paper and joint compound.

The selection of a paint to give the specified or desired finished characteristics is the responsibility of the architect or contractor.

XP Fire-Shield Gypsum Board that is to have a wall covering applied to it should be prepared and primed as described for painting.

Gypsum Association GA-214, *Recommended Specification for Levels of Gypsum Board Finish*, should be referred to in order to determine the level of finishing needed to assure a surface properly prepared to accept the desired decoration.

National 
Gypsum



Material Safety Data Sheet

MSDS No: GB-1501

Gold Bond® BRAND Gypsum Board Products

Date: March 22, 2011
Supersedes Date: July 1, 2009

1. PRODUCT AND COMPANY INFORMATION

Manufacturer Information:
National Gypsum Company
2001 Rexford Road
Charlotte, NC 28211

For Emergency Product Information Call:
Director Quality Services
(704) 551-5820 - 24 Hour Emergency Response
Website: www.nationalgypsum.com

Product Name

- 1/2" Gypsum Board – Square Edge
- 1/2" Gypsum Board – Tapered Edge
- 3/4" Gypsum Board – Tapered Edge
- 5/8" Gypsum Board – Tapered Edge
- 1/2" High Strength LITE Gypsum Board
- 1/2" FS C Gypsum Board
- 5/8" Fire-Shield® Gypsum Board
- 5/8" Fire-Shield® C Gypsum Board
- 1/2" High Strength Ceiling Board

Product Name

- 1/4" High Flex® Gypsum Board
- 1/2" Sta-Smooth® Gypsum Board
- 1/2" FS C Sta-Smooth® Gypsum Board
- 5/8" FS Sta-Smooth® Gypsum Board
- 1/2" Durabase® Gypsum Board
- 5/16" Durabase® Gypsum Board
- 1/2" Foil Back Gypsum Board
- 5/8" FS Foil Back Gypsum Board
- Gypsum Board Reclaim

Use: Gypsum Board products are designed for specific applications that require properties such as: fire resistance, moisture resistance, abrasion resistance, sag resistance and other properties required for applications in walls and ceiling assemblies.

Generic Descriptions: Article Composite. Fire resistant and/or moisture resistant gypsum core encased in paper on front and back sides.

2. HAZARDS IDENTIFICATION

Appearance and Odor: A gypsum core wrapped with paper. Surface finish will vary with product. No odor.

Contains no asbestos. HMIS Hazard Class No. 1, 0, 0.

Emergency Overview

Gold Bond® BRAND Board Products do not present an inhalation, ingestion, or contact health hazard unless subjected to operations such as sawing, sanding or machining which result in the generation of airborne particulate. This product contains quartz (crystalline silica) as a naturally occurring contaminant. It is recommended that a NIOSH approved particulate respirator be worn whenever working with this product results in airborne dust exposure exceeding the prescribed limits. (See Section 11 - Toxicological Information)

2. HAZARDS IDENTIFICATION (CONTINUED)

OSHA Regulatory Status

While this material is not considered hazardous by the OSHA Hazard Communication Standard (29CFR 1910.1200), this MSDS contains valuable information critical to the safe handling and proper use of the product. This MSDS should be retained and available for employees and other users of this product.

Potential Health Effects

Primary Routes of Entry: Inhalation, Dermal contact

Target Organs: Respiratory system, skin, eyes.

Inhalation: Acute exposure to airborne dust concentrations in excess of the PEL/TLV may result in coughing, dyspnea, wheezing, general irritation of the nose, throat, and upper respiratory tract, and impaired pulmonary function. Chronic exposures may result in lung disease (silicosis and/or lung cancer). (See Section 11 - Toxicological Information)

Exposures to respirable crystalline silica have not been documented during normal use of this product. However, good housekeeping practices and industrial hygiene monitoring is recommended when the potential for significant exposure exists.

Skin Contact: Continued and prolonged contact may result in dry skin. Contact with dust or glass fibers may produce itching, rash and/or redness. Repeated or prolonged exposure may result in dermatitis.

Eye Contact: Direct contact may cause mechanical irritation.

Ingestion: No known adverse effects. May result in obstruction or temporary irritation of the digestive tract.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS-Number	Weight Percent
Calcium Sulfate Dihydrate (Gypsum)	10101-41-4	85-95
Crystalline Silica (Quartz)	14808-60-7	<5
Cellulose (Paper Fiber)	9004-34-6	5-15
And may contain:		
Fiberglas, synthetic, vitreous, continuous	65997-17-3	<1%

4. FIRST AID MEASURES

- **Inhalation:** Remove exposed individual to fresh air immediately. If breathing difficulty persists, seek medical attention.
- **Skin:** Flush and wash skin with soap and water. Utilize lotions to alleviate dryness if present. Seek medical attention if irritation persists.
- **Eye:** Immediately flush eyes with water for 15 minutes. Remove contact lenses (if applicable). Seek medical attention if irritation persists.
- **Ingestion:** Gypsum is non-hazardous and no harmful effects are expected upon ingestion of small amounts. Larger amounts may cause abdominal discomfort or possible obstruction of the digestive tract. Seek medical attention if problems persist.

5. FIRE FIGHTING MEASURES

Flammable Properties

- Not flammable or combustible
- NFPA Hazard Class No: 1/0/0

Extinguishing media

- Dry chemical, foam, water, fog or spray

Protection of firefighters

- Standard protective equipment and precautions

Fire and Explosion Hazards

- None

Hazardous Combustion Products

- None
- Above 1450°C, material can decompose and release sulfur dioxide (SO₂) and oxides of carbon.

6. ACCIDENTAL RELEASE MEASURES

Not applicable, as product is an article composite.

General recommendations:

- Wear appropriate Personal Protective Equipment. (See Section 8)
- Maintain proper ventilation.
- Pick-up larger pieces to avoid a tripping hazard. Return large pieces of damaged/scraped material for recycling. Sweep or vacuum remaining material into a waste container for disposal. Use a light water spray to minimize dust generation.
- Waste material is not a hazardous waste. Dispose of in accordance with applicable federal, state, and local regulations.

7. HANDLING AND STORAGE

- Avoid contact with eyes, skin and clothing.
- Wear recommended personal protective equipment when handling. (See Section 8)
- Avoid breathing dust.
- Minimize generation of dust.
- Utilize proper lifting techniques when moving product and employ mechanical/ergonomic assistance when possible (i.e. move with forklifts, hold in place with lifts) to minimize the risk of back injury.
- Store material in a cool, dry, ventilated area.
- Store panels flat to minimize damage and warping.
- Do not stack panels too high when storing to minimize the risk of falling.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Guidelines

Component	Exposure Limits	
	OSHA PEL (mg/m³)	ACGIH TLV (mg/m³)
Calcium Sulfate Dihydrate (Gypsum)	15 ^(T) 5 ^(R)	10 ^(T)
Crystalline Silica (Quartz)	0.1 ^(R)	0.025 ^(R)
Cellulose (Paper Fiber)	15 ^(T) 5 ^(R)	10 ^(T)
Fiberglas, synthetic, vitreous, continuous	15 ^(T) 5 ^(R)	1 f/cc ^(R)

T- Total Dust
R- Respirable Dust

Engineering Controls

- Work/Hygiene Practices: The score and snap method of cutting is recommended. Sawing, drilling or machining will produce dust.
- Ventilation: Provide local and general exhaust ventilation to maintain a dust level below the PEL/TLV.
- Utilize wet methods, when appropriate, to reduce generation of dust.

Personal Protective Equipment

- Respiratory Protection: A NIOSH approved particulate respirator is recommended in poorly ventilated areas or if the PEL/TLV is exceeded. OSHA's 29 CFR 1910.134 (Respiratory Protection Standard) must be followed whenever work conditions require respirator use.
- Eye Protection: Safety glasses or goggles.
- Skin: Gloves, protective clothing and/or barrier creams may be utilized if conditions warrant.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Paper faced gypsum boards with white/gray core
Odor: None
Physical State: Solid
Ph: ~7
Solubility (H₂O): 2.1 g/L @ 20°C
Boiling, Freezing, Melting Point: Not Applicable
Decomposition Temperature: 1450°C
Vapor pressure: Not Applicable
Vapor density: Not Applicable
Volatile organic compounds (VOC) content: None

Flammability: Not Applicable
Flash Point: Not Applicable
Upper/Lower explosive limits: Not applicable
Auto-ignition temperature: Not Applicable
Partition coefficient: n-octanol/water: Not applicable
Evaporation rate: Not Applicable
Molecular weight: 172.2 grams
Molecular formula: CaSO₄·2H₂O
Specific Gravity: 2.31 g/cc
Bulk Density: ~55 lb/ft³

10. STABILITY AND REACTIVITY

Chemical stability: Stable in dry environments.
Conditions to avoid: Contact with strong acids may result in generation of carbon dioxide.
Incompatibility: None
Hazardous decomposition: Above 1450°C gypsum will decompose to calcium oxide (CaO), with releases of sulfur dioxide (SO₂) and various oxides of carbon.
Hazardous polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Data presented is for the major component of this product: Gypsum (calcium sulfate dihydrate)

Human Data

There is no information on toxicokinetics, metabolism and distribution.

There have been reports of irritation to mucus membranes of the eyes and respiratory tract upon acute exposure to dusts in excess of the recommended limits.

Chronic exposure to crystalline silica (a naturally occurring contaminant in gypsum) in the respirable size has been shown to cause silicosis, a debilitating lung disease. In addition, the International Agency for Research on Cancer (IARC) classifies crystalline silica inhaled in the form of quartz or cristobalite from occupational sources as carcinogenic to humans, Group 1. The National Toxicology Program (NTP) classifies respirable crystalline silica as a substance which may be reasonably anticipated to be a carcinogen. OSHA does not regulate crystalline silica as a human carcinogen. Industrial hygiene monitoring to date has not identified any detectable respirable crystalline silica in dust sampling conducted during gypsum panel installation utilizing recommended procedures.

Animal Data

The acute oral toxicity study [OECD TG 420, Fixed dose procedure] of calcium sulfate dihydrate showed that this chemical did not cause any changes even at 2,000 mg/kg b.w. Therefore, the oral LD₅₀ value was more than 2,000-mg/kg b.w. for female rats (Sprague-Dawley).

Calcium sulfate, dihydrate was not irritating to the skin of rabbits at 1, 24, 48 and 72 hours after removal of test patches [OECD TG 404]. There is no indication of skin sensitization in guinea pigs [OECD TG 406].

In vivo and *In vitro* studies for mutagenicity were negative.

Reproduction/Developmental Toxicity Screening Tests were negative.

12. ECOLOGICAL INFORMATION

This product does not present an ecological hazard to the environment.

Ecotoxicological Information

Toxicity studies performed with fish, aquatic invertebrates and aquatic plants showed no toxic effect.

Environmental Fate

Gypsum is a naturally occurring mineral. Biodegradation and/or bioaccumulation potential is not applicable.

13. DISPOSAL CONSIDERATIONS

- Dispose of according to Local, State, Federal, and Provincial Environmental Regulations.
- Recycle if possible.

14. TRANSPORT INFORMATION

- This product is not a DOT hazardous material
- Shipping Name: Same as product name
- ICAO/IATA/IMO: Not applicable

15. REGULATORY INFORMATION

All ingredients are included on the TSCA inventory.

Federal Regulations

SARA Title III: Not listed under Sections 302, 304, and 313

CERCLA: Not listed

RCRA: Not listed

OSHA: Dust and potential respirable crystalline silica generated during product use may be hazardous.

State Regulations

California Prop 65: Respirable crystalline silica is known to the state of California to cause cancer. Industrial hygiene monitoring during recommended use of this product failed to identify any respirable crystalline silica.

Canada WHMIS

All components of this product are included in the Canadian Domestic Substances List (DSL).
Crystalline silica: WHMIS Classification D2A

16. OTHER INFORMATION**MSDS Revision Summary**

Effective Date Change: 5/22/06

Supersedes: 1/26/04

Format Changes: ANSI Z400.1-2004

16. OTHER INFORMATION (CONTINUED)

Key/Legend

ACGIH	American Conference of Governmental Industrial Hygienists
CAS	Chemical Abstract Services Number
CFR	Code of Federal Regulations
DOT	Department of Transportation
EPA	Environmental Protection Agency
HEPA	High Efficiency Particulate Air
HMIS	Hazardous Material Identification System
IARC	International Agency for Research on Cancer
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
IMO	International Maritime Organization
NIOSH	National Institute for Occupational Safety and Health
NFPA	National Fire Protection Association
NTP	National Toxicology Program
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
PPE	Personal Protective Equipment
TLV	Threshold Limit Value
TSCA	Toxic Substance Control Act
TWA	Time Weighted Average
WHMIS	Workplace Hazardous Materials Information System

The information and recommendations contained herein are based upon data believed to be correct. However, no guarantee or warranty of any kind expressed or implied is made with respect to the information contained herein. This material safety data sheet was prepared to comply with the OSHA Hazard Communication Standard (29 CFR 1910.1200) and with the Workplace Hazardous Materials Information System (WHMIS).

Disclaimer of Liability:

As the conditions or methods of use are beyond our control, we do not assume any responsibility and expressly disclaim any liability for any use of the material. Information contained herein is believed to be true and accurate, but all statements or suggestions are made without any warranty, express or implied, regarding accuracy of the information, the hazards connected with the use of the material, or the results to be obtained for the use thereof.

Gold Bond® BRAND Fire-Shield® Gypsum Board
Gold Bond® BRAND Fire-Shield® C Gypsum Board
National Gypsum Company
Drop In Specification Language

(Specifier Note: The purpose of this guide specification language is to assist the specifier in correctly specifying fire-resistance rated gypsum board products and their installation. The specifier needs to edit these guide specifications to fit the needs of each specific project. Contact National Gypsum Company to assist in appropriate product selections.

*The language provided is not adequate as a complete stand-alone specification section. Recommended section numbers and titles where this information may be included: **Section 09 21 16 - Gypsum Board Assemblies** or **Section 09 29 00 Gypsum Board**. Language that the specifier may elect to include in each of the 3-Parts has been provided. Article numbering is only for navigating this document and language should be incorporated into the appropriate Article heading in the desired section.*

These gypsum board products may be used in a single layer application or a multi-layered wall assembly - EDIT the installation requirements accordingly.

*Specifier Notes included in (italicized red text) are included to provide assistance in selecting appropriate text for inclusion in a Specification. **[Bold text]** indicates a selection is required. Text in the brackets may not be the only options available, but are recommended or common selections.)*

PART 1 - GENERAL

1.1 SUBMITTALS

(Specifier Note: GREENGUARD certification is optional, visit www.greenguard.org for program information. DELETE paragraph and sub-paragraphs below if not project specific.)

A. GREENGUARD Submittal:

(Specifier Note: Products that have achieved GREENGUARD Children and Schools Certification meet stricter emission guidelines than those with GREENGUARD Indoor Air Quality Certification. GREENGUARD Children and Schools Certification also meet CHPS Low-Emitting Materials.)

1. Product Certificate for GREENGUARD Children & Schools: For products and materials required to comply with requirements for minimum chemical emissions

PART 2 - PRODUCTS

2.1 MANUFACTURER/PRODUCTS

A. Fire-Resistance Rated Gypsum Board

(Specifier Note: Maintain brand name when proprietary specification is acceptable. Use generic term when project must be competitively bid. CONFIRM product requirements and characteristics prior to listing products of other manufacturers.)

1. Basis of Design: National Gypsum Company; Gold Bond® BRAND Fire-Shield® Gypsum Board
2. Basis of Design: National Gypsum Company; Gold Bond® BRAND Fire-Shield® C Gypsum Board

2.2 FIRE-RESISTANCE RATED GYPSUM BOARD

A. Type X, Panel Physical Characteristics

1. Core: Fire-resistant rated gypsum core
2. Surface paper: 100% recycled content paper on front, back and long edges
3. Long Edges: **[Square] [Tapered]**
4. Overall thickness: 5/8 inch
5. Panel complies with requirements of ASTM C 1396, Type X

B. Type C, Panel Physical Characteristics

(Specifier Note: National Gypsum Co, Gold Bond BRAND Fire-Shield C Gypsum Board has enhanced fire-resistance characteristics from the Gold Bond BRAND Fire-Shield X Gypsum Board. In non-proprietary rated designs, Type C may be used to replace Type X. Type X cannot be used to replace Type C fire-resistance rated gypsum board. Assembly design should be used to determine use of Type C fire-resistance rated gypsum board.)

1. Core: Enhanced fire-resistance rated gypsum core
2. Surface paper: 100% recycled content paper on front, back and long edges
3. Long Edges: **[Square] [Tapered]**
4. Overall thickness: **[5/8 inch] [1/2 inch]**
5. Panel complies with requirements of ASTM C 1396, Type X

(Specifier Note: Acoustical sealant and firestopping requirements may be specified in other Sections, COORDINATE location of information so that it is not duplicated.)

PART 3 - EXECUTION *(COORDINATE Preparation and Installation requirements with the desired partition, ceiling or floor assembly.)*

DISCLAIMER:

National Gypsum Company Guide Specifications have been written as an aid to the professionally qualified specifier and design professional. The use of this information requires the professional judgment and expertise of the qualified specifier and design professional to adapt the information to the specific needs of the building Owner and the project; to coordinate with the design professional's construction document process, and to meet the applicable building codes, regulations and laws. National Gypsum disclaims any warranty, expressed or implied, including the warranty of fitness for a particular purpose of the product for a project.

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GRIPRITE COARSE THREAD DRYWALL SCREWS

Model: 114CDWS1
Location: Interior Walls
Dimensions: 8 x 2 1/2"



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Grip-Rite #6 x 1-1/4 in. Coarse Phosphate-Plated Steel Bugle-Head Phillips Drywall Screws (1 lb.-Pack)

Model # 114CDWS1 Internet # 100152392 Store SKU # 479652

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Kwikset 883 Satin Chrome Single Cylinder Single-Sided Deadbolt

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Product Description Specifications Customer Reviews More Info Shipping Options

PRODUCT DESCRIPTION

For the most comprehensive selection of screws look for Grip-Rite, the most popular brand of fasteners in America. No matter what the project or what size the job, Grip-Rite has the optimal fastening solution. There are many sizes and styles of screws available. As construction materials and techniques evolve, fastener design keeps pace with the changing technology. Fastener needs vary from project to project and the safety and life expectancy of the project can be extended or compromised based upon the fastener used. Fasteners have been designed to meet the special needs of projects such as roofing or drywall and in many cases are known by the application for which they are intended

- For attaching drywall to wood studs
- Great for interior wood applications
- Phosphate-plated steel construction
- 1-1/4 in. long
- Coarse threads
- Phillips drive style
- Includes 1 lb. of drywall screws
- MFG Brand Name : Grip-Rite
- MFG Model # : 114CDWS1
- MFG Part # : 114CDWS1

Return To Top

SPECIFICATIONS

Assembled Depth (in.)	3.5 in	Assembled Height (in.)	1.875 in
Assembled Width (in.)	4.75 in	Drive Style	Phillips
Driver bit included	No	Fastener Callout Size	#6 X 1 1/4"
Fastener Head Style	Bugle	Fastener Thread Type	Coarse
Fastener length (in.)	1.25	Finish	Phosphate Plated
Finish Family	Black	Head diameter (in.)	0.325
Indoor/Outdoor	Indoor	Item Package Type	Cardboard Container
Manufacturer Warranty	No	Package Quantity	258
Primary Use	Attaching gypsum board to wood studs	Product Weight (lb.)	1
Returnable	90-Day	Self drilling	No
Self tapping	No	Tamper Resistant	No



OSI GREENSERIES F-38 DRYWALL AND PANEL ADHESIVE

Model Number: F-38
Location: Main House
Available: OSI Sealants

OSI®

Professional Grade Adhesives & Sealants



GreenSeries®

F-38™ ADHESIVE

DRYWALL & PANEL

- No Sag, Ultra-low VOC formulation
- Easy water clean-up
- Reduces fastener use up to 50%
- Provides sufficient time for positioning panels
- Helps eliminate nail pops and call-backs
- Available in all 50 states

OSI® GreenSeries® Formula #38 (F-38™) Drywall and Panel Construction Adhesive is a non-flammable construction adhesive developed for drywall and other panel applications. This ultra-low VOC product offers fast strength development and high shear strength. The unique formulation offers green builders a latex-based high performance construction adhesive without sacrificing strength and performance. Meets LEED® requirements.



www.osipro.com

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OS F38 SS



Professional Grade Adhesives & Sealants

Recommended Uses

- Bonding drywall to wood or metal framing
- Adhering foamboard, decorative paneling and other types of panels to wood furring strips, concrete walls or drywall
- Can be used in most interior remodeling or repair projects. Bonds to drywall, paneling, all types of wood trim, plywood, hardboard, OSB, countertops and similar materials
- Can be used for recreational and prefab modular manufacturing

Not Recommended For

- Underwater applications or permanent water immersion
- Applications requiring temperature resistance greater than 170°F (77°C)
- Exterior applications where rain is expected within 24 hours
- Use on mirrors and metals that will corrode
- Bonding two non-porous surfaces
- Polyethylene, polypropylene, Nylon™ or Teflon™
- Cement Board (Durock™)

Coverage

For a 28 fl oz (828 mL) cartridge: A 1/4" (6 mm) bead extrudes approximately 86 ft (26 m). A 3/8" (9.5 mm) bead extrudes approximately 38 ft (12 m).

Storage And Disposal

DAMAGED BY FREEZING. Store in a cool, dry location at room temperature. For maximum shelf life store at 75°F (24°C). Take unwanted product to an approved household hazardous waste transfer facility. Hardened material may be disposed of with trash.

Typical Cured Properties

Color:	Off-White
Cured Form:	Non-flammable solid
Service Temperature:	10°F (-12°C) to 160°F (71°C)
Water Resistant:	Yes
	Do not use outdoors if rain is expected within 24 hours.

Shear Strength (ASTM C 557-99):

24 hours @ 73°F: 26.3 psi

14 days @ 73°F: 42.3 psi

Tensile Strength (ASTM C 557-99):

24 hours @ 73°F: 18.3 psi

14 days @ 73°F: 27.5 psi

Specifications:

- Tested per ASTM E 72 – Racking Load Evaluation of Sheathing Materials on a Standard Wood Frame
- Meets and conforms to the performance characteristics of ASTM C 557
- GreenGuard® certified
- Qualifies for LEED® points
- VOC compliant:
 - SCAQMD Rule 1168
 - BAAQMD

Disclaimer

The information and recommendations contained herein are based on our research and are believed to be accurate, but no warranty, express or implied, is made or should be inferred. Purchasers should test the products to determine acceptable quality and suitability for their own intended use. Nothing contained herein shall be construed to imply the nonexistence of any relevant patents or to constitute a permission, inducement or recommendation to practice any invention covered by any patent, without authority from the owner of the patent.



Henkel Corporation
Professional and Consumer Adhesives
Phone 1-800-824-7767
Fax (440) 250-7873
www.henkel.com www.osipro.com



TECHNICAL DATA SHEET



Henkel Corporation
 Professional and Consumer Adhesives
 Rocky Hill, CT 06067
 Phone 1-800-624-7767
 Fax (440) 250-7863
www.henkel.com www.osi.com

DESCRIPTION

OSI® GreenSeries™ F-38 Drywall and Panel Adhesive is a professional grade, latex-based construction adhesive designed for drywall and other panel applications. This non-flammable, low gassing adhesive can be used for all interior and in-plant construction use. This ultra-low VOC product offers fast strength development and high shear strength, making it well suited for a variety of construction projects requiring high bond strength. The product's unique formulation offers Green Builders a high performance construction adhesive over traditional solvent based adhesives without sacrificing strength and performance. Engineered for use with most building materials.

RECOMMENDED USES:

- Bonding drywall to wood or metal framing
- Adhering foamboard, decorative paneling and other types of panels to wood furring strips, concrete walls or drywall
- Can be used in most interior remodeling or repair projects. Bonds to drywall, paneling, all types of wood trim, plywood, hardboard, OSB, countertops and similar materials
- Can be used for recreational and prefab modular manufacturing

NOT RECOMMENDED FOR:

- Underwater applications or permanent water immersion
- Applications requiring temperature resistance greater than 170°F (77°C)
- Exterior applications where rain is expected within 24 hours
- Use on mirrors and metals that will corrode
- Bonding two non-porous surfaces
- Bonding polyethylene, polypropylene, Nylon™ or Teflon™
- Use on Cement Board (Durock™)

FEATURES & BENEFITS:

Feature	Benefits
Ultra low VOC content.....	GREENGUARD® approved and qualifies for LEED® points
Water-based adhesive.....	Non-flammable and environmentally friendly
Low odor.....	Great for indoor projects = no strong solvent odor
Bonds to most building materials.....	Provides a strong, durable bond to multiple surfaces
Gap filling.....	Will bridge minor gaps when bonding irregular Surfaces
Easy cleanup with water (uncured adhesive).....	Eliminates the use of harsh cleaning Chemicals
High Grab.....	Reduces nailing and fastener requirements by up to 50%



Item #	Package	Size
1498717	Paper Cartridge	28 fl. oz. (828 mL)



COVERAGE

For a 28 fl. oz. cartridge:

A 1/4" (6 mm) bead extrudes approximately 86 ft. (26 m).

A 3/8" (9.5 mm) bead extrudes approximately 38 ft. (12 m).

DIRECTIONS

Tools Typically Required:

Utility knife, caulking gun and tool to puncture inside seal of cartridge. For best application results, OSI® recommends the use of a high quality caulking gun such as the Albion® B12Q Cartridge Gun.

Safety Precautions:

Wear gloves.

Preparation:

The temperature of the product, the surfaces and the working area must be above 40°F (4°C) and below 100°F (38°C). For best performance, apply adhesive at 70°F (21°C). Ensure surfaces to be bonded are clean, dry, structurally sound and free of dust, grease, oil, and other foreign contaminants. Pre-cut and fit materials before applying adhesive. Cut off tip of cartridge in an "X" cutting method, cutting both sides of the nozzle. Puncture inside seal of cartridge.

Application:

General Construction Use:

Using a caulking gun, apply adhesive to surfaces using a 1/4" (6 mm) to 3/8" (9.5 mm) round bead size. Join surfaces together within 10 minutes of application. If work is delayed, remove excess adhesive and begin again. Note: Actual cure time will vary depending upon ambient conditions at the time of application.

Paneling and Foamboard Installation:

Apply continuous beads of adhesive to studs or furring strips (wood or metal). For wall surfaces, prepare surface accordingly and apply continuous parallel beads 12" (30 cm) to 16" (40 cm) O.C. Position panel and press firmly into place. Use finishing nails or mechanical fasteners along top and bottom edges to hold panels in place. Temporary blocking of panels may be required until adhesive sets.

Drywall Installation to Wood & Metal Studs:

Apply a continuous 1/4" to 3/8" bead of adhesive to all framing members starting 4 to 6 inches from the top and ending 4 to 6 inches from the bottom of where each panel is positioned on the stud. Apply two 1/4" parallel beads of adhesive on framing members where joints abut. Position gypsum board and press firmly in place. Use flat panels only. Do not use warped panels unless they have been pre-bowed. Follow the fastening schedule for Adhesive Nail-on Attachment in the Gypsum Association Manual (GA-216) or Table No. 47-G of the Uniform Building Code. Perimeter fasten 16" O.C. for walls and ceilings and 24" O.C. in the field of ceiling applications. Field fasteners are not required for wall construction unless walls show evidence of warping. For shear wall construction, field fasteners are required.

Laminating Gypsum Board:

Apply a continuous 1/4" to 3/8" zigzag bead of adhesive 12" O.C. to the base ply or fixed structure. Position and firmly press panels to the bonding surface. Follow recommended fastening schedules in Table No. 47-H of the Uniform Building Code for two-ply construction or refer to the Gypsum Association Manual (GA-216) for multi-ply construction. For single-ply application to concrete walls, concrete should be cured at least 28 days and free of any release agents prior to using the adhesive. Permanent mechanical fasteners are required the same as for applications to wood or metal studs. Field fasteners are recommended.

Clean-up:

Clean tools and uncured adhesive residue immediately with warm water and soap. Cured adhesive may be carefully cut away with a sharp-edged tool.

STORAGE AND DISPOSAL

DAMAGED BY FREEZING. Store in a cool, dry location at room temperature. For maximum shelf life store at 75°F (24°C). Take unwanted product to an approved household hazardous waste transfer facility. Hardened material may be disposed of with trash.

LABEL PRECAUTIONS

CAUTION! CONTAINS ETHYLENE GLYCOL and Crystalline Silica. Avoid eye contact. Do not take internally.
Use with adequate ventilation. **KEEP OUT OF REACH OF CHILDREN.**

Refer to the Material Safety Data Sheet (MSDS) for further information

DISCLAIMER

The information and recommendations contained herein are based on our research and are believed to be accurate, but no warranty, express or implied, is made or should be inferred. Purchasers should test the products to determine acceptable quality and suitability for their own intended use. Nothing contained herein shall be construed to imply the nonexistence of any relevant patents or to constitute a permission, inducement or recommendation to practice any invention covered by any patent, without authority from the owner of the patent.

TECHNICAL DATA

Typical Uncured Physical Properties		Typical Application Properties	
<u>Color:</u>	Tan	<u>Application Temperature:</u>	40°F (4°C) to 100°F (38°C)
<u>Appearance:</u>	Thick paste	<u>Repositioning Time:</u>	20 minutes @ 70°F, 50% Relative Humidity
<u>Base:</u>	Acrylic	<u>Cure Time:</u>	48 hours Cure time depends upon temperature, humidity, porosity of substrate and amount of adhesive used.
<u>Odor:</u>	Mild acrylic odor		
<u>Viscosity:</u>	225,000 to 325,000 cps		
<u>Solids Content:</u> (At 266°F (130°C) to constant weight)	66.3% by weight		
<u>VOC Content:</u>	0.1% by weight (< 2 g/L)		
<u>Shelf Life:</u>	24 months from date of manufacture (Unopened)		
<u>Lot Code Explanation:</u>	YYDDD YY = Last two digits of year of manufacture DDD = Day of manufacture based on 365 days in a year		
(Lot code stamped on bottom plunger of cartridge)	For example: 09061 = 61 st day of 2009 = March 2, 2009		

Typical Cured Performance Properties

<u>Color:</u>	Tan
<u>Cured Form:</u>	Non-flammable solid
<u>Service Temperature:</u>	10°F (-12°C) to 170°F (77°C)
<u>Water Resistant:</u>	Yes, the adhesive is water-resistant once fully cured. Do not use outdoors if rain is expected within 24 hours.
<u>ASTM C 557 - Shear Strength Results:</u> (Plywood to Drywall Paper Backing)	
Ref. # 10.1.4: 24 hours @ 73°F:	28.3 psi (Requirement: > 10 psi)
Ref. # 10.1.5: 14 days @ 73°F:	42.3 psi (Requirement: > 40 psi)
<u>ASTM C 557 - Tensile Strength Results:</u> (Douglas Fir to Drywall Paper Backing)	
Ref. # 10.2.3: 24 hours @ 73°F:	18.3 psi (Requirement: >15 psi)
Ref. # 10.2.4: 14 days @ 73°F:	27.5 psi (Requirement: > 25 psi)
<u>ASTM D 3498 - Dry Lumber Bonding:</u> (Douglas Fir to Douglas Fir Plywood)	
24 hours:	387 ± 46 psi
48 hours:	519 ± 46 psi
7 days:	613 ± 43 psi
28 days:	570 ± 59 psi (Requirement: > 150 psi)
<u>ASTM D 3498 - Gap Filling @ 0.06 inches:</u> (Douglas Fir to Douglas Fir Plywood)	
	440 ± 40 psi (Requirement: > 100 psi)

Specifications:

- Tested per ASTM E 72 – Racking Load Evaluation of Sheathing Materials on a Standard Wood Frame
- Conforms to the performance characteristics of ASTM C 557
- GreenGuard® Certified
- Qualifies for LEED® points
- Complies to the following VOC regulations:
 - SCAQMD Rule # 1168
 - CARB
 - BAAQMD



Revision Number: 001.0

Issue date: 06/18/2012

1. PRODUCT AND COMPANY IDENTIFICATION

Product name: OSI Green Series Formula 38 Drywall & Metal Framing Adhesive
 Product type: Water based adhesive
 IDH number: 1498717
 Region: United States
 Company address: Henkel Corporation, One Henkel Way, Rocky Hill, Connecticut 06067
 Contact information: Telephone: 800.624.7767
 MEDICAL EMERGENCY Phone: Poison Control Center 1-877-671-4608 (toll free) or 1-303-592-1711
 TRANSPORT EMERGENCY Phone: CHEMTREC 1-800-424-9300 (toll free) or 1-703-527-3887

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Physical state:	Paste	HEALTH:	1
Color:	Tan	FLAMMABILITY:	0
Odor:	mild	PHYSICAL HAZARD:	0
		Personal Protection:	See MSDS Section 8

CAUTION: MAY CAUSE EYE, SKIN AND RESPIRATORY TRACT IRRITATION.

Relevant routes of exposure: Inhalation, Skin contact

Potential Health Effects

Inhalation: May cause irritation to nose and throat. Abrasion of cured material such as by sanding or grinding could release respirable particles of silica quartz, a cancer hazard by inhalation. Normal use of this product causes no such release.

Skin contact: May cause slight irritation to skin.

Eye contact: May cause slight irritation to eyes on contact.

Ingestion: Not expected to be harmful by ingestion. Ingestion of large amounts may produce gastrointestinal disturbances including irritation, nausea, and diarrhea.

Existing conditions aggravated by exposure: None known

This product is considered hazardous under 29 CFR 1910.1200 (Hazard Communication).
 See Section 11 for additional toxicological information.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Hazardous components	CAS NUMBER	%
Limestone	1317-65-3	30 - 60
Kaolin	1332-58-7	1 - 5
Ethylene glycol	107-21-1	1 - 5
Quartz (SiO2)	14808-60-7	0.1 - 1

4. FIRST AID MEASURES

Inhalation: Move to fresh air in case of accidental inhalation of vapours.

Skin contact: Wash affected area immediately with soap and water.

Eye contact: Immediately flush eyes with plenty of water for at least 15 minutes. If symptoms develop and persist, get medical attention.

Ingestion: Consult a physician if necessary.

5. FIRE FIGHTING MEASURES

Flash point: No flashpoint. Aqueous preparation.

Autoignition temperature: Not available.

Flammable/Explosive limits - lower: Not available.

Flammable/Explosive limits - upper: Not available.

Extinguishing media: Carbon dioxide, foam, powder Water fog.

Special firefighting procedures: Use water spray to keep fire exposed containers cool and disperse vapors.

Unusual fire or explosion hazards: Closed containers may rupture (due to build up of pressure) when exposed to extreme heat.

Hazardous combustion products: Oxides of carbon. Oxides of nitrogen.

6. ACCIDENTAL RELEASE MEASURES

Use personal protection recommended in Section 8, isolate the hazard area and deny entry to unnecessary and unprotected personnel.

Environmental precautions: Not available.

Clean-up methods: Absorb spill with inert material. Shovel material into appropriate container for disposal.

7. HANDLING AND STORAGE

Handling: Avoid prolonged or repeated skin contact with this material. Keep out of the reach of children.

Storage: For safe storage, store at or above 0 °C (32°F)
Keep from freezing. Store in a cool, dry area. Keep containers closed when not in use.

For information on product shelf life, please review labels on container or check the Technical Data Sheet.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Employers should complete an assessment of all workplaces to determine the need for, and selection of, proper exposure controls and protective equipment for each task performed.

Hazardous components	ACGIH TLV	OSHA PEL	AIHA WEEL	OTHER
Limestone	10 mg/m ³ TWA Total dust.	5 mg/m ³ TWA Respirable fraction. 15 mg/m ³ TWA Total dust.	None	None
Kaolin	2 mg/m ³ TWA Respirable fraction.	5 mg/m ³ TWA Respirable fraction. 15 mg/m ³ TWA Total dust.	None	None
Ethylene glycol	100 mg/m ³ Ceiling Aerosol.	None	None	None
Quartz (SiO ₂)	0.025 mg/m ³ TWA Respirable fraction.	2.4 MPPCF TWA Respirable. 0.1 mg/m ³ TWA Respirable. 0.3 mg/m ³ TWA Total dust.	None	None

Engineering controls:

Use local ventilation if general ventilation is insufficient to maintain vapor concentration below established exposure limits.

Respiratory protection:

Use NIOSH approved respirator if there is potential to exceed exposure limit(s).

Eyeface protection:

Safety goggles or safety glasses with side shields.

Skin protection:

Use impermeable gloves and protective clothing as necessary to prevent skin contact.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state:	Paste
Color:	Tan
Odor:	mild
Odor threshold:	Not available.
pH:	7.2 - 7.8
Vapor pressure:	15 mm hg (20.0 °C (68°F))
Boiling point/range:	100 °C (212°F)
Melting point/ range:	Not available.
Specific gravity:	1.224
Vapor density:	Heavier than air
Flash point:	No flashpoint. Aqueous preparation.
Flammable/Explosive limits - lower:	Not available.
Flammable/Explosive limits - upper:	Not available.
Autoignition temperature:	Not available.
Evaporation rate:	< 0.6 (Butyl acetate = 1)
Solubility in water:	Soluble
Partition coefficient (n-octanol/water):	Not available.
VOC content:	0.1 %; < 2 g/l (calculated)

10. STABILITY AND REACTIVITY

Stability:	Stable under normal conditions of storage and use.
Hazardous reactions:	Will not occur.
Hazardous decomposition products:	Oxides of carbon. Oxides of nitrogen.
Incompatible materials:	None
Conditions to avoid:	Heat. Do not freeze.

11. TOXICOLOGICAL INFORMATION

Hazardous components	NTP Carcinogen	IARC Carcinogen	OSHA Carcinogen (Specifically Regulated)
Limestone	No	No	No
Kaolin	No	No	No
Ethylene glycol	No	No	No
Quartz (SiO ₂)	Known To Be Human Carcinogen.	Group 1	No

Hazardous components	Health Effects/Target Organs
Limestone	Nuisance dust
Kaolin	Nuisance dust
Ethylene glycol	Blood, Bone Marrow, Central nervous system, Developmental, Eyes, Irritant, Kidney, Liver, Metabolic
Quartz (SiO ₂)	Immune system, Lung, Some evidence of carcinogenicity

12. ECOLOGICAL INFORMATION

Ecological information: Not available.

13. DISPOSAL CONSIDERATIONS

Information provided is for unused product only.

Recommended method of disposal: Dispose of according to Federal, State and local governmental regulations.

Hazardous waste number: It is the responsibility of the user to determine if an item is hazardous as defined in the Resource Conservation and Recovery Act (RCRA) at the time of disposal. Product uses, transformations, mixtures, processes, etc., may render the resulting material hazardous, under the criteria of ignitability, corrosivity, reactivity and toxicity characteristics of the Toxicity Characteristics Leaching Procedure (TCLP) 40 CFR 261.20-24.

14. TRANSPORT INFORMATION

U.S. Department of Transportation Ground (49 CFR)

Proper shipping name: Not regulated
Hazard class or division: None
Identification number: None
Packing group: None

International Air Transportation (ICAO/IATA)

Proper shipping name: Not regulated
Hazard class or division: None
Identification number: None
Packing group: None

Water Transportation (IMO/IMDG)

Proper shipping name: Not regulated
Hazard class or division: None
Identification number: None
Packing group: None

15. REGULATORY INFORMATION

United States Regulatory Information

TSCA 8 (b) Inventory Status: All components are listed or are exempt from listing on the Toxic Substances Control Act Inventory.

TSCA 12(b) Export Notification: None above reporting de minimus

CERCLA/SARA Section 302 EHS: None above reporting de minimus
CERCLA/SARA Section 311/312: Immediate Health, Delayed Health
CERCLA/SARA 313: This product contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 (40 CFR 372). Ethylene glycol (CAS# 107-21-1).

California Proposition 65: This product contains a chemical known in the State of California to cause cancer.

Canada Regulatory Information

CEPA DSL/NDL Status: All components are listed on or are exempt from listing on the Canadian Domestic Substances List.
WHMIS hazard class: D.2.A, D.2.B

16. OTHER INFORMATION

This material safety data sheet contains changes from the previous version in sections: Corrected information in Section(s):
2

Prepared by: Mary Ellen Roddy, Sr. Regulatory Affairs Specialist

DISCLAIMER: The data contained herein are furnished for information only and are believed to be reliable. However, Henkel Corporation and its affiliates ("Henkel") does not assume responsibility for any results obtained by persons over whose methods Henkel has no control. It is the user's responsibility to determine the suitability of Henkel's products or any production methods mentioned herein for a particular purpose, and to adopt such precautions as may be advisable for the protection of property and persons against any hazards that may be involved in the handling and use of any Henkel's products. In light of the foregoing, Henkel specifically disclaims all warranties, express or implied, including warranties of merchantability and fitness for a particular purpose, arising from sale or use of Henkel's products. Henkel further disclaims any liability for consequential or incidental damages of any kind, including lost profits.



ALL PURPOSE JOINT COMPOUND

Model Number: 6262059

Location: Walls and Cieling throughout house

Sheetrock® All Purpose Joint Compound



A complete conventional weight all purpose joint compound providing professional-grade performance

- Smoother working
- Excellent bond
- Good open time
- Excellent for embedding tape
- For use with SHEETROCK® brand MOLD TOUGH™ gypsum panels to achieve a mold resistant system

Description

This all purpose joint compound provides overall high performance, as well as superior working qualities and good open time. It offers excellent bond over bead, trim and fastener concealments. This special latex formulation is ideal for embedding paper tape and for filling, leveling and finishing over gypsum panel joints, fasteners, bead and trim. SHEETROCK brand conventional weight all purpose joint compound is also excellent for skim coating and hand-applying simple textures. Recommended for use with MOLD TOUGH gypsum panels to achieve a complete mold resistant wall system. Complies with ASTM C475.

Limitations

1. Protect container from freezing and extreme heat.
2. Prior to using any epoxy coating over any surface treated with joint compound, consult the epoxy coating manufacturer and follow manufacturer's specific recommendations regarding the preparation or suitability of substrates for the epoxy coating. Many epoxy coatings exert significant shear stress on the substrate as the strong epoxy film shrinks while curing/drying. This stress can cause the bond of the joint compound to fail, resulting in delamination problems.

Preparation

Position and apply SHEETROCK® brand gypsum panels in accordance with manufacturer's recommendations. In cold weather and during gypsum panel joint finishing, temperatures within the building shall be maintained at a minimum of 55° F (13° C). Adequate ventilation shall be provided to carry off excess moisture. Mix contents lightly without adding water. Use directly from container for covering fasteners and corner bead. For taping and finishing joints (especially for use in mechanical tools), thin as necessary. Add water in half-pint increments to avoid overthinning. Remix lightly and test apply after each water addition.

Application

Cover joint with a thin layer of compound and embed paper tape, leaving about 1/32" of compound under feathered edge. Let dry and sand lightly. Apply second coat, feathering approximately 2" beyond first coat. Let dry, sand lightly as required, and then apply third coat, feathering 2" beyond second coat. Sand lightly as required when dry. Finish fastener heads, corner bead and inside corners as required with at least three coats of joint compound, feathered out onto panel faces and finished to a smooth surface.

Decorating

For priming and decorating with paint, texture or wallcovering, follow manufacturer's directions for materials used. All surfaces, including applied joint compound, must be thoroughly dry, dust-free and not glossy before decorating. A prime coat of SHEETROCK® brand First Coat™ primer or a good quality interior latex flat wall paint with a high solids content should be applied undiluted and allowed to dry before decoration. Walls to be covered with wallpaper or vinyl wallcovering should be sealed per manufacturer's recommendation.

To improve fastener concealment, where gypsum panel walls and ceilings will be subjected to severe artificial or natural side lighting and be decorated with a gloss paint (eggshell, semigloss or gloss), the gypsum panel surface should be skim coated with SHEETROCK brand conventional weight all purpose joint compound to equalize suction before priming and painting, or spray wall with SHEETROCK® brand TUFF-HIDE™ primer-surfacer.

Product Data

Material: Latex-type formulation.
Types: Hand or mechanical application.
Freezing Sensitivity: Protect from freezing.
Coverage: Approximately 125 lb. to 150 lb./1,000 sq. ft. (61.0 to 73.2 kg/100 sq. m) of gypsum panels.
Compliance with Standards: Meets ASTM Standard C475.
Storage: Shelf life up to 9 months under storage conditions. Store compound in protected place, because extreme heat or cold accelerates aging. Check production date codes periodically. Rotate stock on first-in, first-out basis.
Packaging: 48-lb., 50-lb. and 61.7-lb. (28 kg) pails and cartons. Cartons and pails will vary by geographic region.
Cleanup and Storage: Wash tools with warm, soapy water. Wipe tools dry to prevent rusting. Keep container tightly sealed. Store in a dry location at room temperature. Protect from freezing, exposure to extreme heat and direct sunlight.

Submittal Approvals:

Job Name		
Contractor		Date

WARNING:
Dust generated from sanding product may cause eye, skin, nose, throat or respiratory irritation. Use wet-sanding to avoid creating dust. Avoid inhalation of dust and eye contact. If dusty, wear a NIOSH/MSHA-approved respirator. Prolonged and repeated exposure to respirable mica may cause lung disease. Wear eye protection. Provide good general ventilation and local exhaust ventilation to avoid excessive amounts of dust. If eye contact occurs, flush thoroughly with water for 15 minutes. If irritation persists, call physician. Do not ingest. If ingested, call physician. Product safety information: (800) 507-8899
Keep out of reach of children.

Trademarks:
The following trademarks used herein are owned by United States Gypsum Company: SHEETROCK, MOLD TOUGH, TUFF-HIDE.
Note:
Products described here may not be available in all geographic markets. Consult your United States Gypsum Company sales office or representative for information.

Notice:
We shall not be liable for incidental and consequential damages, directly or indirectly sustained, nor for any loss caused by application of these goods not in accordance with current printed instructions or for other than the intended use. Our liability is expressly limited to replacement of defective goods. Any claim shall be deemed waived unless made in writing to us within thirty (30) days from date it was or reasonably should have been discovered.

SAFETY FIRST!
Follow good safety and industrial hygiene practices during handling and installing of all products and systems. Take necessary precautions and wear the appropriate personal protective equipment as needed. Read material safety data sheets and related literature on products before specification and/or installation.





MATERIAL SAFETY DATA SHEET

SHEETROCK® All Purpose Joint Compound

MSDS #61-320-001
Page 1 of 8

SECTION 1 CHEMICAL PRODUCT AND IDENTIFICATION

United States Gypsum Company
550 West Adams Street
Chicago, Illinois 60661-3637
A Subsidiary of USG Corporation

Product Safety: 1 (800) 507-8899
www.usg.com
Version Date: January 1, 2011
Version: 7

PRODUCT(S) SHEETROCK® All Purpose Joint Compound

**CHEMICAL FAMILY /
GENERAL CATEGORY** Joint Treatment

SYNONYMS Joint Compound, Taping Compound, Mud

SECTION 2 HAZARD IDENTIFICATION

**EMERGENCY OVERVIEW:
ΔWARNING!**

This product is not expected to produce any unusual hazards during normal use. Exposure to high dust levels may irritate the skin, eyes, nose, throat, or upper respiratory tract. Prolonged and repeated breathing of respirable mica dust may cause lung disease (pneumoconiosis).

POTENTIAL HEALTH EFFECTS (See Section 11 for more information)

ACUTE :

Inhalation	Exposure to dust generated during the handling or sanding of the product may cause temporary irritation to eyes, skin, nose, throat, and upper respiratory tract. Persons subjected to large amounts of this dust will be forced to leave area because of nuisance conditions such as coughing, sneezing and nasal irritation. Labored breathing may occur after excessive inhalation. If respiratory symptoms persist, consult physician.
Eyes	Dust can cause temporary mechanical irritation of eyes. If burning, redness, itching, pain or other symptoms persist or develop, consult physician.
Skin	None known.
Ingestion	None known.

CHRONIC:

Inhalation	Prolonged and repeated breathing of respirable mica dust may cause lung disease (pneumoconiosis). The extent and severity of lung injury correlates with the length of exposure and dust concentration. Exposures to respirable crystalline silica are not expected during the normal use of this product; however, actual levels must be determined by workplace hygiene testing. Prolonged and repeated exposure to airborne free respirable crystalline silica can result in lung disease (i.e., silicosis) and/or lung cancer. The development of silicosis may increase the risks of additional health effects. The risk of developing silicosis is dependent upon the exposure intensity and duration.
Eyes	None known.
Skin	None known.
Ingestion	None known.



MATERIAL SAFETY DATA SHEET

SHEETROCK® All Purpose Joint Compound

MSDS #61-320-001
Page 2 of 8

TARGET ORGANS: Eyes, skin and respiratory system.

PRIMARY ROUTES OF ENTRY: Inhalation, eyes and skin contact.

CARCINOGENICITY CLASSIFICATION OF INGREDIENT(S) All substances listed are associated with the nature of the raw materials used in the manufacture of this product and are not independent components of the product formulation. All substances, if present, are at levels well below regulatory limits. See Section 11: Toxicology Information for detailed information.

MATERIAL	IARC	NTP	ACGIH	CAL- 65
Crystalline silica	1	1	A2	Listed

IARC - International Agency for Research on Cancer: 1- Carcinogenic to humans; 2A – Probably carcinogenic to humans; 2B – Possibly carcinogenic to humans; 3 - Not classifiable as a carcinogen; 4 – Probably not a carcinogen

NTP – National Toxicology Program (Health and Human Services Dept., Public Health Service, NIH/NIEHS): 1- Known to be carcinogen; 2- Anticipated to be carcinogens

ACGIH – American Conference of Governmental Industrial Hygienists: A1 – Confirmed human carcinogen; A2 – Suspected human carcinogen; A3 – Animal carcinogen; A4 - Not classifiable as a carcinogen; A5 – Not suspected as a human carcinogen

CAL-65 – California Proposition 65 “Chemicals known to the State of California to Cause Cancer”

Respirable crystalline silica: IARC: Group 1 carcinogen, NTP: Known human carcinogen. The weight percent of crystalline silica given represents total quartz and not the respirable fraction. The weight percent of respirable silica has not been measured in this product.

Food and Drug Administration [CFR Title 21, v.3, sec 184.1409] – Ground limestone is Generally Recognized as Safe (GRAS).

POTENTIAL ENVIRONMENTAL EFFECTS: This product has no known adverse effect on ecology. (See Section 12 for more information.)

SECTION 3 COMPOSITION, INFORMATION ON INGREDIENTS

MATERIAL	WT%	CAS #
Limestone Or Dolomite	>65	1317-65-3 16389-88-1
Mica	<20	12001-26-2
Attapulgite	<5	12174-11-7
Vinyl Alcohol Polymer	<5	9002-89-5
Hydroxypropyl Amylopectin Phosphate	<5	113894-92-1
Crystalline Silica	<5	14808-60-7 [^]

All ingredients of this product are included in the U.S. Environmental Protection Agency's Toxic Substances Control Act Chemical Substance Inventory and the Canadian Domestic Substances List (DSL).

[^]The weight percent for silica represents total quartz and not the respirable fraction.

SECTION 4 FIRST AID MEASURES

FIRST AID PROCEDURES

Inhalation	Remove to fresh air. Leave the area of exposure and remain away until coughing and other symptoms subside. Other measures are usually not necessary, however if conditions warrant, contact physician.
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MATERIAL SAFETY DATA SHEET

SHEETROCK® All Purpose Joint Compound

MSDS #61-320-001
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Eyes	In case of contact, do not rub or scratch your eyes. To prevent mechanical irritation, flush thoroughly with water for 15 minutes. If irritation persists, consult physician.
Skin	Wash with mild soap and water. If irritation persists, consult physician.
Ingestion	This product is not intended to be ingested or eaten. If gastric disturbance occurs, call physician.

MEDICAL CONDITIONS WHICH MAY BE AGGRAVATED: Pre-existing upper respiratory and lung diseases such as, but not limited to, bronchitis, emphysema and asthma. Pre-existing skin diseases such as, but not limited to, rashes and dermatitis.

NOTES TO PHYSICIAN: Treatment should be directed at the control of symptoms and the clinical condition.

SECTION 5 FIRE FIGHTING MEASURES

General Fire Hazards	None known		
Extinguishing Media	Water or use extinguishing media appropriate for surrounding fire.		
Special Fire Fighting Procedures	Wear appropriate personal protective equipment. See section 8.		
Unusual Fire/ Explosion Hazards	None known		
Hazardous Combustion Products	Above 800° C – limestone may decompose to calcium oxide (CaO) and carbon dioxide (CO ₂).		
Flash Point	Not Determined	Auto Ignition	Not Applicable
Method Used	Not Applicable	Flammability Classification	Not Applicable
Upper Flammable Limit (UFL)	Not Determined	Rate of Burning	Not Applicable
Lower Flammable Limit (LFL)	Not Determined		

SECTION 6 ACCIDENTAL RELEASE MEASURES

CONTAINMENT: No special precautions. Wear appropriate personal protective equipment. See section 8.
CLEAN-UP: Use normal clean up procedures. No special precautions.
DISPOSAL: Follow all local, state, provincial and federal regulations. Never discharge large releases directly into sewers or surface waters.

SECTION 7 HANDLING AND STORAGE

HANDLING: Avoid dust contact with eyes and skin. Wear the appropriate eye and skin protection against dust (See Section 8). Minimize dust generation and accumulation. Avoid breathing dust. Wear the appropriate respiratory protection against dust in poorly ventilated areas and if TLV is exceeded (see Sections 2 and 8). Use good safety and industrial hygiene practices.
--



MATERIAL SAFETY DATA SHEET

SHEETROCK® All Purpose Joint Compound

MSDS #61-320-001
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STORAGE: Store in a cool, dry, ventilated area away from sources of heat, moisture and incompatibilities (see Section 10).

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

MATERIAL	WT%	TLV (mg/m ³)	PEL (mg/m ³)
Limestone	>65	10	15 (T) / 5 (R)
Or Dolomite		10	15 (T) / 5 (R)
Mica	<20	3 (R)	20 mppcf
Attapulgite	<5	(NE)	(NE)
Vinyl Alcohol Polymer	<5	(NE)	(NE)
Hydroxypropyl Amylopectin Phosphate	<5	(NE)	(NE)
Crystalline Silica	<5	0.025 (R)	0.1 (R)

(T)–Total; (R)–Respirable; (NE)–Not Established; (C)–Ceiling; (STEL)–Short-term exposure limit
(F)–Fume; (Du)–Dust; (M)–Mist
ppm–part per million; f/cc–fiber per cubic centimeter; mppcf– million particles per cubic foot

ENGINEERING CONTROLS: Provide ventilation sufficient to control airborne dust levels. If user operations generate airborne dust, use ventilation to keep dust concentrations below permissible exposure limits. Where general ventilation is inadequate, use process enclosures, local exhaust ventilation, or other engineering controls to control dust levels below permissible exposure limits.

RESPIRATORY PROTECTION: Wear a NIOSH/MSHA-approved respirator equipped with particulate cartridges when dusty in poorly ventilated areas, and if TLV is exceeded. A respiratory program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator's use. If engineering controls are not possible, wear a properly fitted NIOSH/MSHA-approved particulate respirator.

OTHER PERSONAL PROTECTIVE EQUIPMENT:

Eye/Face	Wear eye protection, safety glasses or goggles, to avoid possible eye contact.
Skin	Wear gloves and protective clothing to prevent repeated or prolonged skin contact.
General	Selection of Personal Protective Equipment will depend on environmental working conditions and operations.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance	White to off white	Vapor Density (Air = 1)	Not Applicable
Odor	Low to no odor	Specific Gravity (H ₂ O = 1)	~2.3 - 2.6
Odor Threshold	Not Determined	Solubility in water (g/100g)	~ 0.15 g/100 g
Physical State	Solid/ Powder	Partition Coefficient	Not Determined
pH @ 25 ° C	~7.5-9	Auto-ignition Temp	Not Determined
Melting Point	Not Applicable	Decomposition Temp	Not Determined



MATERIAL SAFETY DATA SHEET

SHEETROCK® All Purpose Joint Compound

MSDS #61-320-001

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Freezing Point	Not Applicable	Viscosity	Not Applicable
Boiling Point	Not Applicable	Particle Size	Varies
Flash Point	Not Determined	Bulk Density	~ 40-80 lb/ft ³
Evaporation Rate (BuAc = 1)	Not Applicable	Molecular Weight	Mixture
Upper Flammable Limit (UFL)	Not Determined	VOC Content	Zero g/L
Lower Flammable Limit (LFL)	Not Determined	Percent Volatile	Zero
Vapor Pressure (mm Hg)	Not Applicable		

SECTION 10 CHEMICAL STABILITY AND REACTIVITY

STABILITY	Stable.
CONDITIONS TO AVOID	Contact with incompatibles (see below).
INCOMPATIBILITY	None known.
HAZARDOUS POLYMERIZATION	None known.
HAZARDOUS DECOMPOSITION	Above 800° C – limestone may decompose to calcium oxide (CaO) and carbon dioxide (CO ₂).

SECTION 11 TOXICOLOGICAL INFORMATION

ACUTE EFFECTS: None known.

CHRONIC EFFECTS / CARCINOGENICITY:

Mica: Prolonged and repeated breathing of respirable mica dust may cause lung disease (pneumoconiosis). The extent and severity of lung injury correlates with the length of exposure and dust concentration.

Crystalline Silica: Exposures to respirable crystalline silica are not expected during the normal use of this product; however, actual levels must be determined by workplace hygiene testing. The weight percent of respirable crystalline silica may not have been measured in this product. Prolonged and repeated exposure to airborne free respirable crystalline silica can result in lung disease (i.e., silicosis) and/or lung cancer. The development of silicosis may increase the risks of additional health effects. Smoking in combination with silica exposures increases the risk of cancer. The risk of developing silicosis is dependent upon the exposure intensity and duration.

In June, 1997, IARC classified crystalline silica (quartz and cristobalite) as a human carcinogen. In making the overall evaluation, the IARC Working Group noted that carcinogenicity in humans was not detected in all industrial circumstances studied. Carcinogenicity may be dependent on inherent characteristics of the crystalline silica or on external factors affecting its biological activity or distribution of its polymorphs.

IARC states that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (Group 1).

SECTION 12 ECOLOGICAL INFORMATION



MATERIAL SAFETY DATA SHEET
SHEETROCK® All Purpose Joint Compound

MSDS #61-320-001
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ENVIRONMENTAL TOXICITY: This product has no known adverse effect on ecology.

Ecotoxicity value	Not determined.
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**SECTION 13
 DISPOSAL CONSIDERATIONS**

WASTE DISPOSAL METHOD: Dispose of material in accordance with federal, state, and local regulations. Never discharge directly into sewers or surface waters. Consult with environmental regulatory agencies for guidance on acceptable disposal practices.

**SECTION 14
 TRANSPORT INFORMATION**

U.S. DOT INFORMATION: Not a hazardous material per DOT shipping requirements. Not classified or regulated.

Shipping Name	Same as product name.
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Hazard Class	Not classified.
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UN/NA #	None. Not classified.
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Packing Group	None.
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Label (s) Required	Not applicable.
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GGVSec/MDG-Code	Not classified.
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ICAO/IATA-DGR	Not applicable.
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RID/ADR	None.
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ADNR	None.
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**SECTION 15
 REGULATORY INFORMATION**

UNITED STATES REGULATIONS

All ingredients of this product are included in the U.S. Environmental Protection Agency's Toxic Substances Control Act Chemical Substance Inventory.

MATERIAL	WT%	3 0 2	3 0 4	3 1 3	CERCLA	CAA Sec. 112	RCRA Code
Limestone Or Dolomite	>65	NL	NL	NL	NL	NL	NL
Mica	<20	NL	NL	NL	NL	NL	NL
Attapulgate	<5	NL	NL	NL	NL	NL	NL
Vinyl Alcohol Polymer	<5	NL	NL	NL	NL	NL	NL



MATERIAL SAFETY DATA SHEET

SHEETROCK® All Purpose Joint Compound

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Hydroxypropyl Amylopectin Phosphate	<5	NL	NL	NL	NL	NL	NL
Crystalline Silica	<5	NL	NL	NL	NL	NL	NL

Key : NL = Not Listed

SARA Title III Section 302 (EPCRA) Extremely Hazardous Substances: Threshold Planning Quantity (TPQ)

SARA Title III Section 304 (EPCRA) Extremely Hazardous Substances: Reportable Quantity (RQ)

SARA Title III Section 313 (EPCRA) Toxic Chemicals: X= Subject to reporting under section 313

CERCLA Hazardous Substances: Reportable Quantity (RQ)

CAA Section 112 (r) Regulated Chemicals for Accidental Release Prevention: Threshold Quantities(TQ)

RCRA Hazardous Waste: RCRA hazardous waste code

CANADIAN REGULATIONS

This product has been classified in accordance with the hazard criteria of Controlled Product regulations and the MSDS contains all the information required by the Controlled Products Regulations. All ingredients of this product are included in the Canadian Domestic Substances List (DSL).

MATERIAL	WT%	IDL Item #	WHMIS Classification
Limestone	>65	Not Listed	D2A
Or Dolomite		Not Listed	Not Listed
Mica	<20	1088	Not Listed
Attapulgite	<5	Not Listed	Not Listed
Vinyl Alcohol Polymer	<5	Not Listed	Not Listed
Hydroxypropyl Amylopectin Phosphate	<5	Not Listed	Not Listed
Crystalline Silica	<5	1406	D2A

IDL Item#: Canadian Hazardous Products Act – Ingredient Disclosure List Item #

WHMIS Classification: Workplace Hazardous Material Information System

Risk and Safety Phrases defined by European Union Directive 67/548/EEC (Annex III and IV)

R-Phrase(s): R36/37/38

S-Phrase(s): S51 S38 S39

SECTION 16 OTHER INFORMATION

Label Information**Δ WARNING!**

Dust can cause irritation to eyes, skin and respiratory tract. Use wet-sanding to reduce dust created. Wear eye, skin and respiratory protection as necessary per working conditions. If eye contact occurs flush with water for 15 minutes. Do not ingest. If ingested, call physician. Frequent breathing of mica dust can cause lung disease (pneumoconiosis). Product safety information: 800-507-8899 or usg.com. Customer Service: 800 USG-4-YOU (800 874-4968). KEEP OUT OF REACH OF CHILDREN.



MATERIAL SAFETY DATA SHEET

SHEETROCK® All Purpose Joint Compound

MSDS #61-320-001

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INFORMATION FOR HANDLING AND IDENTIFICATION OF CHEMICAL HAZARDS

NFPA Ratings:			HMIS Ratings:		<table border="1"> <tr> <td>HEALTH</td> <td>*</td> <td>1</td> </tr> <tr> <td>FLAMMABILITY</td> <td></td> <td>0</td> </tr> <tr> <td>PHYSICAL HAZARD</td> <td></td> <td>0</td> </tr> <tr> <td>PERSONAL PROTECTION</td> <td></td> <td>E</td> </tr> </table>	HEALTH	*	1	FLAMMABILITY		0	PHYSICAL HAZARD		0	PERSONAL PROTECTION		E	0 = Minimal Hazard
HEALTH	*		1															
FLAMMABILITY			0															
PHYSICAL HAZARD			0															
PERSONAL PROTECTION		E																
Health:	1	Health:	1	1 = Slight Hazard														
Fire:	0	Fire:	0	2 = Moderate Hazard														
Reactivity:	0	Reactivity:	0	3 = Serious Hazard														
					4 = Severe Hazard													

E – Safety glasses, gloves and dust respirator; * - Contains silica

Key/Legend

ANSI	American National Standards Institute
ACGIH	American Conference of Governmental Industrial Hygienists
CAA	Clean Air Act
CAS	Chemical Abstracts Service (Registry Number)
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
CFR	Code of Federal Regulations
DOT	United States Department of Transportation
DSL	Canadian Domestic Substances List
EPA	United States Environmental Protection Agency
EPCRA	Emergency Planning & Community Right-to-know Act
HMIS	Hazardous Materials Identification System
IARC	International Agency for Research on Cancer
MSHA	Mine Safety and Health Administration
NDSL	Canadian Non-Domestic Substances List
NFPA	National Fire Protection Association
NIOSH	National Institute for Occupational Safety and Health
OSHA	Occupational Health and Safety Administration
PEL	Permissible Exposure Limit
PPE	Personal Protection Equipment
RCRA	Resource Conservation and Recovery Act
SARA	Superfund Amendments and Reauthorization Act of 1986
TLV	Threshold Limit Value
TSCA	Toxic Substances Control Act
UN/NA#	United Nations/North America number
WHMIS	Workplace Hazardous Material Information System

Prepared by:
 Product Safety
 USG Corporation
 550 West Adams Street
 Chicago, IL 60661-3637

The information contained in this document applies to this specific material as supplied. It may not be valid for this material if it is used in combination with any other materials. It is the user's responsibility to satisfy oneself as to the suitability and completeness of this information for his/her own particular use.

END



JOINT TAPE

Model Number: 382175
Dimensions: 2 1/16" x 250' Roll
Color: White



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2-1/16 in. x 250 ft. Drywall Joint Tape Roll 152120

Model # 152120 Store SKU # 258423

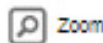
★★★★★ | [Write The First Review](#)

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PRODUCT OVERVIEW

Sheetrock Brand paper joint tape is a special fiber tape designed for use with USG joint compounds to reinforce joints and corners in gypsum drywall interiors. Also recommended for joint treatment in veneer finish systems subject to rapid drying conditions and where framing exceeds 16 in. (406 mm) spacing. Sheetrock paper joint tape resists cracking and stretching and is lightly sanded for increased bond.

- For strength and crack resistance in drywall joint treatment
- High tensile strength to resist tearing, stretching and distortion
- Wafer-thin paper for easier joint treatment
- Roughened surface for superior bond
- Accurately center-creased to improve corner treatment
- 250 ft. Roll
- MFG Model # : 152120
- MFG Part # : 152120

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SPECIFICATIONS

Assembled Depth (in.)	6.125 in	Assembled Height (in.)	2.063 in
Assembled Width (in.)	6.125 in	Fiberglass Mesh	No
Moisture Resistant	No	Mold Resistant	No
Perforated	No	Product Length (ft.)	250 ft
Product Thickness (mm)	0.009 mm	Product Weight (lb.)	1.25
Product Width (in.)	2.065	Self Adhesive	No

Quantity:

item must be picked up in store

Pick Up In Store Free

Available TODAY
66 in Stock
at Williston ...
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[+ ADD TO MY LIST](#)

CUSTOMERS WHO VIEWED THIS ITEM PURCHASED...



\$178.00

OPTIX
48 in. x 96 in. x 1/4 in.
Clear Acrylic Sheet-Glass

★★★★★ (6)

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\$97.96

48 in. x 96 in. x 1/8 in.
Acrylic Sheet

★★★★★ (3)

[+ ADD TO CART](#)





MATERIAL SAFETY DATA SHEET

BEADEX® Drywall Joint Tape

MSDS #88-905-002

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SECTION 1 CHEMICAL PRODUCT AND IDENTIFICATION

United States Gypsum Company
550 West Adams Street
Chicago, Illinois 60661-3637
A Subsidiary of USG Corporation

Product Safety: 1 (800) 507-8899
www.usg.com
Version Date: January 1, 2011
Version: 3

PRODUCT(S) BEADEX® Drywall Joint Tape

**CHEMICAL FAMILY /
GENERAL CATEGORY** Tape

SYNONYMS Cellulose Tape

SECTION 2 HAZARD IDENTIFICATION

EMERGENCY OVERVIEW:
ΔCAUTION!

This product is not expected to produce any unusual hazards during normal use. Direct contact may irritate the skin, or eyes.

POTENTIAL HEALTH EFFECTS (See Section 11 for more information)

ACUTE :

Inhalation	Due to the physical nature of this product, inhalation is unlikely. There are no known health effects due to inhalation.
Eyes	Direct contact can cause irritation of eyes. If burning, redness, itching, pain or other symptoms persist or develop, consult physician. Direct contact or dust from sanding of the product may cause mechanical irritation of the eyes.
Skin	Direct, prolonged or repeated contact with the skin may cause irritation. Contact along a length of the edge of the paper may result in a paper cut of the skin.
Ingestion	None known.

CHRONIC:

Inhalation	None known. None known.
Eyes	None known.
Skin	None known.
Ingestion	None known. This product is not intended to be eaten. Wash hands before eating.

TARGET ORGANS: Eyes, skin and respiratory system.

PRIMARY ROUTES OF ENTRY: Inhalation, eyes and skin contact.

CARCINOGENICITY CLASSIFICATION OF INGREDIENT(S) All substances listed are associated with the nature of the raw materials used in the manufacture of this product and are not independent components of the product formulation. All substances, if present, are at levels well below regulatory limits. See Section 11: Toxicology Information for detailed information.



MATERIAL SAFETY DATA SHEET

BEADEX® Drywall Joint Tape

MSDS #88-905-002

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MATERIAL	IARC	NTP	ACGIH	CAL- 65
Crystalline silica	1	1	A2	Listed
IARC - International Agency for Research on Cancer: 1- Carcinogenic to humans; 2A – Probably carcinogenic to humans; 2B – Possibly carcinogenic to humans; 3 - Not classifiable as a carcinogen; 4 – Probably not a carcinogen				
NTP – National Toxicology Program (Health and Human Services Dept., Public Health Service, NIH/NIEHS): 1- Known to be carcinogen; 2- Anticipated to be carcinogens				
ACGIH – American Conference of Governmental Industrial Hygienists: A1 – Confirmed human carcinogen; A2 – Suspected human carcinogen; A3 – Animal carcinogen; A4 - Not classifiable as a carcinogen; A5 – Not suspected as a human carcinogen				
CAL-65 – California Proposition 65 “Chemicals known to the State of California to Cause Cancer”				
POTENTIAL ENVIRONMENTAL EFFECTS: This product has no known adverse effect on ecology. (See Section 12 for more information.)				

SECTION 3 COMPOSITION, INFORMATION ON INGREDIENTS

MATERIAL	WT%	CAS #
Cellulose	>99	9004-34-6
Limestone	<1	1317-65-3
Aluminum Sulfate	<1	10043-01-3
Crystalline Silica	<5	14808-60-7^
All ingredients of this product are included in the U.S. Environmental Protection Agency's Toxic Substances Control Act Chemical Substance Inventory and the Canadian Domestic Substances List (DSL).		
^The weight percent for silica represents total quartz and not the respirable fraction.		

SECTION 4 FIRST AID MEASURES

FIRST AID PROCEDURES	
Inhalation	Remove to fresh air. Leave the area of exposure and remain away until coughing and other symptoms subside. Other measures are usually not necessary, however if conditions warrant, contact physician.
Eyes	In case of contact, do not rub or scratch your eyes. To prevent mechanical irritation, flush thoroughly with water for 15 minutes. If irritation persists, consult physician.
Skin	Wash with mild soap and water. If irritation persists, consult physician.
Ingestion	This product is not intended to be ingested or eaten. If gastric disturbance occurs, call physician.
MEDICAL CONDITIONS WHICH MAY BE AGGRAVATED: Pre-existing skin diseases such as, but not limited to, rashes and dermatitis.	
NOTES TO PHYSICIAN: Treatment should be directed at the control of symptoms and the clinical condition.	



**SECTION 5
 FIRE FIGHTING MEASURES**

General Fire Hazards				Emits toxic gases under fire conditions.			
Extinguishing Media				Water or use extinguishing media appropriate for surrounding fire.			
Special Fire Fighting Procedures				Wear appropriate personal protective equipment. See section 8.			
Unusual Fire/ Explosion Hazards				If paper fiber or dust is dried to bone dry condition, a paper or cellulose dust explosion problem exists.			
Hazardous Combustion Products				Emits toxic gases under fire conditions.			
Flash Point		Not Determined		Auto Ignition		Not Applicable	
Method Used		Not Applicable		Flammability Classification		Not Applicable	
Upper Flammable Limit (UFL)		Not Determined		Rate of Burning		Not Applicable	
Lower Flammable Limit (LFL)		Not Determined					

**SECTION 6
 ACCIDENTAL RELEASE MEASURES**

CONTAINMENT: No special precautions. Wear appropriate personal protective equipment. See section 8.			
CLEAN-UP: Use normal clean up procedures. No special precautions.			
DISPOSAL: Follow all local, state, provincial and federal regulations. Never discharge large releases directly into sewers or surface waters.			

**SECTION 7
 HANDLING AND STORAGE**

HANDLING: Avoid contact with eyes. Wear the appropriate eye protection (See Section 8). Use good safety and industrial hygiene practices.			
STORAGE: Store in a cool, dry, ventilated area away from sources of heat, moisture and incompatibilities (see Section 10). Keep dry, paper stored in wet conditions can become a fire hazard via methane production by microbe activity.			

**SECTION 8
 EXPOSURE CONTROLS/PERSONAL PROTECTION**

MATERIAL	WT%	TLV (mg/m³)	PEL(mg/m³)
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MATERIAL SAFETY DATA SHEET

BEADEX® Drywall Joint Tape

MSDS #88-905-002

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Cellulose	>99	10	15 (T) / 5 (R)
Limestone	<1	10	15 (T) / 5 (R)
Aluminum Sulfate	<1	2*	15 (T) / 5 (R)
Crystalline Silica	<5	0.025 (R)	0.1 (R)

(T)–Total; (R)–Respirable; (NE)–Not Established; (C)–Ceiling; (STEL)–Short-term exposure limit

(F)–Fume; (Du)–Dust; (M)–Mist

ppm–part per million; f/cc–fiber per cubic centimeter; mppcf– million particles per cubic foot

ENGINEERING CONTROLS: If user operations generate exposures, use ventilation to keep exposure concentrations below permissible exposure limits. Where general ventilation is inadequate, use process enclosures, local exhaust ventilation, or other engineering controls to control exposure levels below permissible exposure limits.

RESPIRATORY PROTECTION: A respiratory program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator's use.

OTHER PERSONAL PROTECTIVE EQUIPMENT:

Eye/Face	Wear eye protection, safety glasses or goggles, to avoid possible eye contact.
Skin	Wear gloves and protective clothing to prevent repeated or prolonged skin contact.
General	Selection of Personal Protective Equipment will depend on environmental working conditions and operations.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Manila paper in various widths.	Vapor Density (Air = 1)	Not Applicable
Odor	Low to no odor.	Specific Gravity (H ₂ O = 1)	Not Applicable
Odor Threshold	Not Determined	Solubility in water (g/100g)	Not Applicable
Physical State	Solid/ Tape	Partition Coefficient	Not Applicable
pH @ 25 ° C	Not Applicable	Auto-ignition Temp	Not Applicable
Melting Point	Not Applicable	Decomposition Temp	Not Determined
Freezing Point	Not Applicable	Viscosity	Not Applicable
Boiling Point	Not Applicable	Particle Size	Not Applicable
Flash Point	Not Determined	Bulk Density	Not Determined
Evaporation Rate (BuAc = 1)	Not Applicable	Molecular Weight	Not Applicable
Upper Flammable Limit (UFL)	Not Determined	VOC Content	Zero g/L
Lower Flammable Limit (LFL)	Not Determined	Percent Volatile	Zero
Vapor Pressure (mm Hg)	Not Applicable		

SECTION 10 CHEMICAL STABILITY AND REACTIVITY



MATERIAL SAFETY DATA SHEET

BEADEX® Drywall Joint Tape

MSDS #88-905-002

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STABILITY	Stable.
CONDITIONS TO AVOID	Contact with incompatibles (see below).
INCOMPATIBILITY	None known.
HAZARDOUS POLYMERIZATION	None known.
HAZARDOUS DECOMPOSITION	None known.

SECTION 11 TOXICOLOGICAL INFORMATION

ACUTE EFFECTS: None known.
CHRONIC EFFECTS / CARCINOGENICITY: None known.

SECTION 12 ECOLOGICAL INFORMATION

ENVIRONMENTAL TOXICITY: This product has no known adverse effect on ecology.	
Ecotoxicity value	Not determined.

SECTION 13 DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: Dispose of material in accordance with federal, state, and local regulations. Never discharge directly into sewers or surface waters. Consult with environmental regulatory agencies for guidance on acceptable disposal practices.

SECTION 14 TRANSPORT INFORMATION

U.S. DOT INFORMATION: Not a hazardous material per DOT shipping requirements. Not classified or regulated.	
Shipping Name	Same as product name.
Hazard Class	Not classified.
UN/NA #	None. Not classified.
Packing Group	None.
Label (s) Required	Not applicable.
GGVSec/MDG-Code	Not classified.
ICAO/IATA-DGR	Not applicable.
RID/ADR	None.



MATERIAL SAFETY DATA SHEET

BEADEx® Drywall Joint Tape

MSDS #88-905-002

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ADNR	None.
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SECTION 15 REGULATORY INFORMATION

UNITED STATES REGULATIONS

All ingredients of this product are included in the U.S. Environmental Protection Agency's Toxic Substances Control Act Chemical Substance Inventory.

MATERIAL	WT%	3 0 2	3 0 4	3 1 3	CERCLA	CAA Sec. 112	RCRA Code
Cellulose	>99	NL	NL	NL	NL	NL	NL
Limestone	<1	NL	NL	NL	NL	NL	NL
Aluminum Sulfate	<1	NL	NL	NL	5,000	NL	NL
Crystalline Silica	<5	NL	NL	NL	NL	NL	NL

Key: NL = Not Listed

SARA Title III Section 302 (EPCRA) Extremely Hazardous Substances: Threshold Planning Quantity (TPQ)

SARA Title III Section 304 (EPCRA) Extremely Hazardous Substances: Reportable Quantity (RQ)

SARA Title III Section 313 (EPCRA) Toxic Chemicals: X= Subject to reporting under section 313

CERCLA Hazardous Substances: Reportable Quantity (RQ)

CAA Section 112 (r) Regulated Chemicals for Accidental Release Prevention: Threshold Quantities(TQ)

RCRA Hazardous Waste: RCRA hazardous waste code

CANADIAN REGULATIONS

This product has been classified in accordance with the hazard criteria of Controlled Product regulations and the MSDS contains all the information required by the Controlled Products Regulations. All ingredients of this product are included in the Canadian Domestic Substances List (DSL).

MATERIAL	WT%	IDL Item #	WHMIS Classification
Cellulose	>99	Not Listed	Not Listed
Limestone	<1	Not Listed	D2A
Aluminum Sulfate	<1	53	D2B
Crystalline Silica	<5	1406	D2A

IDL Item#: Canadian Hazardous Products Act – Ingredient Disclosure List Item #

WHMIS Classification: Workplace Hazardous Material Information System

Risk and Safety Phrases defined by European Union Directive 67/548/EEC (Annex III and IV)

R-Phrase(s): None known.

S-Phrase(s): None known.



MATERIAL SAFETY DATA SHEET

BEADEX® Drywall Joint Tape

MSDS #88-905-002

Page 7 of 8

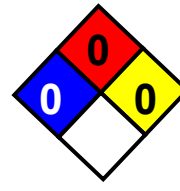
SECTION 16 OTHER INFORMATION

Label Information

Δ CAUTION!

Product safety information: 800-507-8899 or usg.com. Customer Service: 800 USG-4-YOU (800 874-4968). KEEP OUT OF REACH OF CHILDREN.

INFORMATION FOR HANDLING AND IDENTIFICATION OF CHEMICAL HAZARDS

NFPA Ratings:			HMIS Ratings:		HEALTH <input type="text" value="0"/>	0 = Minimal Hazard
Health:	0		Health:	0	FLAMMABILITY <input type="text" value="0"/>	1 = Slight Hazard
Fire:	0		Fire:	0	PHYSICAL HAZARD <input type="text" value="0"/>	2 = Moderate Hazard
Reactivity:	0		Reactivity:	0	PERSONAL PROTECTION <input type="text" value="B"/>	3 = Serious Hazard
						4 = Severe Hazard

B - Safety glasses and gloves

Key/Legend

ANSI	American National Standards Institute
ACGIH	American Conference of Governmental Industrial Hygienists
CAA	Clean Air Act
CAS	Chemical Abstracts Service (Registry Number)
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
CFR	Code of Federal Regulations
DOT	United States Department of Transportation
DSL	Canadian Domestic Substances List
EPA	United States Environmental Protection Agency
EPCRA	Emergency Planning & Community Right-to-know Act
HMIS	Hazardous Materials Identification System
IARC	International Agency for Research on Cancer
MSHA	Mine Safety and Health Administration
NDSL	Canadian Non-Domestic Substances List
NFPA	National Fire Protection Association
NIOSH	National Institute for Occupational Safety and Health
OSHA	Occupational Health and Safety Administration
PEL	Permissible Exposure Limit
PPE	Personal Protection Equipment
RCRA	Resource Conservation and Recovery Act
SARA	Superfund Amendments and Reauthorization Act of 1986
TLV	Threshold Limit Value
TSCA	Toxic Substances Control Act
UN/NA#	United Nations/North America number
WHMIS	Workplace Hazardous Material Information System



MATERIAL SAFETY DATA SHEET

BEADEx® Drywall Joint Tape

MSDS #88-905-002

Page 8 of 8

Prepared by:
Product Safety
USG Corporation
550 West Adams Street
Chicago, IL 60661-3637

The information contained in this document applies to this specific material as supplied. It may not be valid for this material if it is used in combination with any other materials. It is the user's responsibility to satisfy oneself as to the suitability and completeness of this information for his/her own particular use.

END



LISBON CORK POR DO SOL CORK FLOORING

Model Number: 10022308

Location: Bathroom

Dimensions:

Length: 11.8"

Width: 23.6"

Thickness: 0.16"

Color: Light

Available: Lumber Liquidators

ORDER SAMPLES TODAY! 3 FOR \$10* [Fees!](#) [MORE](#)

Lisbon Cork Por do Sol Cork



116.25 sq. ft. per box
SKU: 10022308
~~Comparable Price \$4.88/sq. ft.~~
~~Our Low Price \$4.48/sq. ft.~~
Special Price \$1.29/sq. ft.
Save up to \$6.70/sq. ft. (35%)

Your Square Feet:

[Check Measurement](#)

Your Material Cost:

ADD TO CART

Not sure it's the one? Order a sample! **ADD SAMPLE TO CART**

Add this product to your wish list **ADD TO WISHLIST**



47 people like this. Be the first of your friends.

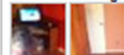


Customer Rating



[Read 9 Reviews](#) [Write a Review](#)

Customer Images



[Zoom](#)

[Product Description](#) | [Accessories, Tools & Trim](#) | **[Specs](#)** | [Installation](#) | [Reviews](#) | [Questions & Answers](#) | [Email A Friend](#)

Brand: *Lisbon Cork*

FLOORING SKU: 10022308

SAMPLE SKU: 10022311

Limited Warranty: [25 years](#)

Trade Name: *cork*

Botanical Name: *N/A*

Marketing Name: *Cork*

Janka Rating: *N/A*

AC Rating: *N/A*

Grade: *Cork*

Color Shade: *Light*

Width: *193mm*

Thickness: *3 mm*

Construction: *Cork*

Installation Type: *Glue*

Sq. Ft. Per Box: *116.25*

Hardness Rating: *N/A*

Waste: *10%*

Weight per box/unit: *58.12*

Installation Details: [Installation Guide.pdf](#)

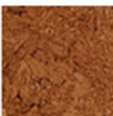
Catalog Page: [Lisbon Cork Catalog Page](#)

[Please click here to download Adobe Reader.](#)

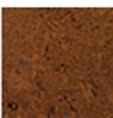
Similar Products



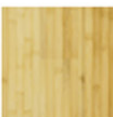
Castelo Cork



Medina Cork



Mora Cork



3/8 x 3-15/16
Horizontal
Natural Bamboo



5mm Greolan
Terracotta
Resilient Vinyl



LEPAGE PL 400 SUBFLOOR CONSTRUCTION ADHESIVE

Model Number: 2032-945

Location: Exterior and Interior Use

Size: 295 mL



LePage® PL® 400 Subfloor & Deck Adhesive

PRODUCT DESCRIPTION:

LePage® PL® 400 is an interior and exterior heavy-duty premium quality adhesive, designed for structural projects that require strength and durability. Ideal for installing sub-floors, exterior sheathing, siding and decking.

RECOMMENDED FOR:

Many common construction building materials in various combinations such as wood, fiberglass, drywall, fiberboard, hardboard, metal, concrete and masonry; All exterior projects, such as decks, fences and gazebos.

NOT RECOMMENDED FOR:

Polystyrene foam board insulation or tub surrounds; Mirrors; Applications over hygroscopic salt-treated wood, such as zinc chloride treatments; Continuous water immersion; Installation of tiles and floor coverings.

FEATURES:

- Elastomeric: Eliminates squeaky floors
- High Grab: Minimizes nailing requirements
- Easy gunning outdoors in sub-zero temperatures
- Bonds well to dry, wet, treated or frozen lumber

SIZES:

- 295 mL
- 825 mL

COLOURS:

- Tan

CLEAN UP:

Clean tools and uncured adhesive residue immediately with mineral spirits. Cured adhesive may be carefully cut away with a sharp-edged tool.

HOW TO USE:

STEP 1

Use above -17°C (0°F). Surfaces must be structurally sound, clean and free of foreign materials. Remove any ice or free-standing water. Pre-fit all materials and protect finished surfaces.

STEP 2

Apply a continuous zigzag bead to all joists or studs. To laminate sheets to flat surfaces apply a continuous bead, 5 cm (2") in from the edge around perimeter of the panel and an "X" bead extending from corner to corner.

STEP 3

Allow 2 mm (1/16") gaps between joints for expansion. Sub-floors must be nailed or screwed (both at the perimeter and at the intermediate joists) following proper installation methods.

STEP 4

Apply the adhesive at a rate so that the materials can be positioned and fastened within 10 minutes. All projects may require support until adhesive has cured.



AC PLYWOOD FLOORING

Location: Kitchen, Living, & Bedroom

Dimensions:

Length: 4'

Width: 8'

Thickness: 1/2"

Finish: 2 coats of water based polyurethane

Available: Milford Lumber, New Hampshire

Price: \$31

Plum Creek AC Sanded Plywood

SPECS	<ul style="list-style-type: none"> • Slow growth inland Douglas Fir and Larch yield fine-grained, smooth faces • All Group 1, Struc 1 Species
FACES	<ul style="list-style-type: none"> • "A" grade veneer • Quality wood plugs or putty repairs, minimal use of polyurethane patch • 15 plug average assures the highest face quality • Fully sanded face
BACKS, CENTERS & CORES	<ul style="list-style-type: none"> • Plum Creek's High Integrity Ultra-Core™ construction features composed cross bands for tight core gap tolerance more stringent than APA and industry specs • One piece "C" grade or better center and back
CONSTRUCTION & THICKNESS	<p>Thickness Ply count</p> <p>1/4" 3 Ply</p> <p>3/8" 4 Ply</p> <p>1/2" 5 Ply</p> <p>5/8" 5 or 7 Ply</p> <p>3/4" 7 Ply</p> <ul style="list-style-type: none"> • Standard size 4' x 8' • Panel thickness to 1 1/2" • Solid long length to 102' • Scarfed panels to 16' • Tongue and groove available on 5/8" - 1 1/8" • Underlayment stamp available



VERMONT NATURAL COATINGS FLOOR FINISH

Location: Throughout House
Base Material: Water Polyurethane
Finish: Polywhey

Product Data Sheet

- PolyWhey Floor Finish -

Product Description: Vermont Natural Coatings PolyWhey Floor Finish is an evolved clear coating that resists water, chemicals, and scratches. A neutral odor, excellent flow, quick drying, and easy clean-up with soap and water make PolyWhey a durable, environmentally smart topcoat.

By using whey protein as a co-binder, PolyWhey leverages a renewable resource to reduce its VOC level to 180 g/L, well below the toughest state standard of 275 g/L.

Recommended Uses: Use PolyWhey Floor Finish on interior bare wood flooring or previously varnished or stained wood floors.

Typical Properties

Color in Container	Milky White
Clarity (Dry)	Crystal
Solids Content	28.5%
Chemical Resistance	No visual defects
VOC	Coating: ≤ 180 g/L (wet) Material: 58 g/L (dry)
Flash Point	None
Sheen	Semi-Gloss: 45 units (± 5) @ 60° Satin: 20 units (± 5) @ 60°
Freeze/Thaw Stability	Do not freeze
Pot Life	12 months from date of manufacture
Dry Time	1-2 hours under normal conditions
Clean Up	Soap and hot water
Scent	Neutral
Boiling Point	212°F
Maximum Cure	One week
Coverage	500-600 sq. ft. per gallon

Packaging

Quart, gallon, five gallon, 55-gallon drum Semi-Gloss, Satin

VERMONT NATURAL COATINGS®

Professional Wood Finish Made Green

Application Instructions

Surface Preparation

If applying to previously finished wood, sand in order to remove old finish before applying new finish. If sanding entire surface is not desired, only sand areas of distress that can cause flaking in order to blend edges. Apply the product directly to the surface or the sealer coatings.

Warning! If you scrape, sand, or remove old paint, you may release lead dust. LEAD IS TOXIC. EXPOSURE TO LEAD DUST CAN CAUSE SERIOUS ILLNESS, SUCH AS BRAIN DAMAGE, ESPECIALLY IN CHILDREN. PREGNANT WOMEN SHOULD ALSO AVOID EXPOSURE. Wear a NIOSH-approved respirator to control lead exposure. Clean up carefully with a HEPA vacuum and a wet mop. Before you start, find out how to protect yourself and your family by contacting the National Lead Information Hotline at 1-800-424-LEAD or log onto www.epa.gov/lead.

Application

1. Test the finish on a sample piece of wood. Soft or porous woods such as pine, alder, birch, fir, cedar, or redwood may absorb a finish unevenly. Also, some woods contain tannins and other extractives that will bleed through to the surface and affect appearance.
2. Stir prior to use. Apply thin, even coats with a brush, lambswool and/or spray gun (conventional or low-pressure system), taking care to prevent the finish from puddling. Overlap brush/spray gun strokes and always maintain a wet edge.
3. Apply with a brush and/or spray gun (conventional or low-pressure system) without thinning. Excessive thinning may result in reduced product performance.
4. Sand lightly between each coat with very fine sandpaper (220 grit or finer) and remove dust with water-dampened cloth. Never use steel wool or a tack cloth.
5. Recoat in 2 hours under normal conditions. High humidity or low temperature may lengthen the dry time.
6. Apply 3 coats for best performance.
7. For best results, apply in temperatures between 65°-80° Fahrenheit and relative humidity 40%-60%. Do not apply in direct sunlight.

Precautions

Vermont Natural Coatings' PolyWhey products have low VOC levels, but should still be used with adequate ventilation. Provide adequate fresh air entry. If ventilation is inadequate, use an organic vapor/particulate respirator approved by NIOSH/MSHA for spray/mist vapors. When sanding a dried coating film use a dust/mist respirator approved by NIOSH/MSHA.

This product does not contain formaldehyde or other toxic ingredients that would require protective clothing. However, for those who are chemically sensitive or who will use product over a long period of time, we recommend wearing protective gloves and safety glasses with side shields.

Keep out of reach of children! Do not take internally!

Avoid contact with eyes and prolonged contact with skin.

This product is not flammable, but all polymer films, once applied, can burn and containers could explode if exposed to extreme heat or fire. Avoid breathing fumes of burning dry coating because carbon dioxide/monoxide may be released. Extinguish with Foam CO₂, dry chemicals, or water fog.

Drying/Curing

Under normal conditions (40%-60% humidity and 65°- 80°F) and with good ventilation, wood treated will be dry and ready for next coating or use in 1-2 hours. Allow one week for full product cure.

Cleanup and Storage

Wipe excess finish out of the lip of container with a clean cloth prior to sealing. Brushes and other equipment can be cleaned with warm, soapy water. Store in a dry, ventilated, and cool place and **keep from freezing**. Keep lid closed tightly and container in upright position away from fire or open flame. Shelf life is 12 months from date of manufacture under normal temperature conditions and if the container is resealed correctly to prohibit contamination. Reseal original container immediately after use to reduce skinning or contamination of the product.

Disposal

Waste from this product is not hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Dispose of container and any remaining liquid product in accordance with local, state, and federal regulations. Contact local solid waste officials for local handling requirements. Do not rinse empty cans out before disposal. Open can and allow to air dry. Empty, dry containers may commonly be recycled. If recycling is unavailable, dispose of empty containers in trash. Do not put containers that contain liquid product in the trash. Contact local officials for local recycling and disposal guidance.

Guarantee

We guarantee your satisfaction with our products. If proper pre-application and application techniques have been followed and you are not satisfied with the results, please contact us. We welcome your feedback and will provide you with replacement product, credit, or a cash refund.

Limited Liability

Liability, whether expressed or implied, is limited to replacement of product or refund of purchase price and cannot include liability for labor costs or consequential damages. It is the user's responsibility to determine the suitability and safety of the product for any particular application. This limited warranty may not be modified or extended by manufacturer's representatives, distributors, or dealers of Vermont Natural Coatings' products.

For questions or comments, please call 1-802-472-8700 Mon- Fri 9:00 AM- 5:00 PM EST. For more information on VNC or wood finishing ideas, check out our web site at www.vermontnaturalcoatings.com

Vermont Natural Coatings, LLC
P.O. Box 512
180 Junction Road
Hardwick, VT 05843
Voice: 802-472-8700 / Fax: 802-472-8755
Email: info@vermontnaturalcoatings.com

H.M.I.S. RATING	
Health	1
Flammability	0
Reactivity	1
Protective Equip.	

MATERIAL SAFETY DATA SHEET

Product Name: Vermont Natural Coatings PolyWhey Floor Finish Semi-Gloss
Product Code: VNCFFC2 (VNC Floor C2.xls)

Product Class: Aqueous emulsion coating
Grade: Standard Contractor/Consumer grade

SECTION I - MANUFACTURER IDENTIFICATION

Manufacturer's Name: Vermont Natural Coatings
Address: Box 512
Hardwick, VT 05843
Date Revised: April 21, 2009

Information Phone: (802) 472-8700
Emergency Phone: (802) 472-8700
Replaces: 1/1/07
Date of Issue: 5/24/08

SECTION II - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

HAZARDOUS COMPONENTS	OCCUPATIONAL EXPOSURE LIMITS				VAPOR PRESSURE	
	CAS NUMBER	OSHA PEL	ACGIH TLV	OTHER	mm Hg	@ TEMP
DIPROPYLENE GLYCOL MONOMETHYL ETHER	34590-94-8	N/E	N/E		0.4	77F
TRIPROPYLENE GLYCOL METHYL ETHER	25498-49-1	50PPM	50PPM		0.7	68F
TRIETHYLAMINE	121-44-8	10PPM	15PPM		54.0	68F
DIPROPYLENE GLYCOL BUTYL ETHER	29911-28-2	N/E	N/E		0.0	68F

Contains one or more toxic chemicals subject to the reporting requirements of S.A.R.A. Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 and of 40CFR 372. A CERCLA Hazardous Substance and Hazardous Air Pollutant.

Generally, the above ingredients that do not possess a vapor pressure are pigments and are only hazardous as airborne particles when the coating begins to degrade. The HMIS (Hazardous Materials Identification System) codes at the upper right area of this page are recognized by OSHA. The PERSONAL PROTECTION code is left blank on Vermont Natural Coatings Company's MSDSs as it depends on application technique and workplace ventilation. Please read all other sections of this MSDS before deciding on the appropriate protective equipment and beginning work.

SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

Boiling Point: 212 Deg F
Vapor Density: Heavier than air
Vapor Pressure: Less than 1 mm Hg
Appearance And Odor: Milky liquid with slight odor.
Coating V.O.C.: 1.50 Lb/Gl (180 Gr/Lt)

Melting Point: Greater than 32 Deg. F
Solubility In Water: Dilutable
Specific Gravity (H2O=1): 1.0
Evaporation Rate: Slower than ether
Material V.O.C.: 0.49 Lb/Gl (59 Gr/Lt)

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

D.O.T. Flammability Classification: Not regulated
Flash Point: None
Flammable Limits In air By Volume - Lower: N/A
Upper: N/A
Extinguishing Media: FOAM CO2 DRY CHEMICAL WATER FOG
Method Used: N/A

SPECIAL FIRE FIGHTING PROCEDURES

Polymer film can burn. Avoid breathing fumes of burning dry coating because carbon dioxide/monoxide may be released. Use full protective equipment including self-contained breathing apparatus. Cool closed containers with water.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Closed containers may explode when exposed to extreme heat or fire. Material may splatter if exposed to extreme heat. Decomposition of burning material may cause toxic gases to form, which may include carbon dioxide and carbon monoxide.

SECTION V - REACTIVITY DATA**STABILITY**

Stable

CONDITIONS TO AVOID

Elevated temperatures. Contact with oxidizing agent.

INCOMPATIBILITY (MATERIALS TO AVOID)

Oxidizers, acids and bases.

HAZARDOUS DECOMPOSITION OR BYPRODUCTS

Burning or decomposing film may give off carbon dioxide and or carbon monoxide.

HAZARDOUS POLYMERIZATION

Will Not Occur

SECTION VI - HEALTH HAZARD DATA**INHALATION HEALTH RISKS AND SYMPTOMS OF EXPOSURE**

Lightheadedness, staggered gait, headache, dizziness and nausea. Irritation to the nose, throat and lungs. Prolonged inhalation may lead to mucous membrane irritation, central nervous system depression, and unconsciousness.

SKIN AND EYE CONTACT HEALTH RISKS AND SYMPTOMS OF EXPOSURE

Irritation and watering of the eyes. Prolonged or repeated contact can cause blurred vision and corneal injury.

SKIN ABSORPTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE

Irritation of skin, redness and possible swelling. Prolonged or repeated contact can cause dermatitis, defatting. Can be absorbed through skin.

INGESTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE

Amounts ingested incidental to consumer and industrial handling are not likely to cause injury. Ingestion of large amounts can cause serious injury, including gastrointestinal irritation, nausea, and vomiting.

HEALTH HAZARDS (ACUTE AND CHRONIC)

Breathing difficulty, headache, dizziness, nausea and irritation to the respiratory tract. Causes eye and skin irritation. Irritation of the digestive tract and nervous system depression. Prolonged and repeated overexposure may cause permanent brain and or nervous system damage. Can cause dermatitis. Sanding dust inhalation may cause lung damage. Intentional misuse through inhalation may be harmful or fatal.

CARCINOGENICITY: NTP? NO**IARC MONOGRAPHS? NO****OSHA REGULATED? NO**

If this product contains ethylene glycol (see section II), oral consumption may produce adverse health effects e.g. kidney damage. This product may contain trace amounts of crystalline silica, which is considered a hazard by inhalation that can cause silicosis.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

Ingredients in this product are reported to aggravate preexisting eye, skin, respiratory, kidney and liver disorders.

SECTION VII - FIRST AID MEASURES**EMERGENCY AND FIRST AID PROCEDURES**

Eye contact: Flush with large quantities of water for at least 15 minutes. Seek immediate medical attention.

Inhalation: Remove to fresh air. Administer oxygen if necessary. Seek immediate medical attention.

Skin contact: Wash thoroughly with soap and water. If irritation persists, get medical attention.

Ingestion: Do not induce vomiting. Drink 1 or 2 glasses of water to dilute. Obtain medical attention immediately.

SECTION VIII - PRECAUTIONS FOR SAFE HANDLING AND USE**PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING**

Keep out of reach of children. Do not take internally. Avoid contact with eyes and prolonged contact with skin. When storing containers, close tightly, keep in upright position, away from fire, open flame and high temperature areas. Transfer only to approved containers with complete and appropriate labeling. Remove contaminated clothing and launder before reuse. Remove contaminated shoes and thoroughly dry before reuse. Wash skin thoroughly with soap and water after contact.

OTHER PRECAUTIONS

Warning! If you scrape, sand or remove an old coating, you may release lead dust. Lead is toxic. Exposure to lead dust can cause serious illness, such as brain damage, especially in children. Pregnant women should also avoid exposure. Wear a NIOSH-approved respirator to control lead exposure. Clean up carefully with a HEPA vacuum and wet mop. Before you start, find out how to protect yourself and your family by contacting the National Lead Information Hotline at 1-800-424-LEAD or log onto www.epa.gov/lead.

SECTION IX - ACCIDENTAL RELEASE MEASURES**STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED**

Avoid contact and breathing of vapors. Ventilate area. Remove ignition sources. Dike and absorb with absorbent material. Prevent material from entering sewers or open bodies of water.

SECTION X - CONTROL MEASURES**RESPIRATORY PROTECTION**

Use only with adequate ventilation. Provide adequate fresh air entry. If not wear the proper respiratory protection. If ventilation is inadequate use an organic vapor/particulate respirator approved by NIOSH/MSHA for spray/mist vapors. When sanding a dried coating film use a dust/mist respirator approved by NIOSH/MSHA for dust which may be generated.

VENTILATION

Local exhaust preferable.
If in confined areas, use mechanical ventilation to keep vapor concentration under permissible TLV and LEL.

PROTECTIVE GLOVES

Waterproof rubber gloves are required during repeated contact.

EYE PROTECTION

Splash resistant and spray mist protection required. Use splash goggles or safety glasses with side shields.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT

Clothing adequate to protect skin. Remove and wash before reuse.
Eye wash, safety shower.

WORK/HYGIENIC PRACTICES

Normal industrial hygienic practices should be followed. Wash hands before eating, smoking or using the washroom.

SECTION XI - DISPOSAL CONSIDERATIONS**WASTE DISPOSAL METHOD**

Waste from this product is not hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Triple rinse all containers. Then offer for recycling or reconditioning or puncture and dispose of in a sanitary landfill or by other procedures approved by state and local authorities. Improper disposal is a violation of federal laws. Dispose of in accordance with Federal, State and Local regulations. If approved for incinerating, incinerate in an approved facility. Do not incinerate closed containers. Do not drop or throw containers. If these wastes cannot be disposed of by use according to label instructions, contact the Environmental Control Agency or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

SECTION XII - ECOLOGICAL INFORMATION

Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans or other waters unless in accordance with the requirements of a Nation Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance, contact your State Water Board or Regional Office of the EPA.

SECTION XIII - TRANSPORTATION DATA**DOT**

Non-Bulk Not Regulated (Water based material Non-bulk - PROTECT FROM FREEZING!)

Bulk Not Regulated (Water based material Bulk - PROTECT FROM FREEZING!)

Note N/A

IMDG

Not Regulated

IATA

Not Regulated

SECTION XIV - REGULATORY INFORMATION**WORKPLACE CLASSIFICATIONS**

This product is considered non-hazardous under the OSHA Hazard Communication Standard (29CFR 1910.1200).

EMERGENCY PLANNING & COMMUNITY RIGHT-TO-KNOW (SARA TITLE 3)

Sections 311/312 Categorization (40CFR 370). This product is not a hazardous chemical under 29CFR 1910.1200, and therefore is not covered by Title III of SARA.

Section 313 Information (40CFR) 372. This product does not contain a chemical that is listed in Section 313 above de minimis concentrations.

SECTION XV - STATE/LOCAL REGULATORY**PENNSYLVANIA (WORKER AND COMMUNITY RIGHT-TO-KNOW ACT) : PENNSYLVANIA HAZARDOUS SUBSTANCES LIST AND/OR PENNSYLVANIA ENVIROMENTAL HAZARDOUS SUBSTANCE LIST:**

To the best of our knowledge this product does not contain chemicals at levels which require reporting under this statute.

PENNSYLVANIA (WORKER AND COMMUNITY RIGHT-TO-KNOW ACT) : PENNSYLVANIA SPECIAL HAZARDOUS SUBSTANCES LIST:

To the best of our knowledge this product does not contain chemicals at levels which require reporting under this statute.

CALIFORNIA PROPOSITION 65 (SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986)

To the best of our knowledge this product does not contain chemicals at levels which require reporting under this statute.

SECTION XVI - DISCLAIMER

All information contained in this MSDS is based on current technical data believed to be accurate and reliable. Additions of reducers or other additives to this product may substantially alter the composition and hazards of the product. Since these conditions are outside our control, we furnish this MSDS without any express or implied warranties.



SHERWIN WILLIAMS HARMONY

Model Number: 650259146
Location: All interior walls
Color: Extra White Semi-Gloss
Available: Sherwin- Williams



**SHERWIN
WILLIAMS.**



101.60

HARMONY®

INTERIOR LATEX SEMI-GLOSS B10-900 SERIES

As of 09/22/08, Complies with:		
OTC	Yes	LEED® Clv2.0 Yes
SCAQMD	Yes	LEED® NCv2.2Yes
CARB	Yes	LEED® SCv2.0Yes
MPI Spec #	147	LEED® H Yes
NAHB	Yes	LEED® Schools Yes

CHARACTERISTICS

Harmony® Interior Latex Semi-Gloss provides a durable, low-odor, anti-microbial*, interior paint formulated without silica. You can use this product, without typical odor complaints, in **occupied** areas because of the very low odor during application and drying.

Color: Most Colors

To optimize hide and color development, always use the recommended P-Shade primer

Coverage: 350-400 sq ft/gal
@ 4 mils wet; 1.6 mils dry

Drying Time, @ 77°F, 50% RH:

Touch: 1 hour
Recoat: 4 hours

Drying and recoat times are temperature, humidity, and film thickness dependent

Flash Point: N/A

Finish: 35 - 45 units @ 60°

Tinting with Blend-A-Color:

Base	oz/gal	Strength
Extra White	0-5	100%
Deep Base	4-12	100%

Addition of Blend-A-Color Tinting Color may increase the VOC.

Vehicle Type: Styrenated Acrylic/EVA
B10W00951

VOC (EPA Method 24):

0 g/L; 0.0 lb/gal

Volume Solids: 39 ± 2%

Water Vapor Permeance

ASTME96 A 2.3 perms

Weight Solids: 47 ± 2%

Weight per Gallon: 9.8 lb

* Anti-microbial - This product contains agents which inhibit the growth of microbes on the surface of this paint film.

SPECIFICATIONS

Block

- 1 ct. Loxon Block Surfer*
- 2 cts. Harmony Interior Latex Semi-Gloss

Drywall

- 1 ct. Harmony Interior Latex Primer
- 2 cts. Harmony Interior Latex Semi-Gloss

Masonry

- 1 ct. Loxon Concrete & Masonry Primer*
- or Harmony Interior Latex Primer
- 2 cts. Harmony Interior Latex Semi-Gloss

Plaster

- 1 ct. Premium Wall & Wood Primer*
- or Harmony Interior Latex Primer
- 2 cts. Harmony Interior Latex Semi-Gloss

Wood, Composition Board

- 1 ct. Premium Wall & Wood Primer*
- or Harmony Interior Latex Primer
- 2 cts. Harmony Interior Latex Semi-Gloss

* These primers contain relatively low amounts of VOCs, but could result in minor, noticeable odors.

SURFACE PREPARATION

WARNING! Removal of old paint by sanding, scraping or other means may generate dust or fumes that contain lead. Exposure to lead dust or fumes may cause brain damage or other adverse health effects, especially in children or pregnant women. Controlling exposure to lead or other hazardous substances requires the use of proper protective equipment, such as a properly fitted respirator (NIOSH approved) and proper containment and cleanup. For more information, call the National Lead Information Center at 1-800-424-LEAD (in US) or contact your local health authority.

Remove all surface contamination by washing with an appropriate cleaner, rinse thoroughly and allow to dry. Existing peeled or checked paint should be scraped and sanded to a sound surface. Glossy surfaces should be sanded dull. Stains from water, smoke, ink, pencil, grease, etc. should be sealed with the appropriate primer/sealer.

Drywall

Fill cracks and holes with patching paste/spackle and sand smooth. Joint compounds must be cured and sanded smooth. Remove all sanding dust.

Masonry, Concrete, Cement, Block

All new surfaces must be cured according to the supplier's recommendations—usually about 30 days. Remove all form release and curing agents. Rough surfaces can be filled to provide a smooth surface. If painting cannot wait 30 days, allow the surface to cure 7 days and prime the surface with Loxon Concrete & Masonry Primer.

101.60

HARMONY[®]

INTERIOR LATEX SEMI-GLOSS

B10-900 SERIES



<u>SURFACE PREPARATION</u>	<u>APPLICATION</u>	<u>CAUTIONS</u>
<p>Plaster Bare plaster must be cured and hard. Textured, soft, porous, or powdery plaster should be treated with a solution of 1 pint household vinegar to 1 gallon of water. Repeat until the surface is hard, rinse with clear water and allow to dry.</p> <p>Wood Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth.</p> <p>Mildew Remove before painting by washing with a solution of 1 part liquid bleach and 3 parts water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with water and allow the surface to dry before painting. Wear protective eyewear, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.</p> <p>Caulking Gaps between walls, ceilings, crown moldings, and other interior trim can be filled with the appropriate caulk after priming the surface.</p>	<p>Apply at temperatures above 50°F. No reduction necessary.</p> <p>Brush—Use a nylon/polyester brush.</p> <p>Roller—Use a 3/8" - 3/4" nap synthetic roller cover.</p> <p>Spray—Airless Pressure 2000 psi Tip013"-.017"</p> <p><u>CLEANUP INFORMATION</u></p> <p>Clean spills, spatters, hands and tools immediately after use with soap and warm water. After cleaning, flush spray equipment with mineral spirits to prevent rusting of the equipment. Follow manufacturer's safety recommendations when using mineral spirits.</p>	<p>For interior use only. Protect from freezing. Non-photochemically reactive.</p> <p>CAUTIONS Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH approved) or leave the area. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage. FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, call Poison Control Center, hospital emergency room, or physician immediately. WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN. HOTW 09/22/2008 B10W00951 09 00</p> <p>The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of The Sherwin-Williams Company. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication. Consult your Sherwin-Williams representative to obtain the most recent Product Data Sheet.</p>

MATERIAL SAFETY DATA SHEET

B10W951
17 00

DATE OF PREPARATION
Apr 26, 2013

SECTION 1 — PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NUMBER

B10W951

PRODUCT NAME

HARMONY® Interior Semi-Gloss Finish, Extra White

MANUFACTURER'S NAME

THE SHERWIN-WILLIAMS COMPANY

101 Prospect Avenue N.W.

Cleveland, OH 44115

Telephone Numbers and Websites

Product Information	www.sherwin-williams.com
Regulatory Information	(216) 566-2902 www.paintdocs.com
Medical Emergency	(216) 566-2917
Transportation Emergency*	(800) 424-9300
*for Chemical Emergency ONLY (spill, leak, fire, exposure, or accident)	

SECTION 2 — COMPOSITION/INFORMATION ON INGREDIENTS

% by Weight	CAS Number	Ingredient	Units	Vapor Pressure
0.1	13463-41-7	Zinc Pyrithione		
		ACGIH TLV	Not Available	
		OSHA PEL	Not Available	
14	13463-67-7	Titanium Dioxide		
		ACGIH TLV	10 mg/m3 as Dust	
		OSHA PEL	10 mg/m3 Total Dust	
		OSHA PEL	5 mg/m3 Respirable Fraction	

SECTION 3 — HAZARDS IDENTIFICATION

ROUTES OF EXPOSURE

INHALATION of vapor or spray mist.

EYE or SKIN contact with the product, vapor or spray mist.

EFFECTS OF OVEREXPOSURE

EYES: Irritation.

SKIN: Prolonged or repeated exposure may cause irritation.

INHALATION: Irritation of the upper respiratory system.

SIGNS AND SYMPTOMS OF OVEREXPOSURE

Redness and itching or burning sensation may indicate eye or excessive skin exposure.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

None generally recognized.

CANCER INFORMATION

For complete discussion of toxicology data refer to Section 11.

HMIS Codes

Health	1*
Flammability	0
Reactivity	0

SECTION 4 — FIRST AID MEASURES

EYES: Flush eyes with large amounts of water for 15 minutes. Get medical attention.

SKIN: Wash affected area thoroughly with soap and water.

INHALATION: If affected, remove from exposure. Restore breathing. Keep warm and quiet.

INGESTION: Do not induce vomiting. Get medical attention immediately.

SECTION 5 — FIRE FIGHTING MEASURES

FLASH POINT	LEL	UEL	FLAMMABILITY CLASSIFICATION
Not Applicable	Not Applicable	Not Applicable	Not Applicable
	Applicable	Applicable	EXTINGUISHING MEDIA

Carbon Dioxide, Dry Chemical, Alcohol Foam

UNUSUAL FIRE AND EXPLOSION HAZARDS

Closed containers may explode (due to the build-up of pressure) when exposed to extreme heat. During emergency conditions overexposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent. Obtain medical attention.

SPECIAL FIRE FIGHTING PROCEDURES

Full protective equipment including self-contained breathing apparatus should be used. Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

SECTION 6 — ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Remove all sources of ignition. Ventilate the area. Remove with inert absorbent.

SECTION 7 — HANDLING AND STORAGE

STORAGE CATEGORY

Not Applicable

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Keep container closed when not in use. Transfer only to approved containers with complete and appropriate labeling. Do not take internally. Keep out of the reach of children.

SECTION 8 — EXPOSURE CONTROLS/PERSONAL PROTECTION

PRECAUTIONS TO BE TAKEN IN USE

Use only with adequate ventilation. Avoid contact with skin and eyes. Avoid breathing vapor and spray mist. Wash hands after using. This coating may contain materials classified as nuisance particulates (listed "as Dust" in Section 2) which may be present at hazardous levels only during sanding or abrading of the dried film. If no specific dusts are listed in Section 2, the applicable limits for nuisance dusts are ACGIH TLV 10 mg/m3 (total dust), 3 mg/m3 (respirable fraction), OSHA PEL 15 mg/m3 (total dust), 5 mg/m3 (respirable fraction). Removal of old paint by sanding, scraping or other means may generate dust or fumes that contain lead. Exposure to lead dust or fumes may cause brain damage or other adverse health effects, especially in children or pregnant women. Controlling exposure to lead or other hazardous substances requires the use of proper protective equipment, such as a properly fitted respirator (NIOSH approved) and proper containment and cleanup. For more information, call the National Lead Information Center at 1-800-424-LEAD (in US) or contact your local health authority.

VENTILATION

Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section 2 is maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.

RESPIRATORY PROTECTION

If personal exposure cannot be controlled below applicable limits by ventilation, wear a properly fitted organic vapor/particulate respirator approved by NIOSH/MSHA for protection against materials in Section 2. When sanding or abrading the dried film, wear a dust/mist respirator approved by NIOSH/MSHA for dust which may be generated from this product, underlying paint, or the abrasive.

PROTECTIVE GLOVES

Required for long or repeated contact.

EYE PROTECTION

Wear safety spectacles with unperforated sideshields.

SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES

PRODUCT WEIGHT	9.74 lb/gal	1167 g/l
SPECIFIC GRAVITY	1.17	
BOILING POINT	212 - 213 °F	100 - 100 °C
MELTING POINT	Not Available	
VOLATILE VOLUME	60%	
EVAPORATION RATE	Slower than ether	
VAPOR DENSITY	Heavier than air	
SOLUBILITY IN WATER	Not Available	
pH	9.0	
VOLATILE ORGANIC COMPOUNDS (VOC Theoretical - As Packaged)		
	0.01 lb/gal	1 g/l
	0.00 lb/gal	0 g/l
		Less Water and Federally Exempt Solvents
		Emitted VOC

SECTION 10 — STABILITY AND REACTIVITY

STABILITY — Stable
CONDITIONS TO AVOID

None known.

INCOMPATIBILITY

None known.

HAZARDOUS DECOMPOSITION PRODUCTS

By fire: Carbon Dioxide, Carbon Monoxide

HAZARDOUS POLYMERIZATION

Will not occur

SECTION 11 — TOXICOLOGICAL INFORMATION

CHRONIC HEALTH HAZARDS

IARC's Monograph No. 93 reports there is sufficient evidence of carcinogenicity in experimental rats exposed to titanium dioxide but inadequate evidence for carcinogenicity in humans and has assigned a Group 2B rating. In addition, the IARC summary concludes, "No significant exposure to titanium dioxide is thought to occur during the use of products in which titanium is bound to other materials, such as paint."

TOXICOLOGY DATA

CAS No.	Ingredient Name			
13463-41-7	Zinc Pyrithione	LC50 RAT	4HR	Not Available
		LD50 RAT		
13463-67-7	Titanium Dioxide	LC50 RAT	4HR	Not Available
		LD50 RAT		

SECTION 12 — ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION

No data available.

SECTION 13 — DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD

Waste from this product is not hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Incinerate in approved facility. Do not incinerate closed container. Dispose of in accordance with Federal, State/Provincial, and Local regulations regarding pollution.

SECTION 14 — TRANSPORT INFORMATION

Multi-modal shipping descriptions are provided for informational purposes and do not consider container sizes. The presence of a shipping description for a particular mode of transport (ocean, air, etc.), does not indicate that the product is packaged suitably for that mode of transport. All packaging must be reviewed for suitability prior to shipment, and compliance with the applicable regulations is the sole responsibility of the person offering the product for transport.

US Ground (DOT)

Not Regulated for Transportation.

Canada (TDG)

Not Regulated for Transportation.

IMO

Not Regulated for Transportation.

IATA/ICAO

Not Regulated for Transportation.

SECTION 15 — REGULATORY INFORMATION

SARA 313 (40 CFR 372.65C) SUPPLIER NOTIFICATION

CAS No.	CHEMICAL/COMPOUND	% by WT	% Element
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No ingredients in this product are subject to SARA 313 (40 CFR 372.65C) Supplier Notification.

CALIFORNIA PROPOSITION 65

WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

TSCA CERTIFICATION

All chemicals in this product are listed, or are exempt from listing, on the TSCA Inventory.

SECTION 16 — OTHER INFORMATION

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

The above information pertains to this product as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to this product may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.



BENJAMIN MOORE EXTERIOR FINISH

Model Number: 326 10

Location: Exterior Rainscreen, siding, and decks

Base Material: Oil

Finish: Alkyd Transluscent



Benjamin Moore Premium Exterior Stain

Benjamin Moore Premium Exterior Stain is a complete selection of the finest stains and sealers. Available in a wide variety of premium quality products, Benjamin Moore has just the right product to achieve the look you want and the protection you need for your home.

Learn More



Get a jump on stain season.

[Learn More »](#)

Features

MSDS/TDS

Additional Info

Exterior Deck and Siding Stain- Alkyd Translucent (326)

- Provides protection and color without obscuring the grain or texture of the wood
- May be applied to both Soft and Hardwoods
- Specially formulated to resist mildew growth on the stain film
- Protection from water and sun damage



AVAILABLE IN:

Acrylic Solid Siding Stain

Waterproof

Alkyd Transparent

Alkyd Translucent

Alkyd Semi Transparent

Alkyd Semi Solid

Alkyd Primer

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Related Products





Material Safety Data Sheet

Revision Date: 06-Apr-2012

Revision Number: 2

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name BENJAMIN MOORE PREMIUM EXTERIOR TRANSLUCENT FINISH
Product Code 326
Product Class ALKYD STAIN
Color All

Manufacturer Benjamin Moore & Co.
101 Paragon Drive
Montvale, NJ 07645
Phone: 201-573-9600
www.benjaminmoore.com

Emergency Telephone Number(s)
CHEMTREC: 800-424-9300

2. COMPOSITION INFORMATION ON COMPONENTS

Hazardous Components

Chemical Name	CAS-No	Weight % (max)
Tung Oil	8001-20-5	30
Distillates, petroleum, hydrotreated light	64742-47-8	20
4-Chlorobenzotrifluoride	98-56-6	15
Stoddard solvent	8052-41-3	15
Silica, amorphous	7631-86-9	10
Titanium dioxide	13463-67-7	5
Zinc borate hydrate	138265-88-0	5
Ethyl benzene	100-41-4	0.5
2-Butoxyethanol	111-76-2	0.5

3. HAZARDS IDENTIFICATION

Emergency Overview

WARNING

Vapors may be irritating to eyes, nose, throat, and lungs. May cause skin irritation and/or dermatitis.
Combustible material.

Rags, steel wool or waste soaked with this product may spontaneously catch fire if improperly discarded.

Appearance liquid

Odor solvent

OSHA Regulatory Status This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Potential Health Effects

Principal Routes of Exposure Eye contact, skin contact and inhalation.

Acute Effects

Eyes

Contact with eyes may cause irritation.

Skin

May cause skin irritation and/or dermatitis.

Inhalation

High vapor / aerosol concentrations are irritating to the eyes, nose, throat and lungs and may cause headaches, dizziness, drowsiness, unconsciousness, and other central nervous system effects.

Ingestion

Ingestion may cause irritation to mucous membranes. Small amounts of this product aspirated into the respiratory system during ingestion or vomiting may cause mild to severe pulmonary injury, possibly progressing to death.

Chronic Effects Avoid repeated exposure

See Section 11 for additional Toxicological information.

Aggravated Medical Conditions None known

HMIS **Health: 1*** **Flammability: 2** **Reactivity: 0** **PPE: -**

HMIS Legend

0 - Minimal Hazard

1 - Slight Hazard

2 - Moderate Hazard

3 - Serious Hazard

4 - Severe Hazard

* - Chronic Hazard

X - Consult your supervisor or S.O.P. for "Special" handling instructions.

Note: The PPE rating has intentionally been left blank. Choose appropriate PPE that will protect employees from the hazards the material will present under the actual normal conditions of use.

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer, has chosen to provide them. HMIS® ratings are to be used only in conjunction with a fully implemented HMIS® program by workers who have received appropriate HMIS® training. HMIS® is a registered trade and service mark of the NPCA. HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

4. FIRST AID MEASURES

General Advice If symptoms persist, call a physician. Show this safety data sheet to the doctor in attendance.

Eye Contact Immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes. Keep eye wide open while rinsing. If symptoms persist, call a physician.

Skin Contact Wash off immediately with soap and plenty of water removing all contaminated clothes and shoes. If skin irritation persists, call a physician.

Inhalation	Move to fresh air. If symptoms persist, call a physician. If not breathing, give artificial respiration. Call a physician immediately
Ingestion	Clean mouth with water and afterwards drink plenty of water. Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person. Consult a physician.
Notes To Physician	Treat symptomatically
Protection Of First-Aiders	Use personal protective equipment

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media	Foam, dry powder or water. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Protective Equipment And Precautions For Firefighters	As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.
Specific Hazards Arising From The Chemical	Combustible material. Closed containers may rupture if exposed to fire or extreme heat. Keep product and empty container away from heat and sources of ignition. Thermal decomposition can lead to release of irritating gases and vapors.
Sensitivity To Mechanical Impact	No
Sensitivity To Static Discharge	Yes
Flash Point Data	
Flash Point (°F)	107
Flash Point (°C)	42
Flash Point Method	PMCC
Flammability Limits In Air	
Lower Explosion Limit	Not available
Upper Explosion Limit	Not available

NFPA **Health:** 1 **Flammability:** 2 **Instability:** 0 **Special:** Not Applicable

NFPA Legend
0 - Not Hazardous
1 - Slightly
2 - Moderate
3 - High
4 - Severe

The ratings assigned are only suggested ratings, the contractor/employer has ultimate responsibilities for NFPA ratings where this system is used.

Additional information regarding the NFPA rating system is available from the National Fire Protection Agency (NFPA) at www.nfpa.org.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions	Use personal protective equipment. Remove all sources of ignition.
Environmental Precautions	Prevent further leakage or spillage if safe to do so. Do not allow material to contaminate ground water system. Prevent product from entering drains. Do not flush into surface water or sanitary sewer system. Local authorities should be advised if significant spillages cannot be contained.
Methods For Clean-Up	Dam up. Soak up with inert absorbent material. Pick up and transfer to properly labeled containers. Clean contaminated surface thoroughly.
Other Information	None known

7. HANDLING AND STORAGE

Handling	Use only in area provided with appropriate exhaust ventilation. Do not breathe vapors or spray mist. Wear personal protective equipment. Take precautionary measures against static discharges. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded. Keep away from open flames, hot surfaces and sources of ignition.
Storage	Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat. Keep in properly labeled containers. DANGER - Rags, steel wool or waste soaked with this product may spontaneously catch fire if improperly discarded. Immediately after use, place rags, steel wool or waste in a sealed water-filled metal container.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits

Hazardous Components

Chemical Name	ACGIH	OSHA
Tung Oil	N/E	N/E
Distillates, petroleum, hydrotreated light	N/E	N/E
4-Chlorobenzotrifluoride	2.5 mg/m ³ - TWA	2.5 mg/m ³ - TWA
Stoddard solvent	100 ppm - TWA	2900 mg/m ³ - TWA 500 ppm - TWA
Silica, amorphous	N/E	- (80)/(%) SiO ₂ mg/m ³ TWA 20 mppcf - TWA
Titanium dioxide	10 mg/m ³ - TWA	15 mg/m ³ - TWA total
Zinc borate hydrate	N/E	N/E
Ethyl benzene	100 ppm - TWA 125 ppm - STEL	100 ppm - TWA 435 mg/m ³ - TWA
2-Butoxyethanol	20 ppm - TWA	240 mg/m ³ - TWA 50 ppm - TWA prevent or reduce skin absorption

Legend

ACGIH - American Conference of Governmental Industrial Hygienists Exposure Limits

OSHA - Occupational Safety & Health Administration Exposure Limits

N/E - Not Established

Engineering Measures

Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment

Eye/Face Protection

Safety glasses with side-shields.

Skin Protection

Long sleeved clothing. Protective gloves.

Respiratory Protection

In operations where exposure limits are exceeded, use a NIOSH approved respirator that has been selected by a technically qualified person for the specific work conditions. When spraying the product or applying in confined areas, wear a NIOSH approved respirator specified for paint spray or organic vapors.

Hygiene Measures

Avoid contact with skin, eyes and clothing. Remove and wash contaminated clothing before re-use. Wash thoroughly after handling. When using do not eat, drink or smoke.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	liquid
Odor	solvent
Density (lbs/gal)	8.0 - 8.4
Specific Gravity	0.95 - 1.01
pH	Not available
Viscosity (centistokes)	Not available
Evaporation Rate	Not available
Vapor Pressure	Not available
Vapor Density	Not available
Wt. % Solids	50 - 60
Vol. % Solids	45 - 55
Wt. % Volatiles	40 - 50
Vol. % Volatiles	45 - 55
VOC Regulatory Limit (g/L)	< 350
Boiling Point (°F)	279
Boiling Point (°C)	137
Freezing Point (°F)	Not available
Freezing Point (°C)	Not available
Flash Point (°F)	107
Flash Point (°C)	42
Flash Point Method	PMCC
Upper Explosion Limit	Not available
Lower Explosion Limit	Not available

10. STABILITY AND REACTIVITY

Chemical Stability

Stable under normal conditions. Hazardous polymerisation does not occur.

Conditions To Avoid	Keep away from open flames, hot surfaces, static electricity and sources of ignition.
Incompatible Materials	Incompatible with strong acids and bases and strong oxidizing agents.
Hazardous Decomposition Products	Thermal decomposition can lead to release of irritating gases and vapors.
Possibility Of Hazardous Reactions	None under normal conditions of use.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity

Product

Repeated or prolonged exposure to organic solvents may lead to permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling vapors may be harmful or fatal.

Component

Distillates, petroleum, hydrotreated light

LD50 Oral: > 5,000 mg/kg (Rat)

LD50 Dermal: > 3,000 mg/kg (Rabbit)

4-Chlorobenzotrifluoride

LD50 Oral: 13000(Rat) mg/kg

LD50 Dermal: 2 mg/kg (Rabbit)

LC50 Inhalation (Vapor): 33 mg/L (Rat, 4 hr.)

Stoddard solvent

LD50 Oral: > 5,000 mg/kg (Rat)

LD50 Dermal: > 3160 mg/kg (Rabbit)

LC50 Inhalation (Vapor): > 6.1 mg/L (Rat)

Silica, amorphous

LD50 Oral: > 5000 mg/kg (Rat)

LD50 Dermal: 2,000 mg/kg (Rabbit)

LC50 Inhalation (Dust): > 2 mg/L

Titanium dioxide

LD50 Oral: > 10000 mg/kg (Rat)

LD50 Dermal: > 10000 mg/m³ (Rabbit)

LC50 Inhalation (Dust): > 6.82 mg/L (Rat, 4 hr.)

Zinc borate hydrate

LD50 Oral: > 10000 mg/kg (Rat) vendor data

LD50 Dermal: > 10000 mg/kg (Rabbit)

LC50 Inhalation (Dust): > 5 mg/L (Rat, 4 hr.)

Ethyl benzene

LD50 Oral: 3500 mg/kg (Rat)
 LD50 Dermal: > 5000 mg/kg (Rabbit)
 LC50 Inhalation (Vapor): 55000 mg/m³ (Rat, 2 hr.)
 Sensitization: No sensitizing effects known.

2-Butoxyethanol

LD50 Oral: 470 mg/kg (Rat)
 LD50 Dermal: 220 mg/kg (Rabbit)
 LC50 Inhalation (Vapor): 2.2 mg/L (Rat, 4 hr.)
 Sensitization: No sensitizing effects known.

Chronic Toxicity

Carcinogenicity

The information below indicates whether each agency has listed any ingredient as a carcinogen:

Chemical Name	ACGIH	IARC	NTP	OSHA Carcinogen
Titanium dioxide		2B - Possible Human Carcinogen		Listed
Ethyl benzene	A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans	2B - Possible Human Carcinogen		Listed
2-Butoxyethanol	A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans			

- Although IARC has classified titanium dioxide as possibly carcinogenic to humans (2B), their summary concludes: "No significant exposure to titanium dioxide is thought to occur during the use of products in which titanium dioxide is bound to other materials, such as paint."

Legend

ACGIH - American Conference of Governmental Industrial Hygienists
 IARC - International Agency for Research on Cancer
 NTP - National Toxicity Program
 OSHA - Occupational Safety & Health Administration

12. ECOLOGICAL INFORMATION

Ecotoxicity Effects

12. ECOLOGICAL INFORMATION

Product

Acute Toxicity to Fish

No information available

Acute Toxicity to Aquatic Invertebrates

No information available

Acute Toxicity to Aquatic Plants

No information available

Component

Acute Toxicity to Fish

Titanium dioxide

LC50: >1000 mg/L (Fathead Minnow - 96 hr.)

Ethyl benzene

LC50: 12.1 mg/L (Fathead Minnow - 96 hr.)

2-Butoxyethanol

LC50: 1490 mg/L (Bluegill sunfish - 96 hr.)

Acute Toxicity to Aquatic Invertebrates

Ethyl benzene

EC50: 1.8 mg/L (Daphnia magna - 48 hr.)

Acute Toxicity to Aquatic Plants

Ethyl benzene

EC50: 4.6 mg/L (Green algae (Scenedesmus subspicatus), 72 hrs.)

13. DISPOSAL CONSIDERATIONS

Waste Disposal Method

Dispose of in accordance with federal, state, and local regulations. Local requirements may vary, consult your sanitation department or state-designated environmental protection agency for more disposal options.

Empty Container Warning

Emptied containers may retain product residue. Follow label warnings even after container is emptied. Residual vapors may explode on ignition.

14. TRANSPORT INFORMATION

DOT

Proper Shipping Name	Paint
Hazard Class	3

14. TRANSPORT INFORMATION

UN-No UN1263
Packing Group III

In the US this material may be reclassified as a Combustible Liquid and is not regulated in containers of less than 119 gallons (450 liters) via surface transportation (refer to 49CFR173.120(b)(2) for further information).

ICAO / IATA Contact the preparer for further information.

IMDG / IMO Contact the preparer for further information.

15. REGULATORY INFORMATION

International Inventories

United States TSCA Yes - All components are listed or exempt.
Canada DSL Yes - All components are listed or exempt.

Federal Regulations

SARA 311/312 hazardous categorization

Acute Health Hazard	Yes
Chronic Health Hazard	Yes
Fire Hazard	Yes
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372:

<u>Chemical Name</u>	<u>CAS-No</u>	<u>Weight % (max)</u>
Zinc borate hydrate	138265-88-0	5
Ethyl benzene	100-41-4	0.5
2-Butoxyethanol	111-76-2	0.5

This product may contain trace amounts of (other) SARA reportable chemicals. Contact the preparer for further information.

Clean Air Act, Section 112 Hazardous Air Pollutants (HAPs) (see 40 CFR 61)

This product contains the following HAPs:

<u>Chemical Name</u>	<u>CAS-No</u>	<u>Weight % (max)</u>
Ethyl benzene	100-41-4	0.5
2-Butoxyethanol	111-76-2	0.5

This product may contain trace amounts of (other) HAPs chemicals. Contact the preparer for further information.

State Regulations

California Proposition 65

This product may contain small amounts of materials known to the state of California to cause cancer or reproductive harm.

State Right-to-Know

Chemical Name	Massachusetts	New Jersey	Pennsylvania	Louisiana	Rhode Island
4-Chlorobenzotrifluoride		X	X		X
Stoddard solvent	X	X	X		X
Silica, amorphous	X	X	X		
Titanium dioxide	X	X	X		X
Zinc borate hydrate		X	X		
Ethyl benzene	X	X	X		X
2-Butoxyethanol	X	X	X		X

Legend

X - Listed

16. OTHER INFORMATION

WARNING! If you scrape, sand, or remove old paint, you may release lead dust. LEAD IS TOXIC. EXPOSURE TO LEAD DUST CAN CAUSE SERIOUS ILLNESS, SUCH AS BRAIN DAMAGE, ESPECIALLY IN CHILDREN. PREGNANT WOMEN SHOULD ALSO AVOID EXPOSURE. Wear a NIOSH approved respirator to control lead exposure. Clean up carefully with a HEPA vacuum and a wet mop. Before you start, find out how to protect yourself and your family by contacting the National Lead Information Hotline at 1-800-424-LEAD or log on to www.epa.gov/lead.

Prepared By

Product Stewardship Department
Benjamin Moore & Co.
360 Route 206 - P.O. Box 4000
Flanders, NJ 07836
866-690-1961

Revision Date:

06-Apr-2012

Revision Summary

Not available

Disclaimer

The information contained herein is presented in good faith and believed to be accurate as of the effective date shown above. This information is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them and must make independent determination of suitability and completeness of information from all sources to assure proper use of these materials and the safety and health of employees. Any use of this data and information must be determined by the user to be in accordance with applicable federal, provincial, and local laws and regulations.

End of MSDS



**VERMONT NATURAL COATINGS POLYWHEY EXTERIOR
WOOD FINISH**

Location: Exterior rain screen

Finish: Acorn Brown

Available: Vermont Natural Coatings

Product Data Sheet

- PolyWhey® Exterior Wood Finish -

Product Description: Vermont Natural Coatings PolyWhey Exterior Wood Finish provides a tough, element-repelling clear finish for decks, fences and other outdoor surfaces. By using the strength of natural whey proteins and water-based resins, PolyWhey Exterior is waterproof and provides protection against mildew, mold and harmful UV rays. A neutral odor, excellent flow, great coverage, quick drying, and easy clean-up with soap and water make durable PolyWhey an environmentally smart finish for all your exterior wood surfaces.

Recommended Uses: Use PolyWhey Exterior Wood Finish on exterior wood decks, fences, siding, railings, outdoor furniture and other wood surfaces. May be used on new wood, pressure-treated wood, and weathered wood.

Typical Properties

Color in Container	Clarity (Dry)
Caspian Clear: bluish-gray	Transparent
Acorn Brown: brown	Semi-transparent
Lakeside Cedar: tan	Semi-transparent
Autumn Red: rust red	Semi-transparent
Solids (volume)	≥ 26%
Solids (weight)	≥ 29%
Solvent type	Water
VOC: Coating:	≤ 95 g/L (wet)
Material:	≤ 48 g/L (dry)

Flash Point: None

Freeze/Thaw Stability: Do not freeze

Maximum Cure: 48 hours

Dry To Touch: 1 hour under normal conditions

Clean Up: Soap and hot water

Odor: Neutral

Shelf Life: 12 months from manufacture

Coverage: approx. 400 sq. ft. per gallon on smooth surfaces, approx. 200 sq. ft. per gallon on rough surfaces

Packaging Five gallon, gallon and quart

Surface Preparation

Sand all wood to remove loose wood fibers and old finishes. Remove dust with a damp rag. Clean the surface with Vermont Natural Coatings Wood Cleaner, rinse thoroughly and allow to dry.

Warning! If you scrape, sand, or remove old paint, you may release lead dust. LEAD IS TOXIC. EXPOSURE TO LEAD DUST CAN CAUSE SERIOUS ILLNESS, SUCH AS BRAIN DAMAGE, ESPECIALLY IN CHILDREN. PREGNANT WOMEN SHOULD ALSO AVOID EXPOSURE. Wear a NIOSH-approved respirator to control lead exposure. Clean up carefully with a HEPA vacuum and a wet mop. Before you start, find out how to protect yourself and your family by contacting the National Lead Information Hotline at 1-800-424-LEAD or log onto www.epa.gov/lead.

Application Tools

HVLP: Check manufacturers recommendations

Pump sprayer: A high quality pump sprayer with a variable tip

Brush: High quality nylon/polyester or pad applicator

PolyWhey® Exterior Wood Finish

Application Instructions

Application

Apply in temperatures between 60°F and 85°F when no rain is expected for 48 hours.

1. Stir prior to use.
2. Apply with a brush and/or spray equipment without thinning to properly prepared surface. Thinning may result in reduced product performance. Apply a thin, even coat going with the grain end to end or on full board lengths. Overlap brush/spray gun strokes and always maintain a wet edge. Coating the end grain of all exposed boards is recommended.
3. Recoat in one hour in normal conditions. Does not require sanding between coats.
4. Apply 2 coats for best performance.
5. For best results, apply in temperatures between 65°-80° Fahrenheit (16-27°C) and relative humidity 40%-60%. High humidity or low temperature may lengthen the dry time. Allow 48 hours without precipitation for curing.

Precautions

This product does not contain formaldehyde or other toxic ingredients that would require protective clothing. However, for those who are chemically sensitive or who will use the product over a long period of time, we recommend wearing protective gloves and safety glasses with side shields.

Keep out of reach of children! Do not take internally! Avoid contact with eyes and prolonged contact with skin. This product is not flammable, but all polymer film once it is applied can burn and containers could explode if exposed to extreme heat or fire. Avoid breathing fumes of burning dry coating because carbon dioxide/monoxide may be released. Extinguish with Foam CO2, dry chemicals, or water fog. Wipe excess finish out of the lip of container with a clean cloth prior to sealing to avoid material gluing lid closed. Reseal original container immediately after use to reduce skinning or contamination of the product. Brushes and other equipment can be cleaned with warm, soapy water.

Disposal

Waste from this product is not hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Dispose of container and any remaining liquid product in accordance with local, state, and federal regulations. Contact local solid waste officials for local handling requirements. Do not rinse empty cans out before disposal. Open can and allow to air dry. Empty, dry containers may commonly be recycled. If recycling is unavailable, dispose of empty containers in trash. Do not put containers that contain liquid product in the trash. Contact local officials for local recycling and disposal guidance.

Storage

1. Store in a dry, ventilated, and cool place and **keep from freezing**.
2. Keep lid closed tightly and container in upright position, away from fire, open flame, or high temperature areas.
3. Shelf life is 12 months from date of manufacture under normal temperature conditions and if the container is resealed correctly to prohibit contamination.
4. Reseal original container immediately after use to reduce skinning or contamination of the product.

Guarantee

We guarantee your satisfaction with our products if proper pre-application and application techniques have been followed. If you are not satisfied with the results, please contact us. We welcome your feedback and will provide you with replacement product, credit, or a cash refund.

Limited Liability

Liability, whether expressed or implied, is limited to replacement of product or refund of purchase price and cannot include liability for labor costs or consequential damages. It is the user's responsibility to determine the suitability and safety of the product for any particular application. This limited warranty may not be modified or extended by manufacturer's representatives, distributors, or dealers of Vermont Natural Coating products.

For questions or comments, please call Monday through Friday 9:00 A.M. • 5:00 P.M. EST toll-free: 1-888-NEW-WHEY (639-9439). For more information on VNC or wood finishing ideas, visit our web site at www.vermontnaturalcoatings.com.

**VERMONT
NATURAL
COATINGS®**
Vermont Natural Coatings, LLC
P.O. Box 512
180 Junction Road
Hardwick, VT 05843
Toll-free: 888-NEW-WHEY (639-9439)
Voice: 802-472-8700
Fax: 802-472-8755
Email: info@vermontnaturalcoatings.com
www.vermontnaturalcoatings.com

**CASPIAN
CLEAR**

**AUTUMN
RED**

**LAKESIDE
CEDAR**

**ACORN
BROWN**

H.M.I.S. RATING	
Health	1
Flammability	0
Reactivity	1
Protective Equip.	

MATERIAL SAFETY DATA SHEET

Product Name: Vermont Natural Coatings PolyWhey Exterior Acorn Brown
Product Code: VNCEXAB

Product Class: Aqueous emulsion coating
Grade: Standard Contractor/Consumer grade

SECTION I - MANUFACTURER IDENTIFICATION

Manufacturer's Name: Vermont Natural Coatings
Address: Box 512
Hardwick, VT 05843
Date Revised: June 29, 2010

Information Phone: (802) 472-8700
Emergency Phone: (802) 472-8700
Replaces:
Date of Issue: June 29, 2010

SECTION II - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

HAZARDOUS COMPONENTS	OCCUPATIONAL EXPOSURE LIMITS				VAPOR PRESSURE	
	CAS NUMBER	OSHA PEL	ACGIH TLV	OTHER	mm Hg	@ TEMP
TRIETHYLAMINE	121-44-8	10PPM	15PPM		54.0	68F
DIPROPYLENE GLYCOL N-BUTYL ETHER	29911-28-2	N/E	N/E		0.0	68F
C. I. PIGMENT WHITE 6	13463-67-7	3PPM	3PPM		N/E	N/E
C. I. PIGMENT YELLOW 42	51274-00-1	0.7PPM	1.4PPM		N/E	N/E
IRON OXIDE	1317-60-8	0.8PPM	1.5PPM		N/E	N/E
C. I. PIGMENT BLACK 7	1333-86-4	20PPM	20PPM		N/E	N/E

Contains one or more toxic chemicals subject to the reporting requirements of S.A.R.A. Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 and of 40CFR 372. A CERCLA Hazardous Substance and Hazardous Air Pollutant.

Generally, the above ingredients that do not possess a vapor pressure are pigments and are only hazardous as airborne particles when the coating begins to degrade. The HMIS (Hazardous Materials Identification System) codes at the upper right area of this page are recognized by OSHA. The PERSONAL PROTECTION code is left blank on Vermont Natural Coatings Company's MSDSs as it depends on application technique and workplace ventilation. Please read all other sections of this MSDS before deciding on the appropriate protective equipment and beginning work.

SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

Boiling Point: 212 Deg F
Vapor Density: Heavier than air
Vapor Pressure: Less than 1 mm Hg
Appearance And Odor: Milky liquid with slight odor.
Coating V.O.C.: .79 Lb/Gl (95 Gr/Lt)

Melting Point: Greater than 32 Deg. F
Solubility In Water: Dilutable
Specific Gravity (H2O=1): 1.0
Evaporation Rate: Slower than ether
Material V.O.C.: 0.27 Lb/Gl (48 Gr/Lt)

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

D.O.T. Flammability Classification: Not regulated

Flash Point: None

Method Used: N/A

Flammable Limits In air By Volume - Lower: N/A **Upper:** N/A

Extinguishing Media: FOAM CO2 DRY CHEMICAL WATER FOG

SPECIAL FIRE FIGHTING PROCEDURES

Polymer film can burn. Avoid breathing fumes of burning dry coating because carbon dioxide/monoxide may be released. Use full protective equipment including self-contained breathing apparatus. Cool closed containers with water.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Closed containers may explode when exposed to extreme heat or fire. Material may splatter if exposed to extreme heat. Decomposition of burning material may cause toxic gases to form, which may include carbon dioxide and carbon monoxide.

SECTION V - REACTIVITY DATA**STABILITY**

Stable

CONDITIONS TO AVOID

Elevated temperatures. Contact with oxidizing agent.

INCOMPATIBILITY (MATERIALS TO AVOID)

Oxidizers, acids and bases.

HAZARDOUS DECOMPOSITION OR BYPRODUCTS

Burning or decomposing film may give off carbon dioxide and or carbon monoxide.

HAZARDOUS POLYMERIZATION

Will Not Occur

SECTION VI - HEALTH HAZARD DATA**INHALATION HEALTH RISKS AND SYMPTOMS OF EXPOSURE**

Lightheadedness, staggered gait, headache, dizziness and nausea. Irritation to the nose, throat and lungs. Prolonged inhalation may lead to mucous membrane irritation, central nervous system depression, and unconsciousness.

SKIN AND EYE CONTACT HEALTH RISKS AND SYMPTOMS OF EXPOSURE

Irritation and watering of the eyes. Prolonged or repeated contact can cause blurred vision and corneal injury.

SKIN ABSORPTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE

Irritation of skin, redness and possible swelling. Prolonged or repeated contact can cause dermatitis, defatting. Can be absorbed through skin.

INGESTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE

Amounts ingested incidental to consumer and industrial handling are not likely to cause injury. Ingestion of large amounts can cause serious injury, including gastrointestinal irritation, nausea, and vomiting.

HEALTH HAZARDS (ACUTE AND CHRONIC)

Breathing difficulty, headache, dizziness, nausea and irritation to the respiratory tract. Causes eye and skin irritation. Irritation of the digestive tract and nervous system depression. Prolonged and repeated overexposure may cause permanent brain and or nervous system damage. Can cause dermatitis. Sanding dust inhalation may cause lung damage. Intentional misuse through inhalation may be harmful or fatal.

CARCINOGENICITY: NTP? NO**IARC MONOGRAPHS? NO****OSHA REGULATED? NO**

If this product contains ethylene glycol (see section II), oral consumption may produce adverse health effects e.g. kidney damage. This product may contain trace amounts of crystalline silica, which is considered a hazard by inhalation that can cause silicosis.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

Ingredients in this product are reported to aggravate preexisting eye, skin, respiratory, kidney and liver disorders.

SECTION VII - FIRST AID MEASURES**EMERGENCY AND FIRST AID PROCEDURES**

Eye contact: Flush with large quantities of water for at least 15 minutes. Seek immediate medical attention.

Inhalation: Remove to fresh air. Administer oxygen if necessary. Seek immediate medical attention.

Skin contact: Wash thoroughly with soap and water. If irritation persists, get medical attention.

Ingestion: Do not induce vomiting. Drink 1 or 2 glasses of water to dilute. Obtain medical attention immediately.

SECTION VIII - PRECAUTIONS FOR SAFE HANDLING AND USE**PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING**

Keep out of reach of children. Do not take internally. Avoid contact with eyes and prolonged contact with skin. When storing containers, close tightly, keep in upright position, away from fire, open flame and high temperature areas. Transfer only to approved containers with complete and appropriate labeling. Remove contaminated clothing and laundry before reuse. Remove contaminated shoes and thoroughly dry before reuse. Wash skin thoroughly with soap and water after contact.

OTHER PRECAUTIONS

Warning! If you scrape, sand or remove an old coating, you may release lead dust. Lead is toxic. Exposure to lead dust can cause serious illness, such as brain damage, especially in children. Pregnant women should also avoid exposure. Wear a NIOSH-approved respirator to control lead exposure. Clean up carefully with a HEPA vacuum and wet mop. Before you start, find out how to protect yourself and your family by contacting the National Lead Information Hotline at 1-800-424-LEAD or log onto www.epa.gov/lead.

SECTION IX - ACCIDENTAL RELEASE MEASURES**STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED**

Avoid contact and breathing of vapors. Ventilate area. Remove ignition sources. Dike and absorb with absorbent material. Prevent material from entering sewers or open bodies of water.

SECTION X - CONTROL MEASURES**RESPIRATORY PROTECTION**

Use only with adequate ventilation. Provide adequate fresh air entry. If not wear the proper respiratory protection. If ventilation is inadequate use an organic vapor/particulate respirator approved by NIOSH/MSHA for spray/mist vapors. When sanding a dried coating film use a dust/mist respirator approved by NIOSH/MSHA for dust which may be generated.

VENTILATION

Local exhaust preferable. If in confined areas, use mechanical ventilation to keep vapor concentration under permissible TLV and LEL.

PROTECTIVE GLOVES

Waterproof rubber gloves are required during repeated contact.

EYE PROTECTION

Splash resistant and spray mist protection required. Use splash goggles or safety glasses with side shields.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT

Clothing adequate to protect skin. Remove and wash before reuse. Eye wash, safety shower.

WORK/HYGIENIC PRACTICES

Normal industrial hygienic practices should be followed. Wash hands before eating, smoking or using the washroom.

SECTION XI - DISPOSAL CONSIDERATIONS**WASTE DISPOSAL METHOD**

Waste from this product is not hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Triple rinse all containers. Then offer for recycling or reconditioning or puncture and dispose of in a sanitary landfill or by other procedures approved by state and local authorities. Improper disposal is a violation of federal laws. Dispose of in accordance with Federal, State and Local regulations. If approved for incinerating, incinerate in an approved facility. Do not incinerate closed containers. Do not drop or throw containers. If these wastes cannot be disposed of by use according to label instructions, contact the Environmental Control Agency or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

SECTION XII - ECOLOGICAL INFORMATION

Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans or other waters unless in accordance with the requirements of a Nation Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance, contact your State Water Board or Regional Office of the EPA.

SECTION XIII - TRANSPORTATION DATA**DOT**

Non-Bulk Not Regulated (Water based material Non-bulk - PROTECT FROM FREEZING!)

Bulk Not Regulated (Water based material Bulk - PROTECT FROM FREEZING!)

Note N/A

IMDG

Not Regulated

IATA

Not Regulated

SECTION XIV - REGULATORY INFORMATION**WORKPLACE CLASSIFICATIONS**

This product is considered non-hazardous under the OSHA Hazard Communication Standard (29CFR 1910.1200).

EMERGENCY PLANNING & COMMUNITY RIGHT-TO-KNOW (SARA TITLE 3)

Sections 311/312 Categorization (40CFR 370). This product is not a hazardous chemical under 29CFR 1910.1200, and therefore is not covered by Title III of SARA.

Section 313 Information (40CFR) 372. This product does not contain a chemical that is listed in Section 313 above de minimis concentrations.

SECTION XV - STATE/LOCAL REGULATORY**PENNSYLVANIA (WORKER AND COMMUNITY RIGHT-TO-KNOW ACT) : PENNSYLVANIA HAZARDOUS SUBSTANCES LIST AND/OR PENNSYLVANIA ENVIROMENTAL HAZARDOUS SUBSTANCE LIST:**

To the best of our knowledge this product does not contain chemicals at levels which require reporting under this statute.

PENNSYLVANIA (WORKER AND COMMUNITY RIGHT-TO-KNOW ACT) : PENNSYLVANIA SPECIAL HAZARDOUS SUBSTANCES LIST:

To the best of our knowledge this product does not contain chemicals at levels which require reporting under this statute.

CALIFORNIA PROPOSITION 65 (SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986)

To the best of our knowledge this product does not contain chemicals at levels which require reporting under this statute.

SECTION XVI - DISCLAIMER

All information contained in this MSDS is based on current technical data believed to be accurate and reliable. Additions of reducers or other additives to this product may substantially alter the composition and hazards of the product. Since these conditions are outside our control, we furnish this MSDS without any express or implied warranties.



DIVISION 10 SPECIALTIES



WOOD POSTS PINE SPRUCE FIR

Location: Kiosk

Dimensions:

Length: 3 1/2"

Width: 3 1/2"

Height: 8'

Finish: Vermont Natural Acorn Brown

Available: East Montpelier Home Center

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Search All 4x4x8 pine

Project: How-To

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Home > Search Results for "4x4x8 pine"



4 x 4 x 8 #2 Pine Pressure-Treated Lumber

Model # 256276 Store SKU # 256276

★★★★☆ (7) [Write a Review](#)

\$7.77 / each

Store Only

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Zoom More Views

Quantity:

Item must be picked up in store

Pick Up In Store
Free

Available TODAY
429 in Stock
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[Product Overview](#) | [Specifications](#) | [Customer Reviews](#) | [Shipping Options](#)

PRODUCT OVERVIEW

This 4 in. x 4 in. x 8 ft. Pressure-Treated Pine Lumber features a micronized copper azole treatment to help protect the wood from termite infestation, rotting and fungal decay, making it ideal for outdoor applications. Use for a variety of applications including decks, stair support posts, walkways and other outdoor projects where lumber is exposed to the elements. When used properly, lumber is safe and environmentally friendly.

California residents: see [Proposition 65 Information](#)

- Manufactured from southern pine
- Micronized copper azole pressure-treatment effective against termites, rot and fungal decay
- Smooth texture
- 3-1/2 in. x 3-1/2 in. x 8 ft.
- Can be painted or stained
- Ground contact allowed
- pressure-treated lumber, pine pressure-treated lumber, dimensional lumber, pine dimensional lumber
- This can be painted or stained features a micronized copper azole treatment to help protect from termite infestation, rotting and fungal decay at The Home Depot
- Note: Product may vary by store.
- MFG Model # : 256276
- MFG Part # : 4210254

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SPECIFICATIONS

Actual product thickness (in.)	3.5	Actual product width (in.)	3.5
Assembled Depth (in.)	192 in	Assembled Height (in.)	5.5 in
Assembled Width (in.)	5.5 in	Chemical retention (lb./cu. ft.)	.16
Contact Type Allowed	Ground Contact	Fastener recommendation	Hot Dipped Galvanized or Stainless Steel
Lumber quality	Premium	Manufacturer Warranty	Lifetime Limited Warranty Against Rot, Decay, and Termites
Nominal Length	96 in	Nominal Product H x W (in.)	4x4
Nominal Product Height (in.)	4	Nominal Product Length (ft.)	8
Nominal Width	4 in	Nominal product width (in.)	4
Portion of product made from wood (%)	100	Product Length (ft.)	8 ft
Product Length (in.)	96	Texture	Smooth
Type of Pressure Treatment	MCA - Micronized Copper Azole	Water Resistant	No



PVC SCHEDULE 40 DRAINAGE PIPE

Location: Kiosk

Dimensions: 8.625" Outside Diameter

Circumference: 27.0825"

Height: 16"

Schedule 40 & Schedule 80 PVC Pipe Specifications

INTRODUCTION

The information presented in this document is for informational purposes only and does not constitute an offer of insurance. The information presented in this document is not intended to be used as a basis for any insurance policy. The information presented in this document is not intended to be used as a basis for any insurance policy. The information presented in this document is not intended to be used as a basis for any insurance policy.

NOTE

The above table contains information for Schedule 40 PVC Pipe and Schedule 80 PVC Pipe. The information in this table is for informational purposes only and does not constitute an offer of insurance. The information presented in this document is not intended to be used as a basis for any insurance policy.

DEFINITIONS

The information presented in this document is for informational purposes only and does not constitute an offer of insurance. The information presented in this document is not intended to be used as a basis for any insurance policy.

REFERENCES

The information presented in this document is for informational purposes only and does not constitute an offer of insurance. The information presented in this document is not intended to be used as a basis for any insurance policy.

Schedule 40 PVC Pipe Dimensions					
PIPE SIZE	O.D.	AVE. I.D.	MIN WALL	NOM WEIGHT (Wt./ft.)	MAX W.P. (PSI)
1/8"	.405	.249	.088	.051	810
1/4"	.540	.344	.088	.088	780
3/8"	.675	.473	.091	.115	620
1/2"	.840	.602	.108	.170	560
3/4"	1.050	.804	.113	.228	480
1"	1.315	1.028	.133	.333	450
1 1/4"	1.600	1.300	.140	.450	370
1 1/2"	1.900	1.550	.145	.537	330
2"	2.375	2.047	.164	.720	280
2 1/2"	2.875	2.445	.203	1.130	300
3"	3.500	3.042	.210	1.488	200
3 1/2"	4.000	3.521	.228	1.700	240
4"	4.500	3.988	.237	2.118	220
5"	5.563	5.016	.258	2.874	180
6"	6.625	6.031	.280	3.733	180
8"	8.625	7.842	.322	5.018	160
10"	10.750	9.978	.385	7.988	140
12"	12.750	11.888	.400	10.524	130
14"	14.000	13.073	.437	12.482	130
16"	16.000	14.540	.500	16.288	130
18"	18.000	16.803	.562	20.687	130
20"	20.000	18.743	.583	24.183	120
24"	24.000	22.544	.687	33.852	120



L BRACKETS

Location: Kiosk

Dimensions: 1.5" X 1.5"



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Everbilt 1-1/2 in. Zinc-Plated Corner Braces (4-Pack)

Model # 15304 | Internet # 203033882 | Store SKU # 338663

★★★★★ (2) | [Write a review](#)

\$2.67 / package

This item cannot be shipped to the following state(s): AK, GU, HI, PR, VI

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PRODUCT OVERVIEW

The Everbilt 1-1/2 in. Corner Braces (4-Pack) are ideal for reinforcing inside of right-angle corner joints. Countersunk design allows screws to sit flush with material. Easy to install.

- Made of steel
- Zinc-plated finish
- Ideal for use with wood on indoor and outdoor applications
- Screws not included
- 4-hole design
- MPN Model #: 15304
- MPN Part #: 15304

Info & Guides

[Installation Guide](#)

You will need Adobe® Acrobat® Reader to view PDF documents. [Download](#) a free copy from the Adobe Web site.

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SPECIFICATIONS

Assembled Depth (in.)	0.08 in	Assembled Height (in.)	1.5 in
Assembled Width (in.)	0.5 in	Builders Hardware Product Type	Mending Plates
Gauge	3	Manufacturer Warranty	none
Material	Steel	Number of Pieces	4
Number of mounting holes	4.0	Product Height (in.)	1.5
Product Thickness (in.)	0.0625 in	Product Weight (lb.)	0.1
Product Width (in.)	0.5 in	Returnable	30-Day
Type	Corner brace		

[Return To Top](#) ▾

Quantity:

Ship to Home
FREE (price does cover)

Pick Up In

Store:

Free

Available TODAY
41 in Stock
at Williston...
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\$2.49

Everbilt
1 in. Zinc-Plated
Mending Plates (4-Pack)
[View Product](#)

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\$23.70

Screw-It®
5/16 in. x 1 1/2 in. Threaded
Multi-Purpose Wood
Screw #14
[View Product](#)

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\$14.94

[View Product](#)



POLYCARBONATE

Location: Kiosk

Dimensions: 1/8" x 1 3/4"

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LEXAN 12 in. x 24 in. Clear Polycarbonate Sheet

Model # GE-33 Internet # 202038063 Store SKU # 987359

★★★★★ (3) | Write a Review

\$14.28 / each

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Quantity: 1

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Product Overview | Specifications | Customer Reviews | Shipping Options

PRODUCT OVERVIEW

The LEXAN 12 in. x 24 in. Clear Polycarbonate Sheet is 0.093 in. thick and virtually unbreakable in normal use. It is lightweight and UV protected to maintain its clarity and strength.

- Made of strong, lightweight and insulating Lexan polycarbonate
- Clear
- Impact-resistant surface makes it great for vandal protection and window and storm-door replacement
- 0.093 in. thick
- UV protected for long-term weatherability
- Shatter resistant
- Can be cut and sized without specialized tools
- Note: Product may vary by store.
- MFG Model #: GE-33
- MFG Part #: GE-33

Info & Guides

Use and Care Manual

You will need Adobe® Acrobat® Reader to view PDF documents. [Download](#) a free copy from the Adobe Web site.

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SPECIFICATIONS

Assembled Depth (in.)	24 in	Assembled Height (in.)	0.093 in
Assembled Width (in.)	12 in	Bullet Proof	No
Mirrored	No	Non-Glare	No
Product Length (in.)	12 in	Product Thickness (in.)	.093 in
Product Weight (lb.)	1.16	Product Width (in.)	24 in
Returnable	90-Day	Shatter Resistant	Yes
Surface Type	Clear		

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CUSTOMERS WHO VIEWED THIS ITEM PURCHASED...



\$9.88

Husky
10-Piece T-Handle
Wrench Set
DISCONTINUED

★★★★★ (3)

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\$23.70

Screw-Tite
Single and Twin Thread
Multi-Purpose Wood
Screw #14

(Not yet rated)

+ ADD TO CART



\$167.00



HIGH DENSITY OVERLAY

Location: Kiosk
Thickness: 3/4"



HDO/MDO Plywood

PRODUCT GUIDE



WOOD

The Natural Choice



Engineered wood products are a good choice for the environment. They are manufactured for years of trouble-free, dependable use. They help reduce waste by decreasing disposal costs and product damage. Wood is a renewable resource that is easily manufactured into a variety of viable products.

A few facts about wood.

- *We're growing more wood every day.* Forests fully cover one-third of the United States' and one-half of Canada's land mass. American landowners plant more than two billion trees every year. In addition, millions of trees seed naturally. The forest products industry, which comprises about 15 percent of forestland ownership, is responsible for 41 percent of replanted forest acreage.



That works out to more than one billion trees a year, or about three million trees planted every day. This high rate of replanting accounts for the fact that each year, 27 percent more timber is grown than is harvested. Canada's replanting record shows a fourfold increase in the number of trees planted between 1975 and 1990.



- *Life Cycle Assessment shows wood is the greenest building product.*

A 2004 Consortium for Research on Renewable Industrial Materials (CORRIM) study gave scientific validation to the strength of wood as a green building product. In examining building products' life cycles – from extraction of the raw material to demolition of the building at the end of its long lifespan – CORRIM found that wood was better for the environment than steel or concrete in terms of embodied energy, global warming potential, air emissions, water emissions and solid waste production. For the complete details of the report, visit www.CORRIM.org.

- *Manufacturing wood is energy efficient.*

Wood products made up 47 percent of all industrial raw materials manufactured in the United States, yet consumed only 4 percent of the energy needed to manufacture all industrial raw materials, according to a 1987 study.

Material	Percent of Production	Percent of Energy Use
Wood	47	4
Steel	23	48
Aluminum	2	8



- *Good news for a healthy planet.* For every ton of wood grown, a young forest produces 1.07 tons of oxygen and absorbs 1.47 tons of carbon dioxide.

Wood: It's the natural choice for the environment, for design and for strong, lasting construction.



NOTICE:

The recommendations in this guide apply only to products that bear the APA trademark. Only products bearing the APA trademark are subject to the Association's quality auditing program.

Demanding applications such as concrete forming, exterior siding, and industrial containers require tough building materials. APA trademarked High and Medium Density Overlay plywood (HDO and MDO) combine the toughness of Exterior-type plywood with the superior wear of an overlaid surface. These features place HDO and MDO among the most durable construction materials on the market today.

This publication from APA describes the properties of HDO and MDO plywood and the applications where these panels are used. It also includes finishing recommendations and sample specifications.

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ABOUT APA	13

PRODUCT DESCRIPTION

High Density Overlay (HDO) plywood is manufactured with a thermosetting resin-impregnated fiber surface bonded to one or both sides under heat and pressure. It's the more rugged of the overlaid panels and ideal for such punishing applications as concrete forming and industrial tanks. HDO brings to the job all the proven advantages of plywood's large size, high strength, light weight, dimensional stability and racking resistance. The tough resin overlay withstands severe exposure without further finishing. It also resists abrasion, moisture penetration and deterioration from many common chemicals and solvents.

As required by Voluntary Product Standard PS 1, the minimum HDO overlay thickness before pressing is 0.012 inch. The overlay weight is not less than 60 pounds per 1,000 square feet of panel surface. HDO plywood is bonded with 100 percent moisture-resistant glue and has inner ply construction of C- or C-Plugged grade veneer. Face veneers are B-grade or better. The HDO surface may be specified on the face only or on both the panel face and back.

HDO is manufactured in two grades; Concrete Form and Industrial. The overlay used on Concrete Form panels is manufactured with not less than 52 percent phenolic resin content. This makes these panels especially suitable for the extremely harsh conditions that can be expected when used for concrete formwork and leave the finished concrete with a smooth "steel-form" finish. Industrial grade is manufactured with not less than 45 percent phenolic-resin content, and is typically used for highway signage and other industrial applications.

HDO usually comes in a natural, opaque color. The overlay gives a soft wood tone appearance to the panel surface. Other colors, such as black, brown, or olive drab, are also available.

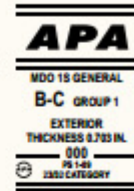
Medium Density Plywood (MDO) plywood is produced with a resin-impregnated fiber overlay with just the right tooth for rapid, even paint application. It's a preferred panel, therefore, for structural siding, exterior color accent panels, soffits and other applications where long-lasting paint or coating performance is required.

Like HDO, Medium Density Overlay plywood is manufactured with an Exterior Bond Classification. Regular MDO is produced with B-grade face and back veneers and C-grade inner plies. Panels with B-grade veneers throughout or C-grade backs for siding can also be manufactured.

MDO plywood is also manufactured in two grades; Concrete Form and General. MDO-Concrete Form panels are manufactured with an overlay that contains a minimum of 34 percent phenolic resin content. While not as durable (fewer re-uses) as HDO-Concrete Form, MDO-Concrete Form can significantly outperform plywood Concrete Form panels manufactured without overlays. The MDO-Concrete Form panels leave behind a matte finish on the cured concrete surface. The MDO-General grade panels have a surface overlay with 27 percent phenolic resin content. This overlay provides a smooth surface on the panel and is an ideal base for painting.

TYPICAL TRADEMARKS

HDO • INDUSTRIAL • A-A • G2 • EXT • 0.734 IN. • APA • 000 • PS 1-09 • 3/4 CAT



COMMON USES OF APA OVERLAID PANELS

- Painted Signs
- Concrete Forming
- Siding
- Soffits and Fascias
- Cabinets and Built-ins
- Industrial Tanks and Vats
- Counter Tops
- Truck and Trailer Linings
- Highway Signs
- Agricultural Bins

The MDO overlay surface may be specified on the face only or on both the face and back. The overlay is smooth and generally opaque, although it may show some evidence of the underlying wood grain. Siding panels with a texture-embossed surface and grooved panels with either smooth or textured overlays are also available. Most manufacturers produce MDO with a wood-tone surface color, although some supply their own identifying brand colors. Some also offer factory-primed and textured MDO, particularly for painted signs and residential siding applications.

Both HDO and MDO are easy to work using ordinary shop and carpentry tools. The overlays provide high resistance to edge splitting and slivering. They are tightly bonded and overlay separation is not a problem – even at high machine speeds. Both panels can be produced with non-skid surfaces. Both can be pressure-treated with preservatives. And both are produced in all standard sizes and thicknesses. Extra-long panels, including 9- and 10-foot siding panels, can be special ordered from some member mills of APA.

While HDO is best suited for some applications and MDO for others, either panel may be used for a broad range of jobs. Truck and trailer linings, painted signs, highway signs, storage bins, factory work surfaces and farm buildings are just a few uses for which either HDO or MDO offers high performance and low maintenance. Other applications are outlined on the following pages.

APPLICATIONS

Construction

Easy to finish and maintain, Medium Density Overlay plywood lends itself to all kinds of residential and commercial construction applications, both interior and exterior. As siding it's durable, attractive and easy to maintain. And it provides the excellent natural insulation properties of wood. (See "Thermal Properties," page 9.) Other typical exterior applications include color accent panels, soffits and fascias, chimney enclosures, screens, gable ends, privacy fences and garage doors. Inside, MDO is often used for cabinets and built-ins, paneling (with decorative moldings), shelving and partitions. HDO plywood also has been used successfully for wainscoting, partitioning, and interior and exterior walls. MDO and HDO may also be pressure treated with preservative or fire-retardant chemicals when required.



MDO panels are applied to the interior of a cold storage building.

Industry

There is virtually no limit to the industrial uses of HDO and MDO. Because HDO requires no painting and resists scuffs, marks and dirt penetration, it finds wide favor as a material for display shelves, storage racks and bins. The only care it needs is occasional cleaning with a damp cloth. The smooth, snag-free surface also makes the panel an ideal choice for assembly benches and work tables.

HDO-Industrial tanks and vats are less expensive and easier to build than stainless steel or lead-lined equivalents and effectively resist many corrosive liquids. (See "Chemical Resistance," page 10.) Exhaust ducts constructed with HDO stand up to corrosive acid and water vapors, thus providing a longer-lasting and less expensive duct system than those fabricated from other products.

HDO-Industrial grade plywood also performs well when used for pallet decks, storage lockers and trunks, counter tops, drying racks, foundry pattern mounts, freezer lockers, humidity chambers and other controlled atmospheres. Although not as rugged as HDO, MDO plywood is widely used in industry as well. Common applications include factory work surfaces, storage bins, signage, freezer liners, patterns and shelving.

Concrete Forming

From giant gang forms and complex shapes to simple conventional form components, HDO -Concrete Form plywood is the best concrete form material available for exceptionally smooth surfaces and maximum reuse. Some patent-form companies, specialists in handling HDO, expect up to 200 pours. Time and labor savings are greater, too. Form building, stripping and moving are fast and easy.

HDO-Concrete Form performs well under the alkaline exposures common to concrete while the natural insulating quality of plywood helps provide more consistent curing conditions. Scraping of forms is minimized – wiping the surface is usually all that's required. A light application of a releasing agent before each use makes stripping easier. Due to the low permeability of HDO-Concrete Form plywood, the panels may be stacked on level supports immediately after stripping without time-consuming panel separation for drying.

Although general-use MDO is not suitable for concrete forming, MDO-Concrete Form is designed and recommended specifically for forming. It imparts a matte finish to concrete which is often specified by architects.

Chemically reactive release agents are recommended by most MDO-Concrete Form manufacturers because they cause a chemical reaction that resists bonding of the concrete to the overlay. These release agents should be tested and recommended by the manufacturer for use on overlaid plywood.

For complete concrete form design and treatment information, refer to APA's *Design/Construction Guide: Concrete Forming, Form V345*.

Transportation

Plywood's excellent strength-to-weight ratio and the armor-like durability of an overlaid surface make both HDO-Industrial and MDO-General ideal for truck and trailer linings. The panels hold up better, reducing damage and maintenance costs. And they're good looking. Railroad cars lined with HDO-Industrial plywood can help keep freight clean as well as reduce refrigeration costs. Some companies produce a grid-textured HDO-Industrial panel that produces a slip-resistant floor surface. And because of its light weight, abrasion resistance and durability, MDO-General plywood is also specified by recreational vehicle manufacturers for built-in furniture and cabinetry.

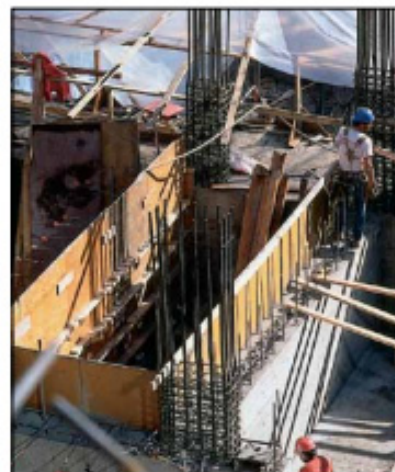
Agriculture

Minimum maintenance and maximum durability are the key reasons HDO-Industrial and MDO-General are specified for many kinds of farm buildings and equipment applications. The panels provide good-looking, easy-to-clean walls – both interior and exterior – on animal shelters and other farm buildings.

The acid-resistance of HDO-Industrial makes it an excellent structural lining for chemical fertilizer bins. HDO-Industrial linings in controlled-atmosphere storage chambers help preserve freshness in fruits and vegetables. HDO-Industrial linings will not pick up odors and, when properly joined and sealed, the virtually impervious surface reduces gas loss. And overlaid plywood forage wagons and fertilizer spreader bodies last longer and won't rust.

Marine

Top-quality performance in marine applications requires premium quality materials. That's why it pays to include HDO-Industrial and MDO-General as an integral part of any boat's structural and appearance makeup. These two panels provide the kind of protection and durability that is especially needed in areas of demanding wear – bulkheads, marina decks, hulls, transoms, cabin construction and hatch covers. Specially constructed Marine grades of plywood, in addition to regular Exterior grades, are also available with HDO-Industrial or MDO-General faces.



HDO panels can be reused many times in concrete forming.

Signs

HDO-Industrial and MDO-General panels are frequently used for signs and large displays. Highway departments and commercial sign shops across the nation specify HDO-Industrial and MDO-General for signs because they carry the message clearly, deliver the structural properties required of large sign installations, and are highly resistant to weathering and vandalism.

While both MDO-General and HDO-Industrial panels can be painted or reflectorized, MDO-General provides an excellent base for painted signs and HDO-Industrial is a superior substrate for reflective films. MDO-General panels should be finished with a quality primer and topcoat before applying reflective backgrounds and legends. HDO-Industrial should be cleaned before finishing or applying reflective material as described in the finishing section on page 13. Rounding the corners of MDO-General and HDO-Industrial panels and applying a quality sealer to the edges will extend the life of reflectorized signs. As life expectancy of a sign is usually dependent on the message material, the HDO-Industrial or MDO-General sign can often be stripped and refinished with no apparent degradation of the overlaid panel base.

HDO-Industrial and MDO-General also may be used to upgrade metal signs that have served beyond their time. A like-new appearance is produced inexpensively by applying an HDO-Industrial or MDO-General sign directly over the worn, original version. For further information, refer to APA's *Industrial Use Guide: Overlaid Plywood for Signs*, Form X240.



HDO is frequently used in highway signs.

PROPERTIES AND CHARACTERISTICS

Bending

Simple curves are easy to form with plywood. A continuous rounded bracing produces the best results. When the application calls for abrupt curvatures, fasten the panel end to the shorter radius first.

The radii in Table 1 have been found through experience to be appropriate minimums for mill-run panels of the Performance Categories shown, bent dry. An occasional panel may develop localized fractures at these radii. Values shown are based on the physical properties of non-overlaid Douglas-fir.

Flame Spread Rating

The flame spread classification of materials used for wall and ceiling finish (and occasionally for other applications) is usually limited by building codes for certain occupancies. Tests have shown that untreated HDO and MDO plywood manufactured in accordance with PS 1 will develop flame spread values between 76 and 200, which puts it in a Class III (or C) category. Smoke will develop a value of less than 200.

HDO-Industrial and MDO-General plywood is therefore suitable as finish for most interior applications. Certain more restrictive locations, such as exitways, require a Class I or Class II rating, which can be achieved by the use of fire-retardant treatment.

TABLE 1

MINIMUM BENDING RADIUS

Panel Performance Category	Across Grain (ft.)	Parallel to Grain (ft.)
1/4	2	5
5/16	2	6
3/8	3	8
1/2	6	12
5/8	8	16
3/4	12	20

Vapor Permeance

Values shown in Table 2 represent the average water vapor transmitted through plywood in grains per square foot per hour per inch of mercury pressure (perms). Materials with vapor permeance of one perm or less are considered effective vapor barriers. Values shown are based on the physical properties of Douglas-fir. The use of overlaid plywood can reduce the water vapor permeance of unfinished plywood.

Water Absorption

Water absorption of HDO plywood, edge-sealed and soaked in room temperature water, averages 10 grams or less per square foot per single panel surface in 48 hours. Water absorption of MDO plywood averages 50 grams or less per square foot per single panel surface in 48 hours.

Thermal Properties

Plywood is a good insulating material. Used for concrete forming, HDO-Industrial plywood helps to assure more consistent curing conditions. And MDO-General plywood siding contributes to the thermal resistance of walls.

Although actual thermal conductivity of wood varies with specific gravity and moisture content, differences are sufficiently small to be ignored in practice. Table 3 lists values for the common thicknesses of MDO plywood. These values are derived from data published by the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE). The use of this information is illustrated in APA's *Engineered Wood Construction Guide*, Form E30.

TABLE 2

WATER VAPOR PERMEANCE

Product	Surface Finish	Perms
Exterior-type Plywood (3/8 Performance Category)	None	0.8
Exterior-type Plywood (3/8 Performance Category)	One coat exterior primer plus two coats exterior house paint (oil system)	0.2
Exterior Medium Density Overlay Plywood One Side (3/8 Performance Category)	None	0.3
Exterior High Density Overlay Plywood Both Sides (1/2 and 5/8 Performance Categories)	None	0.1

TABLE 3

APPROXIMATE THERMAL RESISTANCE OF PLYWOOD

Panel Performance Category	"R Value" ^a (Degrees F-hr-sq ft/Btu)
11/32	0.43
3/8	0.47
15/32	0.59
1/2	0.62
19/32	0.74
5/8	0.78
23/32	0.90
3/4	0.94

a. The tabulated thermal resistance (R) values are based on Douglas fir-Larch plywood at 8% moisture content and 75°F. For more information, refer to TenWalde, A., J. D. McNatt, and L. Krahn. 1988. *Thermal Properties of Wood and Wood Panel Products for Use in Building*. Report prepared for Oak Ridge National Laboratory. DOE/USDA-21697/1 and ORNL/Sub/87-216971. USDA Forest Products Laboratory, Madison, WI.

Chemical Resistance

HDO-Industrial and MDO-General are highly resistant to chemicals and are used effectively in many industrial applications requiring continuous contact with dilute acids, alkalies, organic chemicals and many neutral and acid salts. MDO-General plywood is not as resistant as HDO-Industrial but is suitable for applications where a liner or coating is added to the surface.

Table 4 gives the effects – no effect (N), softened (S), roughened (R), or discolored (D) – of various chemicals to the overlaid surface of HDO-Industrial after 24 hours of contact.

TABLE 4

CHEMICAL RESISTANCE OF OVERLAYS

Reagent	Effect on HDO-Industrial	Effect on MDO-General
Amyl Acetate	N	N
Acetic Acid 10% and 99.5%	N	N
Acetone	N	N
Amyl Alcohol	N	N
Benzene	N	N
Calcium Hypochlorite 30%	N	D-red-brown
Carbon Tetrachloride	N	N
Chloroform	N	N
Cresol	N	N
Formalin 37%	N	N
Formic Acid 88-90%	S, D-grey	R, S, D-yellow-red
Hydrochloric Acid 10%	N	S, D-yellow-brown
Hydrochloric Acid 37%	S, R, D-pink	S, R, D-red-brown
Hydrogen Peroxide 30%	N	D, yellow
Methyl Alcohol	N	N
Monochlorobenzene	N	N
Nitric Acid 1%	D-brown	D-yellow
Nitric Acid 5%	S, R, D-brown	S, D-yellow-brown
Nitric Acid 30%	S, R, D-brown	R, S, D-yellow-brown
Nitric Acid 70%	S-to plywood, R, D-brown (surface gone)	R, S, D-orange-yellow
Phosphoric Acid 85%	S, R	R, S, D-yellow-red-brown
Soapless Detergent (Dreft)	N	N
Sodium Carbonate 25%	D-brown	D-red-brown
Sodium Chloride 10%	N	D-yellow-brown
Sodium Chloride 25%	N	N
Sodium Hydroxide 1%	D-red-brown	R, S, D-red-brown
Sodium Hydroxide 30%	S, R, D-brown	R, S, D-red-orange
Sulfuric Acid 10%	N	R, S, D-yellow-purple
Sulfuric Acid 35%	N	R, S, D-yellow-purple
Sulfuric Acid 50%	D-pink-orange	R, S, D-yellow-purple
Sulfuric Acid 70%	S, R, D-brown	R, S, D-yellow-purple
Sulfuric Acid 97%	S, R, D-black	R, S, D-yellow-purple
Zinc Chloride 50%	N	D-brown

WOODWORKING TECHNIQUES

Proven plywood woodworking techniques are followed in working HDO and MDO plywood. Panels can be sawn, nailed, drilled, routed, shaped and edge-planed. HDO plywood also can be glued. (See details below). Always take care to avoid marring the premium quality overlay surface and use sharp, high-speed power tools.

Cutting

For best results, use a power saw with little or no set and as much lead as possible. Adjust the blade to extend through the panel at least 1/2 inch. Cutting teeth should enter the face of MDO plywood. Backing the panel with scrap material and feeding it through slowly helps avoid chipping.



Overlaid siding is available with grooved or smooth surfaces.

Drilling

A high speed drill is recommended. If appearance of the back is important, panels should be backed with scrap material to avoid chipping as the drill breaks through. Drill at least 1/4 inch in from the panel edge.

Fastening

Nailing procedures for HDO and MDO are the same as for other grades of plywood. Spiral or ring-shank nails provide the best holding power. Care should be taken to avoid overdriving fasteners which could provide a path for moisture to penetrate the overlay. Screws, bolts, staples and other fasteners may also be used. Pre-drill screw holes and countersink carefully. Use washers for a better bearing surface. If fasteners are overdriven or countersunk, fill the holes with caulk or exterior wood filler to protect the underlying surface from moisture which could cause localized swelling. If overlay surface is to be painted, be sure to use a paintable caulk.

Gluing

HDO-Industrial plywood develops strong joints if proper gluing techniques are used. The overlay surface should be roughened by light sanding and cleaned before glue is applied. A resorcinol or phenolic-type glue is recommended for exterior applications. Follow the glue manufacturer's recommendations. Nails, screws or clamps can be used to maintain pressure while the glue cures.

Finishing

MDO-General is an ideal base for paint and is designed to be exposed to the weather when finished. Although it performs perfectly well without further finishing in applications where it is not exposed to the weather, MDO-General should always be face-primed and top-coated with a compatible solid-color stain or house paint if used outdoors or subjected to wet, humid conditions. If solid-color stain is desired, some panel manufacturers recommend only acrylic-latex formulations. Check panel manufacturer's recommendations. Some producers



MDO panels create a smooth, easy-to-finish surface in fascias.

of MDO-General offer panels with a pre-primed surface. HDO-Industrial is designed to be used without further finishing, although it too is an excellent base for conventional paints after a light surface roughening.

Like any finish material, HDO-Industrial and MDO-General should be stored in a cool, dry place out of the sun and protected from heaters or highly humid conditions which frequently exist at construction sites. Be sure panels are dry when finish is applied and that the specific application recommendations of the paint manufacturer are followed.

Panels intended for exterior exposure should be edge-sealed as soon as possible. Edge sealing is not permanent, nor does it necessarily make the edges moisture proof. It does, however, minimize sudden changes in moisture content due to weather cycles. Panel edges may be sealed with one or two heavy coats of top-quality exterior house paint primer formulated for wood. Edges are most easily sealed while panels are in a stack.

To insure a good paint or reflective sheeting bond, HDO-Industrial is prepared by one of the following simple surface conditioning treatments. One method is scuff-sanding with fine grit sandpaper which slightly roughens the surface and provides better tooth for the paint. Scuff-sanding also helps remove any surface contaminants. Panel surfaces should then be wiped clean to remove all dust.

The surface of HDO-Industrial can also be conditioned for painting by thoroughly scrubbing with a nylon abrasive pad saturated in VM&P naphtha or similar solvent. The liquid solvent should then be wiped off with a dry cloth to completely remove any surface contaminants. Panels should be exposed to good air circulation at least overnight to insure complete evaporation of all solvent from the overlay. If stacked, panels should be separated with stickers. The time required to permit complete evaporation will depend upon the temperature and air movement through the stack.

Only paint products formulated for wood should be used to finish overlaid plywood. Primer and finish materials produced by the same manufacturer and formulated as companion products should be specified to insure good adhesion between successive paint coats. Allow each coat to dry before applying the next, but complete as soon as practical to obtain good adhesion between coats. Follow the manufacturer's instructions carefully for best results. Conventional, high-quality exterior house paints as well as sign and bulletin paints perform well on both HDO-Industrial and MDO-General. Best finish durability can be expected when using a top-quality acrylic latex house paint system composed of primer and topcoat. Hard, brittle finishes and clear finishes should be avoided. Both air drying and baking finish systems may be used.

Oil-based finishes should be allowed to erode before repainting to avoid a thick paint buildup. Overly thick oil-based films tend to become brittle and fail within themselves.

SPECIFICATIONS

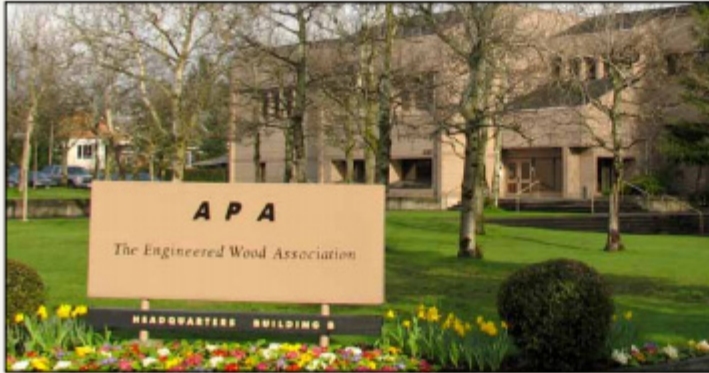
Sample Specification for HDO: Plywood shall be of Exterior type with (one) (both) faces of High Density Overlay (Concrete Form) (Industrial) as described in Voluntary Product Standard PS 1. Each panel shall be identified with the trademark of APA. (If a color other than natural is desired, check local availability before specifying.)

Sample Specification for MDO: Plywood siding shall be of Exterior type with (one) (both) faces of Medium Density Overlay (General) as described in Voluntary Product Standard PS 1. Each panel shall be identified with the trademark of APA.

To order, designate HDO (either Concrete Form or Industrial) or MDO (either Concrete Form or General), the Performance Category, grade, Group number, APA trademark, dimensions and number of pieces. Also designate any special requirements, such as face or inner ply grades, surface texture or special weights of surfacing material.

For example: *1/2 Performance Category High Density Overlay (HDO both faces), Industrial, Group 1, APA trademarked, 48" x 96", 100 pcs.*

ABOUT APA



APA – The Engineered Wood Association is a nonprofit trade association of and for structural wood panel, glulam timber, wood I-joist, structural composite lumber, and other engineered wood product manufacturers. Based in Tacoma, Washington, APA represents approximately 150 mills throughout North America, ranging from small, independently owned and operated companies to large integrated corporations.

Always insist on engineered wood products bearing the **mark of quality** – the APA or APA EWS trademark. Your APA engineered wood purchase is not only your highest possible assurance of product quality, but an investment in the many trade services that APA provides on your behalf. The Association's trademark appears only on products manufactured by member mills and is the manufacturer's assurance that the product conforms to the standard shown on the trademark. That standard may be an APA performance standard, the *Voluntary Product Standard PS 1-09 for Structural Plywood* or *Voluntary Product Standard PS 2-10, Performance Standard for Wood-Based Structural-Use Panels*. APA maintains two quality testing laboratories in key producing regions, and a 42,000-square-foot research center at Association headquarters in Tacoma, Washington.

But quality validation is only one of APA's many functions. The Association also:

- Operates one of the most sophisticated programs for basic panel research in the world.
- Maintains a network of field representatives to assist panel product users, specifiers, dealers, distributors and other segments of the trade.
- Conducts informational buyer and specifier seminars.
- Publishes a vast inventory of publications on panel grades, applications, design criteria and scores of other topics.
- Works to secure acceptance of wood structural panel products and applications by code officials, insuring agencies and lending institutions.
- Develops and maintains performance and national product standards.
- Conducts in-depth market research and development programs to identify and penetrate new panel markets in the U.S. and abroad.
- Works in conjunction with other wood product industry organizations on solutions to problems of common concern.

For More Information

For more information about APA panel products and applications, contact APA, 7011 So. 19th St., Tacoma, Washington 98466. A complete listing of other APA product and design/construction guides can be found on the Association website at www.apawood.org.

HDO/MDO Plywood Product Guide

We have field representatives in many major U.S. cities and in Canada who can help answer questions involving APA trademarked products. For additional assistance in specifying engineered wood products, contact us:

APA HEADQUARTERS

7011 So. 19th St. • Tacoma, Washington 98466
(253) 565-6600 • Fax: (253) 565-7265

PRODUCT SUPPORT HELP DESK

(253) 620-7400
E-mail Address: help@apawood.org

DISCLAIMER

The recommendations provided in this publication are intended to provide simplistic tips for improving tornado resistance of light-frame wood construction and do not constitute an engineering solution that guarantees the safety of the structure so constructed, implicitly or explicitly, by APA. Neither APA, nor its members make any warranty, expressed or implied, or assume any legal liability or responsibility for the use, application of, and/or reference to opinions, findings, conclusions, or recommendations included in this publication. Consult your local jurisdiction or design professional to assure compliance with code, construction, and performance requirements. Because APA has no control over quality of workmanship or the conditions under which engineered wood products are used, it cannot accept responsibility of product performance or designs as actually constructed.



www.apawood.org



Form No. B360P/Revised October 2011





STAINLESS STEEL BBs

Location: Kiosk
Size: 30 Caliber

standard stainless steel balls

 **FIND**

CONTACT US

Narrow By

Shape



Stainless Steel Type

- 302 440A
- 316 440C

Properties

- Formable
- Weldable
- Corrosion Resistant
- Wear Resistant

Finish

- Reflective

Inch/Metric

- Inch
- Metric

Ball Diameter

- 1/16"
- 5/64"
- 3/32"
- 7/64"
- 1/8"
- 9/64"
- 5/32"
- 3/16"
- 7/32"

Material Certification

- No

83 Products

About Stainless Steel

[More](#)

Multipurpose Stainless Steel (Type 302)

Similar to Type 304, which is the most widely used stainless steel, Type 302 has good weldability and formability. Maximum temperature for corrosion resistance is not rated. Commonly used in chemical and food processing equipment. It may become slightly magnetic when worked and is not heat treatable.

View information on the [chemical composition of stainless steel alloys](#), as well as [physical and mechanical properties](#).

Warning! Hardness and yield strength are not guaranteed and are intended only as a basis for comparison.

Precision Balls—Reflective Finish



- Hardness: 253-362 Brinell
- Yield Strength: 32,000 psi
- Work hardened

Meet ASTM A493. Grade is 100. Sphericity is 0.0001". Diameter tolerance is ±0.0005".

Dia.	Pkg. Qty.		Pkg.
1/16"	100	9291K12	\$5.00
3/32"	100	9291K13	5.25
1/8"	100	9291K14	5.36
5/32"	100	9291K16	5.52
3/16"	100	9291K18	7.05
7/32"	100	9291K21	8.21
1/4"	100	9291K23	8.38
9/32"	100	9291K24	13.25
5/16"	50	9291K27	9.24
11/32"	25	9291K28	8.66
3/8"	25	9291K31	10.60
7/16"	25	9291K33	11.62
1/2"	15	9291K35	10.83
5/8"	5	9291K36	7.65
3/4"	5	9291K38	10.28
1"	1	9291K39	10.99



ACRYLIC

Location: Kiosk
Thickness: 1.4"



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Products

Ideas & How-Tos

MyLowe's

What are you looking for?



Home: Building Supplies: Glass & Acrylic: OPTIX 24" x 18" Clear Acrylic

Print

OPTIX 24" x 18" Clear Acrylic

Item #: 239981 | Model #: 1AG2123A

★★★★★ 5 reviews | Write a review

\$19.97



Enlarged Image

Share Pin It Tweet 0 +1 0

Description Specifications Reviews Community Q&A

Length (Feet)	2.0	Color	Clear
Thickness (Inches)	0.22	UV Stabilized	Yes
Impact Strength	0.4	Color Family	Clear

FREE Store Pickup
Your order can be available for pickup in Lowe's Of S Burlington, VT today.
[Change Store](#)

Lowe's Truck Delivery
Your order will be ready for delivery to you from your selected store.

Parcel Shipping
Sent by carriers like UPS, FedEx, USPS, etc.

OPTIX 24" x 18" Clear Acrylic \$19.97

Subtotal: \$19.97

Qty.: 1

Add to Cart +

Save Item

Set a Reminder

Go to Your Account



3/4" X 4' X 8' DOUGLAS FIR MARINE GRADE PLYWOOD

Location: Bathroom Walls

Dimensions:

Thickness: 3/4"

Width: 4'

Length: 8'

Price: \$125.00

Available: Northend Hardwoods



MARINE GRADE PLYWOOD

Marine-grade plywood is made entirely of Douglas-fir or Western Larch. The grade of all plies of veneer is B or better. B-grade veneer may have knots but no knotholes. A-grade veneer has no knots or knotholes. Both A and B grade may contain wood or synthetic patches. Panels are sanded on both faces or Medium Density Overlay (MDO) or High Density Overlay (HDO). The maximum core-gap size permitted is 1/8 inch. Its exposure durability rating is EXTERIOR and the glue used is a fully waterproof structural adhesive. It is considered a "premium" panel grade for use in situations where these characteristics are required. It is available in 4x8-foot sheets of 1/4, 3/8, 1/2, 5/8 and 3/4-inch thickness. Sheets up to 5x12-feet are also available. Available grades are A-A, A-B, B-B (face-back), MDO and HDO.

Marine-grade plywood is not treated with any chemicals to enhance its resistance to decay. If decay is a concern, it should be pressure-preservative treated to an appropriate standard.

The detailed description of veneer grades and Marine-grade plywood is contained in *Voluntary Product Standard PS 1-95 Construction And Industrial Plywood*.

Sample Specification For Marine Grade

APA 3/8" B-B Marine Grade 4x8 10 pieces

Other Exterior Plywood Grades

Plywood panels rated as EXTERIOR but not Marine, such as A-B, A-A or C-C EXTERIOR, may contain any other permissible species and contain C-grade veneer. Unless specially improved, C-grade veneer is permitted to contain knots and knotholes up to approximately 1-1/2 inches across, and the inner plies may have core gaps up to 1-inch wide.

Technical Services Division
January 1996

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Because APA has no control over quality of workmanship or the conditions under which engineered wood products are used, it cannot accept responsibility of product performance or designs as actually constructed. Consult your local jurisdiction or design professional to assure compliance with code, construction, and performance requirements.



1" x 3" PINE

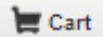
Location: Joint Covers over bathroom marine plywood

Dimensions:

Thickness: 3/4"

Width: 2 1/2"

Length: 8' 10"



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What can we help you find?



Project: How-To ▾

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Home > Search Results for "1 X 3 PINE"



1 x 3 x 6 Select Pine Lumber

Model # 921824 Store SKU # 921824

★★★★★ | [Write The First Review](#)

\$5.75 / each

Store Only

Buy Online, Pick Up In Store Today
[Check Store Inventory](#) +



Quantity:

item must be picked up in store

Pick Up In Store
Free

Available TODAY
97 in Stock
at Williston ...
[\(Change Pick Up Store\)](#)

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PRODUCT OVERVIEW

Claymark uses only the finest timber, leading-edge manufacturing processes and the most skilled people to produce our line of clear solid pine boards. Don't settle for anything less than a flawless finish. Because when it comes to quality, there is no compromise.

California residents: see [Proposition 65 Information](#)

- Environmentally friendly - fsc certified, tree farmed, pruned radiata pine
- Superior quality clear, moulding quality finish on 4 sides. No wane, twist, cupping or bowing
- Uses interior trim/mouldings, furniture, wainscoting, shelving, hobby/crafts, picture frames
- Easy to use easy to cut, nail and glue. Takes paints and stains beautifully
- Note: Product may vary by store.
- MFG Model # : 921824
- MFG Part # : 921824

[Return To Top](#) ^

SPECIFICATIONS

Actual product thickness (in.)	.75	Actual product width (in.)	2.5
Assembled Depth (in.)	1 in	Assembled Height (in.)	72 in
Assembled Width (in.)	3 in	Manufacturer Warranty	none
Nominal Length	72 in	Nominal Product H x W (in.)	1x3
Nominal Product Height (in.)	1	Nominal Product Length (ft.)	6
Nominal Width	3 in	Nominal product width (in.)	3
Portion of product made from wood (%)	100	Primed	No
Product Length (ft.)	6 ft	Product Length (in.)	72 in
Texture	Smooth	Water Resistant	No

[Return To Top](#) ^

CUSTOMERS WHO VIEWED THIS ITEM PURCHASED...



\$178.00

OPTIX
48 in. x 96 in. x 1/4 in.
Clear Acrylic Sheet-
Glass

★★★★★ (6)

[+ ADD TO CART](#)



\$97.96

48 in. x 96 in. x 1/8 in.
Acrylic Sheet

★★★★★ (3)

[+ ADD TO CART](#)



\$167.00

LEXAN
48 in. x 96 in. x .118 in.
Clear Polycarbonate
Sheet

★★★★★ (3)



BENJAMIN MOORE STUDIO FINISHES

Model Number: 308

Location: Office Wall Chalkboard

Finish: Chalkboard Paint



CHALKBOARD PAINT 308

Features

- Chalkboard Paint (308) is a topcoat that turns virtually any interior surface into a chalkboard
- Goes on easily and is washable
- Resists spattering during application
- Available in any color
- Dries to a decorative finish that is extremely durable
- Is formulated to minimize lingering odors
- Soap and water clean-up
- Dries quickly

General Descriptions

Chalkboard Paint (308) is acrylic-based and turns virtually any interior surface into a chalkboard.

Recommended For

For interior use on previously painted surfaces. Use wherever a chalkboard finish is desired.

Limitations

- Do not apply when air and surface temperatures are below 50° F (10° C).

Product Information

Colors — Standard: N/A	Technical Data Base 1X
— Tint Bases: 1X, 2X, 3X and 4X	Vehicle Type 100% Acrylic Pigment Type Titanium Dioxide Volume Solids 40%
— Special Colors: None	Coverage per quart at Recommended Film Thickness 100 – 110 Sq. Ft. Recommended Film Thickness – Wet 3.8 mils – Dry 1.5 mils Depending on surface texture and porosity. Be sure to estimate the right amount of paint for the job. This will ensure color uniformity and minimize the disposal of excess paint.
Certification Very low in VOC's VOC compliant in all regulated areas	<div style="border: 2px solid green; padding: 5px; text-align: center; margin-bottom: 10px;"> Qualifies for LEED® Credit (INTERIOR NON-FLAT) </div> Dry Time @ 77° F – To Touch 2 Hours (25° C) @ 50% RH – To Recoat 4 Hours Allow painted area to cure for 3 days before using. Painted surfaces can be washed after two weeks. High humidity and cool temperatures will result in longer dry, recoat and service times. Dries By Evaporation, Coalescence Viscosity 95 ± 2 KU Flash Point None Gloss / Sheen Eggshell Surface Temperature – Min. 50° F at Application – Max. 90° F Thin With Clean Water Clean Up Thinner Clean Water
Technical Assistance: Available through your local authorized independent Benjamin Moore retailer. For the location of the retailer nearest you, call 1-800-826-2623, see www.benjaminmoore.com , or consult your local Yellow Pages.	Weight Per Gallon 10.5 lbs Storage Temperature – Min. 40° F – Max. 90° F <div style="text-align: center; border: 1px solid black; padding: 5px; margin-top: 10px;"> Volatile Organic Compounds (VOC) 2 Grams/Liter 0.017 lbs./Gallon </div>

◇ Reported values are for Base 1X. Contact Benjamin Moore for values of other bases or colors.

Chalkboard Paint 308

Surface Preparation

Surfaces must be clean, dry and free of wax, grease, dust, mildew, water-soluble materials and scaling paint. Hard, glossy areas should be dulled with sandpaper to ensure proper adhesion.

WARNING! If you scrape, sand or remove old paint, you may release lead dust. **LEAD IS TOXIC. EXPOSURE TO LEAD DUST CAN CAUSE SERIOUS ILLNESS, SUCH AS BRAIN DAMAGE, ESPECIALLY IN CHILDREN. PREGNANT WOMEN SHOULD ALSO AVOID EXPOSURE.** Wear a NIOSH-approved respirator to control lead exposure. Carefully clean up with a HEPA vacuum and a wet mop. Before you start, find out how to protect yourself and your family by contacting the National Lead Information Hotline at 1-800-424-LEAD or log on to www.epa.gov/lead

Primer/Finish Systems

Use the appropriate Benjamin Moore® Fresh Start® primer if a primer is required. Follow label directions. For previously painted surfaces in good condition, apply one or two coats of this product. Otherwise, before and after filling in nail holes, cracks and other surface imperfections, spot prime with the appropriate Benjamin Moore® Fresh Start® primer. When dry, apply one or two finish coats of Chalkboard Paint (308).

Application

Stir thoroughly. Apply one or two coats. For best results, use a Benjamin Moore® custom-blended nylon/polyester brush, Benjamin Moore® short nap roller, or a similar product. This product can also be sprayed. When brushing or rolling, apply generously using short overlapping strokes, always moving from unpainted into painted areas. Do not over apply. Let paint dry before touching up. Do not apply in temperatures below 50°F (10°C).

Before Using

Allow painted area to cure for 3 days before using. Prior to initial use, rub entire surface with a piece of white chalk and then erase using a clean, damp cloth. Because of the additives used in some varieties of chalk, which can leave a residue when erased, we recommend using lighter colored chalk designed for use on chalkboards.

Thinning/Cleanup

Thinning is unnecessary, but if required to obtain desired application properties, a small amount of clean water may be added. Never add other paints or solvents. Wash painting tools in warm soapy water immediately after use. Spray equipment should be given a final rinse with mineral spirits to prevent rusting.

USE COMPLETELY OR DISPOSE OF PROPERLY. Dry, empty containers may be recycled in a can recycling program. **Local disposal requirements vary, consult your sanitation department or state-designated environmental agency on disposal options.**

Environmental, Health & Safety Information

Use only with adequate ventilation. Do not breathe spray mist or sanding dust. Avoid contact with eyes and prolonged or repeated contact with skin. Wear eye protection and gloves during application or sanding. A dust/particulate respirator approved by NIOSH should be worn when sanding or spraying. Close container after each use.

WARNING: This product contains a chemical known to the state of California to cause cancer and birth defects, or other reproductive harm.

FIRST AID: If you experience difficulty in breathing, leave area to obtain fresh air. If continued difficulty is experienced, call physician immediately.

IN CASE OF: SPILL – Absorb with inert material and dispose of as specified under “**THINNING/CLEAN UP**”.

**KEEP OUT OF REACH OF CHILDREN
PROTECT FROM FREEZING**

**Refer to Material Safety Data Sheet for
additional health and safety information**



Material Safety Data Sheet

Revision Date: 07-May-2012

Revision Number: 1

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name BENJAMIN MOORE CHALKBOARD PAINT
Product Code 308
Product Class WATER THINNED PAINT
Color All

Manufacturer Benjamin Moore & Co.
101 Paragon Drive
Montvale, NJ 07645
Phone: 201-573-9600
www.benjaminmoore.com

Emergency Telephone Number(s)
CHEMTREC: 800-424-9300

2. COMPOSITION INFORMATION ON COMPONENTS

Hazardous Components

Chemical Name	CAS-No	Weight % (max)
Nepheline syenite	37244-96-5	30
Titanium dioxide	13463-67-7	20

3. HAZARDS IDENTIFICATION

Emergency Overview

Vapors may be irritating to eyes, nose, throat, and lungs. May cause skin irritation and/or dermatitis.

Appearance liquid

Odor little or no odor

Potential Health Effects

Principal Routes of Exposure Eye contact, skin contact and inhalation.

Acute Effects

Eyes

May cause slight irritation.

Skin

Substance may cause slight skin irritation.

Inhalation

May cause irritation of respiratory tract.

Ingestion

Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.

Chronic Effects

Repeated contact may cause allergic reactions in very susceptible persons.

See Section 11 for additional Toxicological information.

Aggravated Medical Conditions None known

HMIS **Health:** 1 **Flammability:** 0 **Reactivity:** 0 **PPE:** -

HMIS Legend

0 - Minimal Hazard

1 - Slight Hazard

2 - Moderate Hazard

3 - Serious Hazard

4 - Severe Hazard

* - Chronic Hazard

X - Consult your supervisor or S.O.P. for "Special" handling instructions.

Note: The PPE rating has intentionally been left blank. Choose appropriate PPE that will protect employees from the hazards the material will present under the actual normal conditions of use.

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer, has chosen to provide them. HMIS® ratings are to be used only in conjunction with a fully implemented HMIS® program by workers who have received appropriate HMIS® training. HMIS® is a registered trade and service mark of the NPCA. HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

4. FIRST AID MEASURES

General Advice	No hazards which require special first aid measures.
Eye Contact	Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.
Skin Contact	Wash off immediately with soap and plenty of water removing all contaminated clothes and shoes.
Inhalation	Move to fresh air. If symptoms persist, call a physician.
Ingestion	Clean mouth with water and afterwards drink plenty of water. Consult a physician if necessary.
Notes To Physician	Treat symptomatically

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Protective Equipment And Precautions For Firefighters	As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.
Specific Hazards Arising From The Chemical	Closed containers may rupture if exposed to fire or extreme heat.
Sensitivity To Mechanical Impact	No

Sensitivity To Static Discharge	No
Flash Point Data	
Flash Point (°F)	Not applicable
Flash Point (°C)	Not applicable
Flash Point Method	Not applicable
Flammability Limits In Air	
Lower Explosion Limit	Not applicable
Upper Explosion Limit	Not applicable

NFPA **Health:** 1 **Flammability:** 0 **Instability:** 0 **Special:** Not Applicable

NFPA Legend

- 0 - Not Hazardous
- 1 - Slightly
- 2 - Moderate
- 3 - High
- 4 - Severe

The ratings assigned are only suggested ratings, the contractor/employer has ultimate responsibilities for NFPA ratings where this system is used.

Additional information regarding the NFPA rating system is available from the National Fire Protection Agency (NFPA) at www.nfpa.org.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions	Avoid contact with skin, eyes and clothing. Ensure adequate ventilation.
Environmental Precautions	Prevent further leakage or spillage if safe to do so.
Methods For Clean-Up	Soak up with inert absorbent material. Sweep up and shovel into suitable containers for disposal.
Other Information	None known

7. HANDLING AND STORAGE

Handling	Avoid contact with skin, eyes and clothing. Avoid breathing vapors, spray mists or sanding dust. In case of insufficient ventilation, wear suitable respiratory equipment.
Storage	Keep container tightly closed. Keep out of the reach of children.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Limits

Hazardous Components

Chemical Name	ACGIH	OSHA
Nepheline syenite	N/E	5 mg/m ³ - TWA (nuisance dust)
Titanium dioxide	10 mg/m ³ - TWA	15 mg/m ³ - TWA total

Legend

ACGIH - American Conference of Governmental Industrial Hygienists Exposure Limits
 OSHA - Occupational Safety & Health Administration Exposure Limits
 N/E - Not Established

Engineering Measures	Ensure adequate ventilation, especially in confined areas.
Personal Protective Equipment	
Eye/Face Protection	Safety glasses with side-shields.
Skin Protection	Protective gloves and impervious clothing
Respiratory Protection	In case of insufficient ventilation wear suitable respiratory equipment.
Hygiene Measures	Avoid contact with skin, eyes and clothing. Remove and wash contaminated clothing before re-use. Wash thoroughly after handling.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	liquid
Odor	little or no odor
Density (lbs/gal)	10.1 - 12.3
Specific Gravity	1.21 - 1.48
pH	Not available
Evaporation Rate	Not available
Vapor Pressure	Not available
Vapor Density	Not available
Wt. % Solids	50 - 70
Vol. % Solids	35 - 55
Wt. % Volatiles	30 - 50
Vol. % Volatiles	45 - 65
VOC Regulatory Limit (g/L)	< 50
Boiling Point (°F)	212
Boiling Point (°C)	100
Freezing Point (°F)	32
Freezing Point (°C)	0
Flash Point (°F)	Not applicable
Flash Point (°C)	Not applicable
Flash Point Method	Not applicable
Upper Explosion Limit	Not applicable
Lower Explosion Limit	Not applicable

10. STABILITY AND REACTIVITY

Chemical Stability	Stable under normal conditions.
Conditions To Avoid	Prevent from freezing
Incompatible Materials	No materials to be especially mentioned.
Hazardous Decomposition Products	None under normal use.
Possibility Of Hazardous Reactions	None under normal conditions of use.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity

Product

No information available

Component

Nepheline syenite

Sensitization: No sensitizing effects known.

Titanium dioxide

LD50 Oral: > 10000 mg/kg (Rat)

LD50 Dermal: > 10000 mg/m³ (Rabbit)

LC50 Inhalation (Dust): > 6.82 mg/L (Rat, 4 hr.)

Chronic Toxicity

Carcinogenicity

The information below indicates whether each agency has listed any ingredient as a carcinogen:

Chemical Name	ACGIH	IARC	NTP	OSHA Carcinogen
Titanium dioxide		2B - Possible Human Carcinogen		Listed

- Although IARC has classified titanium dioxide as possibly carcinogenic to humans (2B), their summary concludes: "No significant exposure to titanium dioxide is thought to occur during the use of products in which titanium dioxide is bound to other materials, such as paint."

Legend

ACGIH - American Conference of Governmental Industrial Hygienists

IARC - International Agency for Research on Cancer

NTP - National Toxicity Program

OSHA - Occupational Safety & Health Administration

12. ECOLOGICAL INFORMATION

Ecotoxicity Effects

Product

Acute Toxicity to Fish

No information available

Acute Toxicity to Aquatic Invertebrates

No information available

12. ECOLOGICAL INFORMATION

Acute Toxicity to Aquatic Plants
No information available

Component
Acute Toxicity to Fish

Titanium dioxide
LC50: >1000 mg/L (Fathead Minnow - 96 hr.)

Acute Toxicity to Aquatic Invertebrates
No information available

Acute Toxicity to Aquatic Plants
No information available

13. DISPOSAL CONSIDERATIONS

Waste Disposal Method Dispose of in accordance with federal, state, and local regulations. Dry, empty containers may be recycled in a can recycling program. Local requirements may vary, consult your sanitation department or state-designated environmental protection agency for more disposal options.

14. TRANSPORT INFORMATION

DOT Not regulated

ICAO / IATA Not regulated

IMDG / IMO Not regulated

15. REGULATORY INFORMATION

International Inventories

United States TSCA Yes - All components are listed or exempt.
Canada DSL Yes - All components are listed or exempt.

Federal Regulations

SARA 311/312 hazardous categorization
Acute Health Hazard No
Chronic Health Hazard No
Fire Hazard No

Sudden Release of Pressure Hazard	No
Reactive Hazard	No

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372:

This product may contain trace amounts of (other) SARA reportable chemicals. Contact the preparer for further information.

Clean Air Act, Section 112 Hazardous Air Pollutants (HAPs) (see 40 CFR 61)

This product contains the following HAPs:

This product may contain trace amounts of (other) HAPs chemicals. Contact the preparer for further information.

State Regulations**California Proposition 65**

This product may contain small amounts of materials known to the state of California to cause cancer or reproductive harm.

State Right-to-Know

Chemical Name	Massachusetts	New Jersey	Pennsylvania	Louisiana	Rhode Island
Titanium dioxide	X	X	X		X

Legend

X - Listed

16. OTHER INFORMATION

WARNING! If you scrape, sand, or remove old paint, you may release lead dust. LEAD IS TOXIC. EXPOSURE TO LEAD DUST CAN CAUSE SERIOUS ILLNESS, SUCH AS BRAIN DAMAGE, ESPECIALLY IN CHILDREN. PREGNANT WOMEN SHOULD ALSO AVOID EXPOSURE. Wear a NIOSH approved respirator to control lead exposure. Clean up carefully with a HEPA vacuum and a wet mop. Before you start, find out how to protect yourself and your family by contacting the National Lead Information Hotline at 1-800-424-LEAD or log on to www.epa.gov/lead.

Prepared By Product Stewardship Department
Benjamin Moore & Co.
360 Route 206 - P.O. Box 4000
Flanders, NJ 07836
866-690-1961

Revision Date: 07-May-2012
Revision Summary Not available

Disclaimer

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End of MSDS



FUNCTIONAL ROLLER CATCH

Model: BP 97142G
Location: Desk of Office Wall
Finish: Permabrite Zinc



ROLLER CATCH

SKU# 34722G

► (4) #6 T.H. x 1/2"

SHARE *or* PRINT



► SPECIFICATIONS

Collection	N/A
CTC (inches)	N/A
Length (inches)	1.312
CTC (mm)	N/A
Finish	PermaBrite Zinc
Width Inches	0.25
Width (mm)	6.35
Projection (mm)	12.7



**BLUM 170 DEGREE SNAP CLOSE CLIP TOP FRAMELESS
OVERLAY HINGES**

Model: 55840
Location: Desk of Office Wall
Finish: Nickel

Need Help?
LIVE HELP
START CHAT NOW!
Live Chat by LivePerson

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- ▶ Snap Close Frameless Hinges
 - ▶ Free Swing Hinges
 - ▶ European Automatic Hinges

- RELATED SEARCHES**
- ▶ Hinges
 - ▶ Soft Close Hinges
 - ▶ Inset Hinge
 - ▶ Blum Hinges

- TECH DOCUMENTS**
- ▶ Blum Hinge Bag Instructions
 - ▶ Concealed Hinge Jig-It Instructions
 - ▶ Search MSDS

- RELATED ARTICLES**
- ▶ Understanding Hinges
 - ▶ Concealed Hinge Selection Guide

CA RESIDENTS: PROP. 65 INFO

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★★★★☆
\$4.59



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Blum® 170° Snap Close Clip Top Frameless Overlay Hinges

\$17.99 ^{Pair} **ORDER BELOW**

Average Rating: ★★★★★ (15 customer reviews)

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Technical Details:

- Recommended for frameless cabinet applications.
- Clip top functionality enables you to make all three hinge adjustments without loosening screws.
- Clip-on mounting plate adjusts easily and accurately with parallel movement!
- Featuring snap-close functionality.
- 170° Opening.
- Three Way Adjustment.
- Nickel Finish.

What's in the Box?

Pair of Blum® 170° Snap Close Clip Top Frameless Overlay Hinges, mounting screws with caps, parallel - movement mounting plate, and instructions



The Rockler Advantage:

- Hinges are sold by the pair
- Mounting screws are included
- Mounting plates are included
- Step - by - Step instructions
- Expert guidance and tech support at 1-800-260-9663
- See below for a large selection of JIG-ITs to make installation a breeze

[Learn more...](#)




[REQUEST A CATALOG](#)

[MEASUREMENT CONVERTER](#)


Woodworkers Who Viewed This Item Also Viewed



175 Fully Concealed Hinges
★★★★★
\$16.39



Blum 170 Snap Close Clip Top Frameless Inset Hinge
★★★★★
\$22.59



Blum 110 Clip Top Cross-Corner Hinges
★★★★★
\$21.59



Urn Tip Full Back-to-Back Wren-Amount



PLEXIGLASS SHEET IN CLEAR 1/8" X 24" X 48" SHEET

Model: ACRYCLR0.125PM24X28

Dimensions:

Thickness: 1/8"

Length: 48"

Width: 24"

Weight: 5.85 lb

Price: \$36.31

Available: Vermont Plastics

Home > Plexiglass > Plexiglass - Plexiglas® Acrylic sheets > Plexiglass Sheets in Clear >

Plexiglass Clear Acrylic Sheet Paper Masked 1/8" x 24" x 48"



eplastics.com

[View Larger Image](#)

Plexiglass Sheets in Clear 1/8"x24"x48" sheet

Item ID: ACRYCLR0.125PM24X48

.125"x24"x48" Clear Plexiglass Acrylic Sheet Paper Masked

Item Weight: 5.85 lb

Sales Unit: Each

Quantity Price:

Quantity	1	3	10	25
Price each	\$36.31	\$31.85	\$28.28	\$25.48

Need this cut?

Please enter the sizes you would like in the cutting box.

Be sure to add a Labor line – click [HERE](#)

Qty:

1

[Add to Cart](#)

Related Items



1"X 6" TRANSOM FRAMING MATERIAL

Location: Auxilary Bedroom Transom

Dimensions:

Thickness: 3/4"

Width: 5.5"

Species: Pine



Your Store: Williston #4501 (Change)

Store Finder | Local Ad | Credit Center | Savings Center

Shop By Department

Search All

What can we help you find?



Project: How-To

Sign In or Register Your Account

Home > Search Results for "1 x 6 pine"



1 x 6 x 6 Select Pine Lumber

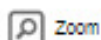
Model # 928787 Store SKU # 928787

★ ★ ★ ★ ★ (1) | Write a Review

\$13.12 / each

Store Only

Buy Online, Pick Up in Store Today
Check Store Inventory



Quantity: 1

Item must be picked up in store

Pick Up In Store
Free

Available TODAY
42 In Stock
at Williston ...
(Change Pick Up Store)

+ ADD TO CART

+ ADD TO MY LIST

Product Overview | Specifications | Customer Reviews | Shipping Options

PRODUCT OVERVIEW

Provide you with the perfect solution for all your project needs. These boards combine the highest grade available in the market with unsurpassed quality of finish, making them ideal for any interior application. These boards have no knots, so every part of the board is useable with no need for wasteful, annoying cutting, meaning great value for money. The knot-free surface allows for easy finishing, whether painting, staining or varnishing your project. Radiata Pine is well known for its excellent workability, easy nailing/screwing, glue holding and superb paint finish. Originally from Monterey, California, Radiata Pine is today sourced from commercially grown tree farms in New Zealand. These forests are FSC certified, meaning they are managed on a completely renewable basis.

California residents: see [Proposition 65 Information](#)

- Environmentally friendly - fsc certified, tree farmed, pruned radiata pine
- Superior quality clear, moulding quality finish on 4 sides. No wane, twist, cupping or bowing
- Uses interior trim/mouldings, furniture, wainscoting, shelving, hobby/crafts, picture frames
- Easy to use easy to cut, nail and glue. Takes paints and stains beautifully
- Note: Product may vary by store.
- MFG Model # : 928787
- MFG Part # : 928787

Return To Top

SPECIFICATIONS

Actual product thickness (In.)	.75	Actual product width (In.)	5.5
Assembled Depth (In.)	1 in	Assembled Height (In.)	72 in
Assembled Width (In.)	6 in	Manufacturer Warranty	none
Nominal Length	72 in	Nominal Product H x W (In.)	1x6
Nominal Product Height (In.)	1	Nominal Product Length (ft.)	6
Nominal Width	6 in	Nominal product width (In.)	6
Portion of product made from wood (%)	100	Primed	No
Product Length (ft.)	6 ft	Product Length (In.)	72 in
Texture	Smooth	Water Resistant	No

Return To Top

CUSTOMERS WHO VIEWED THIS ITEM PURCHASED...



\$178.00

OPTIX
48 in. x 96 in. x 1/4 in.
Clear Acrylic Sheet-
Glass

★★★★★ (6)

+ ADD TO CART



\$97.96

48 in. x 96 in. x 1/8 in.
Acrylic Sheet

★★★★★ (3)

+ ADD TO CART



\$167.00

LEXAN
48 in. x 96 in. x .118 in.
Clear Polycarbonate
Sheet

★★★★★ (3)

+ ADD TO CART



IKEA LILLHOLMEN TOILET ROLL HOLDER

Model Number: 300.741.79

Location: Bathroom

Dimensions:

Width: 5 7/8"

Height: 3 7/8"

Finish: nickel plated

Available: IKEA

Price: \$7.99

Matching Products

Product information



LILLHOLMEN
Toilet roll holder
\$7.99

Care instructions

Wipe clean using a damp cloth and a mild cleaner.
Wipe dry with a clean cloth.

Product description

Main parts: Zinc, Nickel plated, Clear acrylic lacquer
Rod: Steel, Nickel plated, Clear acrylic lacquer
Bracket: Steel, Galvanized

Product dimensions

Width: 5 7/8 "
Height: 3 7/8 "

Width: 15 cm
Height: 10 cm

This product requires assembly

Documents

Download for this product:
[Assembly instructions](#)

Key features

- Concealed suspension hardware.

Designer:

Cecilia Stoop

Package measurement and weight

Packages: 1
Article Number: 300.741.79
Width: 4 1/8 "
Height: 1 3/4 "
Length: 6 1/8 "
Weight: 0lb
Quantity: 1

Article Number: 300.741.79
Width: 11 cm
Height: 5 cm
Length: 16 cm
Weight: 0.2 kg
Quantity: 1



IKEA GRUNDTAL HANGER (2 PACK)

Model Number: 300.612.47

Location: Bathroom

Finish: stainless steel

Available: IKEA

Price: \$3.99

Matching Products

Product information



GRUNDTAL
Hanger
\$3.99

Care instructions

Wipe clean with a water dampened soft cloth and a mild non-abrasive dish detergent or soap, if necessary.

Product dimensions

Package quantity: 2 pack

Package quantity: 2 pack

This product requires assembly

Documents

 Downloads for this product:
[Assembly Instructions](#)

Key features

- Concealed suspension hardware.

Designer:

Nikael Warnhammar

Package measurement and weight

Packages: 1
Article Number: 300.612.47
Width: 2 1/2"
Height: 1 1/4"
Length: 3 1/4"
Weight: 0lb
Quantity: 1

Article Number: 300.612.47
Width: 6 cm
Height: 3 cm
Length: 8 cm
Weight: 0.1 kg
Quantity: 1

Product description

Cover: Stainless steel
Knob: Stainless steel, Stainless steel
Main parts: Polyamide



IKEA LILLHOLMEN TOWEL HOLDER

Model Number: 300.741.84

Location: Bathroom

Dimensions:

Width: 16 1/8"

Height: 9"

Finish: nickel plated

Available: IKEA

Price: \$7.99



\$7.99

Article Number: 501.493.86

[Read more](#)

1


Save to list

Sorry, this product is not for sale on our website, check if it is available in your local store.

Buy at your local store

Choose




Store selection may vary and prices may differ from those online.

 **Assembly instructions**

[Downloads](#)

Services

 [Home furnishing advice](#)

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Matching Products

Product information



LILLHOLMEN
Towel holder
\$7.99

Care instructions

Wipe clean using a damp cloth and a mild cleaner.
Wipe dry with a clean cloth.

Product description

Stainless steel, Clear polyurethane/acrylic lacquer


Product dimensions

Length: 5 3/4"
Width: 5"

Length: 14.5 cm
Width: 12.5 cm

This product requires assembly

Documents

 Downloads for this product:
[Assembly instructions](#)

Designer:

Cecilia Stödp

Package measurement and weight

Packages: 1
Article Number: 501.493.86
Width: 5"
Height: 1 5/8"
Length: 6 1/8"
Weight: 1lb
Quantity: 1

Article Number: 501.493.86
Width: 13 cm
Height: 4 cm
Length: 16 cm
Weight: 0.3 kg
Quantity: 1

More LILLHOLMEN series



[Go to LILLHOLMEN series](#)

More Towel rails & towel holders



[Go to Towel rails & towel holders](#)

Find the Style

[Show matching products](#)



KIDDE RECREATION FIRE EXTINGUISHER

Model Number: 466142

Location: Main House

Dimensions:

Diameter: 3.25"

Width: 4.75"

Height: 13.75"

Finish: Lightweight aluminum

Available: Home Depot

Price: \$19.48



Kidde Recreation Fire Extinguisher

Model # 466142 Store SKU # 132524
Store SO SKU # 198092

★★★★★ (27) [Write a Review](#)

\$19.48 /EA-Each

This item cannot be shipped to the following state(s): AK,HI

[Product Description](#) |
 [Specifications](#) |
 [Customer Reviews](#) |
 [More Info](#) |
 [Shipping Options](#)

PRODUCT DESCRIPTION

The Kidde 1-A:10-B:C Fire Extinguisher is suitable for use on most household fire types including trash, wood, paper, liquid, gas and energized electrical equipment fires. This fire extinguisher is fitted with a pressure gauge that provides at-a-glance status checks and is manufactured from lightweight aluminum with a nylon valve assembly.

- UL listed 1-A:10-B:C for most household fire types
- Monoammonium-phosphate discharge is suitable for use on Class A (trash, wood and paper), Class B (liquids and gases) and Class C (energized electrical equipment) fires
- 6 - 8 ft. discharge range and 8 - 12 second discharge time with an operating pressure of 100 psi
- Pressure gauge helps you check that the extinguisher is in proper working order
- Non-rechargeable
- Lightweight aluminum cylinder with a tough nylon valve assembly
- MFG Brand Name : Kidde
- MFG Model # : 466142
- MFG Part # : 466142

[Return To Top](#)

SPECIFICATIONS

Assembled Depth (in.)	3.25 in	Assembled Height (in.)	13.75 in
Assembled Width (in.)	4.75 in	Electrical Product Type	Fire Extinguisher
Item Package Type	Cardboard Container	Returnable	90-Day

[Return To Top](#)

Full Home Fire Extinguisher

Part number 21006704

Full Home use

Single use

UL Rated 3-A, 40-B:C



Meets NFPA recommendations for the home, garage and workshop



Description

The Full Home extinguisher offers exceptional fire fighting protection and value. The multipurpose unit meets NFPA requirements for living areas, as well as the garage and workshop.

The Full Home unit is the #1 choice for all round home protection and came top in a recent consumer survey.

Fights fires common to the home, garage and workshop such as textiles, paint, wood, gasoline & energized electrical equipment. This unit is easy to use and has a 10 year warranty.

Features bilingual nameplate and carton

At a Glance

- Model FX340GW
- Multipurpose Dry Chemical
- UL listed
- UL rated 3-A, 40-B:C
- Supplied with wall hanger
- Monoammonium Phosphate
- 10 year limited warranty

Features

- Pressure gauge allows for immediate pressure status check
- Easy-to-pull safety pin
- Rust and impact resistant nylon handle
- 5.5 lb. of fire extinguishing agent (Average)
- 10 year limited warranty
- UL approved wall hanger
- Powder coated cylinder for corrosion protection



For use on the following types of fire:



Product Specification

Net agent weight (Average)	5.5 lb.
Unit weight (Average)	8.25 lb.
Diameter	4.5 inches
Height	16.07 inches
Discharge time	13-15 seconds
Discharge range	12-18 feet
Operating pressure	195 psi
Cylinder	Seamless aluminum
Valve, handle, lever	Nylon
Wall hanger	UL Listed

Kidde Residential and Commercial Division
1015 Corporate Park Drive, Mebane, NC 27302 • Tel. 919.563.2711 • www.kidde.com





MATERIAL SAFETY DATA SHEET

Commercial ABC Dry Chemical (Fire Extinguishing Agent)

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATIONS AND OF THE COMPANY UNDERTAKING

Product Name Commercial ABC Dry Chemical (Fire Extinguishing Agent)
Other Trade Names Multi-Purpose, Ammonium Phosphate, Monoammonium Phosphate
Product Description Fire Extinguishing Agent
Manufacturer/Supplier Kidde – Residential and Commercial
Address 1016 Corporate Park Drive
Mebane, NC 27302
USA
Phone Number (919) 563-5911
(919) 304-8200
Chemtrec Number (800) 424-9300
(for emergencies only) (703) 527-3887 (International)
Revision Date: February 28, 2011
MSDS Date: January 15, 2007

Safety Data Sheet according to EC directive 2001/59/EC and OSHA's Hazcom Standard (29 CFR 1910.1200)

2. HAZARDS IDENTIFICATION

EU Main Hazards
Non Hazardous Powder

Routes of Entry

- Eye contact - Inhalation - Skin contact

Carcinogenic Status

See Section 11 - Toxicity

Target Organs

- Respiratory System - Skin - Eye

Health Effects - Eyes

Contact for short periods of time may cause irritation.

Health Effects - Skin

Contact may cause mild irritation.

Health Effects - Ingestion

Ingestion is not an expected route of exposure.

Health Effects - Inhalation

May irritate the respiratory tract. May cause transient cough and shortness of breath.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Component Name	CAS#/Codes	Concentration	R Phrases	EU Classification
Monoammonium Phosphate	7722-76-1 EC#2317645	55 - 65%	None	None
Ammonium Sulfate	7783-20-2 EC#2319841	30 - 40%	None	None
Mica	12001-26-2	1 - 4%	None	None



MATERIAL SAFETY DATA SHEET

Commercial ABC Dry Chemical (Fire Extinguishing Agent)

3. COMPOSITION/INFORMATION ON INGREDIENTS

Component Name	CAS#/Codes	Concentration	R Phrases	EU Classification
Clay	8031-18-3	<2%	None	None
Amorphous Silica	7631-86-9 EC#2315454	<2%	None	None
Dye	NA	<0.1%	None	None

4. FIRST AID MEASURES

Eyes

Immediately flood the eye with plenty of water for at least 15 minutes, holding the eye open. Obtain medical attention if soreness or redness persists.

Skin

Wash affected area with soap and water. Obtain medical attention if irritation persists.

Ingestion

Dilute by drinking large quantities of water and obtain medical attention.

Inhalation

Move victim to fresh air. Obtain medical attention immediately for any breathing difficulty.

Advice to Physicians

Treat symptomatically.

5. FIRE - FIGHTING MEASURES

Extinguishing Media

This preparation is used as an extinguishing agent and therefore is not a problem when trying to control a blaze. Use extinguishing agent appropriate to other materials involved. Keep pressurized extinguishers and surroundings cool with water spray as they may rupture or burst in the heat of a fire.

Unusual Fire and Explosion Hazards

Pressurized containers may explode in heat of fire.

Protective Equipment for Fire-Fighting

Wear full protective clothing and self-contained breathing apparatus as appropriate for specific fire conditions.

6. ACCIDENTAL RELEASE MEASURES

Sweep up or vacuum. Prevent skin and eye contact. Wear appropriate protective equipment.

7. HANDLING AND STORAGE

Pressurized extinguishers should be properly stored and secured to prevent falling or being knocked over. Do not drag, slide or roll extinguishers. Do not drop extinguishers or permit them to strike against each other. Never apply flame or localized heat directly to any part of the extinguisher or plastic container. Store pressurized extinguishers and plastic containers away from high heat sources. Storage area should be: - cool - dry - well ventilated - under cover - out of direct sunlight



MATERIAL SAFETY DATA SHEET

Commercial ABC Dry Chemical (Fire Extinguishing Agent)

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational Exposure Standards

Occupational exposure limits are listed below, if they exist.

Mica

ACGIH TLV: 3 mg/m³ TWA, measured as respirable fraction of the aerosol.

OSHA PEL: 20 mppcf, <1% crystalline silica

Nuisance Dust Limit

OSHA PEL: 50 mppcf or 15 mg/m³ TWA, total dust

15 mppcf or 5 mg/m³ TWA, respirable fraction

Engineering Control Measures

Use with adequate ventilation. There should be local procedures for the selection, training, inspection and maintenance of this equipment. When used in large volumes, use local exhaust ventilation.

Respiratory Protection

Not normally required. Use dust mask where dustiness is prevalent, or TLV is exceeded.

Hand Protection

Not normally needed when used as a portable fire extinguisher. Use gloves if irritation occurs.

Eye Protection

Chemical goggles or safety glasses with side shields.

Body Protection

Normal work wear.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Powder
Color	Pale Yellow
Odor	Odorless
Specific Gravity	Not available
Boiling Range/Point (°C/F)	Not applicable
Flash Point (PMCC) (°C/F)	Not Flammable
Solubility in Water	Not applicable
Vapor Density (Air = 1)	Heavier than air.
Vapor Pressure	Not applicable
Evaporation Rate	Not applicable

10. STABILITY AND REACTIVITY

Stability

Stable under normal conditions.

Conditions to Avoid

- Heat - High temperatures - Exposure to direct sunlight

Materials to Avoid

- Strong oxidizing agents - strong acids - sodium hypochlorite

Hazardous Polymerization

Will not occur.



MATERIAL SAFETY DATA SHEET

Commercial ABC Dry Chemical (Fire Extinguishing Agent)

10. STABILITY AND REACTIVITY

Hazardous Decomposition Products

- oxides of carbon - ammonia - oxides of phosphorus - nitrogen oxides

11. TOXICOLOGICAL INFORMATION

Acute Toxicity

Low order of acute toxicity.

Chronic Toxicity/Carcinogenicity

This product is not expected to cause long term adverse health effects.

Mica and clay may contain small quantities of quartz (crystalline silica) as an impurity. Prolonged exposure to respirable crystalline silica dust at concentrations exceeding the occupational exposure limits may increase the risk of developing a disabling lung disease known as silicosis. IARC found limited evidence for pulmonary carcinogenicity of crystalline silica in humans.

Genotoxicity

This product is not expected to cause any mutagenic effects.

Reproductive/Developmental Toxicity

This product is not expected to cause adverse reproductive effects.

12. ECOLOGICAL INFORMATION

Mobility

No relevant studies identified.

Persistence/Degradability

No relevant studies identified.

Bio-accumulation

No relevant studies identified.

Ecotoxicity

No relevant studies identified.

13. DISPOSAL CONSIDERATIONS

Dispose of container in accordance with all applicable local and national regulations. Do not cut, puncture or weld on or near to the container. No harm to the environment is expected from this preparation.

14. TRANSPORT INFORMATION

DOT CFR 172.101 Data Not regulated

UN Proper Shipping Name Not regulated

UN Class None

UN Number None

UN Packaging Group None

NOTE: For additional HAZMAT shipping information related to shipping pressurized fire extinguishers, refer to Badger Technical Bulletin #123-1201 available for download at www.badgerfire.com.



MATERIAL SAFETY DATA SHEET

Commercial ABC Dry Chemical (Fire Extinguishing Agent)

15. REGULATORY INFORMATION

EU Label Information

Classification and labelling have been performed according to EU directives 67/548/EEC and 99/45/EC including amendments(2001/60/EC and 2006/8/EC)

EU Hazard Symbol and Indication of Danger.

This preparation is not classified as dangerous.

R phrases

None

S phrases

None.

US REGULATIONS (Federal, State) and INTERNATIONAL CHEMICAL REGISTRATION LAWS

TSCA Listing

This product contains ingredients that are listed on or exempt from listing on the EPA Toxic Substance Control Act Chemical Substance Inventory.

EINECS Listing

All ingredients in this product have not been verified for listing on the European Inventory of Existing Commercial Chemical Substances (EINECS) or the European List of New Chemical Substances (ELINCS).

DSL/NDSL (Canadian) Listing

All ingredients in this product are listed on the Domestic Substance List (DSL) or the Non-Domestic Substance List (NDSL) or are exempt from listing.

WHMIS Classification

D2B

This product was classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations and the MSDS contains all the information required by these regulations.

MA Right To Know Law

All components have been checked for inclusion on the Massachusetts Substance List (MSL). Those components present at or above the de minimis concentration include: - Mica (12001-26-2) 1-4% - Amorphous Silica (7631-86-9) <2% - Ammonium Sulfate (7783-20-2) 30 - 40%

PA Right To Know Law

This product contains the following chemicals found on the Pennsylvania Hazardous Substance List: - Mica (12001-26-2) 1-4% - Amorphous Silica (7631-86-9) <2% - Ammonium Sulfate (7783-20-2) 30 - 40%

NJ Right To Know Law

This product contains the following chemicals found on the NJ Right To Know Hazardous Substance List: - Mica (12001-26-2) 1-4% - Amorphous Silica (7631-86-9) <2%

California Proposition 65

This product does not contain materials which the State of California has found to cause cancer, birth defects or other reproductive harm.

SARA Title III Sect. 302 (EHS)

This product does not contain any chemicals subject to SARA Title III Section 302.

SARA Title III Sect. 304

This product does not contain any chemicals subject to SARA Title III Section 304.



MATERIAL SAFETY DATA SHEET

Commercial ABC Dry Chemical (Fire Extinguishing Agent)

15. REGULATORY INFORMATION

SARA Title III Sect. 311/312 Categorization

- Immediate (Acute) Health Hazard

SARA Title III Sect. 313

This product does not contain any chemicals that are listed in Section 313 at or above de minimis concentrations.

16. OTHER INFORMATION

NFPA Ratings

NFPA Code for Health - 1

NFPA Code for Flammability - 0

NFPA Code for Reactivity - 0

NFPA Code for Special Hazards - None

HMIS Ratings

HMIS Code for Health - 1

HMIS Code for Flammability - 0

HMIS Code for Reactivity - 0

HMIS Code for Personal Protection - See Section 8

Abbreviations

N/A: Denotes no applicable information found or available

CAS#: Chemical Abstracts Service Number

ACGIH: American Conference of Governmental Industrial Hygienists

OSHA: Occupational Safety and Health Administration

TLV: Threshold Limit Value

PEL: Permissible Exposure Limit

STEL: Short Term Exposure Limit

NTP: National Toxicology Program

IARC: International Agency for Research on Cancer

R: Risk

S: Safety

Prepared By: EnviroNet LLC.

The information contained herein is based on data believed to be accurate. However, no representation, warranty, or guarantee is made to its accuracy, reliability or completeness. It is the user's responsibility to satisfy himself as to the suitability and completeness of such information for its own particular use. Kidde – Residential and Commercial assumes no responsibility for personal injury or property damage resulting from use, handling or from contact with this product.



**CLOSET MAX 72" X 1.5" HEAVY-DUTY CHROME CLOSET
POLE**

Location: Master Bedroom closet

Dimensions

Depth: 1.3125"

Width: 72"

Adjustable Length: 6'

Color: Silver metallic



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closet poles

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CART

MY LIST

Home > Search Results for "closet"

Share Email Print



Closet Max 72 in. x 1-5/16 in. Heavy Duty Chrome Closet Pole

Model # 0015-6CH Internet # 202183166 Store SKU # 886167

Write No First Review

\$19.96 /EA-Each

Zoom More Views

This item cannot be shipped to the following state(s): AK, HI, GU, PR, VI

ships FREE with \$45.00 order

Buy Online, Pick Up In Store Today
Check Store Inventory

Product Description | Specifications | Customer Reviews | More Info | Shipping Options

PRODUCT DESCRIPTION

The John Strong 72 in. Heavy Duty Closet Pole has a tubular design that helps hangers slide along the pole, making hanger adjustment a breeze. The pole's solid steel body resists the warping and sagging that often occur in wooden poles. Finished in stylish chrome nickel, the pole has a high load capacity of 600 lb., helping you store a large quantity of clothes and other closet items.

- Solid steel construction resists sagging and warping
- Chrome-plated finish matches many closet designs
- Holds up to 600 lb. for large closet loads
- Thick walls and a large diameter combine to offer strength and durability
- Tubular steel design offers great hanger movement for easy adjustment
- Can be cut to fit your unique closet shape with a hacksaw or pole cutter
- MFG Brand Name : Closet Max
- MFG Model # : 0015-6CH1
- MFG Part # : 0015-6CH

Return To Top

SPECIFICATIONS

Accessory Type	Poles and Hangers	Adjustable Length (ft.)	6
Assembled Depth (in.)	1.3125 in	Assembled Height (in.)	1.3125 in
Assembled Width (in.)	72 in	Color Family	Silver metallic
Item Package Type	No Package	Manufacturer Warranty	Lifetime Limited Warranty
Material	Steel	Product Depth (in.)	1.3125
Product Height (in.)	1.3125	Product Length (in.)	72
Product weight (lb.)	4.75	Reversible	90-Deg
Storage Product Type	Hanging Rod		

Return To Top

CUSTOMER REVIEWS

Do you own this product? Be the first to rate it. Your feedback will help users like you to make informed decisions and will help us to improve our product offerings!

Quantity: 1

+ ADD TO CART

CHECK ONLINE INVENTORY

+ ADD TO MY LIST

CUSTOMERS WHO VIEWED THIS ITEM PURCHASED...



\$159.00

Hanna Shaver Living
4 ft. x 3 ft. Classic
White Deluxe Slender
Closet

★★★★★ (75)

+ ADD TO CART



\$22.93

Hanna Shaver Living
24 in. Classic White
Shelf (2-Pack)

★★★★★ (10)

+ ADD TO CART



\$32.74

Hanna Shaver Living
24 in. Classic White
Shelf (2-Pack)

★★★★★ (8)

+ ADD TO CART



\$53.55

Hanna Shaver Living
48 in. Classic White
Vertical Panels (2-Pack)

★★★★★ (8)

+ ADD TO CART



**CLOSET MAX 1 5/16" HEAVY DUTY CHROME CLOSET POLE
SOCKETS (2 PACK)**

Location: Master Bedroom closet

Dimensions

Depth: 2.75"

Width: 0.875"

Color: Silver metallic



More saving. More doing.™

My Store Location: **YV000309 88501** (Change) LOCALAD Help | My Account (Sign In or Register)

SHOP BY DEPARTMENT

SEARCH ALL

closet poles

GO

CART

MY LIST

Home | Search Results for "closet"

Share Email Print

Closet Max 1-5/16 in. Heavy-Duty Chrome Closet Pole Sockets (2-Pack)

Model # CD-0010-CH | Internet # 202163176 | Store SKU # 869107

★★★★★ Write the first review

\$5.57 /EA-Each



Zoom More Views

This item cannot be shipped to the following state(s): AK, HI, GU, PR, VI

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check store inventory

Product Description | Specifications | Customer Reviews | More Info | Shipping Options

PRODUCT DESCRIPTION

The John Sterling 1-5/16 in. Heavy-Duty Closet Pole Sockets (2-Pack) include 1 open-lip socket and 1 closed-lip socket, making it easy to install a closet pole all the way to the wall. Designed for use with closet poles from 1-1/4 in. to 1-5/16 in. in diameter, the sockets are made of solid cast zinc and finished with shiny chrome plating. Mounting screws are included for fast installation.

- Help you install a closet pole all the way to the wall
- For use with closet poles from 1-1/4 in. to 1-5/16 in. in diameter
- Solid cast zinc bodies
- Shiny chrome-plated finish
- 1 open-lip socket helps you install the sockets before inserting a closet pole
- Pair includes 1 open-lip socket and 1 closed-lip socket
- MFG Brand Name : Closet Max
- MFG Model # : CD-0010-CH
- MFG Part # : CD-0010-CH

Return To Top

SPECIFICATIONS

Accessory Type	Brackets	Adjustable Length (ft.)	0
Assembled Depth (in.)	2.75 in	Assembled Height (in.)	2.75 in
Assembled Width (in.)	0.875 in	Color Family	Silver metallic
Item Package Type	Plastic Container	Manufacturer Warranty	Lifetime Limited Warranty
Material	Other	Product Depth (in.)	6.25
Product Height (in.)	3.75	Product Length (in.)	1
Product Weight (lb.)	0.42	Returnable	90-Day
Storage Product Type	Hanging Rod		

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Quantity 1

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CUSTOMERS WHO VIEWED THIS ITEM PURCHASED...



\$159.00

Martha Stewart Living
4 ft. x 8 ft. Classic
White Deluxe Starter
Closet

★★★★★ (76)

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\$22.93

Martha Stewart Living
24 in. Classic White
Short Q-Pole

★★★★★ (10)

ADD TO CART



\$32.74

Martha Stewart Living
24 in. Classic White
Short Q-Pole

★★★★★ (5)

ADD TO CART



\$53.55



2 X 4 X 8 STUD

Location: Water tank shading device

Dimensions:

Thickness: 1 3/4"

Width: 3 1/2"

Length: 8'

Available: Allen Lumber



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Eastern White Pine sets the standard for use in building projects that require quality, appearance, and durability. This unique wood species has a fine grain and uniform texture, shapes easily for appearance products that require a profile, stays true to form, and holds finishes extremely well. For centuries, Eastern White Pine has been the mainstay in quality construction and fine woodworking.



Our spruce framing lumber is the highest quality, kiln-dried, to frame your project right. We stock pine boards and planks for anything from baseboards to window sets and door frames.



All of our Pressure Treated Lumber is quality, #1 grade stamped, and carries a lifetime limited warranty against rot and decay. We stock pressure treated plywood, lumber for framing, decking, balusters, and lattice, landscape and railroad ties.



Cedar - boards, bevel siding and decking...Nothing compares to the natural, rich warmth and stunning beauty of cedar!



2 X 4 X 10 PRESSURE TREATED STUD

Location: Water tank shading device

Dimensions:

Thickness: 1 3/4"

Width: 3 1/2"

Length: 10'

Available: Allen Lumber



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2 X 4 X 8 PRESSURE TREATED STUD

Location: Water tank shading device

Dimensions:

Thickness: 1 3/4"

Width: 3 1/2"

Length: 8'

Available: Allen Lumber



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2 X 4 X 10 STUD

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Dimensions:

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Length: 10'

Available: Allen Lumber



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CANVAS DROP CLOTH

Model Number: 7884T26
Location: Water tank shading device
Size: 12' x 15'
Weight: 12 oz./ square yard
Color: White
Available: McMaster Carr

Search Results
No matches were found for "7884 T23."

Paint Sprayers

Drop Cloths



Polyethylene

Canvas—Absorb paint and minimize tracking. All are 8 oz./sq. yd. canvas except [7884T17](#), which is 12 oz./sq. yd. canvas. Edges are finished with mildew-resistant thread. Color is off-white. *Note:* For other floor protectors, see [floor protection paper](#).

Polyethylene—An economic alternative to canvas drop cloths. They are seamless and 4 mils thick. Color is clear.

Nonskid Fabric—Made of fabric with a skid-resistant polyethylene backing that also prevents spills from leaking through. Cloths are 1/16" thick. Color is gray.

Size	Pkg. Qty.		Each	
			Partial Pkg.	Full Pkg.
Canvas				
5' x 5'	12	7884T17	\$11.73	\$10.53
4' x 15'	12	7884T19	16.80	15.24
9' x 12'	6	7884T25	24.89	22.58
12' x 15'	6	7884T26	41.64	37.39
14' x 16'	4	7884T27	51.73	46.45
20' x 20'	2	7884T28	93.70	84.14
Polyethylene				
9' x 12'	12	3546T62	5.51	4.91
12' x 15'	6	3546T69	8.88	8.07
Nonskid Fabric				
40" x 12'	10	8362T31	18.55	15.76
40" x 100'	1	8362T32	—	93.84



DIVISION 11 EQUIPMENT



SONY DVD HOME THEATER SYSTEM

Model Number: DAV-TZ140

Location: Living Room

Available: Sony Electronics

Price: \$129.00



DVD Home Theater System

Model number: DAV-TZ140



Make your next movie night an affair to remember with 300W of beautiful 5.1-channel surround sound with a DVD home theater system capable of upscaling your DVD to near 1080p HD quality.

In Stock Estimated ship date: 11/08/2012

Free shipping on all orders \$25 and over

\$129^{.99}

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Step up to 1000w of power.

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Need help deciding?

Call 1-877-865-7669.

Product Specifications

Surround Speaker

General

Enclosure Type : Bass Reflex
Front Grille/Material : Fixed - Cloth
Input Terminal : Push Type
Model Name : SS-TS121
Rated Impedance : 8 ohm
Speaker System : 1 Way (Full Range)
Speaker Unit : 1
Supplied Cable : 7 Meters
Type : Micro Sat.
Woofer Unit : 55mm

Disc Based Player

Format

CD (CD-DA) : Yes
CD-R/RW : Yes
CD-R/RW Multi Session : Yes
JPEG : Yes (via: DVD, CD & USB)
MP3 : Yes (MP3/ID3Tag Ver.1.1/ID3Tag Ver.2.0 via: DVD, CD & USB)
WMA : Yes (via: DVD, CD & USB)

Subwoofer

Speaker

Speaker System : Bass Reflex
Speaker Terminal Type : Push Pin
Speaker Unit : 130mm

General

Supplied Cable : 3 Meters

DVD, VCD, CD Player

General

Disc Capacity : Single disc tray

Convenience Features

Multiple Disc Resume : 10 Discs (CD/VCD)
5 Discs DVD

Video Features

DVD Playback : Yes
DVD+R Read Compatibility : Yes (DL as well)
DVD+RW Read Compatibility : Yes
DVD-R Read Compatibility : Yes (DL as well)
DVD-RW Read Compatibility : Yes
VCD Playback : Yes (VCD/SVCD)

Amplifier

Audio Features

Dolby® Digital : Yes
Dolby® Pro Logic® Decoding : Yes
Dts® Decoding : Yes

Equalizer

Preset EQ : Yes (Auto/ Movie/ Music/ TV/ Game)

Power

Power Consumption (In Operation) : 29W
Power Consumption (In Standby) : 0.4W

Audio

Audio Power Output : Amplifier: 300W (50WX5 +50W Sub, 8Ohms, 1kHz, 10%THD)

Inputs and Outputs

Analog Audio Input(s) : 1 (Rear)
Composite Video Output(s) : 1 (Rear)
HDMI™ Connection Output(s) : 1 (rear)- Up to 1080P
USB Port(s) : 1 (Front)-See Owners Manual for devices supported

Audio Formats

2ch STEREO : Yes
A.F.D. Multi : Yes
A.F.D. Standard : Yes
LPCM : Yes (2ch) - Supports out via HDMI
MPEG2 AAC : Yes (AAC Only via DVD, CD & USB), WMA 9 Standard audio support as well

General

On-Screen Display

Language :
English/Spanish/French/Italian/Dutch/Portuguese/Swedish/Greek/Russian/Chinese/Thai
+ 5 others

BRAVIA® Sync™

BRAVIA® Theatre Sync : Yes
Control for HDMI - Easy Setting : Yes

Video Features

HDMI™ Upscaling : Yes
(up to 1080p)

Function

Parental Control : Yes

Center Speaker

General

Enclosure Type : Bass Reflex
Front Grille/Material : Fixed - Cloth
Input Terminal : Push Type
Magnetically Shielded : Yes
Model Name : SS-CT121
Speaker Unit : 1 Way (Full Range)
Supplied Cable : 2 Meters
Woofer Unit : 55mm

Audio

Impedance : 8 ohms
Speaker Type : Full Range Bass Reflex

DVD/SA-CD/VCD/CD Player

Playback Features

Play Mode(s) : Repeat All (CD/DVD/VCD);
Repeat Title/Chapter/Track; Program (CD Only); Shuffle; Resume from Power Off (CD/DVD/VCD); Resume from Stop (CD/DVD/VCD/WM/UPeg)

Weights and Measurements

Dimensions (Approx.) : Main Unit: 13 1/2×2 1/4×12 7/8 in (340×56×325 mm) Incl. projecting parts; Front & Speakers: 3 3/8×4 3/4×4 in (83×119×100 mm) Incl. projecting parts; Surround Speakers 3 3/8×4 3/4×4 in (83×119×100 mm) Incl. projecting parts; Subwoofer: 6 3/8×12 1/2×11 5/8 in (160×315×295 mm) Incl. projecting parts

Weight (Approx.) : Main Unit: 4 lb 11 oz (2.1 kg), Front Speakers: 13 oz (0.35 kg), Center Speaker: 16 oz (0.43 kg), Surround Speakers: 14 oz (0.39 kg), Subwoofer: 6 lb 10 oz (3.0 kg)



APPLE MACBOOK PRO 15.4"

Model Number: MD104LL/A

Location: Main House

Dimensions:

Width: 14.3"

Height: 1"

Depth: 9.8"

Weight: 5.6 lbs

Features:

Processor: Intel Core i7

Processor Speed: 2.6 GHz

Battery Type: Lithium Polymer

Display Type: Wide screen LED-backlit (1440 x 900)

Cache Memory: 6MB

System Memory: 8 GB RAM

Hard Drive: 750 GB

Operating System: Mac OS X Mountain Lion

Electrical:

Wattage: 65W

Voltage: 100-240V/50-60 Hz AC Adapter

Available: BestBuy

Price: \$2,089

Specifications

Specs:	Details:	Description:
Warranty Terms - Parts	1 year limited	
Warranty Terms - Labor	1 year limited	
Height	1 inches	
Width	14.3 inches	
Depth	9.8 inches	
Weight	5.8 pounds	
Processor Brand	Intel®	
Processor	Intel® Core™ i7	(Also known as the <i>CPU</i>). The part of the computer that interprets and executes instructions. Think of it as the brain of the computer.
Processor Speed	2.6GHz	How fast a computer processor carries out instructions. In general, faster is better, but processor speeds across brands may not be equivalent (i.e., a 3.0GHz AMD processor may not be the same speed as a 3.0GHz Intel processor).
Battery Type	Lithium Polymer (Li-Polymer)	The type of battery used to power the phone, usually NiCd (nickel-cadmium), NiMH (nickel-metal hydride) or Lilon (lithium-ion).
Display Type	Widescreen LED-backlit (1440 x 900)	Technology used to display text and images on the screen. Computer monitors are available in 2 types: CRT (traditional tube displays) and LCD (flat-panel liquid crystal displays). Notebook computers, PDAs, mobile DVD players and other devices use LCD screens.
Screen Size (Measured Diagonally)	15.4"	123
Cache Memory	6MB on die Level 3	A small segment of memory that stores frequently used information for fast access by the processor, improving response time.
System Memory (RAM)	8GB	The memory a computer uses to run its operating system, applications and active data files. Greater amounts of RAM improve speed and enable more applications to run at once.
Type of Memory (RAM)	DDR3 SDRAM	
Hard Drive Type	SATA	Hard drives are classified based on the interface they use to connect to a computer. Common interfaces for <i>internal</i> hard drives include EIDE, PATA (also known as, ATA and IDE), SATA and SCSI. Common interfaces for <i>external</i> hard drives include USB 2.0, FireWire and eSATA.
Computer Hard Drive Size	750GB	Capacity for storing programs, photos, video, music and other electronic information. Hard drive capacities range from a few gigabytes to several hundred.
Operating System Platform	Mac	
Operating System	Mac OS X Mountain Lion	The master software that controls hardware functions and provides a platform on top of which any software applications will run. Commonly used systems include Microsoft Windows and Mac OS X for computers and Palm OS and Microsoft Windows Mobile for PDAs.
ENERGY STAR Qualified	Yes	
Backlit Keyboard	Yes	
UPC	885909531684	

Product images, including color, may differ from actual product appearance.



**FRIGIDAIRE 9.9 CU. FT. TOP REFRIGERATOR AND FREEZER
ENERGY STAR**

Model Number: FFHT10F2LW or equal

Location: Kitchen

Dimensions:

Width: 23 3/4"

Depth: 59.75"

Height: 26.75"

Capacity: 9.9 cu. ft.

Finish: White

Electrical:

Current: 15 A

Voltage: 120 V

Available: Sears



Frigidaire 10.0 cu. ft. Top-Freezer Refrigerator - White

NEW Item! | Sears Item# 04602841000 | Model# FFPT10F3NW
0 Reviews | Write a review

\$429.99

Sold by Sears and Fulfilled by Sears

Additional colors



Delivery
Starts at \$69.99

Store Pickup
FREE

In stock for 05663
Delivery by 08/22/13.

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[Frigidaire Top Freezer Refrigerators](#)
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[All Frigidaire](#)

FRIGIDAIRE

Description

The **Frigidaire FFPT10F3NW top-freezer refrigerator** is ideal for small kitchens in apartments, efficiencies or anywhere space is limited. Clear crisper drawers keep produce fresh.

The **white Frigidaire FFPT10F3N** top-freezer refrigerator has convenient features like adjustable glass shelves that help maximize space for more efficient storage.

[Read full description...](#)

Support & Price Matching

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Availability & Rewards

Members earn 4300 **SHOP YOUR WAY** points on this item.

Available for **Layaway** —the easy way to pay.

Special pricing for **Hawaii, Alaska** and **Puerto Rico**

Specifications & Dimensions

Dimensions and Capacity:

Adjustable Legs:	Yes
Cord Length (ft.):	5.5
Standard or Counter Depth:	Standard Depth 
Depth w/ Door Open 90 Degrees:	41.55
Depth w/ Handle (in.):	25.95
Depth w/out Handle (in.):	25.95
Freezer Capacity (Cu Ft):	2.62
Height to Top of Case (in.):	59.54
Height to Top of Hinge (in.):	60 
Overall Capacity (Cu Ft):	10
Panel Dimensions:	23.625" x 59.575" x 25.215"
Refrigerator Capacity:	7.32
Width w/ Door Closed (in.):	24.02
Width w/Door Open 90 Degrees (in.):	24.02
Depth without Door (in.):	22.5

Color and Styling:

Cabinet Color:	White
Color Family:	White
Crisper Color:	Clear
Door Color:	White
Door Finish:	Smooth
Door Style:	Flat
Handle Color:	White

Product Overview:

Automatic Defrost:	Yes
Climate Class:	N
Door Hinge:	Right
Dynamic Cooling:	No
Exterior Features:	Pre-Paint Steel with Smooth Finish
Fast Freeze:	No
Ice Dispenser:	No
Remote Diagnostics:	No Remote Diagnostics
Reversible Door:	Yes
Voltage (V):	115
Weight, Shipping:	145

Performance:

Compressor Noise Level (dB):	45
Control Type:	Mechanical
Kilowatt Hrs. per Year:	357

General Features:

General Warranty:	1 Year Limited Warranty
Power Cord Included:	Yes

Durability:

Freezer Shelf Material:	Wire
Refrigerator Shelf Material:	Glass

Filtration & Dispensing:

Ice Maker:	No
Ice Style:	None
Internal Water Dispenser:	No
Thru Door Dispenser:	None
Water Filter:	No

Refrigeration Conveniences:

Adjustable Shelves:	Yes
Control Location:	Interior
Crisper Style:	Slide-out
Gallon Door Storage:	Yes
Humidity-Controlled Crisper:	No 
Number of Refrigerator Door Bins:	2
Number of Refrigerator Drawers:	2
Number of Refrigerator Shelves:	2
Refrigerator Interior Light:	Yes

Freezer Conveniences:

Defrost System:	Frost-free
Flexible Storage Shelf:	Yes
Freezer Interior Light:	No
Number of Freezer Door Bins:	2
Number of Freezer Shelves/Baskets:	1

Certifications:

ENERGY STAR Compliant:	No
------------------------	----



FRIGIDAIRE 30" FREESTANDING ELECTRIC RANGE

Model Number: FFEF3015LS or equal

Location: Kitchen

Dimensions:

Length: 29 7/8"

Width: 28.5"

Depth: 47"

Finish: Stainless Steel

Electrical:

Current: 40 A

Voltage: 240 V

Available: Sears

Price: \$529.00



Videos & Product Demos

Frigidaire 5.3 cu. ft. Electric Range - FFEF3015L

Sears Item# 02260783000 | Model# FFEF3015LS

0 Reviews | Write a review

Reg Price: \$549.99

Savings: \$40.00

\$509.99

Sold by Sears and Fulfilled by Sears

Delivery Starts at \$69.99

Store Pickup FREE

In stock for 05663 Delivery by 08/22/13.

More Options

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Description

Electric Frigidaire range is a versatile workhorse

The Frigidaire 30-inch electric range has plenty of cooktop capacity. Two 8-inch 2,100-watt and two 6-inch 1,250-watts coil surface elements provide 4 cooking zones for conveniently cooking several dishes at one time. Removable chrome drip bowls protect the cooktop surface and easily wash clean with soap and water.

The 5.3 cubic-foot oven in the electric Frigidaire range has a self-clean option that eliminates the hassle of cleaning baked-on foods. The oven window lets you check on food without opening the door.

Read full description...

Support & Price Matching

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Availability & Rewards

Members earn 5100 SHOP YOUR WAY™ points on this item.

Available for Layaway—the easy way to pay.

Special pricing for Hawaii, Alaska and Puerto Rico

FRIGIDAIRE

Frigidaire Electric Ranges Frigidaire Ranges All Frigidaire



WHIRLPOOL BUILT-IN DISHWASHER ENERGY STAR

Model Number: WDF510PAYS

Location: Kitchen

Dimensions:

Height: 34 1/2"

Width: 23 7/8"

Depth: 23 7/8"

Finish: Stainless Steel

Capacity: 14 Place Settings

Wash System: Direct Feed

Electrical:

Current: 10A

Voltage: 120 V

Available: Sears



Videos & Product Demos



Whirlpool Built-In Dishwashers
Whirlpool Dishwashers
All Whirlpool

Whirlpool 24" Dishwasher w/ AnyWare™ Plus Silverware Basket - Stainless Steel ENERGY STAR®

Sears Item# 02215493000 | Model# WDF510PAY5

★★★★★ Rating 4.5 | 341 Reviews | Write a review

Reg Price: \$449.99
Savings: \$30.00

\$419.99

Sold by Sears and Fulfilled by Sears

Additional colors



Delivery Starts at \$69.99

Store Pickup FREE

In stock for 05663
Delivery by 08/15/13.

More Options

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Description

Take advantage of the AnyWare™ Plus silverware basket's 100% usable rack space with this ENERGY STAR® and CEE Tier 1* qualified model. This basket cleans better and holds up to 12 more pieces of silverware for maximum flexibility. Designed to endure repeated use, this model also delivers years of reliable performance. No one has fewer dishwasher repairs 15 years in a row.** With the industry-exclusive Overnight cycle and energy-efficient Eco Wash cycle, you can optimize water efficiency and still achieve excellent cleaning. Our most efficient dishwasher cycle helps minimize energy and water usage while cleaning dishes.***

*Based on the Consortium for Energy Efficiency product qualifications. Visit cee1.org for more information.

**According to a leading consumer magazine.

***Available on Whirlpool® models MSRP \$449 and above.

[Read full description...](#)

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Members earn 4200 SHOP YOUR WAY® points on this item.

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Special pricing for Hawaii, Alaska and Puerto Rico

Drying Options:

Heated Dry:	Yes
Unheated Air Dry:	Yes
Number of Drying Options:	2

Upper Rack Features:

Adjustable Upper Rack:	No
Removable Upper Rack:	No
Silverware Basket Upper Rack:	Yes
Upper Rack Fold Down Tines:	No
Upper Rack No Flip Clips:	No
Upper Rack Wash Only:	No

Lower Rack Features:

Cutlery Holder:	No
Lower Rack Fold Down Tines:	No
Lower Rack No Flip Clips:	No
Removable Lower Rack:	Yes
Silverware Basket Lower Rack:	Yes
Silverware Basket Splittable:	No
Silverware Basket w/Covers:	Yes
Stemware Holder:	No
Third Rack:	No

Wash Rinse Options:

High Temp Rinse:	Yes
Quick Rinse:	No
Rinse Aid Dispenser:	Yes
Rinse Aid Dispenser Indicator:	Yes
Sanitary Rinse:	Yes

Certifications:

ADA Compliant:	No
ENERGY STAR Compliant:	Yes

Specifications & Dimensions

Color and Styling:

Color Coordinated Control Panel:	Yes
Color Family:	Stainless Steel
Handle Color:	Black

Dimensions:

Cutout Dimensions:	See Installation Guide below product description
Depth with Door Closed (in.):	25.25
Depth with Door Open (in.):	49.75
Item Weight (lbs.):	85
Maximum Height (in.):	34.5
Minimum Height (in.):	33.5
Number of Place Settings:	14
Width (in.):	23.875

Product Overview:

Installable Under Sink:	No
Fill Hose Included:	No

Capacity:

Interior Size:	Tall
----------------	------

Performance:

Annual Operating Cost, Estimated \$ (Electric Water Heater):	27
Annual Operating Cost, Estimated \$ (Gas Water Heater):	21
Control Type:	Electronic
Kilowatt Hrs. per Year:	258
Minimum Circuit Breaker:	20 amps
Sound Level (Decibels):	55

General Features:

Control Location:	Front Panel
Control Panel Lockout:	No
Cycle Countdown:	No
Cycle Status Lights:	No
Delay Wash:	Yes
Door Style:	Fully visible console
Drain Hose Included:	Yes
Filter Cleaning:	Self-cleaning filter
Food Disposal:	No
General Warranty:	1 year limited
Power Cord Included:	No
Sensor Washing:	Yes
Wash Tower:	No ?

Convenience Features:

Detergent Dispenser:	Yes
Quiet Package:	Yes

Durability:

Rack Material:	Vinyl
Tub Material:	Plastic

Standard Cycles:

Cancel & Drain:	Yes
Heavy Duty Cycle:	Yes
High Temp Wash:	Yes
Light Wash:	No
Normal Wash Cycle:	Yes
Number of Automatic Cycles:	5
Pot & Pan Cycle:	No
Pre Soak Cycle:	No
Quick Wash:	Yes

Special Cycles:

China, Gentle Wash:	No
Glassware Cycle:	No
Lower Rack Wash Only:	No
NSF Certified Rinse:	Yes
Plastic Item Cycle:	No
Plate Warmer Cycle:	No



FRIGIDAIRE 0.7 CU. FT. COUNTERTOP MICROWAVE

Model Number: FFCM0734LS or equal

Location: Kitchen

Dimensions:

Height: 10.125"

Width: 17"

Depth: 13"

Weight: 23 lbs.

Finish: Stainless steel

Electrical:

Wattage: 700 W

Microwave Turntable Diameter: 9 3/5"

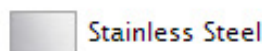
Available: Sears

Price: \$93.99

Frigidaire 0.7 Cu. Ft. Countertop Microwave



Model: FFCM0734LS
17-1/4" W x 13-1/8" D x 10-1/8" H
MSRP: \$93.00



Specifications

Product Code: FFCM0734LS
Product Type: Countertop
Power Type: Electric
Size: 0.7 Cu. Ft.
Installation Type: Countertop
UPC Code: 0-12505-74788-5
Color: Stainless Steel

Capacities

Capacity (Cu. Ft.): 0.7

Microwave Oven Specifications

Watts : 700
Microwave Turntable Diameter: 9-3/5"
Interior Light Wattage: 20
Frequency (Mhz): 2,450

Internal Specifications

Interior Light: Yes
Microwave Interior Width: 12"
Microwave Interior Depth: 12-1/8"
Microwave Interior Height: 8-1/4"

Exterior Specifications

Handle Color: Stainless Steel

Controls

Controls: Membrane
Display Type: LED
Display Color: Green
Touch Pad Buttons: 23
Electronic Clock: Yes - Separate Button
Timer Function: 99:99
Stop / Cancel Button: Yes
Start Button: Yes
Quick Settings (Time): Yes 1 - 6
Add 30 Seconds: Yes
Numeric Touch Pad: Yes
Power Levels: 10
Cooking - Multiple Stages: Yes - 2 Stages

Auto Features

Auto Cook Options: 7
Auto Reheat Options: 4
Auto Defrost Options: Yes
Auto Popcorn: Yes - Options for 1.75/3.0/3.5 oz.
Baked Potato Button: Yes
Reheat: Yes
Fresh Vegetable: Yes
Beverage (cups): Yes

User Modes

Clock: Yes - Separate Button
Child Lock: Yes

Exterior Dimensions

Width: 17-1/4"
Depth: 13-1/8"
Height: 10-1/8"

Certifications & Approvals

UL/cUL Approval: Yes

Electrical Specifications

Power Supply Connection Location: Rear
Voltage Rating: 120V, 60Hz
Connected Load (kW Rating) @ 120V: 1.55
Amps @ 120 Volts: 13.0

General Specifications

Product Weight (lbs): 23
Shipping Weight (lbs): 25.4



GE UNDER-CABINET RANGE HOOD

Model Number: JVE40STSS

Location: Kitchen

Dimensions:

Length: 30"

Finish: Stainless Steel

Voltage: 120 Volts

Power: 15 Amps



RED HOT Summer DEALS AND STEALS SAVE 10-30% on select appliances PLUS FREE DELIVERY on orders of \$749 or more SHOP NOW

Home > [Cooking Appliances](#) > [Range Hoods](#) > [Under Cabinet Mount Hoods](#) > JVE40STSS

Quick Specs

Appearance
Style : Standard Hood
Type : Hood
Color : Stainless Steel
Mounting Type : Under Cabinet
Venting Type : Convertible
Blower Type : Internal

Dimensions
Width : 29 7/8"
Depth : 19 1/2"
Height : 5 7/8"

Features
CFM : 200
Dishwasher Safe Filters : Yes
Speeds : 2
Lighting Levels : 1
Halogen Lighting : No
Approved for Outdoor Use : No

Technical Details
Energy Star Rated : Yes
Amps : 15
Voltage : 120 Volts



Image disclaimer



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GE JVE40STSS

30" Under-Cabinet Range Hood with 200 CFM Internal Blower, 2 Fan Speeds, Cooktop Light, Mesh Filters and Convertible Venting: Stainless Steel

Your Price: **\$419.00**

Qty:

Add to Cart

Price Match Policy

Print

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12 MONTHS NO INTEREST if paid in full within 12 months
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As low as **\$34.92/month**
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Color Options		
Select	Black	\$399.00
Select	White	\$399.00
Selected	Stainless Steel	\$419.00

Description Specifications Features Info & Guides Reviews

Specifications

Features	
Venting Type:	Convertible
Exhaust CFM Back Rectangular:	180 CFM
Exhaust CFM Top Round:	200 CFM
Exhaust CFM Top Rectangular:	180 CFM
Fan Controls:	Rocker
Ducting:	3-Way Convertible
Light Controls:	On/Off
Control Location:	Front
Removable Grease Filter(s):	Mesh
Lighting:	2 - 15 Watts CFLs
Filter Cleaning:	Dishwasher Safe Mesh
Fan Speed Control:	2-Speed
Exhaust Options:	3 1/4" x 10" Rectangular Duct
Claims and Certifications	
UL:	Yes
ENERGY STAR Qualified:	Yes
Dimensions and Weights	
Overall Width:	29 7/8"
Overall Depth:	19 1/2"
Overall Height:	5 7/8"
Net Weight:	20 Lbs.
Approx. Shipping Weight:	29 Lbs.



SUMMIT FRONT LOAD WASHER/DRYER COMBO

Model Number: SPWD1800 or equal

Location: Bathroom

Dimensions:

Height: 33.63"

Width: 23.38"

Depth: 23.5"

Summit SPWD1800 24" Front Load Washer/Dryer Combo with 1.8 cu. ft. Capacity, 11 Fabric Care Wash Cycles, and LED Control Display

Brand: Summit Model: SPWD1800



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Finance it for
\$25.62 a month

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Product Rating

☆☆☆☆ (0 Ratings)

[Write a Review](#)



- Description
- Features
- Specifications
- Literature
- Accessories
- Rebates
- Reviews

How We Ship

Specifications
Height: 33.63
Width: 23.38
Depth: 23.5
Capacity: 1.8 cu. ft.
Shipping Weight: 209 lbs
Weight: 196 lbs
Depth with door at 90°: 39.5 "
Features
Control Type : Digital
Drum Material : Stainless Steel
Reversible Door : No
Leveling Legs : Yes
Wash Cycles : 11
Steam Cycle : No
Soak Setting : Yes
Maximum Spin Speed (RPM): 1000
Bleach Dispenser : Yes
Fabric Softener Dispenser: Yes
Water Heater : No
Self Cleaning Lint Filter : No
Sensor Dry : No
Dry Rack : No
Extra Large Lint Filter : No
Venting Type : Ventless
Usage: Residential
Electrical
Amps: 12.0
Voltage/Frequency: 115 V AC/60 Hz
US Electrical Safety: ETL



HAIKU BAMBOO

Model Number: K3150-S1

Location: Living Room

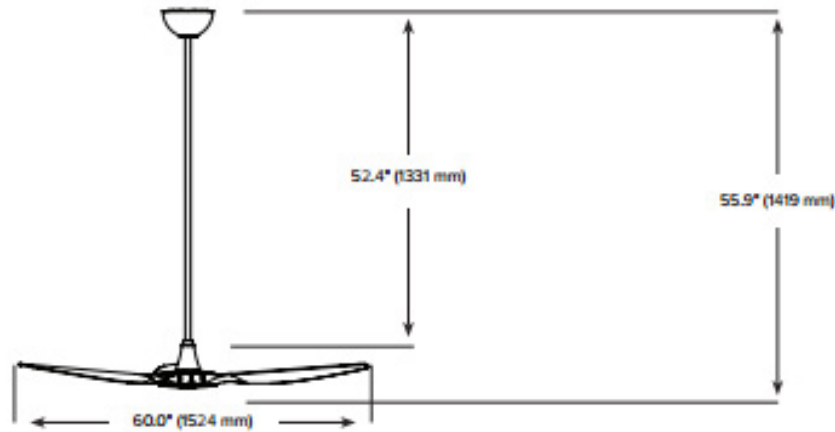
Size: 60"

Wattage: 25 Watts

Available: Big Ass Fans

Technical Specifications

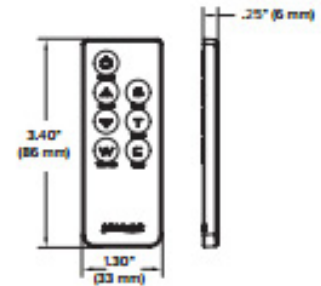
HAIKU™
POETRY IN MOTION



Technical Specifications	
Model	Haiku® Bamboo
Model number	S3150-XO-48
Fan diameter	60 in. (1524 mm)
Motor and assembly finishes	Black or white
Airfoil material	Bamboo
Airfoil finishes	Caramel or Cocoa
Number of airfoils	3
Motor type	EC motor with a digital inverter drive
Controller included	Yes, remote
Controller features	On/off
	Sleep mode
	Off timer
	Whoosh mode
	Reverse
Mount and drop tube	55.9" (1419mm)
Hanging weight	14.0 lb (6.4 kg)
Number of fan speeds	7
Operating voltage	100–240 VAC, 1Φ
Operating frequency	50–60 Hz
RPM (min/max)	35/195 RPM
Amps (min/max)	0.05 - 0.363 A
Watts (min/max)	2/30 W
Ambient operational temperature range	32°–120° F (0–49° C)
Environment	UL listed for dry locations
Fan mode indicator	LED display
Warranty*	Limited lifetime

* See Haiku warranty in installation guide for complete details

Controller



Color Options



855-MY HAIKU (855-694-2458) | WWW.HAIKUFAN.COM

BIG ASS FANS
No Equal.



Ask how Haiku Fans contribute to LEED®-NC 2009 credits in: Optimized Energy Performance; Enhanced Refrigerant Management; Minimum Indoor Air Quality Performance; Increased Ventilation; Thermal Comfort - Design Innovation in Design and LEED-NC 2009 credits in: Advanced Lighting Package; High Efficiency Appliances



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VIZIO 32" 1080HD 3-D OPTIONAL TV

Model Number: E3D320VX

Location: Living Room

Dimensions:

Width: 31.2"

Height: 22.5"

Depth: 7.4"

Weight: 26.7 lbs

Energy Star QualifiedBase Mineral: Oil

Finish: Satin



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32" CLASS THEATER 3D LCD HDTV WITH VIZIO INTERNET APPS®

VIZIO's 32" Class Theater 3D™ LCD HDTV delivers cinema-style 3D with lightweight, battery-free glasses you can wear at home or at the movies. Theater 3D delivers crystal-clear, flicker-free 3D that's better and brighter than conventional 3D. Including 2 free pairs of 3D glasses, this HDTV puts next-generation 3D well within reach.



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* Compatible with RealD 3D

THEATER 3D



VIZIO THEATER 3D™

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This TV has built-in WiFi, bringing you the best of the web. Our easy-to-use app gallery lets you choose from favorites like Netflix, VUDU™, Hulu Plus™, Pandora®, Facebook, Twitter, and more. Movies, TV, music, and friends—it's all waiting for you.



32" CLASS THEATER 3D™ LCD HDTV WITH VIZIO INTERNET APPS®

E3D320VX

TV SPECIFICATIONS

Screen Size	32" Class
Viewable	31.55"
TV Type	CCFL
Refresh Rate	60Hz
Maximum Resolution	1920 x 1080
Dynamic Contrast Ratio	200,000:1
Response Time	10ms
Internet Connectivity	802.11n Single-Band, Ethernet
Remote Control Type	XRT110
Ambient Light Sensor	Yes
Energy Star Qualified	Energy Star 5.3
Certifications	CSA, CSA-US, FCC Class B, HDMI V1.4 incl. CEC, ARC, VIZIO PGA, VIZIO AQA

CONNECTIONS

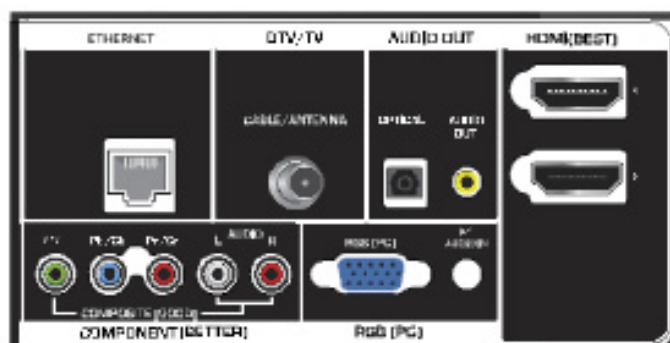
HDMI Inputs	3 [2 rear, 1 side]
Component Video Inputs	1
Composite Inputs	1 (shared with component)
RF Antenna Input	1
USB Ports	2 (side)
PC Input	1
Audio Outputs	1
Number of Speakers / Watts	2 x 10W
Surround / Simulated Surround	SRS StudioSound HD™

DIMENSIONS (WxHxD)

Product Dimensions	31.2" x 22.5" x 7.4"
Product Weight	20.0 lbs
Product Dimensions without Stand	31.2" x 20.8" x 3.2"
Product Weight without Stand	19.0 lbs
Shipping Dimensions	35.2" x 24.2" x 8.1"
Shipping Weight	26.6 lbs

WARRANTY

1 year



CONNECTIONS



DIVISION 12 FURNISHINGS



BAR ANGLE

Location: Solar Shade

Dimensions: 1 1/2" x 1 1/2" x 1/8"

Quantity: 4

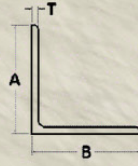
Available: Capitol Steel and Supply Co., Inc.

Price: \$25



SUPERIOR STEEL SUPPLY

575 E. 19th. Street Tucson, Arizona 85701
 Phone: (520) 623-6318 Fax: (520) 623-1227



Bar-Angles

Description	"A"	"B"	"T"	Stock Length	Wt/Ft
Angle 1/2 x 1/2 x 1/8	1/2	1/2	1/8	20'	0.380
Angle 3/4 x 3/4 x 1/8	3/4	3/4	1/8	20'	0.590
Angle 1 x 1 x 1/8	1	1	1/8	20'	0.800
Angle 1 x 1 x 3/16	1	1	3/16	20'	1.160
Angle 1 x 1 x 1/4	1	1	1/4	20'	1.490
Angle 1-1/4 x 1-1/4 x 1/8	1-1/4	1-1/4	1/8	20'	1.010
Angle 1-1/4 x 1-1/4 x 3/16	1-1/4	1-1/4	3/16	20'	1.480
Angle 1-1/4 x 1-1/4 x 1/4	1-1/4	1-1/4	1/4	20'	1.920
Angle 1-1/2 x 1-1/2 x 1/8	1-1/2	1-1/2	1/8	20'	1.230
Angle 1-1/2 x 1-1/2 x 3/16	1-1/2	1-1/2	3/16	20'	1.800
Angle 1-1/2 x 1-1/2 x 1/4	1-1/2	1-1/2	1/4	20'	2.340
Angle 2 x 1-1/2 x 1/8	2	1-1/2	1/8	20'	1.440
Angle 2 x 1-1/2 x 3/16	2	1-1/2	3/16	20'	2.120
Angle 2 x 1-1/2 x 1/4	2	1-1/2	1/4	20'/40'	2.770
Angle 2 x 2 x 1/8	2	2	1/8	20'	1.650
Angle 2 x 2 x 3/16	2	2	3/16	20'	2.440
Angle 2 x 2 x 1/4	2	2	1/4	20'/40'	3.190
Angle 2-1/2 x 1-1/2 x 1/4	2-1/2	1-1/2	1/4	20'/40'	3.190
Angle 2-1/2 x 2-1/2 x 3/16	2-1/2	2-1/2	3/16	20'	3.070
Angle 2-1/2 x 2-1/2 x 1/4	2-1/2	2-1/2	1/4	20'/40'	4.100
Angle 2-1/2 x 2-1/2 x 5/16	2-1/2	2-1/2	5/16	20'/40'	5.000
Angle 2-1/2 x 2-1/2 x 3/8	2-1/2	2-1/2	3/8	20'/40'	5.900
Angle 2-1/2 x 2-1/2 x 1/2	2-1/2	2-1/2	1/2	20'/40'	7.700



WASHER

Location: Solar Shade

Dimensions:

Outer Diameter: 1"

Inner Diameter: 1/4"

Thickness: 1/16"

Quantity: 168

Available: Capitol Steel and Supply Co., Inc.



STAINLESS STEEL MACHINE SCREW 1/4" - 20

Location: Solar Shade

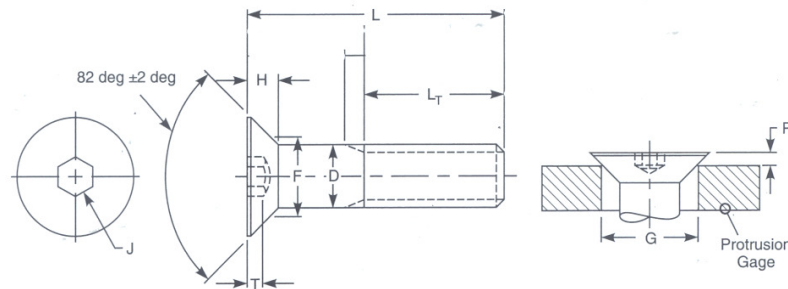
Dimensions:

Length: 1 1/2"

Quantity: 225

Flat Head Socket Cap Screws, Stainless Steel

The information below lists the required dimensional, chemical and physical characteristics of the products in this purchase order. If the order received does not meet these requirements, it may result in a supplier corrective action request, which could jeopardize your status as an approved vendor. Unless otherwise specified, all referenced consensus standards must be adhered to in their entirety.



Size	D		A		H	G		P		J		T	F
	Body Diameter		Head Diameter		Head Height	Protrusion Gage Dia.		Protrusion		Hex Socket		Key Engagement	Fillet Transition Dia.
	Max.	Min.	Max.	Min.	Ref.	Max.	Min.	Max.	Min.	Max.	Min.	Min.	Max.
0	.0600	.0568	.138	.117	.044	.078	.077	.036	.026	0.0355	0.0350	.025	.072
1	.0730	.0695	.168	.143	.054	.101	.100	.040	.028	0.0510	0.0500	.031	.089
2	.0860	.0822	.197	.168	.064	.124	.123	.043	.031	0.0510	0.0500	.038	.106
3	.0990	.0949	.226	.193	.073	.148	.147	.046	.033	0.0635	0.0625	.044	.119
4	.1120	.1075	.255	.218	.083	.172	.171	.049	.036	0.0635	0.0625	.055	.136
5	.1250	.1202	.281	.240	.090	.196	.195	.051	.037	0.0791	0.0781	.061	.153
6	.1380	.1329	.307	.263	.097	.220	.219	.052	.037	0.0791	0.0781	.066	.168
8	.1640	.1585	.359	.311	.112	.267	.266	.055	.039	0.0952	0.0937	.076	.194
10	.1900	.1840	.411	.359	.127	.313	.312	.058	.041	0.1270	0.1250	.087	.220
12	.2158	.2102	.450	.410	.135	.360	.359	.061	.042	0.1270	0.1250	.094	.246
1/4	.2500	.2435	.531	.480	.161	.424	.423	.064	.043	0.1587	0.1562	.111	.280
5/16	.3125	.3053	.656	.600	.198	.539	.538	.070	.047	0.1900	0.1875	.135	.343
3/8	.3750	.3678	.781	.720	.234	.653	.652	.076	.050	0.2217	0.2187	.159	.405
7/16	.4375	.4294	.844	.781	.234	.690	.689	.092	.063	0.2530	0.2500	.159	.468
1/2	.5000	.4919	.938	.872	.251	.739	.738	.119	.087	0.3160	0.3125	.172	.530
5/8	.6250	.6163	1.188	1.112	.324	.962	.961	.135	.096	0.3790	0.3750	.220	.655
3/4	.7500	.7406	1.438	1.355	.396	1.186	1.185	.150	.104	0.5050	0.5000	.220	.780
7/8	.8750	.8647	1.688	1.604	.468	1.411	1.410	.165	.118	0.5680	0.5625	.248	.905
1	1.000	.9886	1.938	1.841	.540	1.635	1.634	.181	.130	0.6310	0.6250	.297	1.030
1-1/8	1.1250	1.1086	2.188	2.079	.611	1.859	1.858	.196	.140	0.7570	0.7500	.325	1.187
1-1/4	1.2500	1.2336	2.438	2.316	.683	2.083	2.082	.212	.150	0.8850	0.8750	.358	1.312
1-3/8	1.3750	1.3568	2.688	2.553	.755	2.306	2.305	.228	.162	0.8850	0.8750	.402	1.437
1-1/2	1.5000	1.4818	2.938	2.791	.827	2.530	2.529	.243	.173	1.0200	1.0000	.435	1.562

Screws with lengths 1-1/2 times the nominal diameter may be undercut to facilitate full length threads

Specification Requirements:

- Dimensions: ASME B18.3
#12 see dimensions above. Body & Grip Lengths are equivalent to a #10 per ASME B18.3
- Material & Mechanical Properties: Alloy Group 1, Alloy Condition CW per ASTM F879
- Thread requirements: ASME B1.1, Class 3A UNRC and UNRF (0.060" to 1" inclusive)
Class 2A UNRC and UNRF (Over 1" to 1.5" inclusive)
Class 2A UNRC series (Over 1.5").
- Finish: Per ASTM A380.
- Material Test Reports: The MTR must have documented lot traceability, including full chemical and mechanical figures, to the specification(s) above.



TUBULAR DOOR TRACK

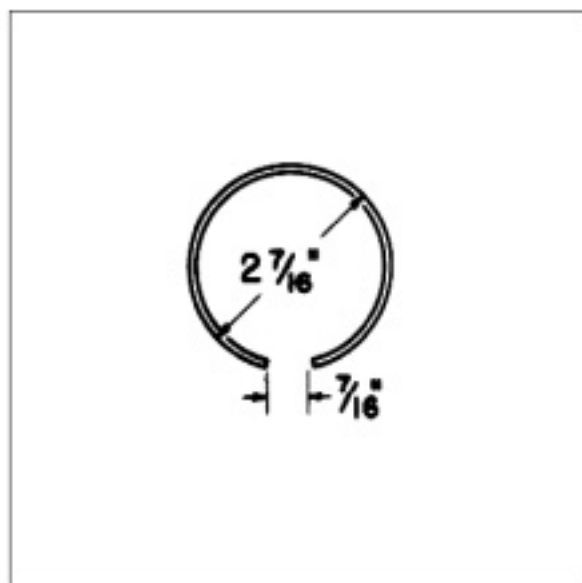
Model: CB-2

Location: Solar Shade

Material: 13 ga. High carbon steel

Available: Cannonball HNP

TUBULAR DOOR TRACK



Heavy-gauge Tubular Track — Packed 2 pieces of one length in nested bundle. Galvanized.

Part # 900910
Packed Bulk

646505 GALVANIZED UNIVERSAL BRACKETS FOR MOUNTING TUBULAR TRACK

Universal Brackets are used as splice brackets, end brackets and intermediate brackets. Lug-Loc devices keep track sections locked in line and prevent track from shifting lengthwise. When brackets are used as intermediate supports, lugs should be knocked out with a nail. A bracket must always be located at each end of the track run to prevent track from moving lengthwise.

Material: 13 ga. high carbon steel

Lengths available: 6'-20' in 2' increments

Weight per lineal foot: 2.2 lbs

Finish: galvanized

Bracket spacings: 12", 18", 24"

Maximum door leaf weight with single truck trolley hangers: 600 lbs.

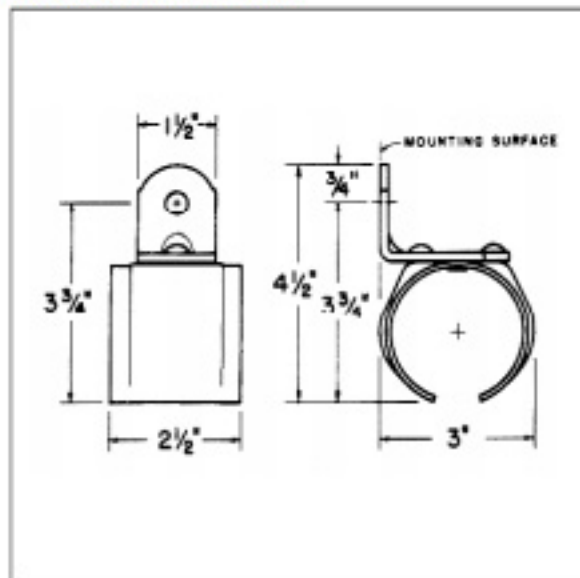
Maximum door leaf weight with double truck trolley hangers: 1200 lbs.*

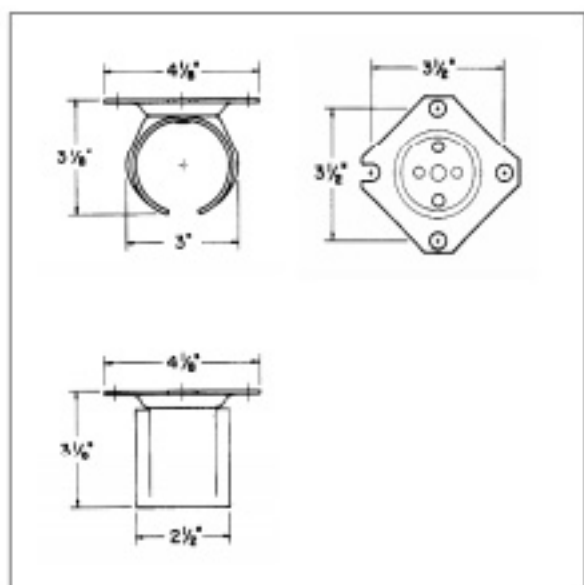
End Caps required per Track run: 2

Supported lugs (Packed with brackets): 2

Weight per lineal ft.: 2.2 lbs.

*Brackets mounted on 12" centers.





646602 Galvanized Ceiling Bracket — For mounting a single run of track from above. Galvanized. Weight 1 lb. each. Order two 3/8" x 2-1/2" lag bolts separately.

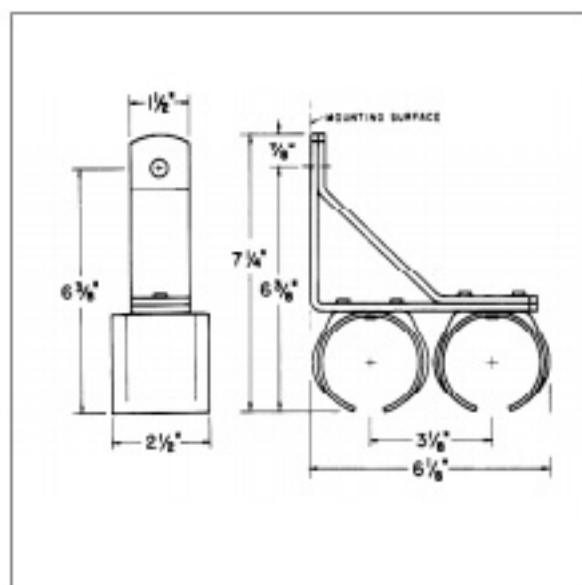
649017 UNIVERSAL BRACKET FOR MOUNTING TUBULAR TRACK ON METAL CONSTRUCTION

All Metal Construction Brackets are for mounting track from above. Each has a 1/2 - 13 stud bolt welded to its' top. Packed 24 in carton unless otherwise specified. Weight .8 lbs. each.

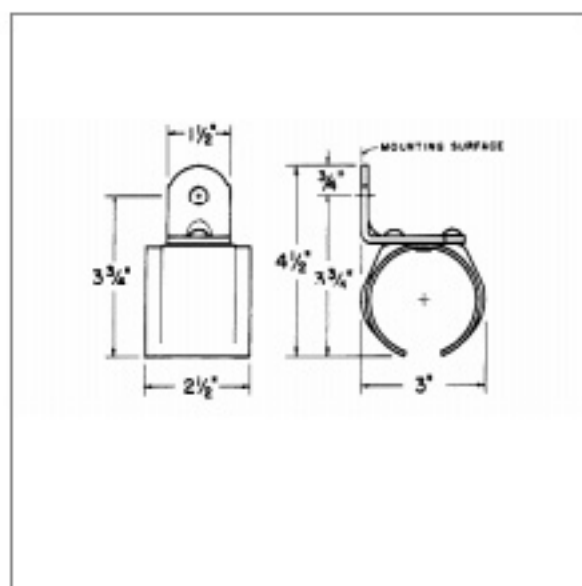
Metal Construction Bracket — Has 1-5/16" long stud. Zinc-plated.

179200 Hex Nuts — For all Brackets. Zinc-plated.

End Caps — IMPORTANT! Purpose of End Caps is for bird-proofing the tracks - *not as door stops*. Two required for each run of tubular and Seal-Tite Track. Furnished with 643426 or 643427 Trolley Hangers. Galvanized.



646801 Galvanized Universal Double Bracket — For mounting two parallel runs of tubular track for by-passing door applications. Zinc-plated. Packed 12 per carton with twelve 3/8" x 2-1/2" lags. Weight 3 lbs. each.





DERLIN & STEEL SINGLE-TRUCK, ADJUSTABLE TROLLEY HANGERS

Model: CB-8

Location: Solar Shade

Dimensions: 7" x 5 5/8"

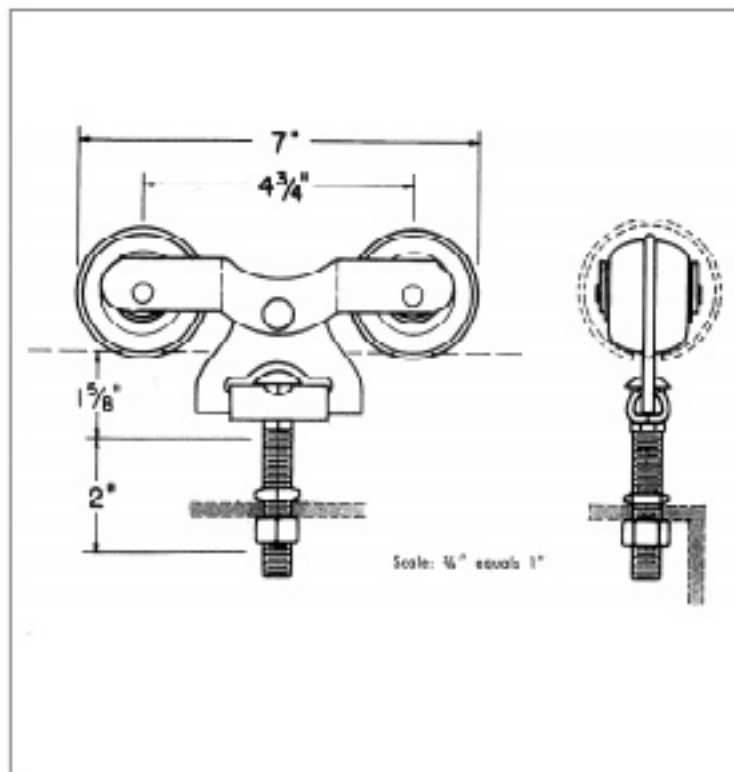
Finish: Galvanized

Available: Cannonball HNP

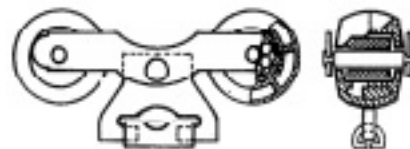
SPECIFICATIONS

CB-8

DELTRIN & STEEL SINGLE-TRUCK, ADJUSTABLE TROLLEY HANGERS FOR USE WITH METAL FRAME DOORS



NEW DELRIN TROLLEY



Quiet-running, corrosive-resistant DuPont Delrin, combined with the easy-running, long-lasting benefits of CannonBall needle-bearing design. Lower friction. Available in **all** popular CannonBall trolley systems.

- Never use more than 1 pair per door leaf.
- Finish: - galvanized.
- Packed 20 single trolleys per carton.
- Weight 2 pounds each.

Door Thickness: Variable

Door Leaf Weight Steel: Up to 400 lbs. per pair with 13- or 14-gauge track

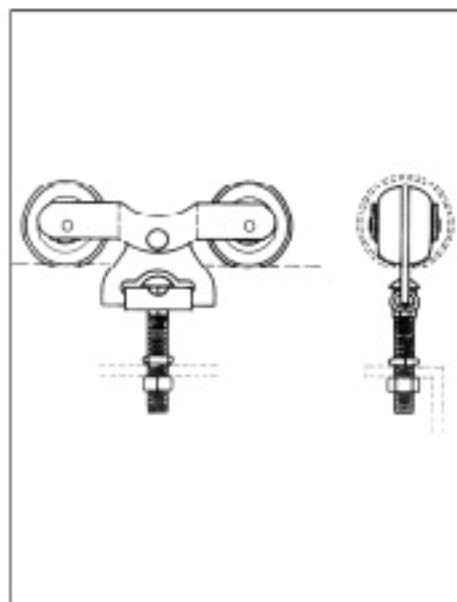
Delrin: Up to 450 lbs. per pair with 14-gauge track
Up to 600 lbs. per pair with 13-gauge track
Up to 1000 lbs. per pair with 13-gauge track, with universal side brackets on 12" spacing

Rods: 2 provided; 1/2" dia. Zinc-plated

Vertical Adjustment: Up to 2 inches

Lateral Adjustment: Slotted doorframe hole required

Suspension Bolt: 1/2 - 13 zinc-plated bolt, hex lock nut and adjusting nut

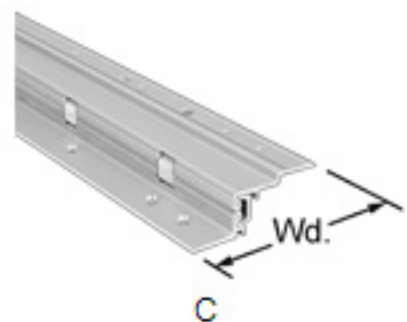
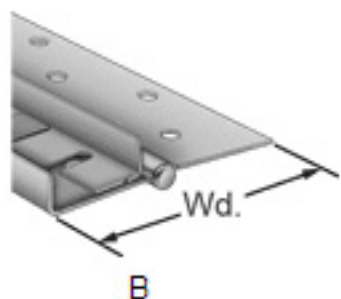
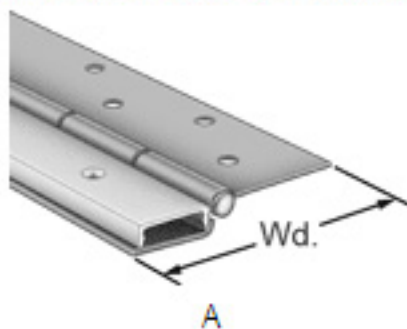




LOAD RATED PIANO HINGES WITH HOLES

Model: 14225A22
Location: Solar Shade
Dimensions: 4" x 0.075" x 6'11"
Finish: Primed Steel
Available: McMaster-Carr
Price: \$238.02 each

Load-Rated Piano Hinges with Holes



Ensure smooth operation of heavy doors. Hinges have nylon bearings spaced evenly along the length to distribute door weight. The full range of motion is 180°. Fasteners included.


Styles A and B are UL fire-rated for 90 minutes on hollow metal and composite core wood doors. Maximum door thickness is 1 3/4". **1' and 3'6"** lengths are available for either right-hand or left-hand mounting. **6'11"** lengths are reversible for right-hand or left-hand mounting. **To Order:** For 1' and 3'6" lengths, please specify right-hand or left-hand mount. Use a right-hand hinge if, from the push side of the door, the hinge is on the right; use a left-hand hinge if it is on the left.

Style A have one leaf that mounts to the surface of the door, while the other mounts to the frame.

Style B has one leaf that mounts around the edge of the door, while the other mounts to the frame.

Style C come with a snap-on cover that protects hinge from tampering and creates a finished appearance. Both leaves are surface mount.

Note: Load capacity is based on a maximum door size of 2' Wd. × 1'6" Ht. for 1' Lg. hinges, 3' Wd. × 4' Ht. for 3'6" Lg. hinges, and 4' Wd. × 7' Ht. for 6'11" Lg. hinges.

 For technical drawings and 3-D models, click on a part number.

Wd.	Leaf Thick.	Pin Dia.	Knuckle Lg.	6'11" Lengths	
				Load Cap., lbs.	Each
(A) Primed Steel					
4"	0.075"	3/16"	2"	600	14225A22 \$238.02
<div style="border: 1px solid black; padding: 5px;"> <p>CAD Catalog Page Bookmark ✕</p> <p>Load-Rated Piano Hinge w/ Bearings & Holes Steel, 4" W, 600 lb Cap, 6'11" Length</p> <p style="text-align: right;"><input type="text"/> Each</p> <p style="text-align: right;"><input type="button" value="ADD TO ORDER"/></p> <p style="text-align: right;">In stock</p> </div>					
(A) Type 304 Stainless Steel					
4"	0.075"	3/16"	2"	600	14225A24 371.55
(B) Type 304 Stainless Steel					
4 9/16"	0.075"	3/16"	2"	600	14225A26 378.76
(C) Anodized Aluminum					
4"	0.063"	—	—	160	1382A18 204.51
4"	0.063"	—	—	320	1382A23 249.92



HEAVY DUTY CATCH MAGNET

Model: BP 9798 AW
Location: West Living Room Window Shade
Dimensions: 2 1/32" x 1 1/16" x 13/16"
Finish: Aluminum

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Home > Search Results for "HEAVY DUTY CATCH MAGNET"



Amerock Magnetic Catch with Steel Strike

Model # BP9798AW | Internet # 202176373 | Store SO SKU # 376464

★★★★★ | [Write The First Review](#)

\$1.98 / each

This item cannot be shipped to the following state(s): AK, GU, HI, PR, VI

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CUSTOMERS WHO
VIEWED THIS ITEM
PURCHASED

PRODUCT OVERVIEW

Add a touch of style to your cabinets with the Amerock Magnetic Catch with Steel Strike that features an attractive woodgrain aluminum case. The catch holds 12-19 lb. to help ensure your cabinets stay closed and secure and comes with a steel strike and installation hardware. Coordinating all of a home's hardware from the mudroom to cabinets to bathrooms allows for personal expressions, while at the same time creating a unified flow from one room to another. The blended elements create a fresh look for comfortable modern living.

- Magnetic catch
- Woodgrain aluminum case
- Steel strike measures 3/4 in. W x 1 in. L
- Includes three #6 x 1/2 in. truss head screws
- MFG Model #: BP9798AW
- MFG Part #: BP9798AW

[Return To Top](#) ^

SPECIFICATIONS

Assembled Depth (In.)	2.0 In	Assembled Height (In.)	0.625 In
Assembled Width (In.)	1 In	Builders Hardware Product Type	Cabinet Latch
Center to center measurement (In.)	1	Finish	Tan
Finish Family	Brown	Latch type	Surface mounted
Manufacturer Warranty	Lifetime Limited	Material	Metal
Product Depth (In.)	2	Product Height (In.)	0.625
Product Width (In.)	1	Returnable	30-Day

[Return To Top](#) ^



42" CORNER SINK BASE

Model Number: CDSB42

Location: Kitchen

Dimensions:

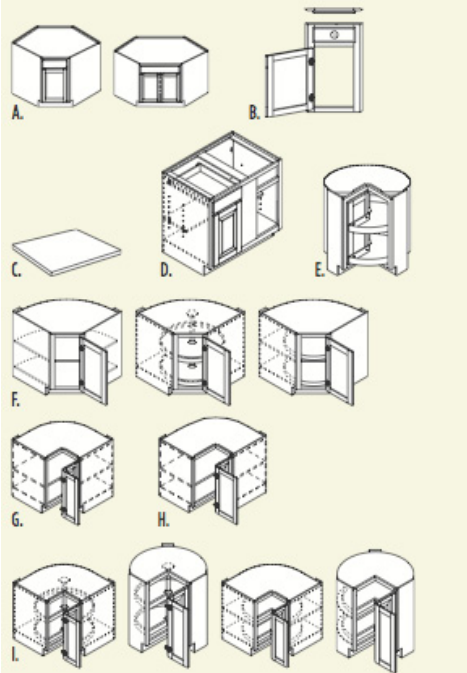
Width: 24"

Height: 34 1/2"

Depth: 24"

Finish: Maple

Available: Home Crest



CORNER BASES

- A. Corner Diagonal Sink Base**
CDSB36 L or R CDSB42
- B. Corner Sink Front**
CSF36 L or R CSF42
- C. Corner Sink Front Bottom**
CSFB CSFB-APC
- D. Base Corner**
BC3639 L or R BC4245 L or R BC4851 L or R
BC3942 L or R BC4548 L or R
- E. Base Lazy Susan Corner with Revolving Door**
BC36SPN
- F. Corner Diagonal Base**
CDB36 L or R CDB36PSS L or R CDB36SS L or R
- G. Base Easy Reach**
BER33 L or R BER36 L or R
- H. Asymmetrical Base Easy Reach**
BER3336 L or R BER3633 L or R
- I. Base Corner Super Susan**
BC33PSS L or R BC33SS L or R
BC36PSS L or R BC36SS L or R



HOMECREST BASE CABINETS 24" THREE DRAWER BASES

Model Number: B3D22434.5-24

Location: Kitchen

Dimensions:

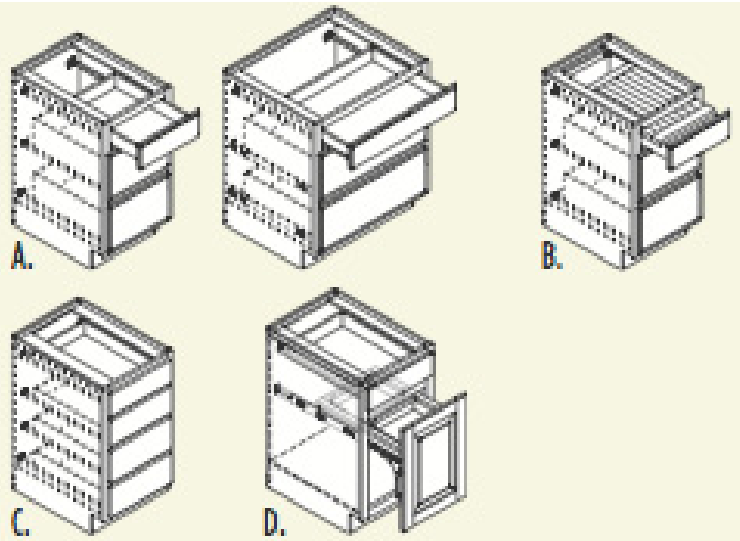
Width: 24"

Height: 34 1/2"

Depth: 24"

Finish: Maple

Available: Home Crest



DRAWER BASES

A. Three Drawer Base

3BD12	3BD21	BD300
3BD15	3BD24	BD330
3BD18	3BD27	BD360

B. Three Drawer Base Special

BD1888

C. Four Drawer Base

4BD12	4BD18	4BD24
4BD15	4BD21	4BD27

D. Base Waste Basket

BWB15	BWB18
-------	-------



HOMECREST 30" BASE CABINET

Model Number: B3034.5-34

Location: Kitchen

Dimensions:

Width: 30"

Height: 34 1/2"

Depth: 24"

Finish: Maple

Available: Home Crest

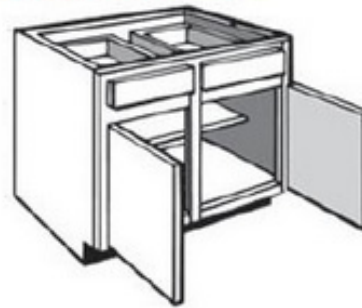
12" Wide to 60" Wide Base Cabinets



- B12: 12"W X 34 1/2"H X 24"D
- B15: 15"W X 34 1/2"H X 24"D
- B18: 18"W X 34 1/2"H X 24"D
- B21: 21"W X 34 1/2"H X 24"D
 - One adjustable half-shelf
 - One drawer

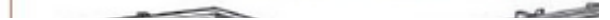


- B24: 24"W X 34 1/2"H X 24"D
 - One adjustable half-shelf
 - One drawer
 - Two doors



- B27: 27"W X 34 1/2"H X 24"D
- B30: 30"W X 34 1/2"H X 24"D
- B33: 33"W X 34 1/2"H X 24"D
- B36: 36"W X 34 1/2"H X 24"D
- B39: 39"W X 34 1/2"H X 24"D
- B42: 42"W X 34 1/2"H X 24"D
 - One adjustable half-shelf
 - Two drawers

Base Island Cabinets





HOMECREST CUSTOM CABINET

Model Number: MBC1824-24.5

Location: Kitchen

Dimensions:

Width: 18"

Height: 34.5"

Depth: 24"

Finish: Maple

Available: Home Crest



PLYWOOD SHELVING

Location: Kitchen

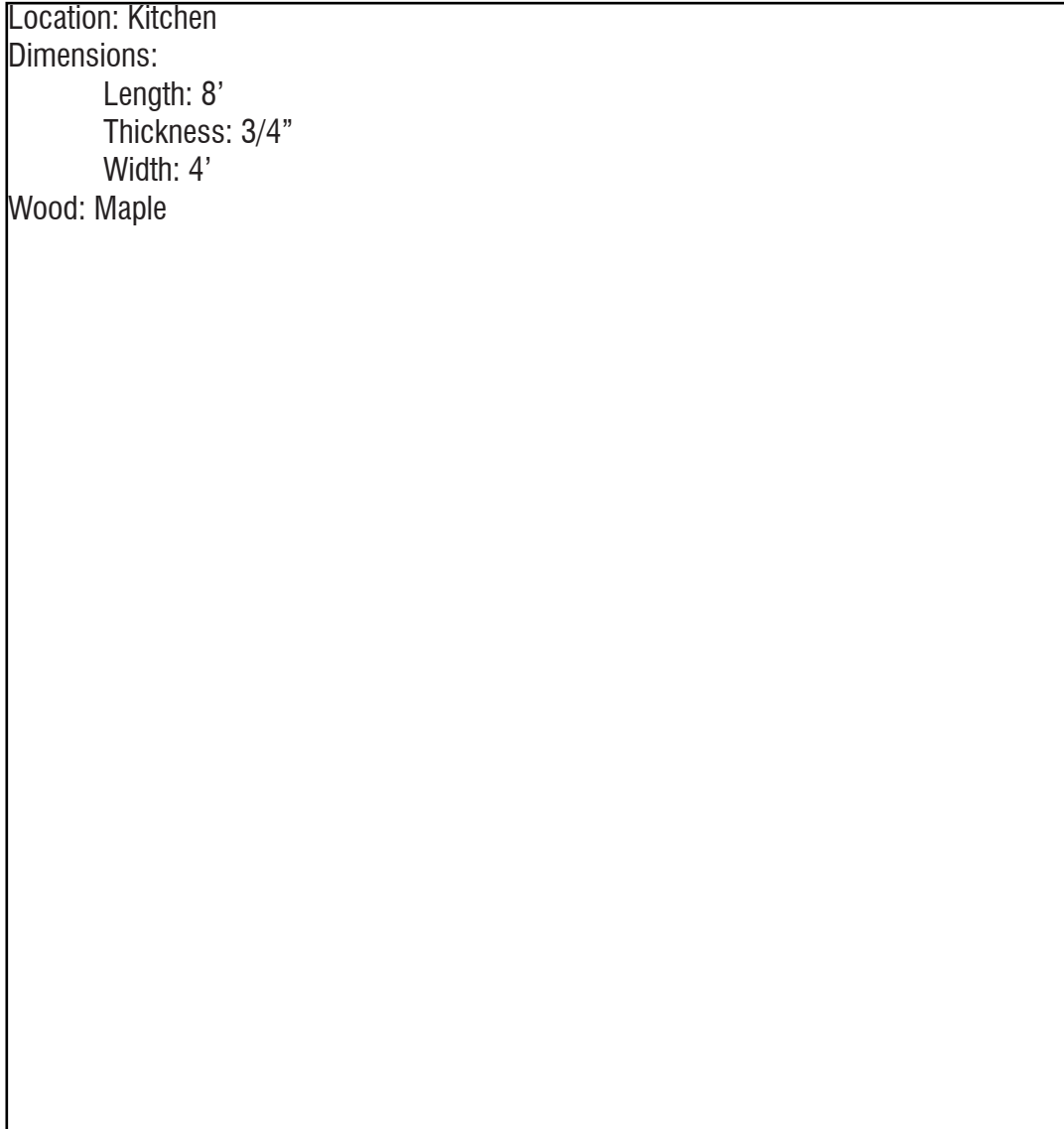
Dimensions:

Length: 8'

Thickness: 3/4"

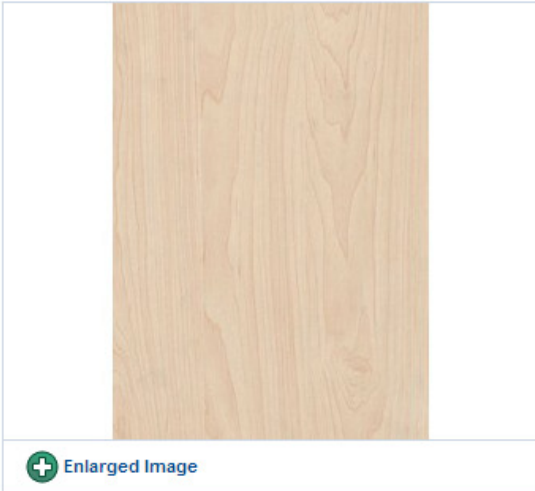
Width: 4'

Wood: Maple



Home: Search "maple plywood" : Top Choice 3/4 Top Choice Maple Hardwood

Print



Enlarged Image

Top Choice 3/4 Top Choice Maple Hardwood

Item #: 75514 | Model #: 75514

★★★★★ 2 reviews | [Write a review](#)

\$52.95

Product is sold in individual pieces; please review the product specifications for details

Share [Pin it](#) Tweet 0 +1 0

Description | Specifications | Reviews | Community Q&A

Pre-Cut	Yes	Actual Thickness (Inches)	0.75
Species	Maple	Actual Length (Inches)	96.0
Face Grade	N/A	Actual Width (Inches)	48.0
Back Grade	N/A	Weather Exposure	For interior use
Nominal Thickness in Inches	3/4	Struct 1	No
Nominal Length (Feet)	8.0	Environmental Certification	N/A
Nominal Width (Feet)	4.0	CARB Compliant	No
		No Added Formaldehyde (NAF) Compliant	No

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AMEROCK BP19009SS TKNOB

Model Number: BP19009SS
Location: Kitchen Drawers
Material: Stainless Steel
Price: \$6.57
Available: Knobs and Hardware

Images



2994599S

Amerock BP19009SS TKnob Knob, Stainless Steel

Part of the [Stainless Steel Collection](#) by [Amerock](#)

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Dimensions & Weights

Projection	1.38 inches
Length	1.31 inches

Quick Links

Dimensions	Q & A
Reviews	Manuals
	Brand Info

Overview

Modern styling with unadorned surfaces. Smooth styling in high quality stainless steel.

Size	1-1/4" (dia)
Finish	Stainless Steel
Materials	Stainless Steel

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\$9.11
★★★★★



GRASS TEC 864 SIDE MOUNT 45 MM SCREW ON HINGE

Model Number: 03050

Location: Kitchen

Swing: 108 Degrees

Finish: Polished nickel

Cabinet Hardware > Cabinet Hinges > European > Grass > Tec 864 108° Face Frame > TEC 864 108 Degree Face Frame Hinge By Grass >

★★★★★ 4.4 out of 5
based on 185 ratings

> Tec 864 1-1/4" Side Mount 45MM Screw On Hinge (#03050) by Grass

Item # **GHA3050** - Sold Each Without Screws



+1 Recommend this on Google

Pin it

This one piece hinge for face frame cabinets features a 108° opening angle, 3 dimensional adjustment, and all metal construction with a polished nickel finish.

List Price: ~~\$3.70~~

1-4	5-16	17-50	51+
\$ 2.96	\$ 2.37	\$ 2.11	\$ 1.79
20% off	36% off	43% off	52% off

Item # **GHA3050**

QTY

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> **Add to Project List**

> Product Specs

- ▶ Mounting Hardware Included: :
No-See Installation Hardware
- ▶ Manufacturer : **Grass**
- ▶ Manufacturer Part # : **03050**
- ▶ Overlay : **1-1/4"**
- ▶ Cup Depth : **7/16"**
- ▶ Degree of Opening : **108**
- ▶ Bore Diameter : **35MM**
- ▶ Mounting Type : **Screw On**
- ▶ Sold : **Each**
- ▶ Product Type : **Hinge & Plate: Face Frame**
- ▶ Material : **Metal**

Grass TEC 864

108° Opening Angle - ¼" to 1" Overlay



Face Frame Hinges with 3-dimensional Adjustment

- One piece hinge and base plate combination
- For door thickness of up to ¾"
- Front locating tabs position hinge on face frame
- Micro side adjustment
- Cam depth adjustment
- Height adjustment at mounting screw

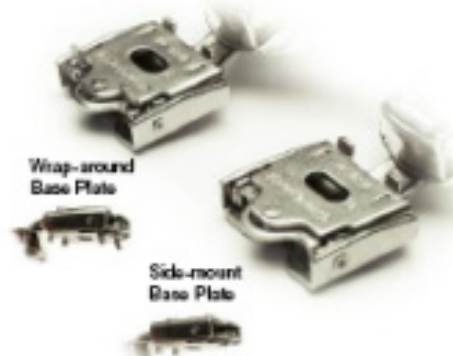
VS - Screw-on cup, 42mm pattern
 VS8 - Dowelled cup, 42mm pattern
 VS1-45 - Dowelled cup, 45mm pattern

Side-mount - 42mm drilling pattern								
Overlay	Door Clearance	Arm Clearance	Dowelled Hinge Cup			Screw-on Hinge Cup		
mm [inch]	mm [inch]	mm [inch]	Reference #	Item #	Box Qty.	Reference #	Item #	Box Qty.
6 [¼"]	11 [⅜"]	14.5 [⅝"]	864VS8 (09-01)	03044-15	300	864VS (09-01)	03046-15	300
12.5 [½"]	3.5 [⅜"]	11 [⅜"]	864VS8 (82-01)	03024-15	300	864VS (82-01)	03026-15	300
19 [¾"]	0	11 [⅜"]	864VS8 (83-01)	02960-15	300	864VS (83-01)	02962-15	300
25 [1"]	0	11 [⅜"]	864VS8 (37-01)	02944-15	300	864VS (37-01)	02946-15	300

Wrap-around - 42mm drilling pattern								
Overlay	Door Clearance	Arm Clearance	Dowelled Hinge Cup			Screw-on Hinge Cup		
mm [inch]	mm [inch]	mm [inch]	Reference #	Item #	Box Qty.	Reference #	Item #	Box Qty.
6 [¼"]	11 [⅜"]	14.5 [⅝"]	864VS8 (09-02)	02928-15	300	864VS (09-02)	02930-15	300
12.5 [½"]	3.5 [⅜"]	11 [⅜"]	864VS8 (82-02)	02924-15	300	864VS (82-02)	02926-15	300
19 [¾"]	0	11 [⅜"]	864VS8 (83-02)	02958-15	300	864VS (83-02)	02958-15	300
25 [1"]	0	11 [⅜"]	864VS8 (37-02)	02920-15	300	-	-	-

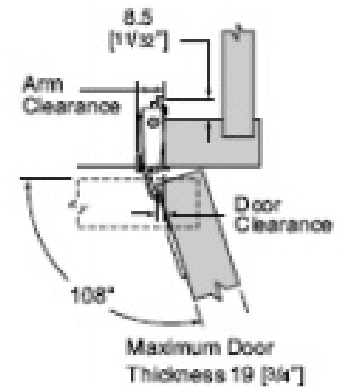
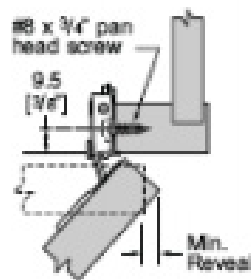
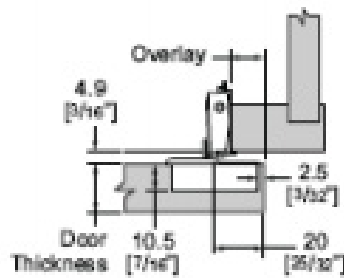
Side-mount - 45mm drilling pattern					
Overlay	Door Clearance	Arm Clearance	Dowelled Hinge Cup		
mm [inch]	mm [inch]	mm [inch]	Reference #	Item #	Box Qty.
6 [¼"]	11 [⅜"]	14.5 [⅝"]	864VS8-45 (09-01)	03045-15	300
12.5 [½"]	3.5 [⅜"]	11 [⅜"]	864VS8-45 (82-01)	03025-15	300
25 [1"]	0	11 [⅜"]	864VS8-45 (37-01)	02945-15	300

Wrap-around - 45mm drilling pattern					
Overlay	Door Clearance	Arm Clearance	Dowelled Hinge Cup		
mm [inch]	mm [inch]	mm [inch]	Reference #	Item #	Box Qty.
11 [⅜"]	5 [⅞"]	11 [⅜"]	864VS8-45 (77-02)	02992-15	300
12.5 [½"]	3.5 [⅜"]	11 [⅜"]	864VS8-45 (82-02)	02925-15	300
19 [¾"]	0	11 [⅜"]	864VS8-45 (83-02)	02957-15	300
25 [1"]	0	11 [⅜"]	864VS8-45 (37-02)	02921-15	300



IMPORTANT
 To determine the correct application, Grass strongly recommends a trial mounting for all hinges and base plates.

Dimensions - Door Closed	Minimum Reveal	Door Open - Clearances
--------------------------	----------------	------------------------



TEC 864 Minimum Reveal
 Door Thickness 16 [5/8\"/>
 Minimum Reveal 4.2 [1/4\"/>
 Based on door with square edge.

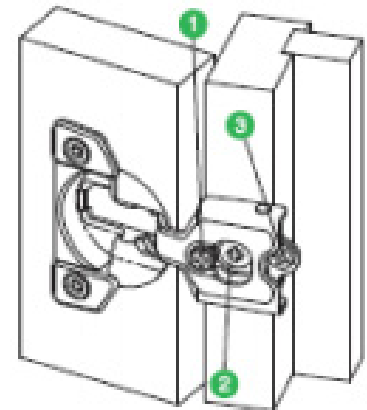
Arm and Door clearances see Page 6.

Adjustment Details

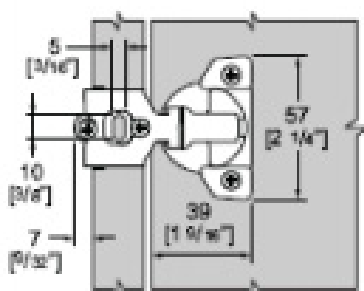
- 1** Side Adjustment +/-1.5mm [1/16\"/>
Rotate micro screw.
- 2** Height Adjustment..... +/-2mm [1/8\"/>
Loosen screw, align door, tighten screw.
- 3** Depth Adjustment..... out 2.5mm [3/16\"/>
Rotate cam screw.

Mounting Screws

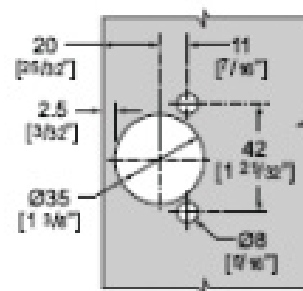
- Hinge cup to door, #6 x 1/8\" Flat head screw
- Base plate to face frame, #8 x 1/4\" Pan head screw



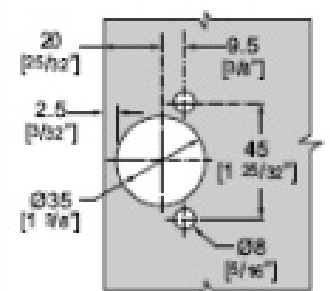
Overall Dimensions



42mm drilling pattern



45mm drilling pattern



Grass TEC 864

108° Opening Angle - 1¼" to 1½" Overlay



Face Frame Hinges with 3-dimensional Adjustment

- One-piece hinge and base plate combination
- For door thickness of up to ¾"
- Front locating tabs position hinge on face frame
- Cam side adjustment
- Cam depth adjustment
- Height adjustment at mounting screw

VS = Screw-on cup, 42mm pattern
 VS8 = Dowelled cup, 42mm pattern
 VS8-45 = Dowelled cup, 45mm pattern

Side-mount - 42mm drilling pattern

Overlay	Door Clearance	Arm Clearance	Dowelled Hinge Cup			Screw-on Hinge Cup		
			Reference #	Item #	Box Qty.	Reference #	Item #	Box Qty.
32 [1 ¼"]	0	10 [¾"]	864/VS8 (31-01)	03048-15	300	864/S (31-01)	03050-15	300
35 [1 ¾"]	0	10 [¾"]	864/VS8 (16-01)	03086-15	300	864/VS (16-01)	03088-15	300
38 [1 ½"]	0	10 [¾"]	864/VS8 (33-01)	03096-15	300	864/VS (33-01)	03100-15	300

Wrap-around - 42mm drilling pattern

Overlay	Door Clearance	Arm Clearance	Dowelled Hinge Cup			Screw-on Hinge Cup		
			Reference #	Item #	Box Qty.	Reference #	Item #	Box Qty.
32 [1 ¼"]	0	10 [¾"]	864/VS8 (31-02)	02932-15	300	864/S (31-02)	02934-15	300
35 [1 ¾"]	0	10 [¾"]	864/VS8 (16-02)	02936-15	300	864/VS (16-02)	02938-15	300
38 [1 ½"]	0	10 [¾"]	864/VS8 (33-02)	02940-15	300	864/VS (33-02)	02942-15	300

Side-mount - 45mm drilling pattern

Overlay	Door Clearance	Arm Clearance	Dowelled Hinge Cup		
			Reference #	Item #	Box Qty.
32 [1 ¼"]	0	10 [¾"]	864/VS8-45 (31-01)	03049-15	300
35 [1 ¾"]	0	10 [¾"]	864/VS8-45 (16-01)	03087-15	300
38 [1 ½"]	0	10 [¾"]	864/VS8-45 (33-01)	03099-15	300

Wrap-around - 45mm drilling pattern

Overlay	Door Clearance	Arm Clearance	Dowelled Hinge Cup		
			Reference #	Item #	Box Qty.
32 [1 ¼"]	0	10 [¾"]	864/VS8-45 (31-02)	02933-15	300
35 [1 ¾"]	0	10 [¾"]	864/VS8-45 (16-02)	02937-15	300
38 [1 ½"]	0	10 [¾"]	864/VS8-45 (33-02)	02941-15	300



Wrap-around Base Plate

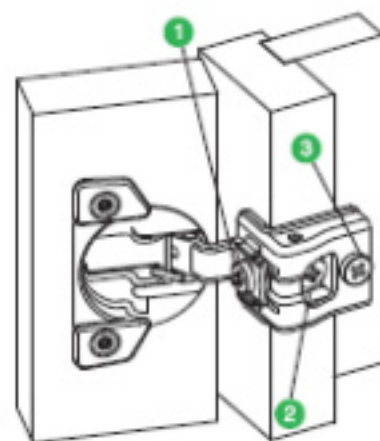
Side-mount Base Plate

IMPORTANT
 To determine the correct application, Grass strongly recommends a trial mounting for all hinges and base plates.

Dimensions - Door Closed	Minimum Reveal	Door Open - Clearances
	<p>TEC 864 Minimum Reveal</p> <p>Door Thickness 16 [5/8\"/> Minimum Reveal 4.2 [1/8\"/> Based on door with square edge.</p>	<p>Arm and Door clearances see Page 8.</p>

Adjustment Details

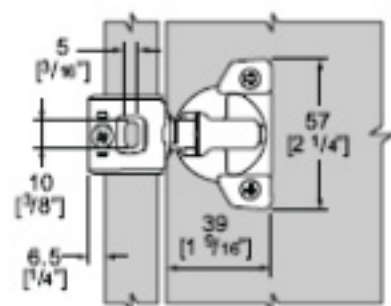
- 1** Side Adjustment +/-1.5mm [1/16\"/>
Rotate cam screw.
- 2** Height Adjustment..... +/-2mm [1/8\"/>
Loosen screw, align door, tighten screw.
- 3** Depth Adjustment.....out 2.5mm [1/8\"/>
Rotate cam screw.



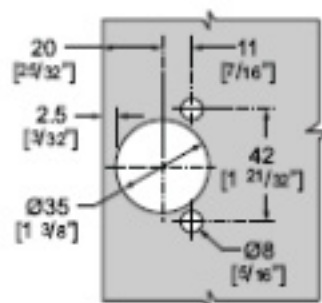
Mounting Screws

Hinge cup to door, #6 x 1/2" Flat head screw
 Base plate to face frame, #8 x 3/4" Pan head screw

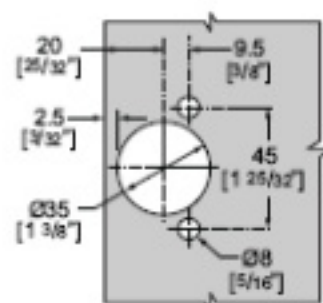
Overall Dimensions



42mm drilling pattern



45mm drilling pattern





**GRASS ELITE FULL EXTENSION CONCEALED DRAWER
SLIDE WITH AIRMATIC CONTROLLED CLOSING**

Model: 7523

Location: Kitchen

Dimensions:

Slide Length: 21 21/32"

Drawer Length: 22"

Finish: Zinc-plated

Grass Elite™

7523 Full Extension, Concealed Drawer Slide with AIRMATIC™ controlled closing



- Slides mount under the drawer to give a full view of finely crafted drawers
- Zinc plated, roll formed steel components
- Precision, smooth-running synthetic roller carriages
- Airmatic shock absorber softly glides drawers to a stop
- Self-latching front locking devices have comfortable release levers for drawer removal
- Self-aligning rear brackets for face frame applications
- Available for 5/8" or 3/4" maximum drawer side thickness

TECHNICAL INFORMATION

U.S. Patent # 6,932,200

- Type B05011, ANSI / BHMA 156.9 grade 1 drawer slide
- Passes BHMA testing standards
- Positive tracked right side, +/- 1/16" side tolerance on left side)
- Locking devices include a 3/32" height adjustment feature
- Self-closing springs engage at 1 1/4" before closed position

■ Cabinet member fastening:

Wood screw:#7 x 5/8" flat head

Euro screw:Ø5mm x 13mm (1/2")

■ Front locking device:

Wood screw:#6 x 1/2" flat head

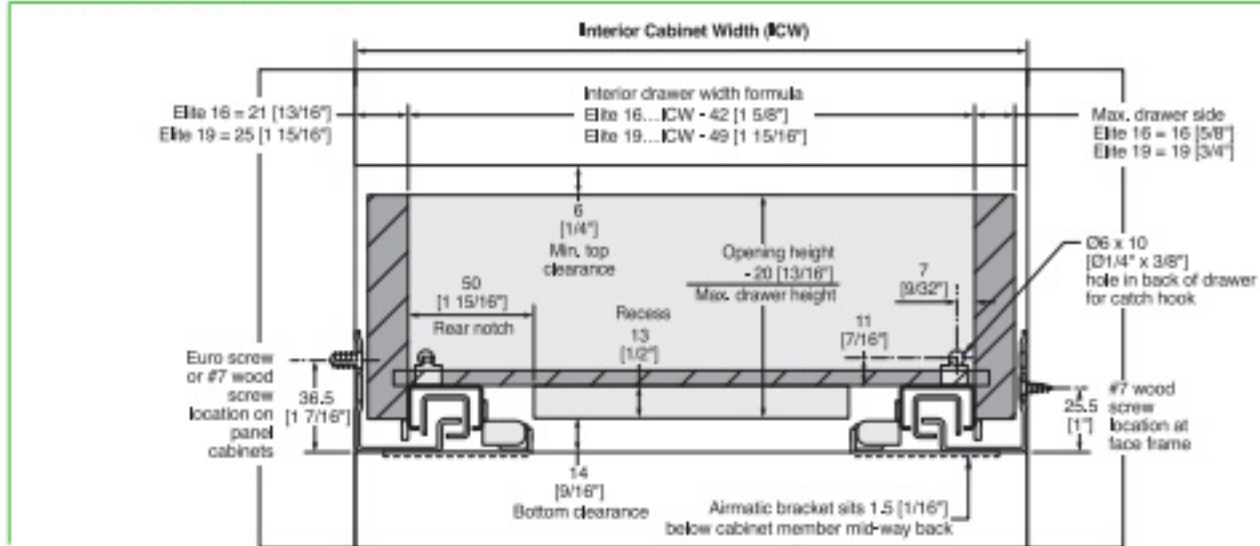
Grass Elite 16 slides with Airmatic controlled closing	REFERENCE NUMBER	CABINET MEMBER LENGTH		DRAWER LENGTH		ITEM NUMBERS	
	mm	mm	inch	mm	inch	5 sets/box	200 sets bulk
	7523 - 16 / 250 / 240	250	9 13/16"	240	9 7/8"	60485	60621
For 16mm (5/8") maximum drawer side thickness	7523 - 16 / 317 / 305	317	12 1/2"	305	12"	60488	60624
	7523 - 16 / 394 / 381	394	15 1/2"	381	15"	60490	60626
	7523 - 16 / 470 / 457	470	18 1/2"	457	18"	60493	60629
	7523 - 16 / 550 / 533	550	21 5/8"	533	21"	60496	60632

Grass Elite 19 slides with Airmatic controlled closing	REFERENCE NUMBER	CABINET MEMBER LENGTH		DRAWER LENGTH		ITEM NUMBERS	
	mm	mm	inch	mm	inch	5 sets/box	200 sets bulk
	7523-19 / 250 / 240	250	9 13/16"	240	9 7/8"	60519	60655
For 19mm (3/4") maximum drawer side thickness	7523-19 / 317 / 305	317	12 1/2"	305	12"	60522	60658
	7523-19 / 394 / 381	394	15 1/2"	381	15"	60524	60660
	7523-19 / 470 / 457	470	18 1/2"	457	18"	60527	60663
	7523-19 / 550 / 533	550	21 5/8"	533	21"	60530	60666

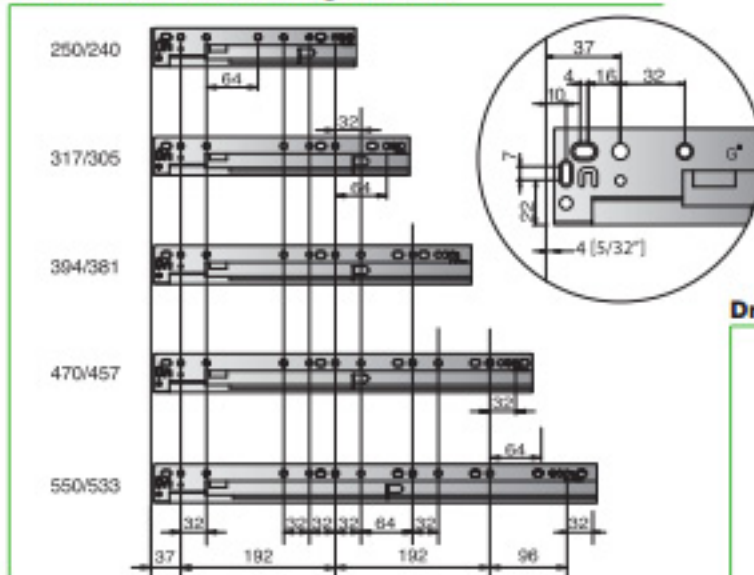
	REFERENCE NUMBER	DESCRIPTION	ITEM NUMBERS	BOX QTY.
Front Locking Device Kit	7523-FLD-KIT	Polybagged right and left locking devices plus (4) #6 x 1/2" Flat head Phillips attachment screws (5) kits per bag / 200 kits per box	02236	5
Left Locking Device	7523-FLD-LH	Left Front Locking Device	02234	200
Right Locking Device	7523-FLD-RH	Right Front Locking Device	02235	200

IMPORTANT: To determine the correct application, Grass strongly recommends a trial mounting for all drawer slides.

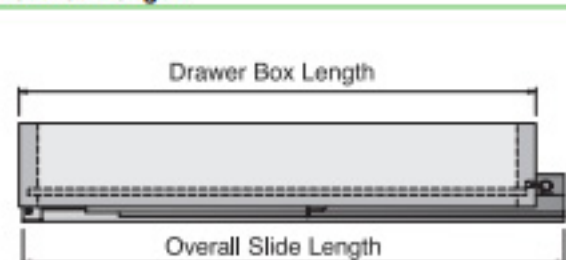
Drawer Dimension Instructions



Cabinet Member Fastening Positions



Drawer Box Length

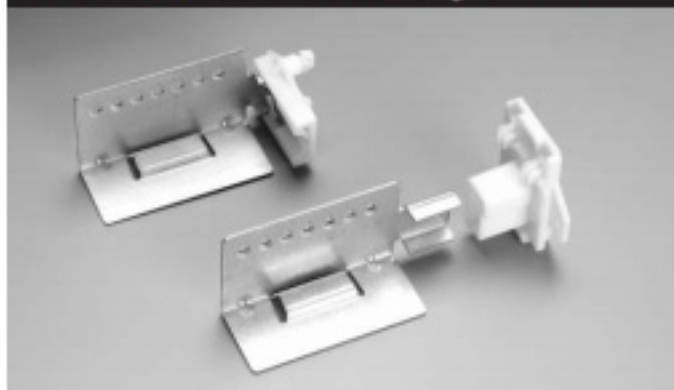


Dimensions with screw-on rear brackets in face frame cabinets

Slide code cabinet member/ drawer box	Overall slide length		Min. inside cabinet depth		Drawer Box Length	
	mm	inch	mm	inch	mm	inch
250/240	250	9 13/16"	258	10 3/16"	240	9 7/8"
317/305	317	12 1/2"	325	12 13/16"	305	12"
394/381	394	15 1/2"	402	15 13/16"	381	15"
470/457	470	18 1/2"	478	18 13/16"	457	18"
550/533	550	21 5/8"	558	21 15/16"	533	21"

Brackets

Grass Elite Rear Mounting Brackets



- Rear mounting brackets for face frame cabinetry
- Full range of brackets to meet manufacturing needs
- Brackets available in screw-on and dowelled
- Dowelled brackets ensure easy insertion into pre-drilled cabinet backs
- Allows for self-alignment of double captive slides
- Metal bracket position can be fixed with a Euro screw

IMPORTANT: To determine the correct application, Grass strongly recommends a trial mounting for all drawer slides.

	DESCRIPTION	ITEM NUMBERS
Bracket Kit	7523 Bracket Kit for Face Frame (5/30)	02207
	Kit includes one each: <ul style="list-style-type: none"> • Front Locking Device 7523 L/R with 4 x #6x1/2 wood screws • 7523/6603 22mm Adj. Bracket - LH - screw on • 7523/6603 22mm Adj. Bracket - RH - screw on • Bracket, Rear, Straight 6610 - Grass Elite LH, metal • Bracket, Rear, Straight 6610 - Grass Elite RH, metal 	

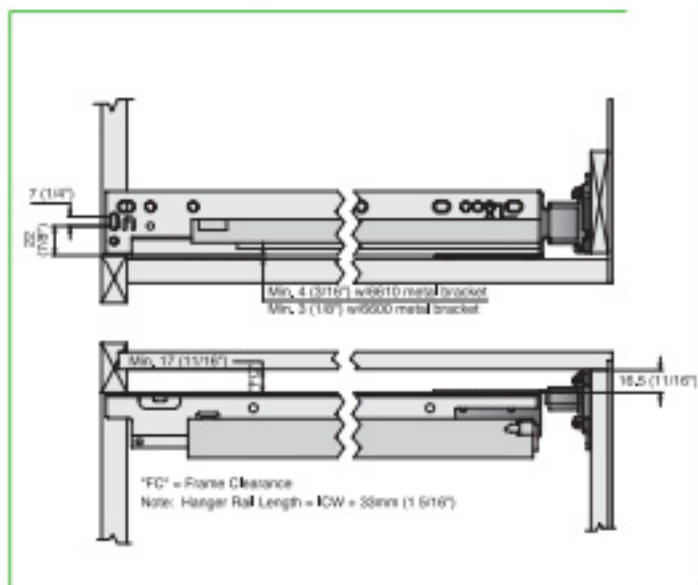
	DESCRIPTION	ITEM NUMBERS
Straight rear brackets	Bracket, Rear, Straight 6610 - Grass Elite LH, metal (200)	02210
	Bracket, Rear, Straight 6610 - Grass Elite RH, metal (200)	02211
	Bracket, Rear, Straight 6600 - Grass Elite LH, metal (200)	02208
	Bracket, Rear, Straight 6600 - Grass Elite RH, metal (200)	02209
	7523/6603 22mm Adj. Bracket - LH - screw on (200)	30992
	7523/6603 22mm Adj. Bracket - RH - screw on (200)	30993

	DESCRIPTION	ITEM NUMBERS
V-notch rear brackets	Bracket, Rear, VN-6610 - Grass Elite LH (5)	02216
	Bracket, Rear, VN-6610 - Grass Elite RH (5)	02217
	Bracket, Rear, VN-6610 - Grass Elite LH (200)	02214
	Bracket, Rear, VN-6610 - Grass Elite RH (200)	02215

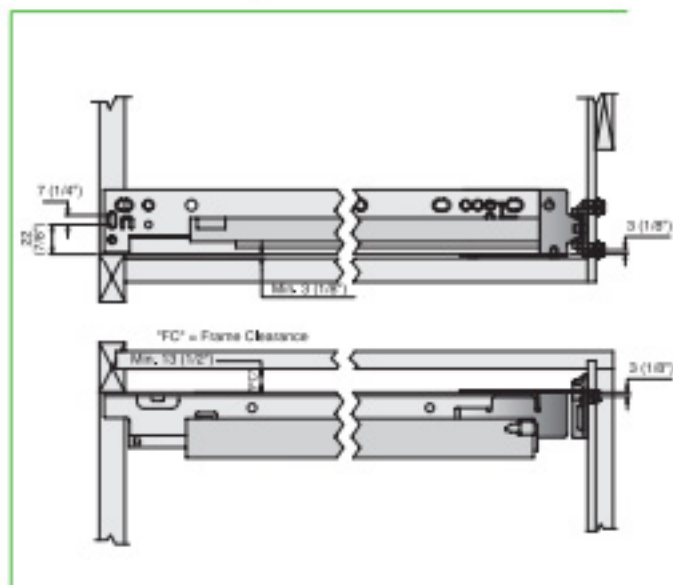
Brackets

Grass Elite Rear Mounting Brackets

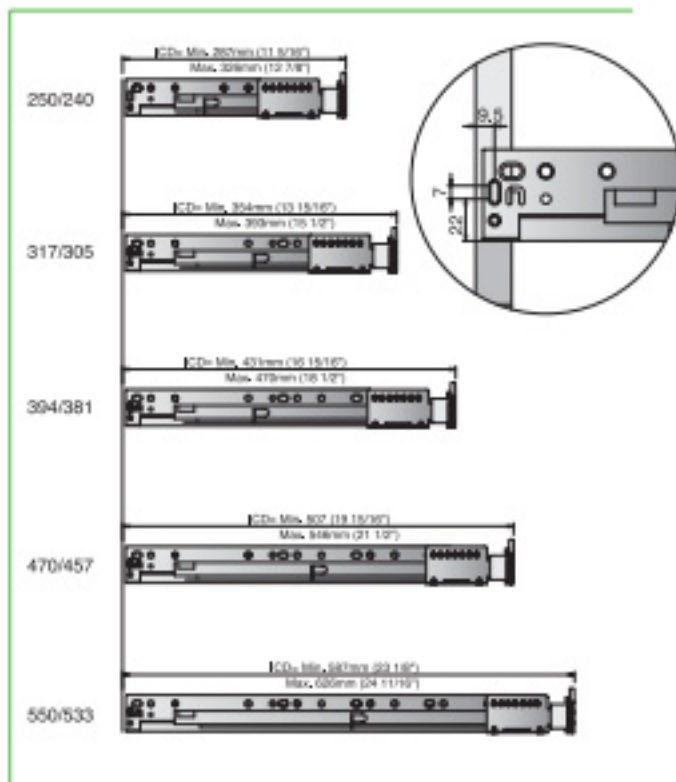
7523 Location Guide, Screw-on



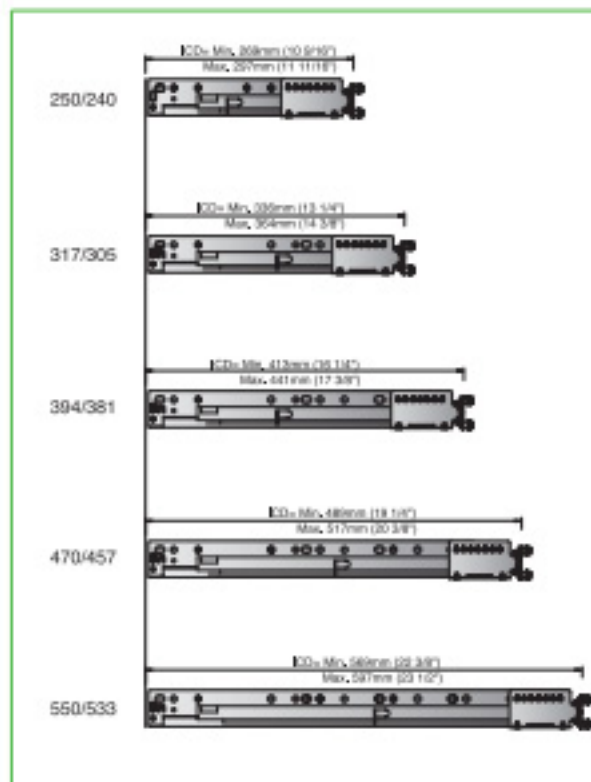
7523 Location Guide, Dowelled



Cabinet Member Fastening Positions, Screw-on



Cabinet Member Fastening Positions, Dowelled





**WILLIAMSBURG BUTCHER BLOCK CO. 1 1/2" X 25" X 8'
MAPLE BUTCHER BLOCK COUNTERTOP**

Location: Kitchen

Dimensions:

Width: 25"

Height: 1 1/2"

Length: 8'

Finish: Unfinished

Available: Lumber Liquidators





CLAPMAN'S BEES WAX SALAD BOWL FINISH

Location: Kitchen Butcher Block
Finish: Beeswax/ Carnauba/ Mineral Oil

About our Beeswax Salad Bowl Finish:



Our edible Beeswax /Carnauba/Mineral oil finish is suitable for all things wooden in the kitchen. The finish protects the wood and gives it a soft lustrous shine. It is suitable for salad bowls, butcher blocks, cutting boards, wooden spoons, kitchen counter tops- both wood and stone, and also children's wooden toys and cribs.

Apply the finish thinly with your hand, cloth or paper towel. It may take some time to dry depending on the temperature and humidity of your home or workshop, but the piece can be used immediately. When dry, buff to a light shine and ENJOY. Re-apply when the piece looks dry.

For answers to frequently asked questions about this product please see our [FAQ page](#) .

Available prices and sizes

2oz: \$8.65 | 8oz: \$20.25 | 40oz: \$74.20



TRIBEKA SHOWER CURTAIN

Model: 08187

Location: Bathroom

Dimensions:

Width: 72"

Height: 72"

Available: Home Decoraters Collection

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Design trends. Special offers.

HOME DECORATORS COLLECTION

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Tribeka Shower Curtain

Transform Your Bathroom with the Tribeka Shower Curtain.

Item # 08187

Overall Rating **★★★★★ (2)** [Read all reviews](#)
5 out of 5 [Write a review](#)

Share this Product: [f](#) [g+](#) [t](#) [G](#)

Product Description

This shower curtain is the definition of urban chic thanks to a graphic and monochromatic embroidered band detail at the bottom of the curtain. Add this stunning touch to your Tribeka Bath Collection. Order yours today.

- 100% cotton.
- Quality crafted.



Size **72"Hx72"W**

Color **White/stone**

Price **\$45**

Shipping **Standard \$8**

Stock Status **Available**

Quantity:

[ADD TO CART](#)

[Add To Wish List](#) | [Email](#) | [Print](#)

May We Also Suggest



Roma Shower Curtain
\$55



Hotel Collection Shower Curtain
\$55

★★★★★



Parisian Shower Curtain
\$45

[Product Details](#)

[Shipping Information](#)

[Customer Reviews](#)

[Low Price Guarantee](#)

- 72"H x 72"W.
- Cotton.
- The digital images on our website are as accurate as possible. However, different monitors may cause colors to vary slightly.



DIGNITET SHOWER CURTAIN WIRE

Model Number: 600.752.95

Dimensions:

Length: 196 3/4"

Finish: Stainless Steel

Max Load Capacity: 11 lbs.

Available: IKEA



DIGNITET

Curtain wire, stainless steel

\$12.99

Article Number: 600.752.95

Complete set with hardware and curtain wire; ready to mount to wall or ceiling.

[Read more](#)

Size
197"

[Save to list](#)

Sorry, this product is not for sale on our website, check if it is available in your local store.

Complementary Products



[View all complementary products](#)

Buy at your local store

Store selection may vary and prices may differ from those online.

Complementary Products

Product information



DIGNITET
Curtain wire
\$12.99

Product dimensions

Length: 196 3/4"
Max. load: 11 lb

Length: 500 cm
Max. load: 5 kg

This product requires assembly

Documents

Downloads for this product:
[Assembly instructions](#)

Key features

- Complete set with hardware and curtain wire; ready to mount to wall or ceiling.
- Fixture with adjustable angle for more flexible use.
- Can be easily cut to the desired length.

Designer:

IKEA of Sweden

Package measurements and weight

Packages: 1
Article Number: 600.752.95
Width: 6 7/8"
Height: 3/4"
Length: 6 7/8"
Weight: 1lb
Quantity: 1

Article Number: 600.752.95
Width: 18 cm
Height: 2 cm
Length: 18 cm
Weight: 0.4 kg
Quantity: 1

Good to know

Includes: 1 curtain wire and 2 fixtures.
For stability you need to use extra support fixtures for curtain wires longer than 55".
Up to 110", 1 extra fitting; up to 165", 2 extra fittings, up to 197", 3 extra fittings.
Different wall/ceiling materials require different types of fasteners. Use fasteners suitable for the wall/ceiling in your home (not included).

Care instructions

Vacuum clean.
Wipe clean with a dry cloth.

Product description

Stainless steel

Assembly instructions

[Downloads](#)

Services

[Home furnishing advice](#)



BOOKSEAT

Location: Auxiliary Bedroom
Dimensions: 36 3/4" x 26 3/4"
Finish: White
Available: Resource Furniture



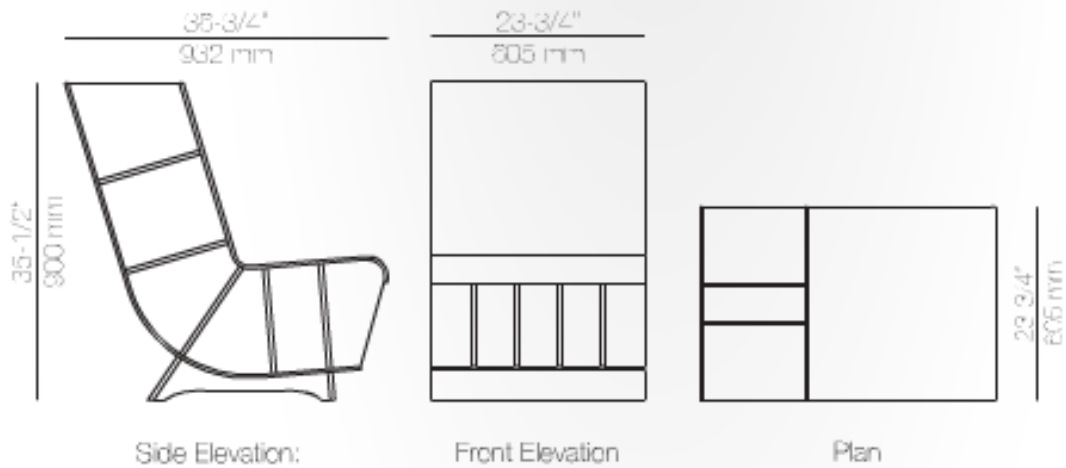
Bookseat

Overall Dimensions:

w. 23-3/4" x l. 36-3/4" x h. 35-1/2"

Weight:

55lbs. (23kg)



The Bookseat is a simple bookcase that playfully curves and becomes a seat.

Available with a felt cushion (20% recycled content) in customizable colors and limited edition leather.



CUBISTA OTTOMAN

Location: Living Room
Dimensions: 20" x 20" x 20"
Finish: Soft Pieno Fiore
Available: Resource Furniture



Cubista

Ottoman/5 Stools

20" x 20" x 20" closed

Converts to 5 stools measuring 18" x 18" x 19" high

212.753.2039

RESOURCE FURNITURE



SPACE. REINVENTED.

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POCKET CHAIR

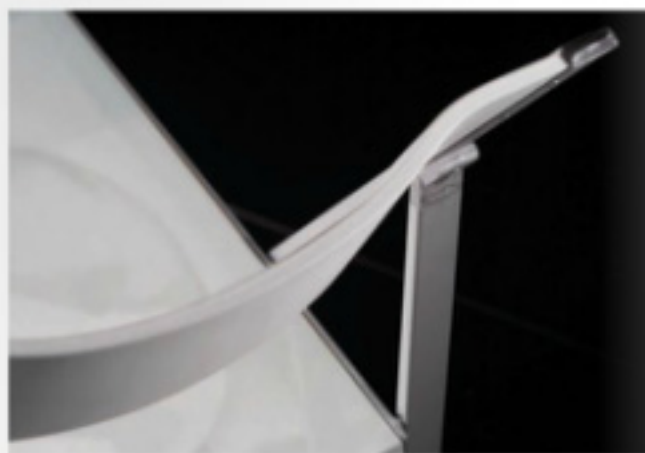
Location: Dining Room

Dimensions: 18.5" x 17.75" x 30.5"

Available: Resource Furniture

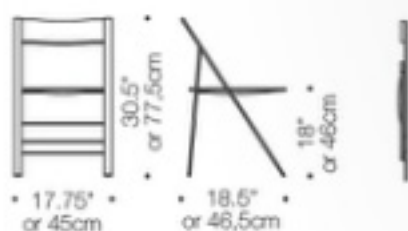


Pocket
Folding Dining Chairs



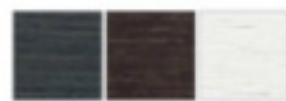
S209 POCKET

SEDIA/ CHAIR/ STUHL/
CHAISE/ SILLA/ ЧУЛ



SEDILE E SCHIENALE/ SEAT AND BACK

LEGNO/ WOOD



PZ80 PZ99 PZ61

LACCATO LUCIDO/
HIGH GLOSS LACQUERED



LL61

STRUTTURA/ STRUCTURE

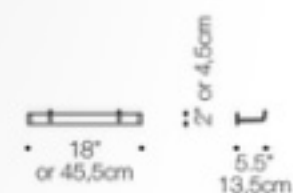
METALLO/ METAL



MT93 MT92

S210 POCKET GANCIO

GANCIO/ HANGER/ HAKEN/
CROCHET/ GANCHO/ КРЮЧОК



STRUTTURA/ STRUCTURE

METALLO/ METAL



MT93

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NEW TABLE CONCEPT

Location: Auxilary Bedroom
Dimensions: 19.75" x 27.5" x 1.25"
Color: White
Available: Resource Furniture



Dimensions:

cm 50x50x3	19.75"x19.75"x1.25"
cm 50x60x3	19.75"x23.75"x1.25"
cm 50x70x3	19.75"x27.5"x1.25"
cm 50x80x3	19.75"x31.5"x1.25"
cm 50x100x3	19.75"x39.5"x1.25"
cm 50x120x3	19.75"x47.25"x1.25"
cm 65x50x3	25.5"x19.75"x1.25"
cm 65x60x3	25.5"x23.75"x1.25"
cm 65x70x3	25.5"x27.5"x1.25"
cm 65x80x3	25.5"x31.5"x1.25"
cm 65x100x3	25.5"x39.5"x1.25"
cm 65x120x3	25.5"x47.25"x1.25"

Custom sizes available.

Wide range of finishes in either laminate or high gloss lacquer.



GOLIATH TABLE

Location: Office/ Living Room

Dimensions: 17"-115"

Color: White

Available: Resource Furniture



Goliath
Console/Dining Table
Extends from 17" to 115"

RESOURCE FURNITURE



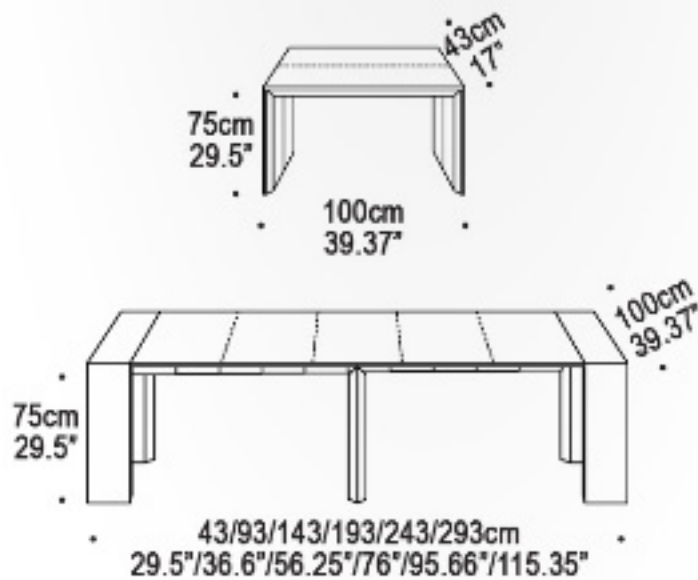
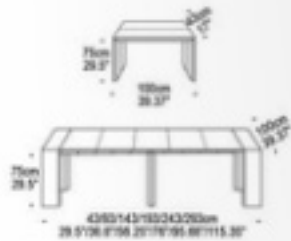
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F261 F299 F280



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SPINDLE LIVING ROOM SEATING

Location: Dining Room
Dimensions: 32" x 80" x 32"
Fabric Color: Plum
Available: Pompanoosuc Mills

SPINDLE LIVING ROOM SEATING

7 configurations from \$1,620.00



Spindle couch & armchair in solid birch shown with Chelsea bowfront.

SPINDLE LIVING ROOM SEATING

Couch (32h x 80w x 32d)

1. select size

2. select options

3. price as configured

choose wood [about our wood...](#)



ash

(\$3,190.00)



birch

(\$3,510.00)



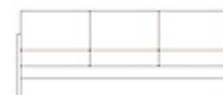
oak

(\$3,510.00)



maple

(\$3,635.00)



Couch

32h x 80w x 32d

starting at \$3,190.00

calculate price



cherry

(\$3,795.00)



walnut

(\$3,990.00)



bird's eye maple

(\$6,380.00)



BENSON CHAIR

Location: Living Room

Finish: Walnut Frame with Cream Leather



VERMONT FARM TABLE

Location: Dining Room

Dimensions:

Width: 36"

Height: 70"

Depth: 30"

Finish: Walnut Top with Steel Legs

Available: Vermont Farm Table



PIANCA TV SYSTEM

Location: Living Room

Color: White

Dimensions:

From the Floor to bottom edge: 32 1/2"

To center of the outlet from floor: 42 1/2"

Length: 78 3/4"

Left Side: 34"

Right Side: 35 1/2"

Available: Resource Furniture





COPLEY QUEEN PLATFORM STORAGE BED

Location: Master Bedroom

Dimensions:

Depth: 80.5

Width: 61.75"

Height: 9"

Finish: Natural Maple

Available: South Shore Central

Price: \$214.23



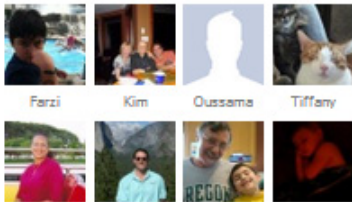
roll on to zoom in [view larger](#)



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+	 \$399.00	+	 \$68.97	+	 \$178.99
+	 \$141.93	+	 \$91.99	+	 \$90.96

1 [Beds](#) Included

1 items selected total price: **\$214.23**
✔ In Stock! ~~\$285.00~~

[seen this item for less?](#) [add to cart](#)

No Interest if paid in full in 6 Months On orders over \$250. See Terms Subject to credit approval.

Shipping: Small Parcel - FREE!

Shipping Time: Ships between 2 and 3 days, estimated between Tue Dec 04 and Wed Dec 05

Details: 9" H x 80.5" W x 61.75" D 142 lbs

item number: 56745 | phone code: C958-7809 |
> Furniture > Bedroom Furniture > Beds

★★★★☆ [write a review](#) | [read reviews](#)

15 14

This sleek Copley storage platform bed with its neutral Natural Maple finish gives your bedroom a light, fresh feeling. Boasting contemporary modern lines and the beauty of simplicity, you can barely believe this bed offers so many features! The two spacious convenient drawers use SmartGlide technology, enabling them to open and close both gently and effortlessly. With the additional child-friendly safety catches, little fingers won't be caught unawares. The most unique aspect of this platform bed is that it allows you to use the mattress you already have, be it Twin, Full or Queen!

Need a headboard or other matching bedroom furniture? This platform bed has an optional matching headboard and optional matching bedroom pieces that you can add on to your purchase to get that complete bedroom look at an incredible value.

Features:

- ◊ Accommodates a Twin, Full or Queen size mattress
- ◊ Neutral Natural Maple finish
- ◊ Modern Contemporary Style
- ◊ 2 large drawers, one on each side, feature metal full extensions and use SmartGlide technology.
- ◊ SmartGlide technology has a lifetime warranty.
- ◊ Manufactured from strong and sturdy engineered-wood products
- ◊ Constructed of CARB compliant materials
- ◊ 5-year warranty
- ◊ Mattress and Linens not included
- ◊ Assembly required

Specifications:

- ◊ Dimensions: 9" H x 61.75" W x 80.5" D
- ◊ Drawer Dimensions: 30" W x 19" H

What is SmartGlide Technology?

This reliable new technology features a lifetime warranty and peace of mind. With features such as a rubber-mechanism that enables the drawers to close softly and safety catches that are child friendly. Thus continuing South Shore's commitment to offering superb technology and customer service.



SHILOH KIDS TWIN MATES STORAGE BED

Location: Auxiliary Bedroom

Dimensions:

Width: 41"

Depth: 76.5"

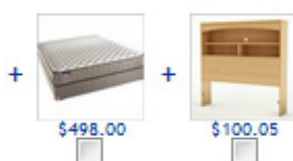
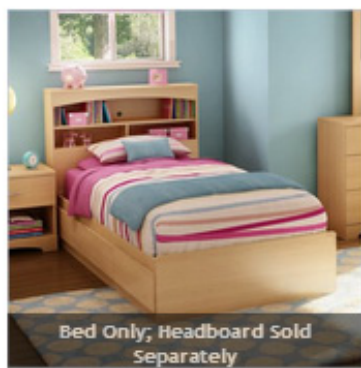
Height: 13.75"

Finish: Natural Maple

Available: South Shore Central

Price: \$194.57

Shiloh Kids Twin Mates Storage Bed Frame Only in Natural Maple Finish by South Shore [Product Size & Specification](#)



1 Beds Included

1 items selected total price: **\$194.57**

In Stock! ~~\$283.00~~

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No Interest if paid in full in 6 Months [BillMeLater](#) On orders over \$250. See Terms Subject to credit approval.

[roll on to zoom in](#) [view larger](#)



Shipping: Small Parcel - FREE!

Shipping Time: Ships between 2 and 3 days, estimated between Tue Dec 04 and Wed Dec 05

Details: 13.75" H x 41" W x 76.5" D 124 lbs

item number: 213824 | phone code: C958-7809 |

[> Furniture > Bedroom Furniture > Beds](#)

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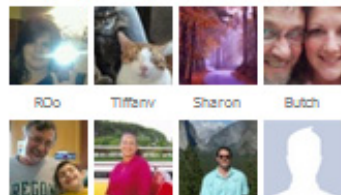
1



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The Shiloh Mates Bed is constructed from laminated engineered wood in a natural maple finish. This kids Twin size mates bed features three storage drawers to provide ample storage and encourages your child to stay organized. It has a stylish, cozy design and does not require a box spring. Combine this mates bed with the Shiloh Bookcase Headboard for a more storage options. With a simple, yet functional design the Shiloh Mates Bed will be the ideal central fixture in your child's bedroom.

The contemporary style of the Shiloh collection from South Shore Furniture provides a calming and pleasing atmosphere to any kid's bedroom. It features simple, clean modern lines for a streamlined look and feel. The natural maple finish offers a stimulating lift to any room design, making the South Shore Furniture Shiloh collection a peaceful haven your child will enjoy for many years.

Features:

- ◊ Kids Mates Bed made of laminate engineered wood
- ◊ Natural Maple finish
- ◊ Twin size
- ◊ Perfect for boys and girls
- ◊ Three practical storage drawers
- ◊ Smart Glide drawer slides feature stops and built-in dampers
- ◊ Box spring not required
- ◊ Contemporary style
- ◊ Certified Environmentally Preferred Product
- ◊ ISTA 3A-certified item packaging
- ◊ Made in Canada
- ◊ Constructed of CARB compliant materials
- ◊ Ready to assemble
- ◊ Manufacturer 5-year limited warranty

Specifications:

- ◊ Overall Dimensions: 41"W x 13.75"H x 76.5"D
- ◊ Shipping Carton Dimensions: 5.5" H x 87" W x 21" D
- ◊ Weight: 124 lbs

Recommended Care:

- ◊ Never let liquids or damp cloths sit on this furniture
- ◊ Do not put plastic or rubber rings under appliances
- ◊ Use cloth of felt protectors
- ◊ To avoid dulling of the finish, do not place furniture in direct sunlight



MID-CENTURY NIGHTSTAND

Location: Master Bedroom

Dimensions:

Width: 18"

Depth: 15"

Height: 24"

Available: West Elm

 **30% Off Select Dining Furniture**
flash sale ends 2.11

 **20% Off Accent Tables**
limited time only

 **20% Off Lighting**
hurry..ends soon

 **20% Off Window Panels**
limited time only

SALE **Up To 70% Off Markdowns**
shop before they're gone

Home > Furniture > Dressers + Nightstands > Mid-Century Nightstand

« PREVIOUS 32 of 77 N



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MID-CENTURY NIGHTSTAND

\$249.00

OVERVIEW DIMENSIONS & CARE SHIPPING INFO

DETAILED SPECIFICATIONS

- Overall product dimensions: 18"w x 15"d x 24"h.
- Drawer dimensions: 14.9"w x 11.6"d x 2.5"h.

PACKAGING

- Number of boxes: 1.
- Shipping package: 22.25"w x 19.25"d x 18"h.
- Package weight: 40 lbs.

ASSEMBLY INSTRUCTIONS

Assembly required. [View assembly instructions.](#)

CARE

Wipe clean with a soft, dry cloth. To protect finish, avoid the use of chemicals or household cleaners. Hardware may loosen over time. Periodically check to make sure all connections are tight.

 View Larger

Roll Over Image to Zoom

 PRODUCT VIDEO





3/4" x 4' x 8' MARINE GRADE PLYWOOD

Model Number: 1251600

Dimensions:

Thickness: 24/32"

Width: 4'

Length: 8'

Location: Bathroom

Available: Menard's

Departments ▾

Search All ▾

Enter SKU, Model # or Keyword



Weekly Ad

Home » Building Materials » Panel Products » Plywood



3/4" x 4' x 8' Marine Grade Plywood

Model Number: 1251600 | Menards® SKU: 1251600

Enter Your ZIP Code for Local Price & Status

Online Availability

Not Available Online

Store Availability

Enter Your ZIP Code for Local Price & Status

Click image for a larger view.
Hover to zoom in.



Earn an annual rebate on all Menards purchases, or take advantage of special financing offers when you use your BIG CARD. [Learn More >](#)

- 2% Year End Rebate
- 6 Month Special Financing on Purchases Over \$299 ⓘ

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Product Description

Roseburg's AB Marine Panel is a marine-grade plywood that is produced entirely of Group 1 species of veneer.

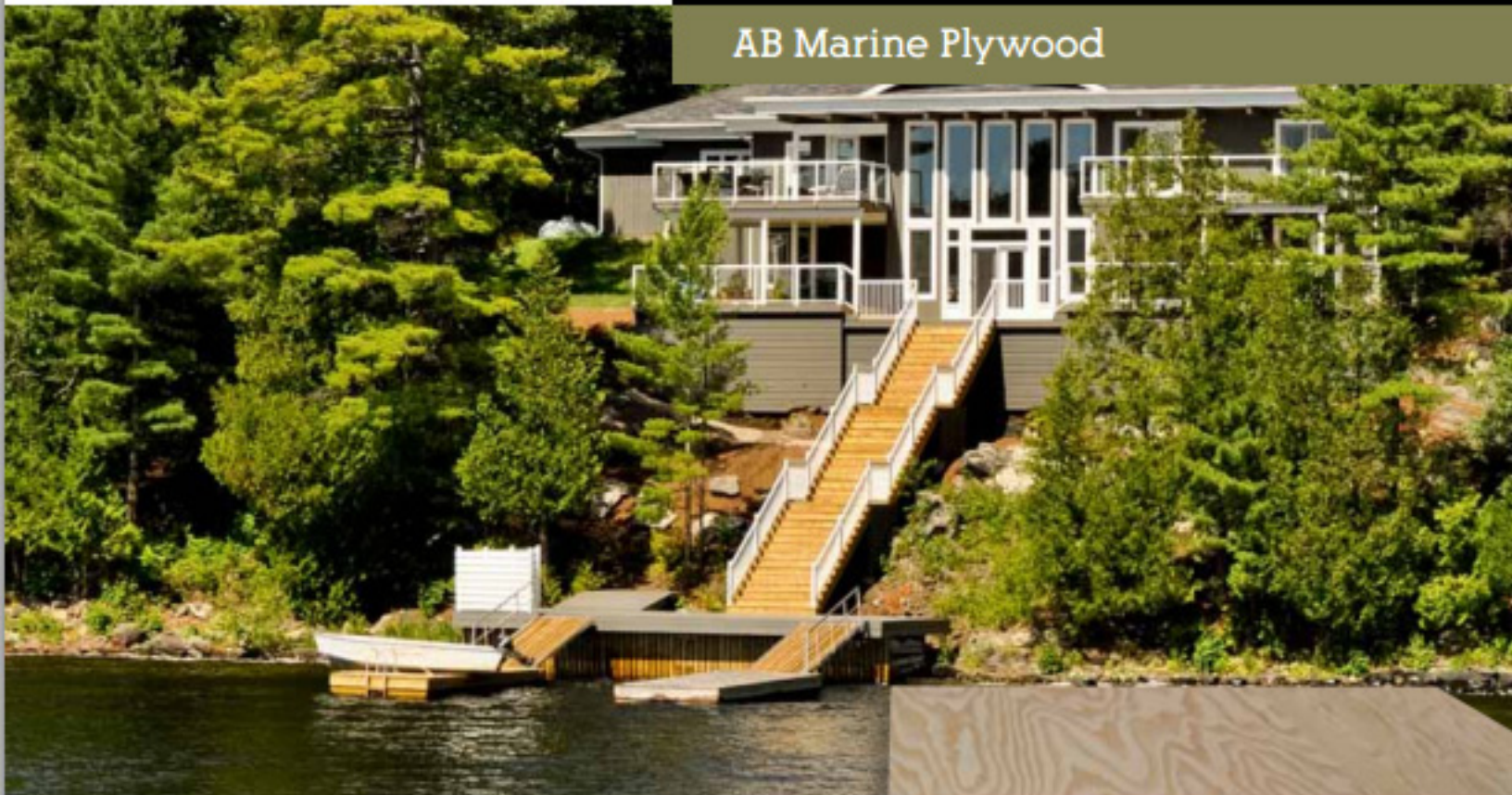
- 24/32" Actual Thickness
- 7 ply
- The panel is sanded on both faces
- Its exposure durability rating is EXTERIOR and the glue used is a water resistant structural adhesive
- It is considered a premium panel grade for use in situations where these characteristics are required
- Additional packaging and handling charges may be required

Dimensions: 3/4" x 4' x 8'

Vendor: Roseburg



AB Marine Plywood



The Most Versatile Plywood Panel

Roseburg AB Marine plywood is an Industrial Grade panel that is perfect for use in greater moisture applications requiring a high quality face and back that is factory sanded and ready to further finish. It is built to Roseburg and APA – The Engineered Wood Association’s industrial grade plywood standards for greater strength, durability and stiffness than standard plywood.

Environmental Stewardship

- Available FSC certified
- California CARB exempt
- NAUF (No added urea formaldehyde)
- Can contribute to achieving LEED credits
- Adhesive NAUF exterior, fully water resistant phenolic glue



Decorative | Construction | Industrial
WOOD PRODUCTS





Overview

Roseburg AB Marine Plywood is an APA – The Engineered Wood Association PS 1 panel with an exterior exposure 1 rating. It is manufactured with a fully water resistant bonding adhesive and is designed for applications where high moisture conditions may be encountered during service.

Applications

- Storage Shelving cabinets
- Garage & carport shelving cabinets
- Home projects
- Commercial projects
- Countertop underlayment
- Furniture
- Cabinets
- Wooden toys
- Playhouses
- Platform for bed frame
- Overlay applications
- Outdoor signs
- Boat building
- Docks
- Fish house
- Boat house

Key Advantages

- Pre-sanded and paintable
- End Stamp: AB-EXT-PS 1-Marine-PTL-#
- No open defects on face
- Fully water resistant adhesive
- Minimal core gaps
- Dimensionally stable

Certifications

- APA – The Engineered Wood Association
- PS 1

Storage

Since Roseburg AB Marine is sanded, it is important to keep the material dry prior to use. Storage in a warehouse or under roof is recommended. If stored outdoors, units should be off the ground and covered loosely with some type of protective material.

Machining and Fastening

Roseburg Roseburg AB Marine can be sawed, routed, shaped, and drilled. Always use sharp, high-speed tools. Because of the cross-layer construction, nails, screws, and other fasteners may be placed near the panel edge without splitting the panel.

Roseburg AB Marine should be securely fastened with 6d nails on 1/4", 3/8", 1/2" panels and with 8d nails on 5/8", 3/4" and 1" panels. Space nails 6" o.c. around all panel edges and 12" o.c. on intermediate supports. For soffit applications, all panel edges should be supported. Nails should penetrate at least one inch into the substrate material. Leave 1/8" gap between panel edges. Spiral or ring shank nails offer the best holding power. Screws and bolts can also be used.

For more information visit: http://roseburg.com/products/APA_Industrial_Panel_Selection_Guide_AR.pdf

Specifications

- Lengths:** 8', 10'
Widths: 4', 5'
Thickness: 1/4", 3/8", 1/2", 5/8", 3/4", 1"
Face: A grade Douglas Fir Veneer

Core Substrate: B grade or better western softwood

Back: B grade Douglas Fir

Adhesive: NAUF exterior, fully water resistant phenolic glue

PATRIOT TIMBER PRODUCTS INTL., INC.
MATERIAL SAFETY DATA SHEET

<u>PRODUCT IDENTIFICATIONS:</u>	Hardwood Plywood (Urea-Formaldehyde Bonded)*
<u>SYNONYMS:</u>	None
<u>TRADE NAME:</u>	Meranti
<u>DESCRIPTION:</u>	This panel product contains a hardwood veneer face bonded to wood components such as other wood veneer lumber or veneer strips using urea-formaldehyde resin.
<u>POTENTIAL AIRBORNE RELEASE:</u>	The product may release small quantities of formaldehyde (CAS No. 50-00-0) in gaseous form. Emissions decrease through time as the panels age. Manual or mechanical cutting or abrasion processes performed on the product can result in generation of wood dust.
<u>PHYSICAL DATA:</u>	
Boiling Point	Not applicable
Specific Gravity (H ₂ O = 1)	< 1
Vapor Density	Not applicable
% Volatiles By Vol.	0
Melting Point	Not applicable
Vapor Pressure	Not applicable
Solubility in H ₂ O (% by wt.)	< 0.1%
Evaporation Rate (Butyl Acetate = 1)	Not applicable
pH	Not applicable
Appearance and Odor	Light to dark color. Color and odor are dependent upon wood species.
*This fact sheet is for products that have not been finished (coated, laminated, or overlaid) or treated (for example, with preservative or fire retardant).	
<u>FIRE AND EXPLOSION DATA:</u>	
Flash point	Not applicable
Autoignition Temperature	Not available (will depend upon duration of exposure to heat source and other variables)
Explosive Limits in Air	See below under "Unusual Fire and Explosion Hazards"
Extinguishing Media	Water, Carbon Dioxide, Sand
Special Fire Fighting Properties	None
Unusual Fire and Explosion Hazards	Sawing, sanding or machining can produce wood dust as a by-product which may present an explosion hazard if a dust particle contacts an ignition source. An airborne concentration of 40 grams of dust per cubic meter in air is often used as the LEL of wood dust.
<u>REACTIVITY DATA:</u>	
Conditions Contributing to Instability	Stable under normal conditions
Incompatibility	Avoid contact with oxidizing agents. Avoid open flame. Product may ignite excess of 400 degrees F.
Hazardous Decomposition Products	Thermal and/or thermal oxidative decomposition can produce irritation and toxic fumes and gases, including carbon monoxide, hydrogen cyanide, aldehydes, organic acids and polynuclear aromatic compounds.
Hazardous Polymerization	Not applicable
<u>HEALTH EFFECTS INFORMATION:</u>	
<u>Exposure Limits</u>	
Formaldehyde	OSHA PEL - TWA 0.75 ppm OSHA PEL - STEL 2 ppm ACGIH TLV - CEILING 0.3 ppm
Wood Dust (all soft and hard Woods except Western Red Cedar)	OSHA PEL - TWA 5 mg/m ³ OSHA PEL - STEL 10 mg/m ³

Eye Contact	Gaseous formaldehyde may cause temporary irritation or a burning sensation. Wood dust can cause mechanical irritation.
Skin Contact	Both formaldehyde and various species of wood dust may evoke allergic contact dermatitis in sensitized individuals.
Ingestion	Not likely to occur
Inhalation	
Gaseous Formaldehyde	<p>May cause temporary irritation to eyes, nose and throat. Some reports suggest that formaldehyde may cause respiratory sensitization, such as asthma, and that pre-existing respiratory disorders may be aggravated by exposure.</p> <p>Formaldehyde is listed by the International Agency for Research on Cancer (IARC) as a probable human carcinogen. The National Toxicology Program (NTP) includes formaldehyde in the Annual Report on Carcinogens. Formaldehyde is regulated by OSHA as a potential cancer agent.</p> <p>In studies involving rats, formaldehyde has been shown to cause nasal cancer after long-term exposure to very high concentrations (14+ ppm), far above those normally found in the workplace using this product.</p> <p>National Cancer Institute (NCI) conducted an epidemiological study of industrial workers exposed to formaldehyde (published June 1986). The NCI concluded that the data provides little evidence that mortality from cancer is associated with formaldehyde exposure at the levels experienced by workers in the study.</p>
Wood Dust	<p>May cause nasal dryness, irritation and obstruction. Coughing, wheezing, and sneezing; sinusitis and prolonged colds have also been reported.</p> <p>Depending on species, may cause respiratory sensitization and/or irritation. Prolonged exposure to wood dust has been reported by some observers to be associated with nasal cancer. Wood dust is not listed as a carcinogen by IARC, NTP, or OSHA.</p>

PRECAUTIONS, SAFE HANDLING:

Formaldehyde: Provide adequate ventilation to reduce the possible buildup of formaldehyde gas, particularly when high temperatures occur.

Wood Dust: Avoid dusty conditions and provide good ventilation.

GENERALLY APPLICABLE CONTROL MEASURES:

Ventilation	Provide adequate general and local exhaust ventilation to keep airborne contaminant concentration levels below the OSHA PELs.
Personal Protective Equipment:	Wear goggles or safety glasses when manufacturing or machining the product. Wear NIOSH/MSHA approved respirator when the allowable exposure limits may be exceeded. Other protective equipment such as gloves and outer garments may be needed depending on dust conditions.

EMERGENCY AND FIRST AID PROCEDURES:

Eyes	Flush eyes with large amounts of water. Remove to fresh air. If irritation persists, get medical attention.
Skin	Wash affected areas with soap and water. Get medical advice if a rash or persistent irritation or dermatitis occurs.
Inhalation	Remove to fresh air. Get medical advice if persistent irritation, severe coughing or breathing difficulty occurs.
Ingestion	Not applicable

Importer/Distributor

PATRIOT TIMBER PRODUCTS INTL., INC.
POST OFFICE BOX 19065
GREENSBORO, NC 27419

Effective Date

06/01/00

Superseded Date

N/A

Prepared By

STAFF

IMPORTANT: The information and data herein are believed to be accurate and have been compiled from sources believed to be reliable. It is offered for your consideration, investigation and verification. Patriot Timber Products International Inc. (PTPI) makes no warranty of any kind, express or implied, concerning the accuracy or completeness of the information and data herein. PTPI will not be liable for claims relating to any party's use of or reliance on information and data contained herein regardless of whether it is claimed that the information and data are inaccurate, incomplete or otherwise misleading. It is incumbent upon the user to obtain the most up-to-date information.



23/32" X 4' X 8' BC SANDED PINE PLYWOOD

Model Number: 166057

Dimensions:

Thickness: 0.47"

Width: 4'

Length: 8'

Species: Pine

Location: Kitchen

Available: Home Depot



23/32 in. x 4 ft. x 8 ft. BC Sanded Pine Plywood

Model # 166057 Store SKU # 166057

★★★★☆ (3) [Write a Review](#)

\$35.77 /EA-Each

[Zoom](#) [More Views](#)

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[Check Store Inventory](#)

[Product Description](#) | [Specifications](#) | [Customer Reviews](#) | [More Info](#) | [Shipping Options](#)

PRODUCT DESCRIPTION

Every piece meets the highest grading standards for strength and appearance. Sanded and smooth BC project panels are perfect for interior and exterior applications from yard art to wainscoting, do-it-yourself projects, cabinets, shelving and furniture to porch ceilings, soffits and flooring underlayment. These panels are ready to be painted. This plywood has great strength and stiffness. These boards are easy to handle and install. They also have excellent nail and adhesive holding ability.

California residents: see Proposition 65 information.

- Each piece of this lumber meets the highest quality grading standards for strength and appearance
- Sanded project panels are perfect for interior and exterior applications
- Great for yard art to wainscoting, do-it-yourself projects, cabinets, shelving and furniture to porch ceilings, soffits and flooring underlayment
- Excellent appearance when painted
- Note: Product may vary by store.
- MFG Model # : 166057
- MFG Part # : 201428

[Return To Top](#)

SPECIFICATIONS

Actual product thickness (in.)	0.47	Actual product width (in.)	47.938
Assembled Depth (in.)	0.72 in	Assembled Height (in.)	96 in
Assembled Width (in.)	48 in	Manufacturer Warranty	NONE
Plywood Type	Sanded Plywood	Portion of product made from wood (%)	100
Pressure Treated	No	Product Length (ft.)	96 ft
Tounge & Groove	No		



PIONEER/TAILGATE CABLE

Model Number: CA-2310
Location: Office Wall Desk
Length: 15.5"
Available: Autozone



ELMER'S 16 OZ. CARPENTER'S WOOD GLUE

Model Number: E7020
Location: Office Wall
Available: Home Depot



Elmer's 16 oz. Carpenter's Wood Glue

Team
ersity

Model # E7020 Store SKU # 801216

★★★★★ [Write The First Review](#) | [Ask a Question](#)

\$4.68 /EA-Each

Zoom More Views

Store Only

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[Product Description](#) | [Specifications](#) | [Customer Reviews](#) | [More Info](#) | [Shipping Options](#)

PRODUCT DESCRIPTION

Elmer's Wood Glues have been a familiar sight in workshops and homes for over fifty years. With its new and improved formula it is better than ever. It is sandable and paintable. Easy clean up with soap and water.

- Sets fast and bonds strong
- New and improved formula is ANSI Type 1 waterproof
- Sandable and paintable
- Easy cleanup with soap and water
- MFG Brand Name : Elmer's
- MFG Model # : E7020
- MFG Part # : E7020

[Return To Top](#)

SPECIFICATIONS

Adhesion level	Medium	Adhesive Product Type	Glue/Epoxy
Assembled Depth (In.)	9.25 In	Assembled Height (In.)	1.8 In
Assembled Width (In.)	3.58 In	Curing time (hours)	12
Dries clear	Yes	Drillable	Yes
Glue/epoxy type	Wood glue	Indoor/Outdoor	Indoor
Manufacturer Warranty	None	Moisture Resistant	Yes
Product Depth (In.)	3.58	Product Height (In.)	9.250
Product Width (In.)	1.8	Recommended surfaces	Coated wood,Painted wood,Woodwork
Sandable	Yes	Solvent resistant	No
UV/sunlight resistant	No		



Material Safety Data Sheet

E

1. Chemical Product and Company Identification

DESCRIPTION: ELMER'S CARPENTERS WOOD GLUE
PRODUCT TYPE: PVAC BASED ADHESIVE
APPLICATION: FOR PRODUCT CODES SEE SECTION 16

- **Manufacturer/Supplier Information**

MSDS Prepared by:
Elmer's Products, Inc.
1 Easton Oval
Columbus, OH 43219
For additional health, safety or regulatory information, call 1-888-435-6377
Call 1-800-848-9400 to place an order or request additional MSDSs.

Emergency Phone Number
Poison Control Center
1-888-516-2502

2. Composition, Information on Ingredients

No hazardous ingredients known to company.

3. Hazards Identification

3.1 Emergency Overview

Appearance: Light yellow liquid
Odor: Mild acetic aroma
Not an immediate health hazard.

- **HMIS Rating**

HEALTH = 0 (minimal)
FLAMMABILITY = 0 (minimal)
REACTIVITY = 0 (minimal)

3.2 Potential Health Effects

- **Immediate Hazards**

INGESTION: No hazards known to company.
INHALATION: No hazards known to company.
SKIN: No hazards known to company.
EYES: No hazards known to company.

- **Delayed Hazards**

None of the components present in this product at concentrations equal to or greater than 0.1% have been listed by NTP, classified by IARC, nor regulated by OSHA as a carcinogen.

4. First Aid Measures

INGESTION: If accidentally swallowed, dilute by drinking large quantities of water. Immediately contact poison control center or hospital emergency room for any other additional treatment directions.
EYES: Immediately flush eyes with plenty of water. Call a physician if irritation persists.

5. Fire Fighting Measures

Autoignition Temperature Not available
Upper/Lower Flammable Limits Not applicable
Up/Lower Explosive Limits, % by Vol Not applicable
Flash Point Not applicable
Will not burn unless water has evaporated. Dried material may burn.
In case of fire, water should be used to keep fire-exposed containers cool.

6. Accidental Release Measures

Soak up with absorbent material and remove to a chemical disposal area. Prevent entry into natural bodies of water.

7. Handling and Storage

7.1 Handling

Handle in accordance with good industrial hygiene and safety practices.

7.2 Storage

Keep from freezing.
Store in a cool, dry place.
Keep containers tightly closed.

8. Exposure Controls/Personal Protection

8.1 Exposure Controls

No special control measures necessary under normal conditions of use.

8.2 Personal Protection

No special protection necessary.

8.3 Exposure Guidelines

None established

9. Physical and Chemical Properties

Percent Volatiles	54.5
pH @ 25 C	5.0
Specific Gravity	1.08
Appearance	Light yellow liquid
Autoignition Temperature	Not available
Boiling Point	100°C (212°F)

Vapor Density (Air=1)	<1
Vapor Pressure, mm Hg @ 20 C	17.5
Evaporation Rate (Butyl Acetate=1)	<1
Upper/Lower Flammable Limits	Not applicable
Up/Lower Explosive Limits, % by Vol	Not applicable
Flash Point	Not applicable
Freezing Point	0°C (32°F)
Odor	Mild acetic aroma
Odor Threshold, ppm	Not available
Solubility in Water	Dispersible
Coefficient of Water/Oil Distrib.	Not available

10. Stability and Reactivity

Normally stable as defined in NFPA 704-12(4-3.1).

- **Incompatibilities:**

Strong acids and alkaline materials.

- **Decomposition products may include:**

CO, CO₂.

- **Hazardous polymerization:**

Will not occur.

- **Other Hazards:**

None known to company.

11. Toxicological Information

INGESTION:	A similar product was found to be non-toxic orally when tested as described in 16 CFR Part 1500.3(c)(1) and (2).
INHALATION:	A similar product was found to be non-toxic by inhalation when tested as described in 16 CFR Part 1500.3 (c)(1) and (2).
SKIN ABSORPTION:	A similar product was found to be non-toxic dermally when tested as described in 16 CFR Part 1500.3 (c)(1) and (2).
SKIN:	A similar product was not an irritant when tested as described in 16 CFR Part 1500.41.

EYES: A similar product was not an irritant when tested as described in 16 CFR Part 1500.42.

12. Ecological Information

Not determined.

13. Disposal Considerations

Recover free liquid. Absorb residue and dispose of according to local, state/provincial, and federal requirements.

14. Transport Information

14.1 U.S. Department of Transportation (DOT)

The data provided in this section is for information only and may not be specific to your package size. You will need to apply the appropriate regulations to properly classify your shipment for transportation.
Non-Regulated.

14.2 Canadian Transportation of Dangerous Goods (TDG)

Non-Regulated.

15. Regulatory Information (Selected Regulations)

15.1 U.S. Federal Regulations

- **OSHA Hazard Communication Standard 29CFR1910.1200**

This material is not a "health hazard" or a "physical hazard" as determined when reviewed according to the requirements of the Occupational Safety and Health Administration 29 CFR Part 1910.1200

"Hazard Communication" Standard.

- **SARA Title III: Section 311/312**

Does not meet any hazard category

- **SARA Title III Section 313 and 40 CFR Part 372**

This product contains the following toxic chemical(s) subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986, and Subpart C-Supplier Notification Requirement of 40 CFR Part 372.

None required per SARA TITLE III SECTION 313.

- **TSCA Section 8(b) Inventory**

All reportable chemical substances are listed on the TSCA Inventory. We rely on certifications of compliance from our suppliers for chemical substances not manufactured by us.

15.2 Canadian Regulations

- **Workplace Hazardous Materials Information System (WHMIS)**

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulation (CPR) and the MSDS contains all the information required by the CPR.

Not a controlled product

- **Canadian Environmental Protection Act (CEPA)**

All reportable chemical substances are listed on the Domestic Substances List (DSL) or otherwise comply with CEPA new substance notification requirements.

- **National Pollutant Release Inventory (NPRI)**

This product contains the following chemical(s) subject to the reporting requirements of the Canadian Environmental Protection Act (CEPA) subsection 16(1), National Pollutant Release Inventory.

None required.

16. Other Information

AP (Non-Toxic): Products bearing the AP (Non-Toxic) Product Seal of The Art & Creative Materials Institute, Inc. (ACMI) are certified in a program of toxicological evaluation by a medical expert to contain no materials in sufficient quantities to be toxic or injurious to humans or to cause acute or chronic health problems. This program is reviewed by ACMI's Toxicological Advisory Board. These products are certified by ACMI to be labeled in accordance with the chronic hazard labeling standard, ASTM D-4236 and Federal Law, P.L. 100-695. In addition, there is no physical hazard as defined within 29 CFR Part 1910.1200 (c).

MSDS covers items:

U.S.: E614, E700, E701, E702, E704, E705, E706, E970, E980,
E1367, E1825, E1850, E7000, E7010, E7020, E7040, E7050
Canada: 60613, 60614, 60615, 60616, 60617, 60618, 60619, 61367

- **User's Responsibility**

The OSHA Hazard Communication Standard 29CFR 1910.1200 and the Workplace Hazardous Materials Information System (WHMIS) require that the information contained on these sheets be made available to your workers. Educate and train your workers regarding OSHA and WHMIS precautions. Instruct your workers to handle this product properly. Consult with appropriate experts to guard against hazards associated with use of this product and its ingredients.

- **Disclaimer**

SELLER MAKES NO WARRANTY, EXPRESS OR IMPLIED, CONCERNING THE PRODUCT OR THE MERCHANTABILITY OR FITNESS THEREOF FOR ANY PURPOSE, except that the product shall conform to contracted specifications, and that the product does not infringe any valid United States or Canadian patent. No claim of any kind shall be greater in amount than the purchase price of the quantity of product in respect of which damages are claimed. In no event shall Seller be liable for incidental or consequential damages, whether Buyer's claim is based on contract, breach of warranty, negligence or otherwise.

CURRENT ISSUE: 30-JUN-10
PREVIOUS ISSUE: 04-MAR-09



AMEROCK BP19018SS STAINLESS STEEL PULL

Model Number: BP19018SS

Location: Kitchen

Dimensions:

Center to Center: 25.2"

Width: 0.469"

Length: 28.3"

Metal: Stainless Steel

Available: Knobs and Hardware

Special Offers and Discounts by email:

FREE SHIPPING
when you spend \$29.99

International Shipping
available through BONGO

No Hassle Returns
every day.

Low Price Guarantee

Volume Pricing Available

Daily Deals - A New Deal Every Day

Commercial Hardware

Home > Knobs And Hardware > Cabinet Hardware > Cabinet Pulls > Amerock BP1901 Stainless Steel Pull

Images

Videos



2993054S

Amerock BP19018SS Stainless Steel Pull

Part of the [Stainless Steel Collection](#) by Amerock

★★★★★ 20 Customer Reviews

List Price: ~~\$74.34~~ [Low Price Guarantee](#)

Price: **\$23.79**

In Stock

You Save **\$50.55**

You Earn **24 Reward Points**

[Ships Feb 12th - Feb 14th](#)

Finish

Stainless Steel

Hole Spacing

25.197"/640mm

Quantity

1

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[Return Policy](#)



1 - 7 of 18

Dimensions & Weights

Center to Center	25.2 inches
Length	28.346 inches
Projection	1.375 inches
Width	0.469 inches

Overview

Modern functionality meets straightforward styling. Simple. Bold. True.

Materials Stainless Steel

Compare Our Price

[Have you seen this item for less?](#)

Recommended For You



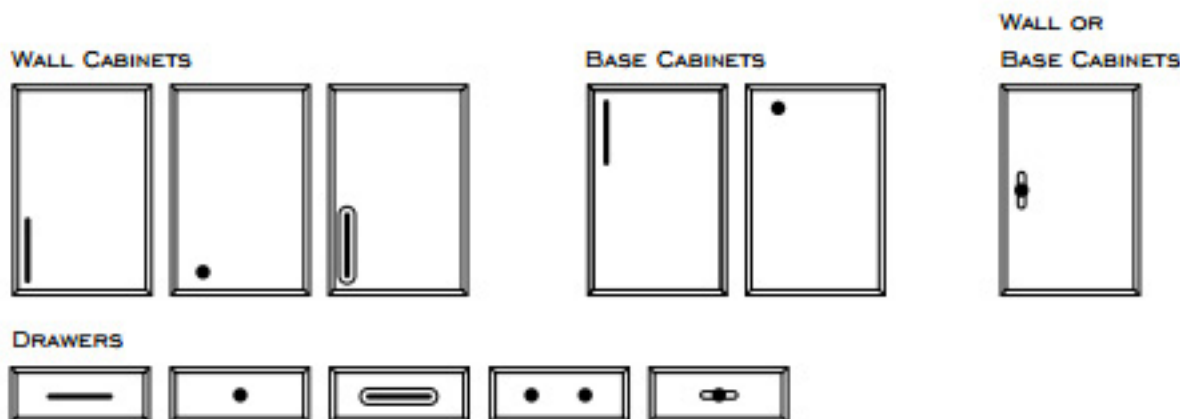
Notting Hill NHK-164-A
\$19.20
★★★★★



INSTALLING NEW CABINET HARDWARE

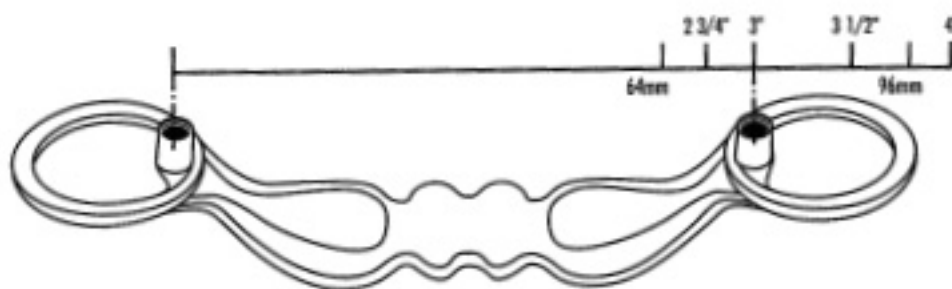
Step 1. Location of Cabinet Hardware

While there are no hard, fast rules for placement of a knob or pull on a cabinet door, most cabinet makers will locate them approximately 3"-4" above the upper non-hinged corner on base cabinets, or the lower non-hinged corner on wall cabinets. However, the decision is yours to make!



Step 2. Mounting Cabinet Hardware

When drilling for a knob or pull, a 3/16" hole is recommended for most styles. The exception is pulls that have "studs". A stud is simply an extension of the molded screw holes. If a pull has a stud, then a 1/4" hole is required with studs sitting securely in the wood.



IMPORTANT Screw Information

Amerock® includes 8-32 x 1" long machine screws with most knobs and pulls because the typical cabinet door or drawer front is 3/4" thick. This screw length should work in most applications. However, if your cabinet doors or drawer fronts are thicker than 3/4", then you will need to use longer screws for mounting. Check the thickness of both a cabinet door and a drawer front in your kitchen, as the thickness dimensions may not be the same. In general, the screw length(s) used should be 1/4" longer than the thickness of your cabinet door or drawer front material. It is not uncommon for some drawers to be constructed with a 3/4" thick front attached to a 3/4" thick drawer box. In this situation, the total drawer thickness is 1-1/2", making a 1-3/4" long screw necessary for mounting. These screws may be purchased from any hardware store. Please note that select hardware sold by Amerock may include metric screws instead of UNC screws.

A. MOUNTING PULLS

Sizes Available

Pulls can be obtained in U.S. measurements as well as metric. Amerock offers a broad range of sizes to choose from.

How to Choose the Right Size

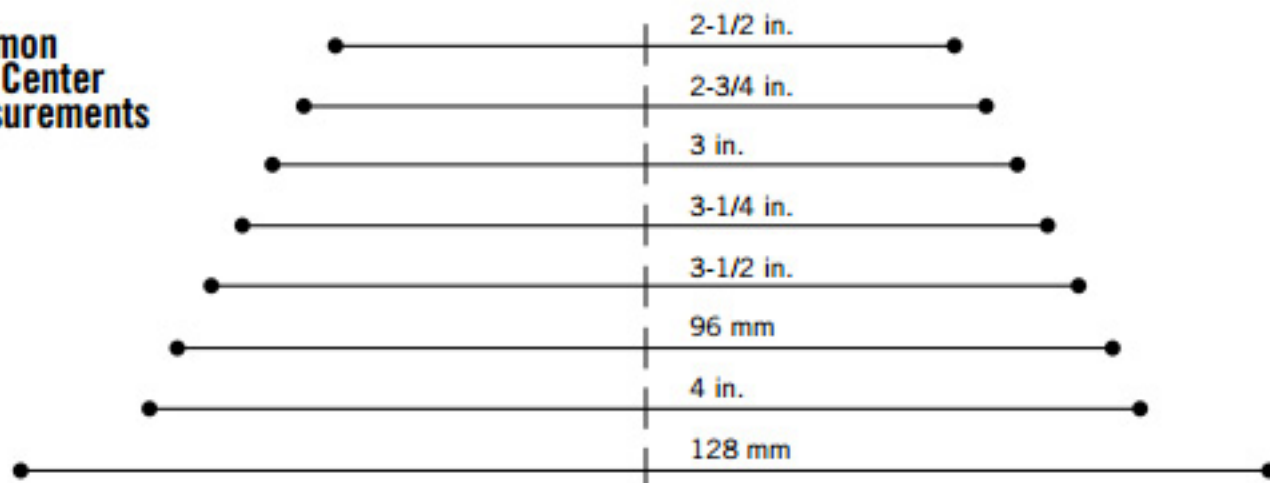
- Take note of all sizes available.
- 3" is the most common size pull.
- Size is determined by measuring from hole to hole, not by the length of the pull itself



Installation Tips

If you are using a pull, you will want to determine the hole center spacing of the pull. 3" hole centers are the most common, however, Amerock offers a wide variety of sizes. You may want to create or purchase a durable template prior to drilling to mark the mounting holes. This will help to ensure that they are parallel with the door or drawer edge and that they are the same placement height on every cabinet. **WARNING! An example is provided below, however, do not use this for drilling purposes as printers may provide template distortions.**

Common Hole Center Measurements



B. MOUNTING KNOBS

Sizes Available

Knobs can be obtained in a variety of sizes, shapes, and diameters. Amerock offers a broad range of sizes to choose from.

How to Choose the Right Size

There are no right or wrong sizes when it comes to selecting the appropriate knob size. Choose the size that looks best in proportion to the size of your cabinet doors and drawers. A 1-1/4" or 1-3/8" diameter knob is the most popular.

To create a dramatic effect, consider using a large (1-1/2" diameter or greater) or small (1" diameter or smaller) sized knob. Small sized knobs also work well on applications such as apothecary drawers, spice drawers, pullout cutting boards, etc.

Installation Tips

If you are installing a knob, it is suggested that you create or buy a durable template prior to drilling to mark the mounting hole. This will help to ensure that the knob is positioned properly on the cabinet door or drawer front and that there is the same placement height on every cabinet.





REPLACING CABINET HARDWARE

A. PULLS

When replacing pulls, the choices are numerous. You may choose to go with a pull with the same hole centers as your existing pull. Pull size is determined by measuring from hole to hole, not by the length of the pull itself. However, if you do choose to use a pull which is longer or shorter, the following information will assist you:

- On wall cabinets, reuse the bottom hole and drill a new top hole
- On base cabinets, reuse the top hole and drill a new bottom hole
- On drawers, drill two new holes and realign in the center

B. KNOBS

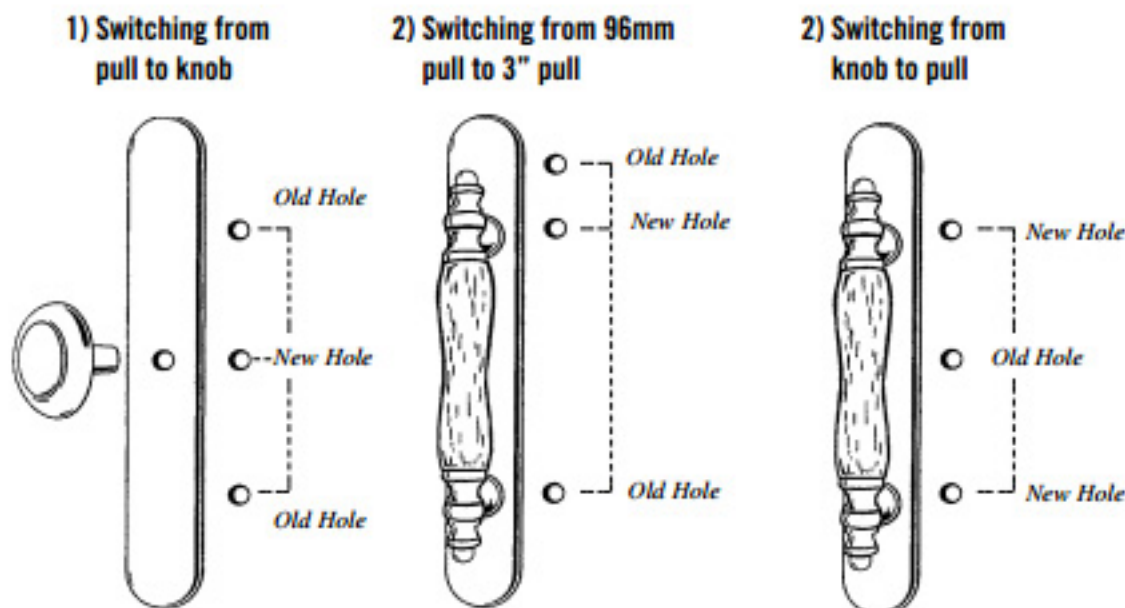
When replacing knobs, simply unscrew your old knob. Leaving the old screw in place, screw on your new knob. Nothing could be easier!

C. BACKPLATES

If you are switching sizes of pulls, or from a knob to a pull, or from a pull to a knob, there may be one or more exposed holes in the cabinet surface. To remedy this situation, you may choose to use a backplate.

- Backplates are used in conjunction with a knob or a pull. It is placed between the cabinet door or drawer surface and the knob or pull. Backplates will also help to protect the wood surface, and visually enhance the existing decorative hardware.

Note: If you are switching from a knob to a pull or from a pull to a knob, generally there will be one or more exposed holes in the cabinet surface! Backplate will cover the old mounting holes.





DIVISION 21 FIRE SUPPRESSION



VIKING RESIDENTIAL HORIZONTAL CONCEALED PENDANT SPRINKLER HEADS

Model Number: VK457

Location: Closet

Finish: White

K-factor: K4.0

Thread size: 1/2"

UL Pressure: 175 psi

Sprinkler temperature range: 155°F - 175°F

VIKING**TECHNICAL DATA****FREEDOM® RESIDENTIAL
CONCEALED PENDENT
SPRINKLER VK457 (K4.9)**

The Viking Corporation, 210 N Industrial Park Drive, Haslings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-6464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

1. DESCRIPTION

Viking Freedom® Residential Concealed Pendent Sprinkler VK457 is a small high-sensitivity solder link and lever residential sprinkler designed for installation on concealed pipe systems where the appearance of a smooth ceiling is desired. The orifice design, with a K-Factor of 4.9 (7L.B metric), allows the sprinkler's efficient use of available water supplies for the hydraulically designed fire-protection system. The operating element and special deflector characteristics meet the challenges of residential sprinkler standards.

The sprinkler is pre-assembled with a threaded adapter for installation with a low-profile small-diameter cover assembly installed flush to the ceiling. The two-piece design allows installation and testing of the sprinkler prior to installation of the cover plate. The "push-on", "thread-off" design of the concealed cover plate assembly allows easy installation of the cover plate after the system has been tested and the ceiling finish has been applied, while also providing up to 3/8" (12.7 mm) of vertical adjustment. The cover assembly can be removed and reinstalled, allowing temporary removal of ceiling panels without taking the sprinkler system out of service or removing the sprinkler.

**2. LISTINGS AND APPROVALS**

cULus Listed: Category VCKW

Refer to the Approval Chart on page 147w and Design Criteria on page 147x for cULus Listing requirements that must be followed.

3. TECHNICAL DATA**Specifications:**

Available since 2008.

Minimum Operating Pressure: Refer to the Approval Chart.

Maximum Working Pressure: 175 psi (12 bar). Factory tested hydrostatically to 500 psi (34.5 bar).

Thread size: 1/2" (15 mm) NPT

Nominal K-Factor: 4.9 U.S. (7L.B metric)*

* Metric K-factor measurement shown is in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

Material Standards:

Sprinkler Body: Brass UNS-C84400 or QM Brass

Deflector: Phosphor Bronze UNS-C51000

Deflector Pins: Stainless Steel UNS-S30200

Button: Brass UNS-C36000

Seat Assembly: Brass UNS-C31600

Compression Screw: Brass UNS-C36000

Fusible Element Assembly: Beryllium Nickel, coated with black acrylic paint

Lever: Stainless Steel UNS-S31600

Lever Bar: Copper Alloy UNS-G72500

Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with Teflon Tape

Cover Adapter: Cold Rolled Steel UNS-G10080, Finish: Gear Chrome over Zinc Plating

Shipping Cap: Polyethylene

Cover Plate Materials:

Cover Plate Assembly: Copper UNS-C11000 and Brass UNS-C26800

Spring: Beryllium Nickel

Solder: Eutectic

Ordering Information: (Also refer to the current Viking price list.)

Viking Freedom® Residential Concealed Pendent Sprinkler VK457 and Cover Plate Assembly must be ordered separately.

Viking Technical Data may be found on
The Viking Corporation's Web site at
<http://www.vikinggroupinc.com>.
The Web site may include a more recent
edition of this Technical Data Page.



TECHNICAL DATA

FREEDOM® RESIDENTIAL CONCEALED PENDENT SPRINKLER VK457 (K4.9)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Sprinkler: Part No. 14894AC (includes a 165°F (74°C) rated sprinkler with a protective plastic cap covering the unit).

Cover Plate Assembly: Base Part No. 13504 (2-3/4" diameter), Base Part No. 13642 (3-5/16" diameter), or Base Part No. 15394 (square cover plate, 3-5/16" diameter)

Specify finish and temperature rating of the cover plate assembly by adding the appropriate suffixes for the finish and the cover temperature rating to the base part number:

Finish Suffix: Polished Chrome = F, Brushed Chrome = F-/B, Bright Brass = B, Antique Brass = B-/A, Brushed Brass = B-/B, Brushed Copper = E-/B, Painted White = M-/W, Painted Ivory = M-/I, Painted Black = M-/B

Temperature Suffix: 135 °F/57 °C = A

For example, cover 13504 with a Polished Chrome finish and a 135 °F/57 °C temperature rating = 13504FA.

Available Finishes And Temperature Ratings: Refer to Table 1.

Accessories: (Also refer to the "Sprinkler Accessories" section of the Viking data book.)

Sprinkler Wrenches:**

A. Heavy Duty Part No. 13623W/B (available since 2006), or

B. Head Cabinet Wrench Part No. 13619*** (available since 2006)

C. Optional Concealed Cover Plate Installer Tool Part No. 14412 (available since 2007)

D. Optional Large Concealed Cover Plate Installer Tool Part No. 14867 (available since 2007)

Requires a 1/2" ratchet (not available from Viking). *Also optional for removal of the protective cap. Ideal for sprinkler cabinets.

Sprinkler Cabinet: Part No. 01731A (available since 1971)

4. INSTALLATION

Refer to appropriate NFPA Installation Standards. For NFPA 13D horizontal ceiling criteria and slopes, refer to TIA 1028R for slope ceiling criteria exceptions.

5. OPERATION

During fire conditions, when the temperature around the sprinkler approaches its operating temperature, the cover plate detaches, releasing the deflector. Continued heating of the exposed sprinkler causes the fusible element to disengage releasing the sealing assembly. Water flowing through the sprinkler orifice strikes the deflector, forming a uniform spray pattern over a specific area of coverage determined by the water supply pressure at the sprinkler to extinguish or control the fire.

6. INSPECTIONS, TESTS AND MAINTENANCE

Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

7. AVAILABILITY

Viking Sprinkler Model VK457 is available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

8. GUARANTEE

For details of warranty, refer to Viking's current list price schedule or contact Viking directly.

TABLE 1: AVAILABLE SPRINKLER TEMPERATURE RATINGS AND FINISHES

Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating ¹	Maximum Ambient Ceiling Temperature ²	Temperature Rating of the Cover Assembly (Required)	Cover Plate Base Part Number ³	Large Cover Plate Base Part Number ³	Square Cover Plate Base Part Number ³
Ordinary	165 °F (74 °C)	100 °F (38 °C)	135 °F (57 °C)	13504	13642	15394

Cover Plate Finishes: Polished Chrome, Brushed Chrome, Bright Brass, Antique Brass, Brushed Brass, Brushed Copper, Painted White, Painted Ivory, or Painted Black

Footnotes

¹ The sprinkler temperature rating is stamped on the deflector.

² Based on NFPA-13, NFPA 13R, and NFPA 13D. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.

³ Part number shown is the base part number. For complete part number, refer to current Viking price list schedule.



TECHNICAL DATA

FREEDOM® RESIDENTIAL CONCEALED PENDENT SPRINKLER VK457 (K4.9)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Approval Chart						
Residential Concealed Pendent Sprinkler VK457						
For systems designed to NFPA 13D ⁷ or NFPA 13R.						
For systems designed to NFPA 13, refer to the design criteria on page 147x.						
Sprinkler Base Part Number ¹	SIN	NPT Thread Size		Nominal K-Factor		Maximum Water Working Pressure
		Inches	mm	U.S.	metric ²	
14694A	VK457	1/2	15	4.9	70.6	175 psi (12 bar)
Maximum Areas of Coverage ⁴	Minimum Water Supply Requirements ⁴			Listings and Approvals ³		
				(Refer also to Design Criteria on page 147x.)		
Installed below smooth, flat, horizontal ceilings, including ceilings with slopes up to and including 2/12 (9.5°).						
12 ft. x 12 ft. (3.7 m x 3.7 m)	13 gpm @ 7.0 psi (49.2 L/min @ 0.48 bar)			AX1	See Footnote 5.	AX1
14 ft. x 14 ft. (4.3 m x 4.3 m)	13 gpm @ 7.0 psi (49.2 L/min @ 0.48 bar)			AX1	See Footnote 5.	AX1
16 ft. x 16 ft. (4.9 m x 4.9 m)	13 gpm @ 7.0 psi (49.2 L/min @ 0.48 bar)			AX1	See Footnote 5.	AX1
18 ft. x 18 ft. (5.5 m x 5.5 m)	17 gpm @ 12.0 psi (64.4 L/min @ 0.83 bar)			AX1	See Footnote 5.	AX1
20 ft. x 20 ft. (6.1 m x 6.1 m)	20 gpm @ 16.7 psi (75.7 L/min @ 1.15 bar)			AX1	See Footnote 5.	AX1
Installed below ceilings with slopes ⁴ up to and including a 8/12 (33.7°) pitch. Refer to Figure 5 on page 147z.						
				UL	NYC	NSF ⁹
16 ft. x 16 ft. (4.9 m x 4.9 m)	26 gpm @ 28.2 psi (98.4 L/min @ 1.94 bar)			AX1	See Footnote 5.	AX1
18 ft. x 18 ft. (5.5 m x 5.5 m)	31 gpm @ 40.0 psi (117.3 L/min @ 2.76 bar)			AX1	See Footnote 5.	AX1
20 ft. x 20 ft. (6.1 m x 6.1 m)	31 gpm @ 40.0 psi (117.3 L/min @ 2.76 bar)			AX1	See Footnote 5.	AX1
Sprinkler Temperature Rating	Cover Temperature Rating			Cover Plate Finishes		
A - 165 °F (74 °C)	X - 135 °F (57 °C) cover 13504 ¹ , 13642 ¹ (large diameter), or 15394 ¹ (square cover plate)			1 - Polished Chrome, Brushed Chrome, Bright Brass, Antique Brass, Brushed Brass, Brushed Copper, Painted White, Painted Ivory, or Painted Black ¹⁰		
Footnotes						
¹ Part number shown is the base part number. For complete part number, refer to current Viking price list schedule.						
² Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.						
³ This chart shows the listings and approvals available at the time of printing. Other approvals may be in process. Check with the manufacturer for any additional approvals.						
⁴ Listed by Underwriter's Laboratories for use in the U.S. and Canada.						
⁵ Meets New York City requirements, effective July 1, 2008.						
⁶ For areas of coverage smaller than shown, use the "Minimum Water Supply Requirement" for the next larger area listed. Flows and pressures listed are per sprinkler. The distance from sprinklers to walls shall not exceed one-half the sprinkler spacing indicated for the minimum Water Supply Requirement used.						
⁷ Refer to TIA 1028R slope ceiling criteria exceptions.						
⁸ Areas under sloped ceilings must be measured along the ceiling slope. Actual floor coverage in the horizontal plane under sloped ceilings will be less than the listed area of coverage.						
⁹ Tested and Certified by NSF (National Sanitation Foundation) to NSF/ANSI Standard 61, Drinking Water System Components.						
¹⁰ Other paint colors are available on request with the same listings as the standard finish colors. Listings and approvals apply for any paint manufacturer. Contact Viking for additional information. Custom colors are indicated on a label inside the cover assembly. Refer to Figure 3.						



TECHNICAL DATA

FREEDOM® RESIDENTIAL CONCEALED PENDENT SPRINKLER VK457 (K4.9)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

DESIGN CRITERIA

(Also refer to the Approval Chart on page 147w.)

cULus Listing Requirements:

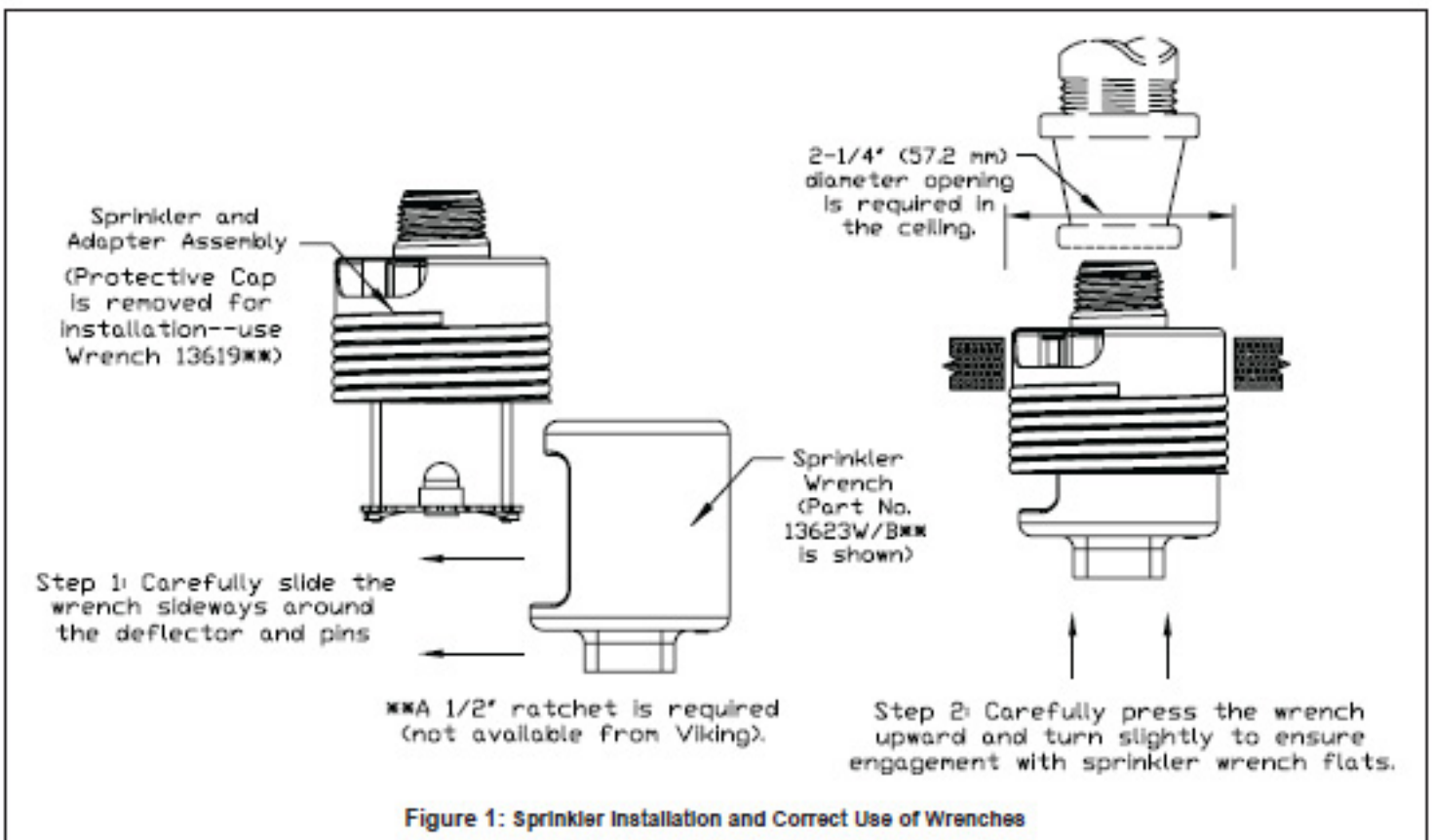
When using Viking Residential Concealed Pendent Sprinkler VK457 for systems designed to NFPA 13D or NFPA 13R, apply the listed areas of coverage and minimum water supply requirements shown in the Approval Chart on page 147w.

For systems designed to NFPA 13: The number of design sprinklers is to be the four contiguous most hydraulically demanding sprinklers. The minimum required discharge from each of the four sprinklers is to be the greater of the following:

- The flow rates given in the Approval Chart on data page 147w for NFPA 13D and NFPA 13R applications for each listed area of coverage, **or**
- Calculated based on a minimum discharge of 0.1 gpm/sq. ft. over the "design area" in accordance with sections 8.5.2.1 or 8.6.2.1.2 of NFPA 13.
- Minimum distance between residential sprinklers: 8 ft. (2.4 m).

NOTE: Concealed sprinklers must be installed in neutral or negative pressure plenums only.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to pages RES1-17 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA and any other similar Authorities Having Jurisdiction, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable. Final approval and acceptance of all residential sprinkler installations must be obtained from the Authorities Having Jurisdiction.



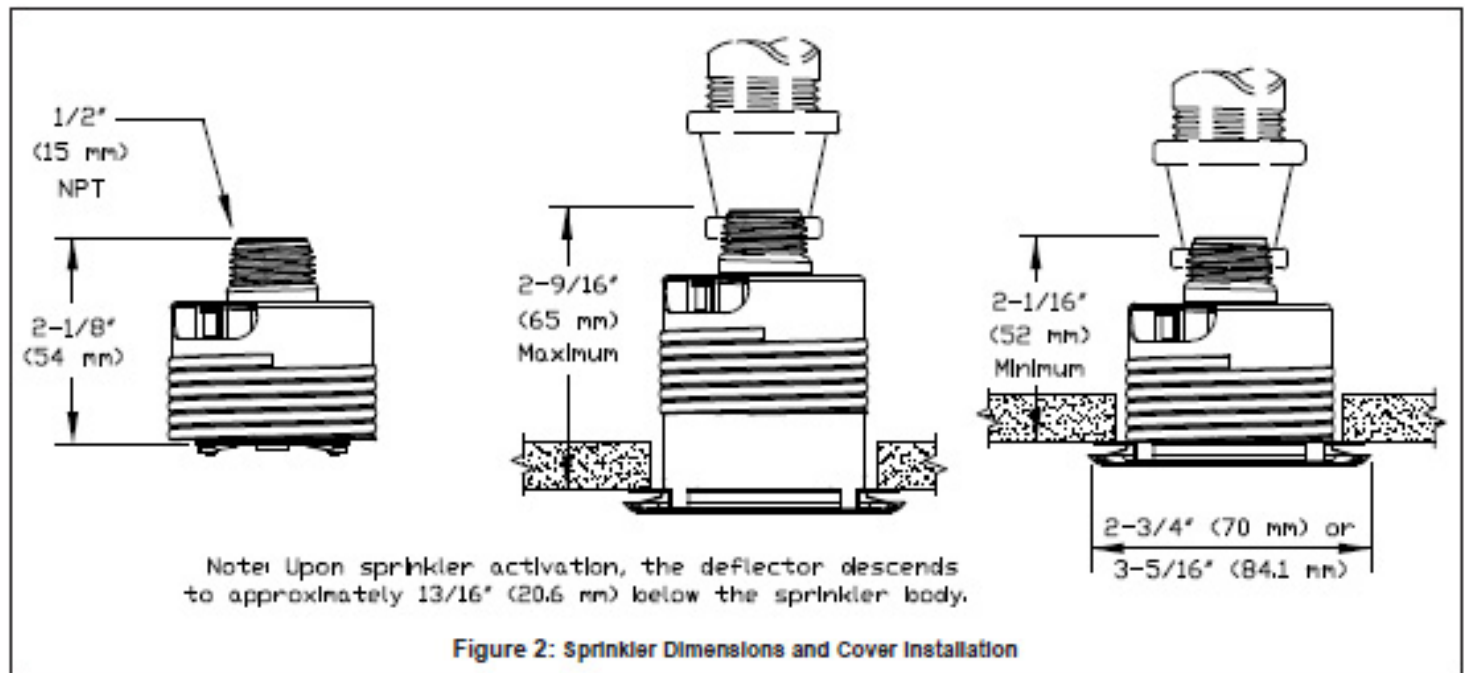
VIKING

TECHNICAL DATA

FREEDOM® RESIDENTIAL CONCEALED PENDENT SPRINKLER VK457 (K4.9)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com



Identification of Custom Paint Color:
All custom color painted cover plates will have an identifying label affixed to the inside of the cover that indicates custom color and will have a representative sample (a paint dot) of the paint on the label.

Figure 3: Identification of Custom Paint Color for Concealed Covers



Figure 4: Square Cover Assembly 15394

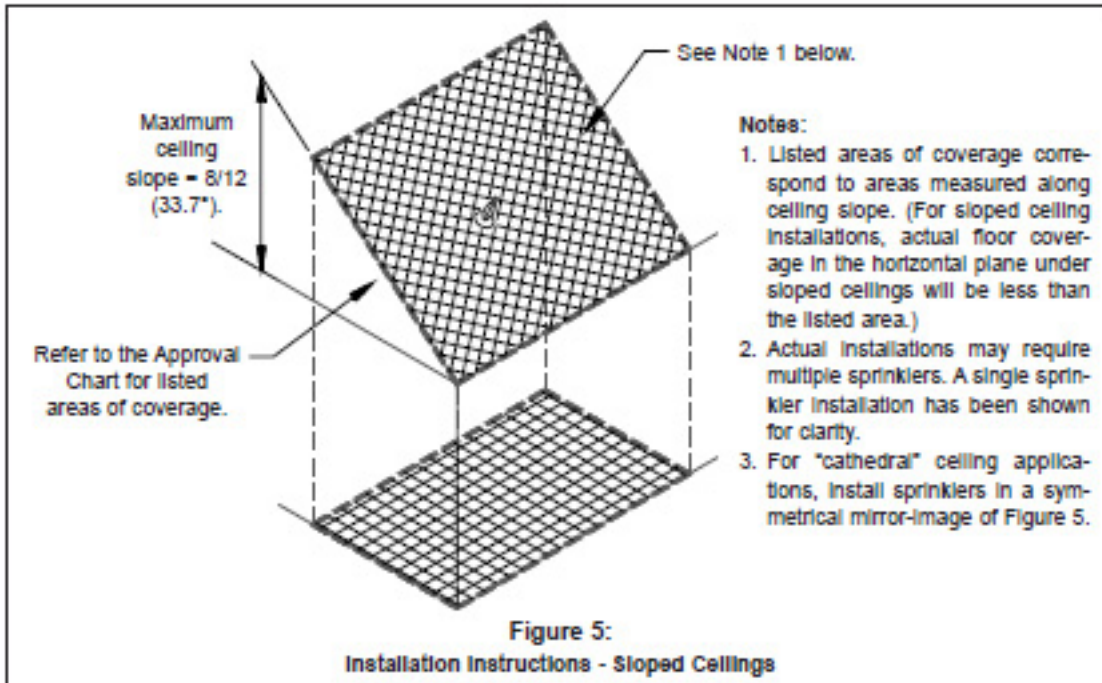
VIKING

TECHNICAL DATA

**FREEDOM® RESIDENTIAL
CONCEALED PENDENT
SPRINKLER VK457 (K4.9)**

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com



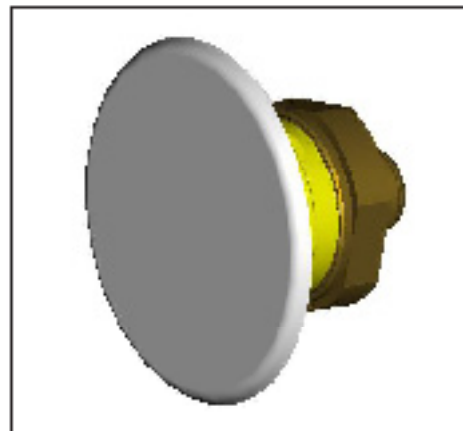
VIKING**TECHNICAL DATA****FREEDOM® RESIDENTIAL
CONCEALED HORIZONTAL
SIDEWALL SPRINKLER VK480**

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-919-1680 Email: techsvcs@vikingcorp.com**1. DESCRIPTION**

Viking Freedom® Residential Concealed Horizontal Sidewall Sprinkler VK480 is a small high-sensitivity solder link and lever residential sprinkler designed for installation on concealed pipe systems, where the appearance of a smooth wall is desired. The sprinkler orifice design, with a K-Factor of 4.0 (57.7 metric*), allows the sprinkler's efficient use of available water supplies for the hydraulically designed fire-protection system. The operating element and special deflector characteristics meet the challenges of residential sprinkler standards.

The sprinkler is hidden from view by a low profile, small diameter cover plate installed flush to the wall. The cover plate is available in several decorative finishes to meet design requirements. The two-piece design allows installation and testing of the sprinkler prior to installation of the cover plate. After the system has been tested and wall finish has been applied, the push-on design of the cover plate assembly allows easy installation of the cover plate with up to 1/4" (6.4 mm) adjustment. Sprinkler VK480 is provided with a pipe guide to properly locate the sprinkler and allow the 1/4" adjustment of the cover plate.

**2. LISTINGS AND APPROVALS**

 eULus Listed: Category VKKW (VK480)

Refer to the Approval Chart and Design Criteria on page 153c for eULus Listing requirements that must be followed.

3. TECHNICAL DATA**Specifications:**

Available since 2010.

Minimum Operating Pressure: Refer to the Approval Chart.

Maximum Working Pressure: 175 psi (12 bar). Factory tested hydrostatically to 500 psi (34.5 bar).

Thread size: 1/2" (15 mm) NPT

Nominal K-Factor: 4.0 U.S. (57.7 metric*)

* Metric K-factor measurement shown is in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

Available Cover Plate Horizontal Adjustment: 1/4" (6.4 mm)

Overall Length (Sprinkler Body): 2" (50 mm)

Patents Pending

Material Standards:

Sprinkler Body: QM Brass and Brass UNS-C84400

Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with Teflon Tape

Seat: Brass UNS-C31400

Deflector Ring: Brass UNS-C23000

Deflector Pins: Stainless Steel UNS-S30200

Hale: Brass UNS-C31400 or Phosphor Bronze UNS-C51000

Flow Shaper: Phosphor Bronze UNS-C51000

Lever Bar Ring: Brass UNS-C31400 or Brass UNS-C84400

Compression Screw: 18-8 Stainless Steel

Fusible Link Assembly: Nickel Alloy and Eutectic Solder

Fusible Link Levers: Stainless Steel UNS-S31600

Guide Pin: Stainless Steel UNS-S43000

Shipping Cap: Polyethylene

Cover Assembly Materials:

Cover Plate Assembly: Copper UNS-C11000 and Brass UNS-C26800

Spring: Beryllium Nickel

Solder: Eutectic

Ordering Information: (Also refer to the current Viking price list.)

Viking Freedom® Residential Concealed HSW Sprinkler VK480 and Cover Plate Assembly must be ordered separately.

Sprinkler: Part No. 10116AC (includes a 165 °F (74 °C) rated sprinkler with a protective plastic cap covering the unit).

Viking Technical Data may be found on
The Viking Corporation's Web site at
<http://www.vikinggroupinc.com>.
The Web site may include a more recent
edition of this Technical Data Page.



TECHNICAL DATA

FREEDOM® RESIDENTIAL CONCEALED HORIZONTAL SIDEWALL SPRINKLER VK480

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Cover Plate Assembly: Base Part No. 16207 (3-5/16" diameter)

Specify finish and temperature rating of the cover plate assembly by adding the appropriate suffixes for the finish and the cover temperature rating to the base part number:

Finish Suffix: Painted White = M-W

Temperature Suffix: 135 °F (57 °C) = A

For example, cover 16207 with a White Painted finish and a 135 °F (57 °C) temperature rating = 16207MA/W.

Available Finishes And Temperature Ratings: Refer to Table 1.

Accessories: (Also refer to the "Sprinkler Accessories" section of the Viking data book.)

Sprinkler Wrenches:**

A. Heavy Duty Wrench Part No. 16208W/R** (available since 2010)

B. Head Cabinet Wrench Part Number 16267*** (available since 2010)

C. Optional Large Concealed Cover Plate Installer Tool Part No. 14867 (available since 2007)

**Requires a ½" ratchet (not available from Viking).

***Ideal for sprinkler cabinets.

Sprinkler Cabinet: Part No. 01731A (available since 1971)

4. INSTALLATION

Refer to appropriate NFPA Installation Standards. For NFPA 13D horizontal ceiling criteria and slopes, refer to TIA 1028R for slope ceiling criteria exceptions.

5. OPERATION

During fire conditions, when the temperature around the sprinkler approaches its operating temperature, the cover plate detaches. Continued heating of the exposed sprinkler causes the fusible element to disengage, releasing the sealing assembly. Water flowing through the sprinkler orifice strikes the flow shaper, forming a uniform spray pattern over a specific area of coverage determined by the water supply pressure at the sprinkler to extinguish or control the fire.

6. INSPECTIONS, TESTS AND MAINTENANCE

Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

7. AVAILABILITY

Viking Freedom® Residential Concealed Horizontal Sidewall Sprinkler VK480 is available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

8. GUARANTEE

For details of warranty, refer to Viking's current list price schedule or contact Viking directly.



Identification of Custom Paint Color:
All custom color painted cover plates will have an identifying label affixed to the inside of the cover that indicates custom color and will have a representative sample (a paint dot) of the paint on the label.

Figure 1: Identification of Custom Paint Color for Concealed Covers

TABLE 1: AVAILABLE SPRINKLER TEMPERATURE RATINGS AND FINISHES

Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating ¹	Maximum Ambient Ceiling Temperature ²	Temperature Rating of the Cover Assembly (Required)	Cover Plate Base Part Number ³
Ordinary	165 °F (74 °C)	100 °F (38 °C)	135 °F (57 °C)	16207

Cover Plate Finish: Painted White

Footnotes

¹ The sprinkler temperature rating is stamped on the inlet.

² Based on NFPA-13, NFPA 13R, and NFPA 13D. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.

³ Part number shown is the base part number. For complete part number, refer to current Viking price list schedule.



TECHNICAL DATA

FREEDOM® RESIDENTIAL CONCEALED HORIZONTAL SIDEWALL SPRINKLER VK480

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Approval Chart

Residential Concealed Horizontal Sidewall Sprinkler VK480

For systems designed to NFPA 13D⁷ or NFPA 13R.

For systems designed to NFPA 13, refer to the design criteria below.

—	Sprinkler Temperature Rating
—	Cover Plate Temperature Rating
AW1*	Cover Plate Finish KEY

Sprinkler Part Number ¹	SIN	NPT Thread Size		Nominal K-Factor		Maximum Water Working Pressure	
		Inches	mm	U.S.	metric ²		
16116AC	VK480	1/2	15	4.0	57.7	175 psi (12 bar)	
Maximum Areas of Coverage ³ Width x Length	Minimum Water Supply Requirements ⁴				Listings and Approvals ⁵ (Refer also to Design Criteria below.)		
					cULus ⁶	NYC	NSF
Installed below smooth, flat, horizontal ceilings, includes ceilings with slopes up to and including 2/12 (9.5°). With the centerline of the sprinkler located between 4-3/8" and 6-3/8" (112 mm and 162 mm) below the ceiling.							
12 ft. x 12 ft. (3.7 m x 3.7 m)	11 gpm @ 7.6 psi (41.7 L/min @ 0.52 bar)				AX1	See Footnote 5.	—
14 ft. x 14 ft. (4.3 m x 4.3 m)	13 gpm @ 10.6 psi (49.3 L/min @ 0.73 bar)				AX1	See Footnote 5.	—
16 ft. x 16 ft. (4.9 m x 4.9 m)	16 gpm @ 16 psi (60.6 L/min @ 1.1 bar)				AX1	See Footnote 5.	—
16 ft. x 18 ft. (4.9 m x 5.5 m)	17 gpm @ 18.1 psi (64.4 L/min @ 1.25 bar)				AX1	See Footnote 5.	—
Installed below smooth, flat, horizontal ceilings, includes ceilings with slopes up to and including 2/12 (9.5°). With the centerline of the sprinkler located between 6-3/8" and 12-3/8" (162 mm and 314 mm) below the ceiling.							
12 ft. x 12 ft. (3.7 m x 3.7 m)	12 gpm @ 9 psi (45.5 L/min @ 0.62 bar)				AX1	See Footnote 5.	—
14 ft. x 14 ft. (4.3 m x 4.3 m)	14 gpm @ 12.3 psi (53 L/min @ 0.84 bar)				AX1	See Footnote 5.	—
16 ft. x 16 ft. (4.9 m x 4.9 m)	16 gpm @ 16 psi (60.6 L/min @ 1.1 bar)				AX1	See Footnote 5.	—
16 ft. x 18 ft. (4.9 m x 5.5 m)	18 gpm @ 20.3 psi (68.1 L/min @ 1.4 bar)				AX1	See Footnote 5.	—
Sprinkler Temperature Rating A - 165 °F (74 °C)	Cover Temperature Rating X - 135 °F (57 °C) Cover Part No. 16207 ¹				Cover Plate Finish 1 - Painted White ⁸		

Footnotes

- ¹ For complete part number, also refer to current Viking price list schedule.
- ² Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.
- ³ This chart shows the listings and approvals available at the time of printing. Other approvals may be in process. Check with the manufacturer for any additional approvals.
- ⁴ Sprinkler VK480 is Listed by Underwriter's Laboratories for use in the U.S. and Canada.
- ⁵ Meets New York City requirements, effective July 1, 2008.
- ⁶ For areas of coverage smaller than shown, use the "Minimum Water Supply Requirement" for the next larger area listed. Flows and pressures listed are per sprinkler. The distance from sprinklers to walls shall not exceed one-half the sprinkler spacing indicated for the "Minimum Water Supply Requirement" used.
- ⁷ Refer to TIA 1028R slope ceiling criteria exceptions.
- ⁸ Other paint colors are available on request with the same listings as the standard finish colors. Listings and approvals apply for any paint manufacturer. Contact Viking for additional information. Custom colors are indicated on a label inside the cover assembly. Refer to Figure 1.

DESIGN CRITERIA

(Also refer to the Approval Chart above.)

cULus Listing Requirements:

When using Viking Residential Concealed Horizontal Sidewall Sprinkler VK480 for systems designed to NFPA 13D or NFPA 13R, apply the listed areas of coverage and minimum water supply requirements shown in the Approval Chart above.

For systems designed to NFPA 13: The number of design sprinklers is to be the four contiguous most hydraulically demanding sprinklers. The minimum required discharge from each of the four sprinklers is to be the greater of the following:

- The flow rates given in the Approval Chart above for NFPA 13D and NFPA 13R applications for each listed area of coverage, **or**
- Calculated based on a minimum discharge of 0.1 gpm/sq. ft. over the "design area" in accordance with sections 8.5.2.1 or 8.6.2.1.2 of NFPA 13.
- **THE TOP OF THE SPRINKLER BODY AND THE TOP OF THE INSTALLATION WRENCH ARE MARKED "TOP".** Orient the top of the sprinkler element parallel with the ceiling as shown in Figure 3.
- Minimum distance between residential sprinklers: 8 ft. (2.4 m).

NOTE: Concealed sprinklers must be installed in neutral or negative pressure plenums only.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to pages RES1-17 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA and any other similar Authorities Having Jurisdiction, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable. Final approval and acceptance of all residential sprinkler installations must be obtained from the Authorities Having Jurisdiction.



TECHNICAL DATA

**FREEDOM® RESIDENTIAL
CONCEALED HORIZONTAL
SIDEWALL SPRINKLER VK480**

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

The internal design of the sprinkler wrench is shaped to fit over the sprinkler and protective cap to ensure that the top of the wrench will be oriented in the same direction as the top of the sprinkler deflector.



Figure 2: Sprinkler VK480 Installation and Correct Use of Wrench

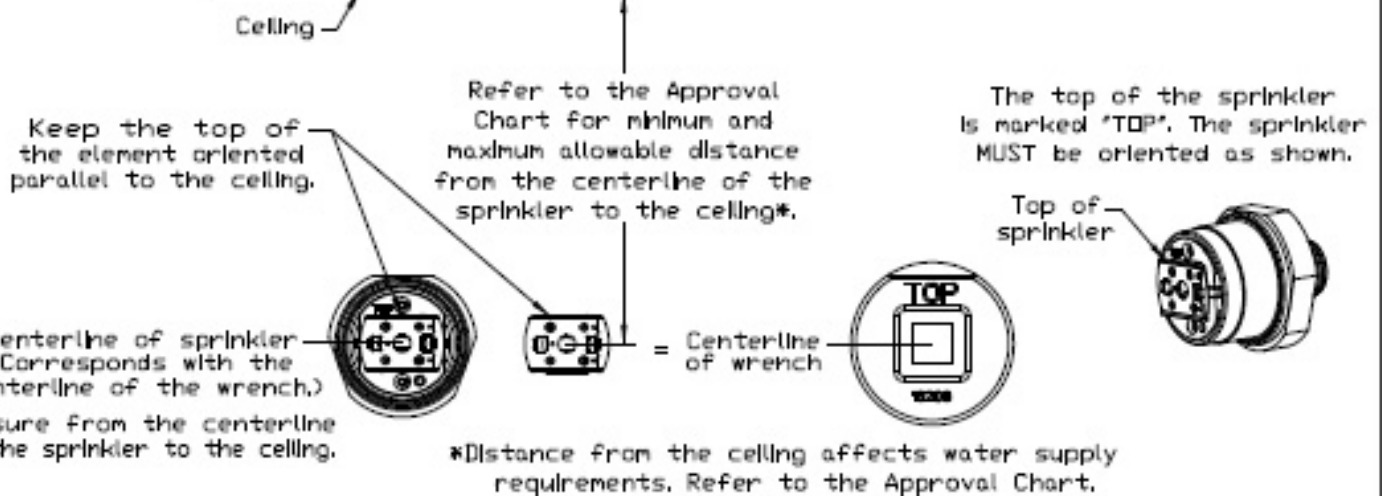


Figure 3: Sprinkler VK480 Correct Deflector Orientation

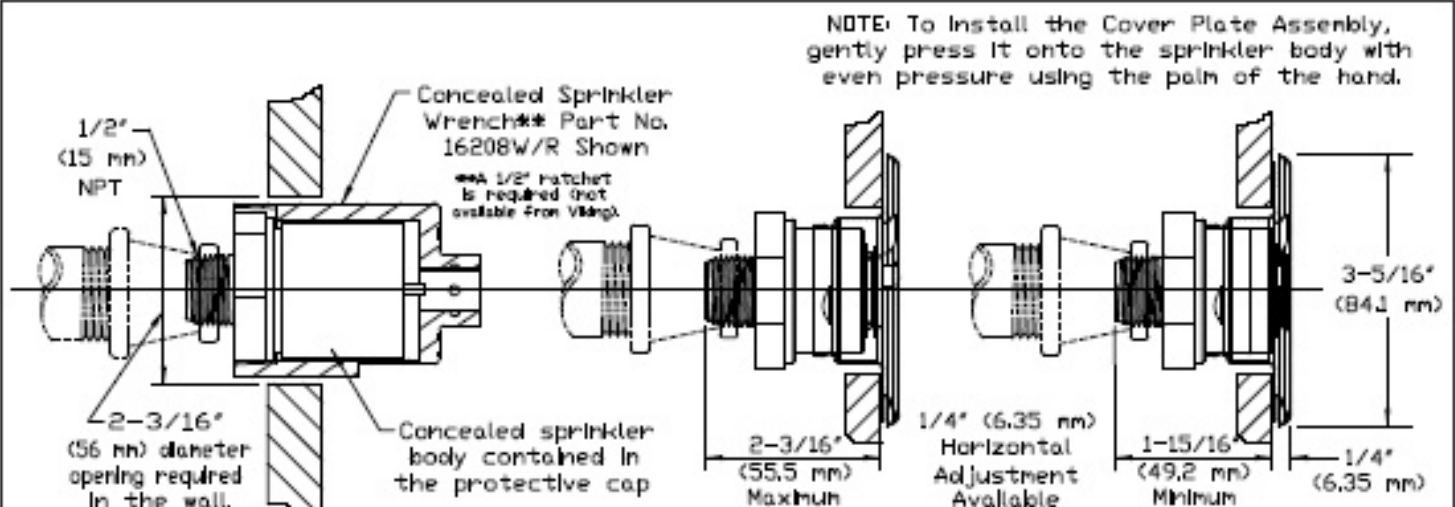


Figure 4: Sprinkler VK480 Dimensions and Cover Installation

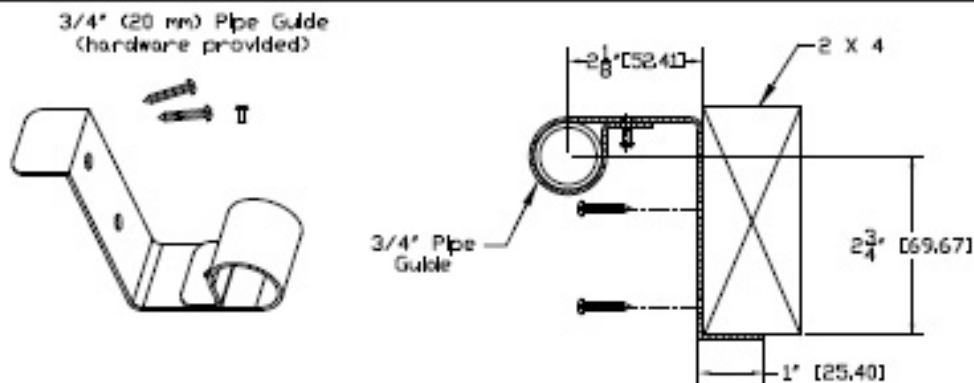
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TECHNICAL DATA

FREEDOM® RESIDENTIAL CONCEALED HORIZONTAL SIDEWALL SPRINKLER VK480

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com



NOTE: To ensure that the sprinkler is located the correct distance from the face of the finished wall, use the pipe guide (included with Sprinkler VK480) and attach it to the 3/4" CPVC pipe and the 2 x 4 inside the wall as shown.

All piping, hangers/bracing must be installed in accordance with NFPA 13.

Figure 5: Sprinkler VK480 Pipe Guide

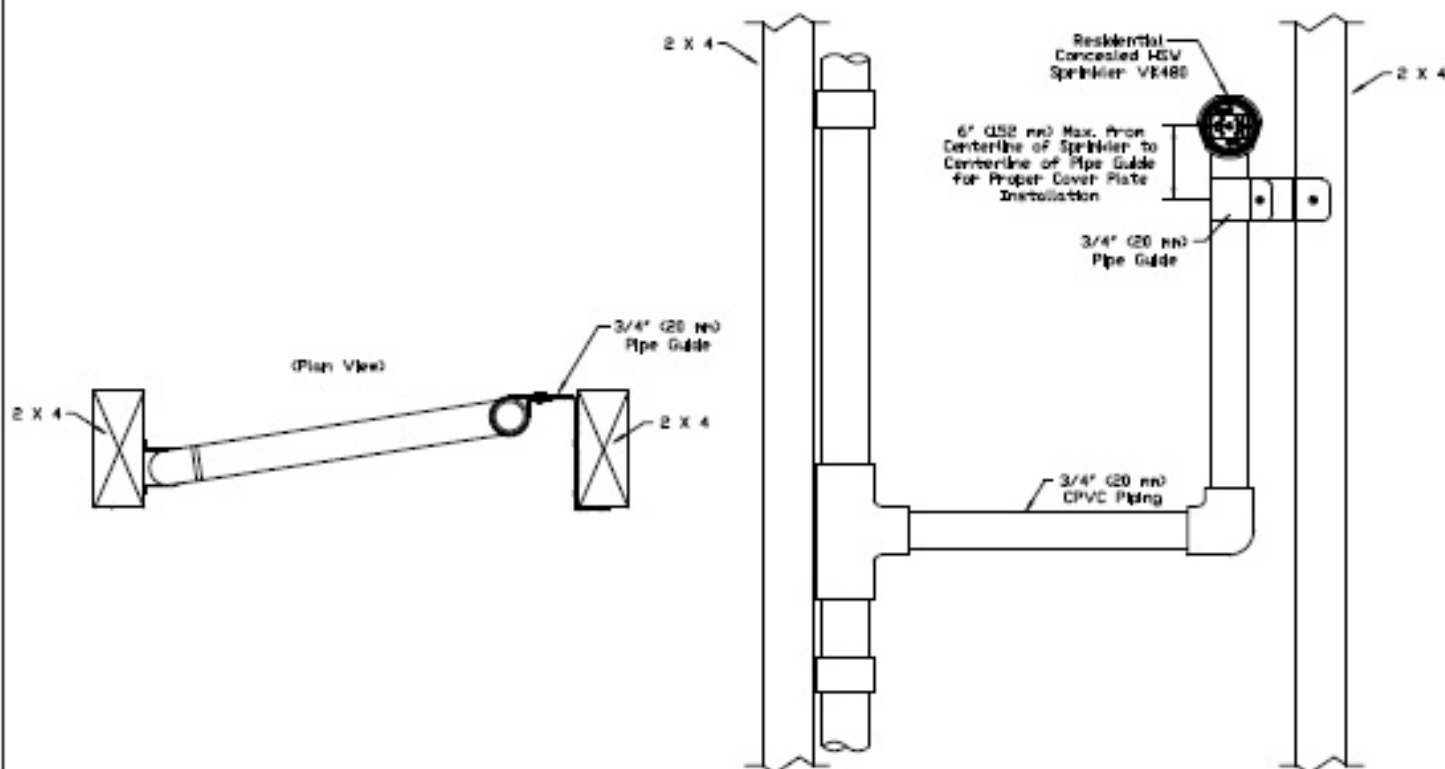


Figure 6: Sprinkler VK480 Pipe Guide Installation Instructions

<h1 style="margin: 0;">VIKING</h1>	<h2 style="margin: 0;">TECHNICAL DATA</h2>	<p style="margin: 0;">FREEDOM® RESIDENTIAL CONCEALED HORIZONTAL SIDEWALL SPRINKLER VK480</p>
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The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
 Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

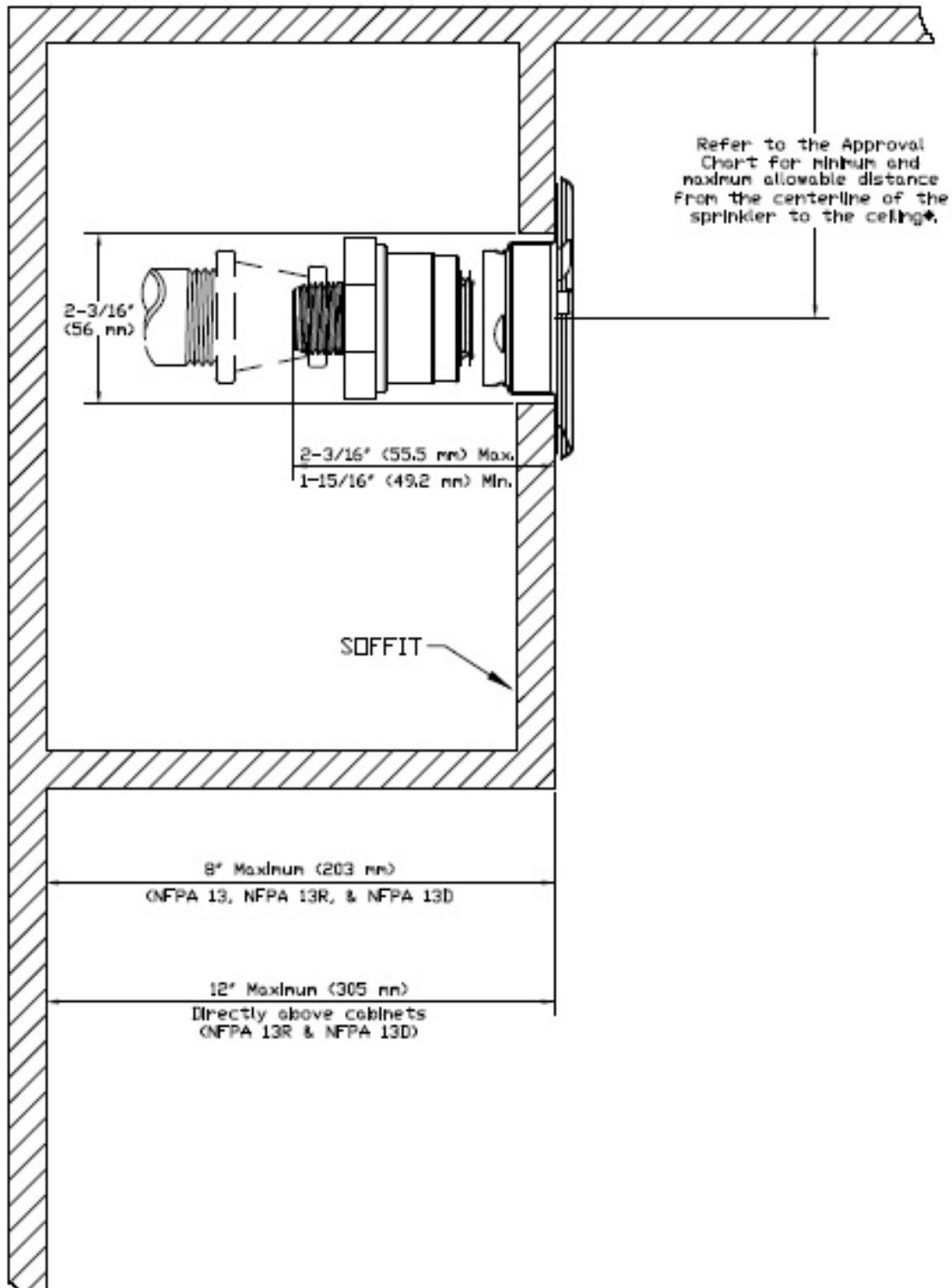


Figure 7: Sprinkler VK480 Installation - soffit



VIKING RESIDENTIAL HORIZONTAL CONCEALED SIDEWALL SPRINKLERS

Model: VK104

Location: Closet

Finish: White

K-factor: 5.6

Thread size: 1/2"

UL pressure: 175 psi

Sprinkler temperature range: 200 F

VIKING**TECHNICAL DATA****MICROMATIC® AND
MICROMATICHP® STANDARD
RESPONSE HORIZONTAL
SIDEWALL SPRINKLERS**

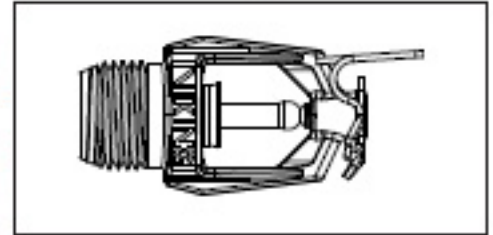
The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

1. DESCRIPTION

Viking Micromatic® and MicromaticHP® Standard Response Horizontal Sidewall Sprinklers are small thermosensitive glass bulb spray sprinklers available with various finishes and temperature ratings to meet design requirements. The special Polyester and Teflon® coatings can be used in decorative applications where colors are desired. In addition, these coatings have been investigated for installation in corrosive atmospheres and are cULus listed as corrosion resistant as indicated in the Approval Chart. (Note: FM Global has no approval classification for Teflon® and Polyester coatings as corrosion resistant.)

Viking standard response sprinklers may be ordered and/or used as open sprinklers (glass bulb and pip cap assembly removed) on deluge systems. Refer to Ordering Instructions on page 14f.



Sprinkler Base Part No. 09849

2. LISTINGS AND APPROVALS

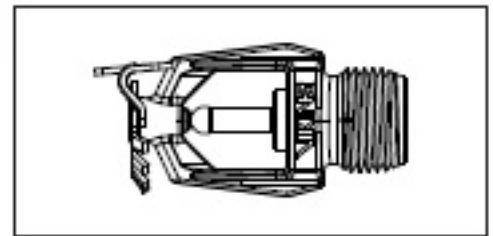
cULus Listed: Category VNIV

FM Approved: Classes 2012 and 2015

LPC Approved: Ref. No. 096e/08

CE Certified: Standard EN 12259-1, EC-certificate of conformity 0832-CPD-2001 and 0832-CPD-2003

Refer to Approval Chart 1 and Design Criteria on page 14h for cULus Listing requirements that must be followed. Refer to Approval Chart 2 and Design Criteria on page 14j for FM Approval requirements that must be followed.



Sprinkler Base Part No. 10224

3. TECHNICAL DATA**Specifications:**

Available since 1996.

Minimum Operating Pressure: 7 psi (0.5 bar)*

Maximum Working Pressure: Sprinklers VK116 and VK015 are rated for use with water working pressures ranging from the minimum 7 psi (0.5 bar) up to 250 psi (17 bar) for high-pressure systems. High-pressure (HP) sprinklers can be identified by locating "250" stamped on the deflector. All other Part Nos. not mentioned above are rated to a maximum 175 psi (12 bar) wwp.

Factory tested hydrostatically to 500 psi (34.5 bar)

Testing: U.S.A. Patent No. 4,831,870

Nominal K-Factor: Refer to the Approval Charts

Glass-bulb fluid temperature rated to -65 °F (-55 °C)

Overall Length: Refer to the Approval Charts

*cULus Listing, FM Approval, and NFPA 13 installs require a minimum of 7 psi (0.5 bar). The minimum operating pressure for LPCB and CE Approvals ONLY is 5 psi (0.35 bar).

Material Standards:

Frame Casting: Brass UNS-C84400 or QM Brass for Sprinkler 10224. Brass UNS-C84400 for all other sprinklers.

Deflector: Copper UNS-C19500

Bushing (for high pressure sprinkler 09997): Brass UNS-C36000

Bulb: Glass, nominal 5 mm diameter

Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with Teflon Tape

Screw: Brass UNS-C36000

Pip Cap for sprinklers 10171 & 10224: Brass UNS-C31600 or UNS-C31400

Pip Cap and Insert Assembly (for all other sprinklers): Copper UNS-C11000 and Stainless Steel UNS-S30400

Pip Cap Attachment (for sprinkler 09997): Brass UNS-C36000

For Teflon® Coated Sprinklers: Belleville Spring-Exposed, Screw-Nickel Plated, Pip Cap-Teflon® CoatedFor Polyester Coated Sprinklers: Belleville Spring-Exposed

Viking Technical Data may be found on
The Viking Corporation's Web site at
<http://www.vikinggroupinc.com>.
The Web site may include a more recent
edition of this Technical Data Page.

VIKING**TECHNICAL DATA****MICROMATIC® AND
MICROMATICHP® STANDARD
RESPONSE HORIZONTAL
SIDEWALL SPRINKLERS**

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Ordering Information: (Also refer to the current Viking price list.)

Order Standard Response Horizontal Sidewall Sprinklers by first adding the appropriate suffix for the sprinkler finish and then the appropriate suffix for the temperature rating to the sprinkler base part number.

Finish Suffix: Brass = A, Chrome-Enloy® = F, White Polyester = M-/W, Black Polyester = M-/B, and Black Teflon® = N, Wax Coated = C, Wax Over Polyester = V-/W

Temperature Suffix (°F/°C): 135°/68° = A, 155°/88° = B, 175°/79° = D, 200°/93° = E, 212°/100° = M, 288°/141° = G, 360°/182° = H, OPEN = Z (Teflon® only).

For example, sprinkler VK104 with a 1/2" thread, Brass finish and a 155 °F/88 °C temperature rating = Part No. 10224AB

Available Finishes And Temperature Ratings: Refer to Table 1.**Accessories:** (Also refer to the "Sprinkler Accessories" section of the Viking data book.)**Sprinkler Wrenches:**

A. Standard Wrench: Part No. 10896W/B (available since 2000).

B. Wrench for recessed sprinklers with protective shields: Part No. 13655W/B** (available since 2003)

C. Wrench for wax coated sprinklers: Part No. 13577W/B** (available since 2006)

**A 1/2" ratchet is required (not available from Viking).

Sprinkler Cabinets:

A. Six-head capacity: Part No. 01724A (available since 1971)

B. Twelve-head capacity: Part No. 01725A (available since 1971)

4. INSTALLATION

Refer to appropriate NFPA Installation Standards.

5. OPERATION

During fire conditions, the heat-sensitive liquid in the glass bulb expands, causing the glass to shatter, releasing the pip cap and sealing spring assembly. Water flowing through the sprinkler orifice strikes the sprinkler deflector, forming a uniform spray pattern to extinguish or control the fire.

6. INSPECTIONS, TESTS AND MAINTENANCE

Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

7. AVAILABILITY

Viking Standard Response Horizontal Sidewall Sprinklers are available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

8. GUARANTEE

For details of warranty, refer to Viking's current list price schedule or contact Viking directly.

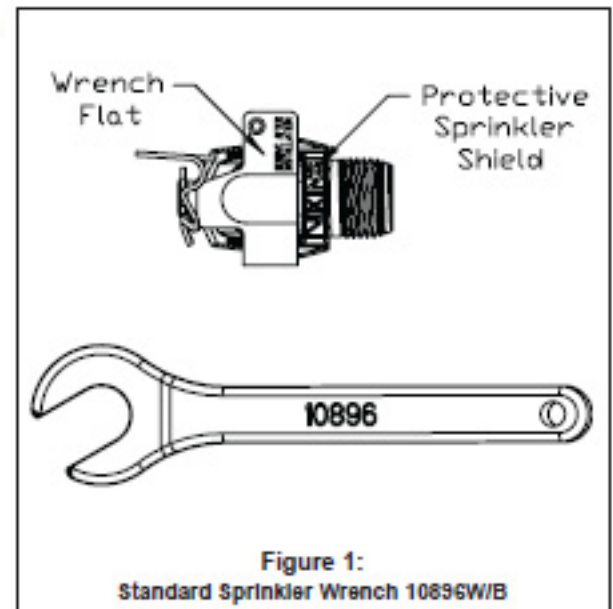


Figure 1:
Standard Sprinkler Wrench 10896W/B

VIKING**TECHNICAL DATA****MICROMATIC® AND
MICROMATICH[®] STANDARD
RESPONSE HORIZONTAL
SIDEWALL SPRINKLERS**

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

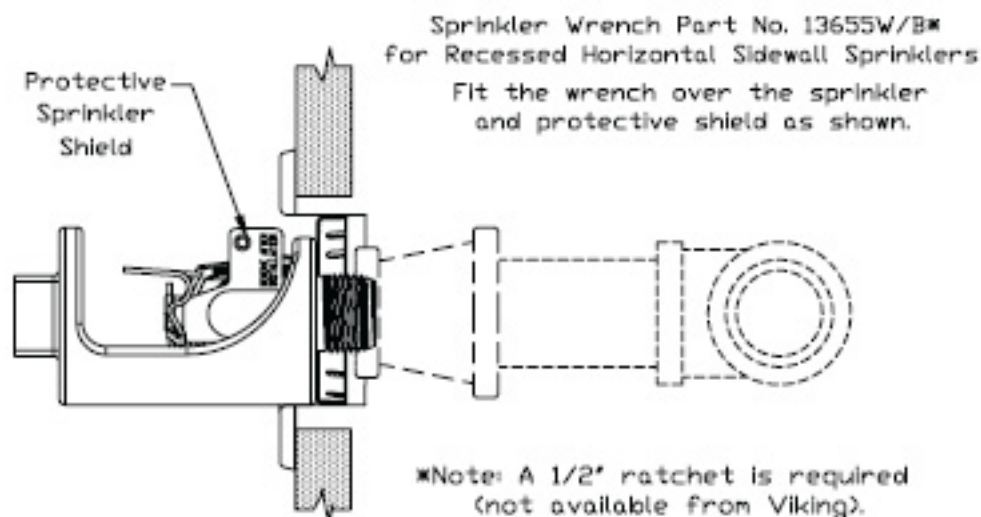
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

TABLE 1: AVAILABLE SPRINKLER TEMPERATURE RATINGS AND FINISHES

Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating ¹	Maximum Ambient Ceiling Temperature ²	Bulb Color
Ordinary	135 °F (57 °C)	100 °F (38 °C)	Orange
Ordinary	155 °F (68 °C)	100 °F (38 °C)	Red
Intermediate	175 °F (79 °C)	150 °F (65 °C)	Yellow
Intermediate	200 °F (93 °C)	150 °F (65 °C)	Green
High	286 °F (141 °C)	225 °F (107 °C)	Blue
Extra High	360 °F (182 °C)	300 °F (149 °C)	Mauve

Sprinkler Finishes: Brass, Chrome-Enloy®, White Polyester, Black Polyester, and Black Teflon®**Corrosion-Resistant Coatings³:** White Polyester, Black Polyester, and Black Teflon® in all temperature ratings. Wax-Coated Brass and Wax over Polyester for sprinklers with the following temperature ratings:

135 °F (57 °C) Off-White Wax 155 °F (68 °C) Lt. Brown Wax 175 °F (79 °C) Brown Wax 200 °F (93 °C) Brown Wax
 286 °F (141 °C) Dk. Brown Wax⁴

Footnotes¹ The sprinkler temperature rating is stamped on the deflector.² Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.³ The corrosion-resistant coatings have passed the standard corrosion test required by the approving agencies indicated in the Approval Chart. These tests cannot and do not represent all possible corrosive environments. Prior to installation, verify through the end-user that the coatings are compatible with or suitable for the proposed environment. For automatic sprinklers, the coatings indicated are applied to the exposed exterior surfaces only. Note that the spring is exposed on sprinklers with Polyester and Teflon® coatings. For Teflon® coated open sprinklers only, the waterway is coated.⁴ Wax melting point is 170 °F (76 °C) for 286 °F (141 °C) temperature rated sprinklers.**Figure 2: Wrench 13655W/B for Recessed Horizontal Sidewall Sprinklers**



TECHNICAL DATA

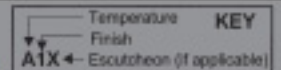
MICROMATIC® AND MICROMATICHP® STANDARD RESPONSE HORIZONTAL SIDEWALL SPRINKLERS

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Approval Chart 1 (UL)

Micromatic® and MicromaticHP® Standard Response Horizontal Sidewall Sprinklers



Maximum 175 PSI (12 Bar) WWP

(See Footnotes Below for Allowable Deflector Distance Below the Ceiling.)

Base Part Number ¹	SIN	Maximum Pressure	Thread Size		Nominal K-Factor		Overall Length		Listings and Approvals ³ (Refer also to Design Criteria on pg 14I.)								
			NPT	BSP	U.S.	metric ²	Inches	mm	cULus ^{4,5}	NYC ⁶	LPCB	CE ¹⁰	⊗ ¹¹				
Standard Orifice																	
10224	VK104	175 psi	1/2"	15 mm	5.6	80.6	2-7/16	62.4	B3W, B1W, A1X	B3V, B1V, A1X	A2Z	D2Y	D2Y				
10171	VK104	175 psi	—	15 mm	—	80.6	2-7/16	62.4	A1X	A1X							
Small Orifice																	
09126	VK016	175 psi	—	10 mm	4.2	57	2-7/16	62.4	cULus	NYC	LPCB	CE	⊗				
									—	—	—	—	—				
Maximum 250 PSI (17 Bar) WWP																	
Standard Orifice, for installation 4" to 12" (102 mm to 305 mm) Below the Ceiling.																	
09849	VK116	250 psi	1/2"	15 mm	5.6	80.6	2-11/16	67.6	cULus ^{4,5} A1X, B1W	NYC See Footnote 7.	LPCB	CE	⊗				
Maximum 250 PSI (17 Bar) WWP																	
Small Orifice⁹, for installation 4" to 6" (102 mm to 152 mm) Below the Ceiling.																	
09997 ¹²	VK015	250 psi	1/2"	15 mm	2.8	40.3	2-3/4	69	cULus ^{4,5} A1X, B1W	NYC See Footnote 7.	LPCB	CE	⊗				
Approved Temperature Ratings			Approved Finishes					Approved Escutcheons									
A - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 286 °F (141 °C), and 360 °F (182 °C) B - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), and 200 °F (93 °C) C - 286 °F (141 °C) D - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 286 °F (141 °C), and 360 °F (182 °C)			1 - Brass, Chrome-Enloy®, White Polyester ^{13,14} , Black Polyester ^{13,14} , and Black Teflon ^{®13} 2 - Brass, Chrome-Enloy®, White Polyester, and Black Polyester 3 - Wax-Coated Brass and Wax Over Polyester (corrosion resistant) 4 - High Temperature 200 °F (93 °C) Wax Coating (corrosion resistant); maximum ambient temperature allowed at ceiling = 150 °F (65 °C)					V - Installed with standard surface-mounted escutcheons or the Viking Microfast® Model F-1 Adjustable Escutcheon, or recessed with the Viking Micromatic® Model E-1 or E-2 Recessed Escutcheon W - Installed with standard surface-mounted escutcheons or the Viking Microfast® Model F-1 Adjustable Escutcheon, or recessed with the Viking Micromatic® Model E-1, E-2, or Model G-1 Recessed Escutcheon X - Installed with standard surface-mounted escutcheons or the Viking Microfast® Model F-1 Adjustable Escutcheon Y - Installed with standard surface-mounted escutcheons only									

Footnotes

¹ Base part number shown. For complete part number, refer to Viking's current price schedule.

² Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

³ This table shows the listings and approvals available at the time of printing. Other approvals may be in process.

⁴ Listed by Underwriters Laboratories Inc. for use in the U.S. and Canada.

⁵ cULus Listings limited to Light Hazard Occupancies where allowed by the installation standards being applied, with the deflector 4" to 12" (102 mm to 305 mm) below the ceiling.

⁶ Approved by the New York City Board of Standards and Appeals under Calendar Number 219-76-SA.

⁷ Meets New York City requirements, effective July 1, 2008.

⁸ cULus Listed for Light Hazard Occupancies where allowed by the installation standards being applied, and Ordinary Hazard Group I and II Occupancies.

⁹ cULus Listings limited to Light Hazard Occupancies where allowed by the installation standards being applied, with hydraulically calculated wet systems.

¹⁰ CE Certified, Standard EN 12259-1, EC-certificate of conformity 0832-CPD-2001 and 0832-CPD-2003.

¹¹ ⊗ MED Certified, Standard EN 12259-1, EC-certificate of conformity 0832-MED-1003 and 0832-MED-1008.

¹² The sprinkler orifice is bushed.

¹³ cULus Listed as corrosion-resistant.

¹⁴ Other colors are available on request with the same Listings and Approvals as the standard colors.



TECHNICAL DATA

**MICROMATIC® AND
MICROMATICHP® STANDARD
RESPONSE HORIZONTAL
SIDEWALL SPRINKLERS**

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

DESIGN CRITERIA - UL
(Also refer to Approval Chart 1 on page 14h.)

cULus Listing Requirements:

Standard Horizontal Sprinklers are cULus Listed as Indicated in the Approval Chart for installation in accordance with the latest edition of NFPA 13 for sidewall standard spray sprinklers.

- Designed for use in occupancy hazard classifications as indicated in the approval chart, below smooth, flat ceilings only.
- Protection areas and maximum spacing shall be in accordance with the tables provided in NFPA 13.
- Minimum spacing allowed is 6 ft. (1.8 m).
- Align the top of the deflector parallel with the ceiling.
- Locate no less than 4" (102 mm) from end walls.
- Maximum distance from end walls shall be no more than one-half of the allowable distance between sprinklers. The distance shall be measured perpendicular to the wall.
- The sprinkler installation and obstruction rules contained in NFPA 13 for sidewall standard spray sprinklers must be followed.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to page SR1-3 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.

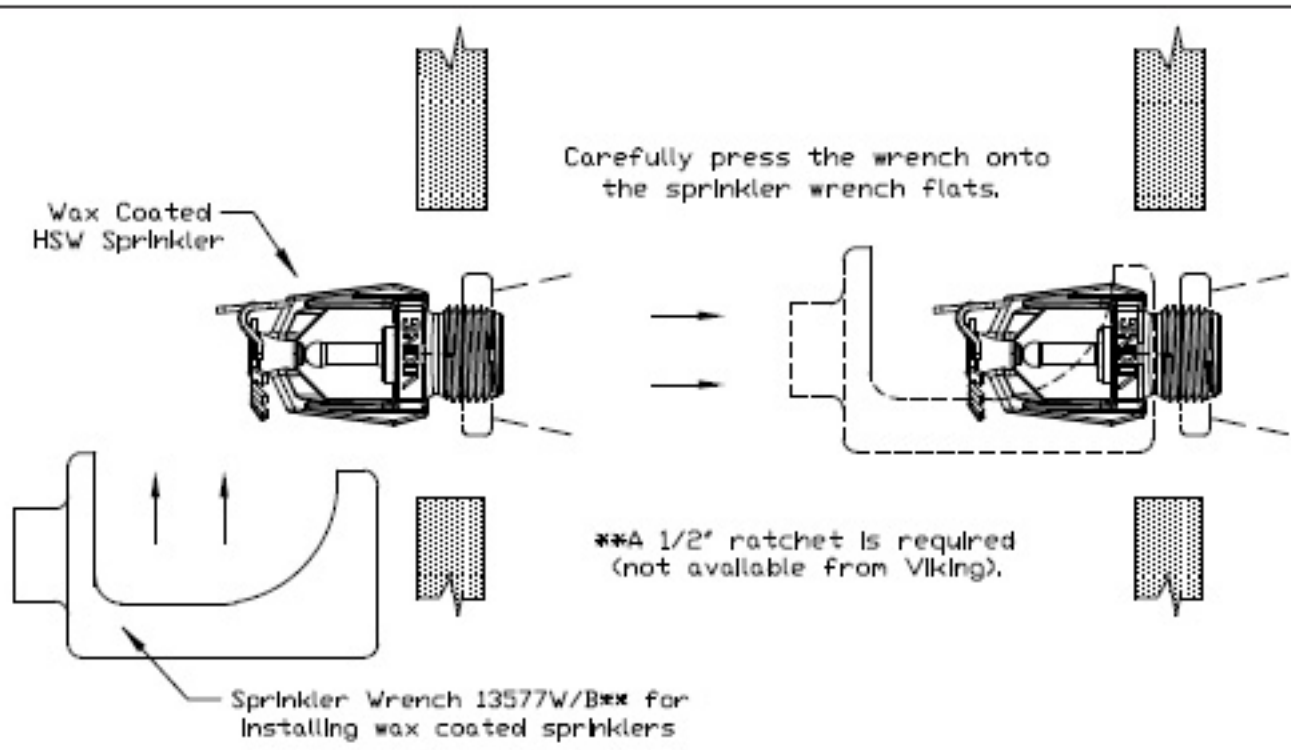


Figure 3: Wrench 13577W/B for Wax Coated Sprinklers



TECHNICAL DATA

MICROMATIC® AND MICROMATICHP® STANDARD RESPONSE HORIZONTAL SIDEWALL SPRINKLERS

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Approval Chart 2 (FM)

Micromatic® Standard Response Horizontal Sidewall Sprinklers
Maximum 175 PSI (12 Bar) WWP

KEY	
Temperature	—
Finish	—
A1X ←	Escutcheon (if applicable)

Base Part Number ¹	SIN	Maximum Pressure	Thread Size		Nominal K-Factor		Overall Length		FM Approvals ³ (Refer also to Design Criteria below.)
			NPT	BSP	U.S.	metric ²	Inches	mm	
10224	VK104	175 psi	1/2"	15 mm	5.6	80.6	2-7/16	62.4	A1X, B1W
10171	VK104	175 psi	—	15 mm	—	80.6	2-7/16	62.4	
Approved Temperature Ratings A - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 285 °F (141 °C). B - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), and 200 °F (93 °C)			Approved Finishes 1 - Brass and Chrome-Enloy®			Approved Escutcheons W - Installed with standard surface-mounted escutcheons or the Viking Microfast® Model F-1 Adjustable Escutcheon, or recessed with the Viking Micromatic® Model E-1, E-2, or Model G-1 Recessed Escutcheon X - Installed with standard surface-mounted escutcheons or the Viking Microfast® Model F-1 Adjustable Escutcheon			

Footnotes

¹ Base part number shown. For complete part number, refer to Viking's current price schedule.

² Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

³ This table shows the listings and approvals available at the time of printing. Other approvals may be in process.

DESIGN CRITERIA - FM

(Also refer to Approval Chart 2 above.)

FM Approval Requirements:

Sprinkler VK104 is FM Approved as a standard response **Non-Storage** sidewall sprinkler as indicated in the FM Approval Guide. For specific application and installation requirements, reference the latest applicable FM Loss Prevention Data Sheets (including 2-0) and Technical Advisory Bulletins. FM Global Loss Prevention Data Sheets and Technical Advisory Bulletins contain guidelines relating to, but not limited to: minimum water supply requirements, hydraulic design, ceiling slope and obstructions, minimum and maximum allowable spacing, and deflector distance below the ceiling.

NOTE: The FM installation guidelines may differ from cULus and/or NFPA criteria.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to page SR1-3 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, FM Global, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.

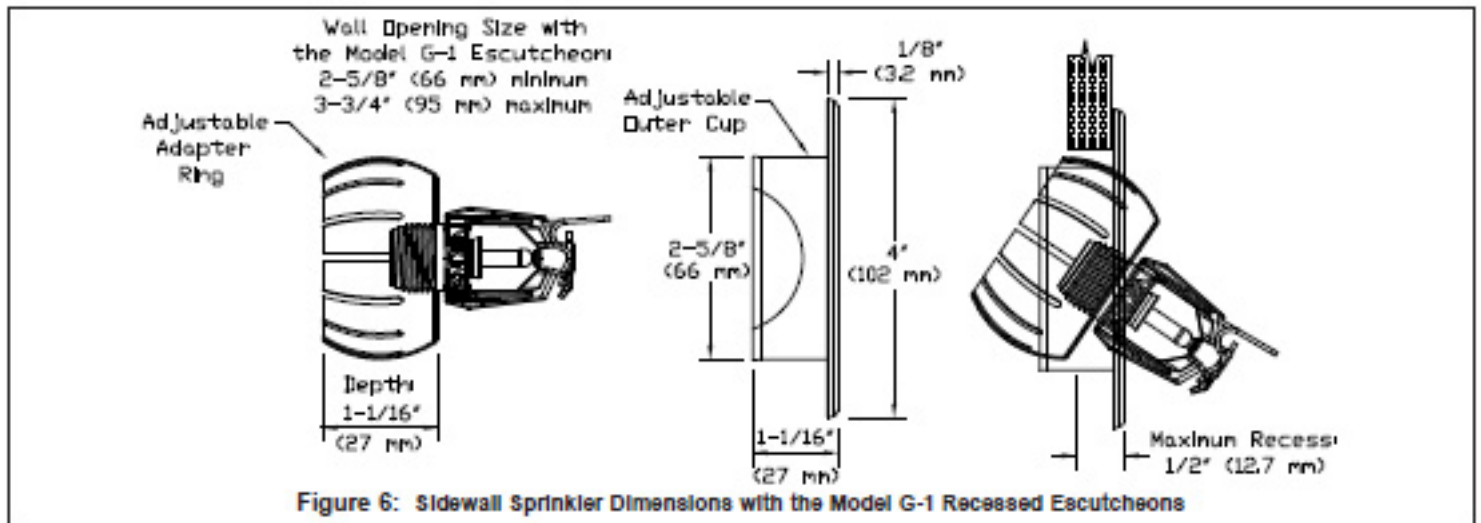
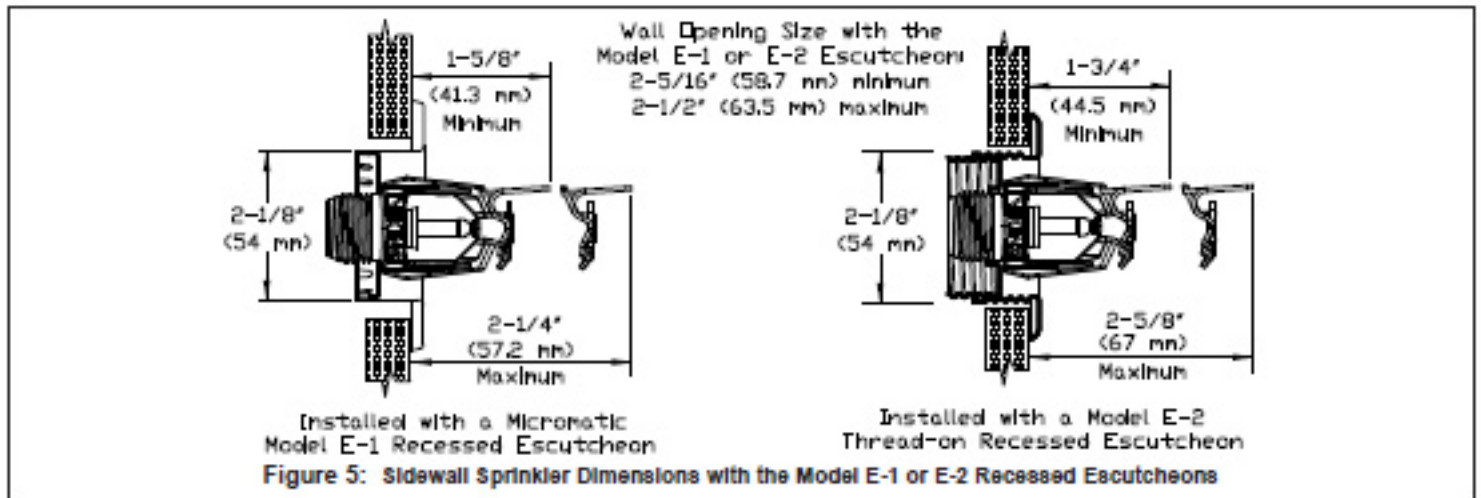
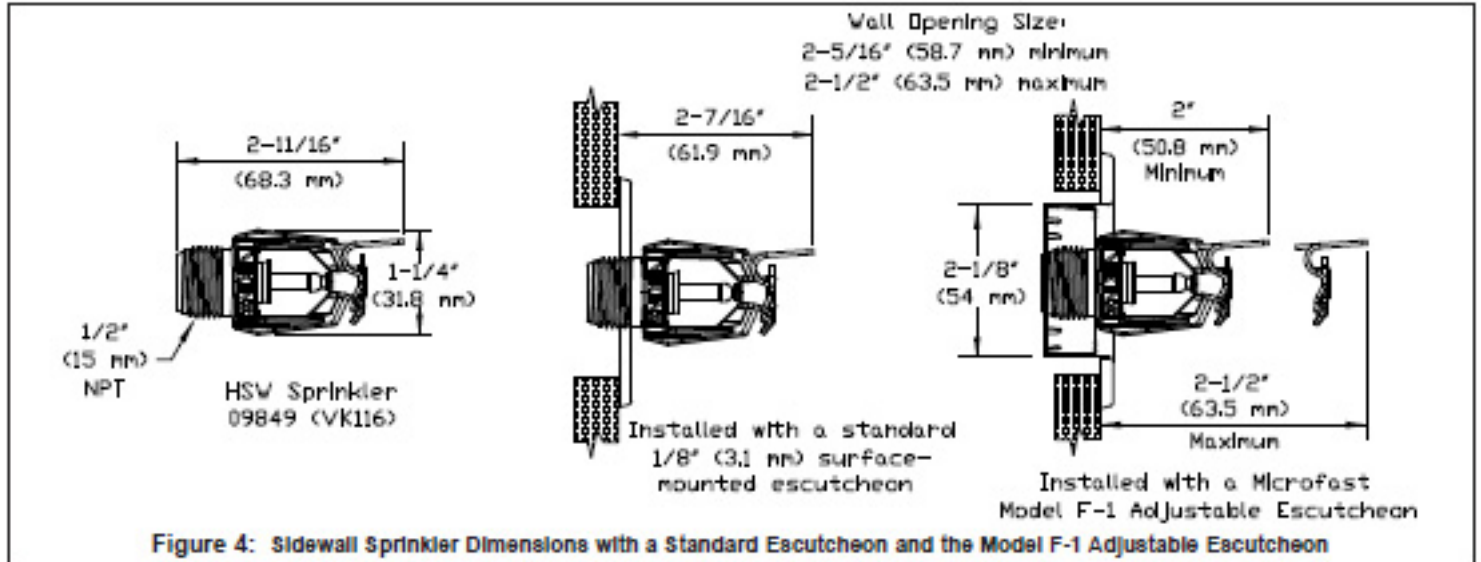


TECHNICAL DATA

**MICROMATIC® AND
MICROMATICHP® STANDARD
RESPONSE HORIZONTAL
SIDEWALL SPRINKLERS**

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com





VIKING BLAZEMASTER 1" CPVC PIPING

Model Number: 1PIPE

Dimensions:

Diameter: 1" x 15'

Weight: 3.93 lbs

Available: viking.com

Price: \$2.73 per foot

Features

- **Sizes Available (Nominal):** 3/4" (DN20) through 3" (DN80) pipe diameters, with a Standard Dimension Ratio (SDR) of 13.5 as specified in ASTM F442.
- **Environmental Specifications:** Indoor use only.
Maximum Ambient Temperature: 150°F (65°C)
- **Hazen-Williams C Value:** 150
- **Pressure Data:** Working Pressure: 175 PSI (12.1 bar) at 150°F (65°C)
- **Specifications:**
 - Meets NFPA 13R and 13D standards for residential occupancies as well as NFPA 13 standards for light hazard occupancies.
 - Pipe meets or exceeds ASTM F442.
 - Certified by NSF International for potable water services.
 - CPVC pipe from Viking Plastics use compound cell class 23547 (demonstrated highest structural properties).
 - cULus Listed, FM Approved, New York City (MEA) Approved, LPCB Approved.



CPVC PIPE PHYSICAL DATA

Nominal Pipe Size		Actual Outside Diameter		Average Inside Diameter		*Weight per 15' (4,6 m) length		Length		Approvals	Part Number
Inch	DN	Inch	mm	Inch	mm	Lb.	Kg.	Feet	M		
3/4"	DN20	1.050	26,670	0.874	22,199	2.52	1,14	15	4.6	cULus, FM, NSF	3/4PIPE
1"	DN25	1.315	33,401	1.101	27,885	3.83	1,78	15	4.6		1PIPE
1 1/4"	DN32	1.660	42,184	1.364	35,408	6.27	2,84	15	4.6		1 1/4PIPE
1 1/2"	DN40	1.800	48,260	1.568	40,589	8.22	3,73	15	4.6		1 1/2PIPE
2"	DN50	2.375	60,325	2.003	50,878	12.89	5,85	15	4.6		2PIPE
2 1/2"	DN65	2.875	73,000	2.423	61,500	18.86	8,55	15	4.6		2 1/2PIPE
3"	DN80	3.500	88,900	2.950	74,900	28.01	12,71	15	4.6		3PIPE
Nominal Pipe Size		Actual Outside Diameter		Average Inside Diameter		*Weight per 10' (3,05 m) length		Length		Approvals	Part Number
Inch	DN	Inch	mm	Inch	mm	Lb.	Kg.	Feet	M		
3/4"	DN20	1.050	26,670	0.874	22,199	1.68	0,78	10	3,05	cULus, FM, NSF	3/4PIPE10
1"	DN25	1.315	33,401	1.101	27,885	2.62	1,19	10	3,05		1PIPE10
1 1/4"	DN32	1.660	42,184	1.364	35,408	4.18	1,90	10	3,05		1 1/4PIPE10
1 1/2"	DN40	1.800	48,260	1.568	40,589	5.48	2,49	10	3,05		1 1/2PIPE10
2"	DN50	2.375	60,325	2.003	50,878	8.59	3,90	10	3,05		2PIPE10
2 1/2"	DN65	2.875	73,000	2.423	61,500	12.57	5,70	10	3,05		2 1/2PIPE10
3"	DN80	3.500	88,900	2.950	74,900	18.67	8,47	10	3,05		3PIPE10

NOTE: CPVC Pipe is produced in SDR 13.5 Diameter in accordance with ASTM F442. Standard Dimension Ratio is the ratio of the outside pipe diameter to the wall thickness of the pipe.

BlazeMaster[®] is a registered trademark of Lohdal.

Specifications subject to change without notice.

*Single pipe weight.

IMPORTANT: Installers should receive thorough hands-on training in the proper methods of assembly and installation of CPVC products.

CPVC Pipe Product Specifications

Corrosion resistant CPVC fire sprinkler pipe, when installed in strict accordance with the manufacturer's design and installation instructions, is UL and c-UL Listed by Underwriters Laboratories for use in the following:

- Meets NFPA 13R and 13D standards for residential occupancies as well as NFPA 13 standards for light hazard occupancies.
- Residential occupancies up to and including four stories in height as defined by NFPA 13R.
- Residential occupancies as defined in the Standard for Sprinkler Systems in One and Two Family Dwellings, NFPA 13D.
- Installation of private fire service mains and their appurtenances, NFPA 24.

CPVC fire sprinkler pipe from Viking Plastics shall be employed in wet pipe systems only and are not listed for outdoor use. CPVC pipe must never be used in a system using compressed air or other gases.

CPVC pipe from Viking Plastics also carries the following enhanced listings and approvals:

- According to UL Listing
 - Can be flush at return air plenums
 - Exposed system risers NFPA 13D, 13R
 - Exposed basement NFPA 13D (solid wood joist)
 - Extended coverage (exposed)
 - 20' spacing on pendent in lieu of 15'
 - 18' spacing on sidewall in lieu of 14'
 - Use with combustible concealed sprinklers
 - Tyco attic sprinkler head (to protect the floor below)
 - Tyco attic sprinkler head with wet system piping (feed main and ridge installation)
- Exposed sidewall sprinkler listing for exposed pipe & fittings
 - 24' extended coverage sidewall sprinkler, 12" drop, 155°F sprinkler head
 - 18' extended coverage sidewall sprinkler, 12" drop, 165°F sprinkler head
 - 16' extended coverage sidewall sprinkler, 12" drop, 175°F sprinkler head
 - 14' standard coverage sidewall sprinkler, 12" drop, 200°F sprinkler head
- Factory Mutual Approved*
 - Factory Mutual Approval exposed
 - Factory Mutual Approval above drop-in ceilings
 - Factory Mutual Approval exposed w/Soffi-Steel soffit covering system

New and enhanced listings and approvals are being pursued. Always check with the appropriate Listing and Approval agency for details on current listing parameters.

CPVC pipe meets all applicable standards for pressure rated application as required in ANSI-NSF Standard 14 and complies with ANSI-NSF Standard 61 for health effects and are marked with the NSF-pw end use marking.

All CPVC fire sprinkler pipe shall be Listed by Underwriters Laboratories for wet pipe systems, and shall carry a rated working pressure of 175 psi @ 150°F (12 bar @ 65.5°C). *The FM Approval is limited to use in wet pipe fire protection sprinkler systems for light hazard occupancies in both concealed and exposed applications with certain restrictions.

Piping must always be installed in strict accordance to the manufacturer's DESIGN AND INSTALLATION GUIDE, including product storage and handling, joining methods, supporting and bracing, expansion and contraction allowance and testing, etc. National Fire Protection Association (NFPA) Standards 13, 13D, and 13R must be referenced for design and installation requirements in conjunction with the installation instructions.

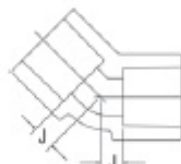
All CPVC fire sprinkler pipe from Viking Plastics is manufactured in the USA. All CPVC pipe shall be packaged immediately after its manufacture to prevent damage and shall be stored indoors after production, at the manufacturing site, until shipped from the factory. The pipe shall bear the logo of the listing agencies, and shall carry the National Sanitation Foundation (NSF) seal of approval for potable water applications.

CPVC products are intended for use in areas where the maximum ambient temperature does not exceed 150°F (65.5°C). If the ambient temperature is expected to exceed this limitation, refer to the manufacturer's DESIGN AND INSTALLATION GUIDE for additional information on methods to reduce the pipe exposure temperatures. CPVC pipe is not intended to be installed in outdoor applications. CPVC pipe is intended to be used in wet pipe systems only and have not been investigated for use in dry pipe systems. Special installation and design criteria relative to pipe hanger spacings, piping and sprinkler restraint, sprinkler temperature rating, piping locations, testing procedures and friction loss characteristics are specified in the manufacturer's installation instructions provided with the pipe. The manufacturer's installation instructions should be reviewed and the Authority Having Jurisdiction consulted before installation.

BlazeMaster® Fire Protection Fittings – STANDARD

ELBOWS

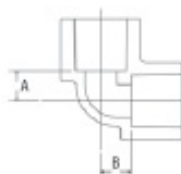
5006



45° Elbow

UNIV. FIG. NO.	NOM. SIZE	APPROX. NET WT./LBS.	DIM. J INCHES	JOINT
5006	3/4"	0.06	0.32	SXS
5006	1"	0.12	0.39	SXS
5006	1-1/4"	0.18	0.48	SXS
5006	1-1/2"	0.36	0.47	SXS
5006	2"	0.54	0.58	SXS
5006	2-1/2"	1.00	0.65	SXS
5006	3"	1.28	0.76	SXS

5007 5007-R



90° Elbow

UNIV. FIG. NO.	NOM. SIZE	APPROX. NET WT./LBS.	DIM. A INCHES	DIM. B INCHES	JOINT
5007	3/4"	0.08	0.56	0.56	SXS
5007	1"	0.14	0.69	0.69	SXS
5007	1-1/4"	0.22	0.91	0.91	SXS
5007	1-1/2"	0.41	1.06	1.06	SXS
5007	2"	0.60	1.24	1.24	SXS
5007	2-1/2"	1.16	1.50	1.50	SXS
5007	3"	1.66	1.81	1.81	SXS
5007-R	1"x3/4"	0.12	0.61	0.75	SXS

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Review – Do's & Don'ts

Do's

- Installation should be made only by a qualified installer or contractor in accordance with all applicable codes and requirements.
- Read and follow the installation instructions.
- Follow recommended safe work practices.
- Make certain that thread sealants, gasket lubricants, or firestop materials are compatible with CPVC.
- Keep pipe and fittings in original packaging until needed.
- Cover pipe and fittings with an opaque tarp if stored outdoors.
- Follow proper handling procedures.
- Use tools specifically designed for use with plastic pipe and fittings.
- Use the proper solvent cement and follow application instructions.
- Use a drop cloth to protect interior finishes.
- Cut the pipe ends square.
- Deburr and bevel the pipe end with a chamfering tool.
- Rotate the pipe 1/4 turn when bottoming pipe in fitting socket.
- Make certain no solvent cement is on sprinkler head and adapter threads.
- Make certain that solvent cement does not run and plug the sprinkler head orifice.
- Follow the manufacturer's recommended cure times prior to pressure testing.
- Fill lines slowly and only at a proper pressure.
- Bleed the air from the system prior to pressure testing.
- Support sprinkler head properly to prevent lift up of the head through the ceiling when activated.
- Keep threaded rod within 1/16" of the pipe or use a surge arrestor.
- Install NIBCO® **BlazeMaster**® CPVC Fire Sprinkler Products in wet systems only.
- Use only insulation and/or glycerin and water solutions for freeze protection.
- Allow for movement due to expansion and contraction.
- Ensure installers have been properly trained per the NIBCO **BlazeMaster**® CPVC Fire Sprinkler System Installation and Design Manual and renew your training every three years at a minimum.

Don'ts

- Do not use edible oils such as Crisco® as a gasket lubricant.
- Do not use petroleum or solvent-based sealants, lubricants, or fire stop materials.
- Do not use any glycol-based solutions as an anti-freeze.
- Do not contaminate the CPVC system with cutting oils or compressor oils.
- Do not mix glycerin and water solutions in contaminated containers.
- Do not use solvent cement that exceeds its shelf life or has become discolored or jellied.
- Do not allow solvent cement to plug the sprinkler head orifice.
- Do not connect rigid metal couplers to CPVC grooved adapters.
- Do not thread or groove CPVC pipe.
- Do not use solvent cement near sources of heat, open flame, or when smoking.
- Do not pressure test with air.
- Do not pressure test until recommended cure times are met.
- Do not exceed proper pressure for testing.
- Do not use ratchet cutters below 50°F.
- Do not use CPVC pipe that has been stored outdoors, unprotected and is faded in color.
- Do not allow threaded rod to come in contact with the pipe.
- Do not install NIBCO **BlazeMaster**® CPVC Fire Sprinkler Products in cold weather without allowing for expansion.
- Do not install NIBCO **BlazeMaster**® CPVC Fire Sprinkler Products in dry systems.
- Do not allow puddling of cement in fittings and pipe.
- Do not use dull or broken cutting tool blades when cutting pipe.

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CPVC Cross Reference Sheet

STANDARD FITTINGS

	NIBCO FIG. NO.	SIZE	SPEARS FIG. NO.	TYCO FIG. NO.	
ADAPTER	5001-G	1-1/4"	4233-012	80160	
	5001-G	1-1/2"	4233-015	80161	
	5001-G	2"	4233-020	80162	
	5001-G	2-1/2"	4233-025	80163	
	5001-G	3"	4233-030	80164	
BUSHINGS	5018	1"x3/4"	4237-131	80200	
	5018	1-1/4"x1"	4237-168	80202	
	5018	1-1/4"x3/4"	4237-167	80201	
	5018	1-1/2"x1-1/4"	4237-212	80205	
	5018	1-1/2"x1"	4237-211	80204	
	5018	1-1/2"x3/4"	4237-210	80203	
	5018	2"x1-1/2"	4237-251	80209	
	5018	2"x1-1/4"	4237-250	80208	
	5018	2"x1"	4237-249	80207	
	5018	2"x3/4"	4237-248	80206	
	5018	2-1/2"x2"	4237-292	80211	
	5018	2-1/2"x1-1/2"	4237-291	80213	
	5018	2-1/2"x1-1/4"	4237-290	80214	
	5018	2-1/2"x1"	N/A	80215	
	5018	3"x2-1/2"	4237-339	80212	
	5018	3"x2"	4237-338	80210	
	CAPS	5017	3/4"	4247-007	80100
		5017	1"	4247-010	80101
		5017	1-1/4"	4247-012	80102
		5017	1-1/2"	4247-015	80103
5017		2"	4247-020	80104	
5017		2-1/2"	4247-025	80105	
5017		3"	4247-030	80106	
5001		3/4"	4229-007	80075	
COUPLINGS	5001	1"	4229-010	80076	
	5001	1-1/4"	4229-012	80077	
	5001	1-1/2"	4229-015	80078	
	5001	2"	4229-020	80079	
	5001	2-1/2"	4229-025	80080	
	5001	3"	4229-030	80081	
	5001-R	1"x3/4"	4229-131	80220	
	5001-R	1-1/4"x1"	4229-168	N/A	
	5001-R	1-1/2"x3/4"	4229-210	N/A	
	5001-R	1-1/2"x1"	4229-211	N/A	
	5001-R	1-1/2"x1-1/4"	4229-212	N/A	
	5001-R	2"x1"	4229-249	N/A	
CROSSES	5001-R	2"x1-1/2"	4229-251	N/A	
	5035	3/4"	4220-007	80009	
	5035	1"	4220-010	80010	
	5035	1-1/4"	4220-012	80011	

STANDARD FITTINGS

	NIBCO FIG. NO.	SIZE	SPEARS FIG. NO.	TYCO FIG. NO.
CROSSES	5035	1-1/2"	4220-015	80012
	5035	2"	4220-020	80013
	5035	2-1/2"	4220-025	80014
	5035	3"	4220-030	80008
	5035-R	1"x3/4"x1"x3/4"	4220-131	80015
	5006	3/4"	4217-007	80050
	5006	1"	4217-010	80051
	5006	1-1/4"	4217-012	80052
	5006	1-1/2"	4217-015	80053
	5006	2"	4217-020	80054
ELBOWS	5006	2-1/2"	4217-025	80055
	5006	3"	4217-030	80056
	5007	3/4"	4206-007	80025
	5007	1"	4206-010	80026
	5007	1-1/4"	4206-012	80027
	5007	1-1/2"	4206-015	80028
	5007	2"	4206-020	80039
	5007	2-1/2"	4206-025	80030
	5007	3"	4206-030	80031
	5007-R	1"x3/4"	4206-131	80032
	5019-H	3/4"	4253-007	N/A
	5019-H	1"	4253-010	N/A
	5019-H	1-1/4"	4253-012	N/A
	5019-H	1-1/2"	4253-015	N/A
	FLANGES	5019-H	2"	4253-020
5019-H		2-1/2"	4253-025	N/A
5019-H		3"	4253-030	N/A
5051-A		3"	4254-030	N/A
5051-2-A		3"	4256-030	N/A
5051-H		3/4"	4251-007	N/A
5051-H		1"	4251-010	N/A
5051-H		1-1/4"	4251-012	N/A
5051-H		1-1/2"	4251-015	N/A
5051-H		2"	4251-020	N/A
5051-H		2-1/2"	4251-025	N/A
5051-H		3"	N/A	N/A
5011		3/4"	4201-007	8000
5011		1"	4201-010	8001
TEES		5011	1-1/4"	4201-012
	5011	1-1/2"	4201-015	8003
	5011	2"	4201-020	80004
	5011	2-1/2"	4201-025	8005
	5011	3"	4201-030	80006
	5011-R	3/4"x3/4"x1"	4201-102	80132
	5011-R	1"x1"x3/4"	4201-131	80260

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CPVC Cross Reference Sheet

STANDARD FITTINGS

	NIBCO FIG. NO.	SIZE	SPEARS FIG. NO.	TYCO FIG. NO.
TEES	5011-R	1"x3/4"x1"	4201-126	80134
	5011-R	1"x3/4"x3/4"	4201-125	80133
	5011-R	1-1/4"x1-1/4"x1"	4201-168	80262
	5011-R	1-1/4"x1-1/4"x3/4"	4201-167	80261
	5011-R	1-1/4"x1"x1-1/4"	4201-159	80137
	5011-R	1-1/4"x1"x1"	4201-158	80136
	5011-R	1-1/4"x1"x3/4"	4201-157	80135
	5011-R	1-1/4"x1-1/4"x1-1/2"	4201-169	80138
	5011-R	1-1/2"x1-1/2"x1-1/4"	4201-212	80275
	5011-R	1-1/2"x1-1/2"x1"	4201-211	80264
	5011-R	1-1/2"x1-1/2"x3/4"	4201-210	80263
	5011-R	1-1/2"x1-1/4"x1"	4201-202	80140
	5011-R	1-1/2"x1-1/4"x3/4"	4201-201	80140
	5011-R	1-1/2"x1-1/2"x2"	4201-213	N/A
	5011-R	2"x2"x1-1/2"	4201-251	80274
	5011-R	2"x2"x1-1/4"	4201-250	80267
	5011-R	2"x2"x1"	4201-249	80266
	5011-R	2"x2"x3/4"	4201-248	80265
	5011-R	2-1/2"x2-1/2"x2"	4201-292	80276
	5011-R	2-1/2"x2-1/2"x1-1/2"	4201-291	80273
5011-R	2-1/2"x2-1/2"x1-1/4"	4201-290	80272	
5011-R	2-1/2"x2-1/2"x1"	4201-289	80271	
5011-R	3"x3"x1-1/2"	4201-339	80269	
5011-R	3"x3"x2"	4201-338	80268	
5011-R	3"x3"x1-1/2"	4201-337	80270	
UNIONS	5033-E	3/4"	4257-007	N/A
	5033-E	1"	4257-010	N/A
	5033-E	1-1/4"	4257-012	N/A
	5033-E	1-1/2"	4257-015	N/A
	5033-E	2"	4257-020	N/A
	5033-E	2-1/2"	N/A	N/A
	5033-E	3"	N/A	N/A

THREADED FITTINGS

	NIBCO FIG. NO.	SIZE	SPEARS FIG. NO.	TYCO FIG. NO.	
ADAPTERS	5003-BI	3/4"	4235-007	80142	
	5003-BI	1"	4235-010	80145	
	5003-BI	1-1/4"	4235-012	80146	
	5003-BI	1-1/2"	4235-015	80147	
	5003-BI	2"	4235-020	80148	
	5003-2-BI	3/4"	4279-007	N/A	
	5003-2-BI	1"	4279-010	N/A	
	5003-S-BI	3/4"x1/2"	4235-101	80175E or 80175W	
	5003-S-BI	1"x1/2"	4235-130	80176E or 80175W	
	5003-S-BI	1"x3/4"	4235-131	80179	
	5003-2-S-BI	3/4"x1/2"	4238-101	N/A	
	5003-2-S-BI	1"x1/2"	4238-130	N/A	
	5004-BI	3/4"	N/A	80157	
	5004-BI	1"	N/A	80158	
	5004-BI	1-1/4"	N/A	N/A	
5004-BI	1-1/2"	N/A	N/A		
5004-BI	2"	N/A	N/A		
CROSSES	5035-3-S-BI-S	1"x1"x1/2"x1/2"	N/A	80462	
	5035-3-S-BI-L	1"x1"x1/2"x1/2"	N/A	80463	
ELBOWS	5007-3-S-BI	3/4"x1/2"	4207-101	80199	
	5007-3-S-BI	1"x1/2"	4207-130	80198	
	5007-3-S-BI	1"x3/4"	4207-131	N/A	
	5007-3-S-BI	1-1/4"x1/2"	4207-166	N/A	
	5011-3-3-S-BI-S	1/2"x1/2"x1"	N/A	80460	
	5011-3-3-S-BI-L	1/2"x1/2"x1"	N/A	80459	
	5012-S-BI	1"	4202-010	N/A	
	5012-S-BI	3/4"x3/4"x1/2"	4202-101	80250	
	5012-R-S-BI	1"x3/4"x1/2"	4202-124	N/A	
	5012-S-BI	1"x1"x1/2"	4202-130	80251	
TEES	5012-R-S-BI	1"x1"x1"	4203-122	N/A	
	5012-R-S-BI	1-1/4"x1"x1/2"	4202-156	80256	
	5012-S-BI	1-1/4"x1-1/4"x1/2"	4202-166	80252	
	5012-R-S-BI	1-1/2"x1-1/4"x1/2"	4202-199	80257	
	5012-S-BI	1-1/2"x1-1/2"x1/2"	4202-209	80254	
	5012-S-BI	2"x2"x1/2"	4202-247	80253	
	5012-R-S-BI	2"x1-1/2"x1/2"	4202-237	80258	
	TEST PLUG	450-005	1/2"	4250-005	N/A
	UNION CONNECTOR	TCBR-3	3/4"	N/A	N/A
		TCBR-3	1"	N/A	N/A
TCBR-3		1-1/4"	N/A	N/A	
TCBR-3		1-1/2"	N/A	N/A	
TCBR-3		2"	N/A	N/A	
TCBR-3		3"	N/A	N/A	

BlazeMaster®

NIBCO LIMITED WARRANTY

Applicable to NIBCO INC. CPVC FIRE PROTECTION Plastic Fittings

NIBCO INC. warrants each NIBCO **BlazeMaster**® Fire Protection CPVC plastic fitting to be free from defects in materials and workmanship under normal use and service for a period of ten (10) years from the date of purchase.

In the event any defect occurs which the owner believes is covered by this Warranty, the owner should immediately contact NIBCO INC., Technical Services, either in writing or by telephone call, (888) 446-4226 or (574) 295-3000. The owner will be instructed to return said fitting or valve, at the owner's expense, to NIBCO INC. or an authorized NIBCO INC. representative for inspection. In the event said inspection discloses to NIBCO INC.'s satisfaction that said fitting or valve is defective, a replacement shall be mailed free of charge to the owner, and NIBCO INC. shall further pay the installing contractor the sum of ten (\$10.00) dollars to apply on the cost of installation of said replacement fitting.

TO THE EXTENT PERMITTED BY LAW, THIS WARRANTY SPECIFICALLY EXCLUDES INCIDENTAL AND CONSEQUENTIAL DAMAGES OF EVERY TYPE AND DESCRIPTION RESULTING FROM ANY CLAIMED DEFECT IN MATERIAL OR WORKMANSHIP, INCLUDING BUT NOT LIMITED TO, PERSONAL INJURIES AND PROPERTY DAMAGES. Some states do not allow the exclusion or limitations of incidental or consequential damages, so these limitations may not apply to you. **TO THE EXTENT PERMITTED BY LAW, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE LIMITED IN DURATION.**

This Warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

NIBCO NIBCO INC. World Headquarters • 1516 Middlebury St. • Elkhart, IN 46516-4740 USA • www.nibco.com

how to order

NIBCO sells its products through select stocking distributors. Our distributors are knowledgeable about plastics fittings as well as the complete line of NIBCO Fire Protection Systems.

Please visit www.nibco.com for a complete listing of authorized NIBCO distributors in your area.

NIBCO INC. Customer Service
World Headquarters
1516 Middlebury Street
P.O. Box 1167
Elkhart, IN 46515-1167
USA
Phone: 800.234.0227
Fax: 800.234.0557

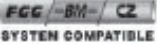
To the best of our knowledge the information contained in this publication is accurate. However, NIBCO® does not assume any liability whatsoever for the accuracy or completeness of such information. Final determinations of the suitability of any information or product for the use to be contemplated is the sole responsibility of the user. The manner of that use, and whether there is any infringement of patents, is also the sole responsibility of the user.

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Sprinkler Head Installation Instructions - Brastic™ CPVC Thread Fittings

NIBCO recommends the use of either pipe joint compound OR PTFE tape when installing sprinkler heads – NEVER use both.

When using pipe joint compound:

- NIBCO recommends IPS® / Weld-On “Blue Seal Plus” Pipe Joint Compound with PTFE.
- Additional manufacturers of joint compounds are acceptable only if confirmed compatible for use with CPVC via the System Compatible program – reference www.systemcompatible.com for the latest listing of approved manufacturers. Compatible compounds will carry the  mark.
- Thread seal compound is to be applied ONLY to the male thread.
- Always follow the compound manufacturer’s application / installation instructions.

When using PTFE tape:

- Always use a quality PTFE tape, having a thickness of no less than .0025” (2.5 mil) and meets or exceeds mil spec MIL-T-27730A.
- On the male sprinkler thread, start with the first full thread and wrap clockwise making sure all threads are fully covered. Make sure the initial wrap fully covers the thread end of the sprinkler head – two to three wraps is sufficient – DO NOT over apply.
- Note: PTFE tape acts as a lubricant, DO NOT over tighten.

Prior to installing the sprinkler head, the sprinkler head adapter fitting should be visually inspected or probed with a dowel to ensure the waterway and threads are clear of any excess cement. All cemented fittings shall be given adequate cure time as recommended in the cure chart tables located in the NIBCO BlazeMaster CPVC Fire Sprinkler System Installation and Design Manual. CAUTION: it is unacceptable practice to assemble sprinklers into sprinkler head adapter fittings prior to solvent cementing.

Sprinkler Installation:

- After applying either pipe joint compound OR PTFE tape to the sprinkler head, thread assembly “finger tight” into the Brastic sprinkler head adapter fitting. Testing indicates **10 to 20ft. lbs.** of torque is adequate to obtain a leak free seal. This amount of torque equates to **1/4 to 1 turn** beyond finger tight. NOTE: Over tightening will result in damaged threads, DO NOT apply more than 30ft. lbs. of torque.
- DO NOT use conventional pipe wrenches that can damage fittings – use an adjustable wrench on the flats of the Brastic fitting or a strap wrench. For the sprinkler head, use only the manufacturer’s approved wrench.



NIBCO BLAZEMASTER CPVC FITTINGS

Model Number: 5003-S-BT

Location: Main House

Dimensions:

1" x 1/2"

Weight: 0.17 lbs

Joint: SXFNPT

NIBCO
AHEAD OF THE FLOW™

BlazeMaster
FIRE SPRINKLER FITTINGS

FEATURES

- Available in ¾" x ½" and 1" x ½"
- Complies with NFPA-13, 13R and 13D requirements
- Use sprinkler manufacturer's wrench for sprinkler install or removal (No special wrench required to remove sprinkler head)
- Large lead chamfer will not remove PTFE tape or thread sealant upon sprinkler assembly
- No lead-containing metal in contact with fluid. NSF Certified for compliance with NSF/ANSI 61, Annex G (Approved for use with potable water intended for human consumption)
- Dezincification and corrosion resistant
- Wide wrench flats for hold back
- Reduced sprinkler installation torque vs. brass
- Made in USA
- U.S. Patent 6,186,558



**THE NEW PATENTED
NIBCO® BRASTIC™
SPRINKLER HEAD ADAPTER
REINVENTS
SPRINKLER INSTALLATION**

UNIQUE DESIGN PROVIDES GREATER RESISTANCE TO RADIAL STRESS ALONG THE ENTIRE LENGTH OF THE SEALING THREADS

SPRINKLER SEALS ENTIRELY AGAINST CPVC WHEN PROPERLY INSTALLED ELIMINATING A POTENTIAL LEAK PATH

IMPROVED TORQUE PERFORMANCE

ROBUST STARTER THREAD TO PREVENT SPRINKLER CROSS THREADING

"Backed By The Name You Can Trust"

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www.nibco.com

Printed in USA

BRASTIC™ Sprinkler Head Adapters

SIZE RANGE – 3/4" x 1/2" and 1" x 1/2" (Socket x FNPT)

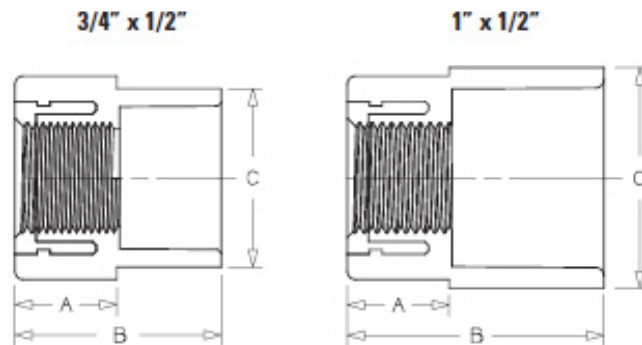
FEATURES –

- Sprinkler seals entirely against CPVC when properly installed eliminating a potential leak path
- Unique design provides greater resistance to radial stress along the entire length of the sealing threads
- Robust starter thread to prevent sprinkler cross threading
(Large lead chamfer will not remove PTFE tape or thread sealant upon sprinkler assembly)
- Use sprinkler manufacturer's wrench for sprinkler install or removal
(No special wrench required to remove sprinkler head)
- No lead-containing metal in contact with fluid. NSF Certified for compliance with NSF/ANSI 61, Annex G.
(Approved for use with potable water intended for human consumption)
- Dezincification and corrosion resistant
- Wide wrench flats for hold back
- Improved torque resistance
- Made in USA
- U.S. Patent 6,186,558



LISTINGS AND APPROVALS –

- UL 1821 Listed
 - Exposed system risers NFPA 13D, 13R
 - Exposed basement NFPA 13D (solid wood joist)
 - Extended coverage (exposed)
 - 20' spacing on pendent in lieu of 15'
 - Exposed extended coverage sidewall sprinkler listing for exposed pipe & fittings
 - Permitted for use with return air plenums with no set-back at ceiling openings per NFPA 90A
- ULC Listed
- Factory Mutual Approved
 - Factory Mutual Approval exposed
 - Factory Mutual Approval above drop-in ceilings
- LPCB Approved
- NSF Certification -pw Annex-G



UNIV. FIG. NO.	NOM. SIZE	APPROX. NET WT./LBS.	DIM. A INCHES	DIM. B INCHES	DIM. C INCHES	JOINT
5003-S-BT	1"X1/2"	0.17	.75	1.89	1.625	SKFNPT
5003-S-BT	3/4"x1/2"	0.15	.75	1.52	1.315	SKFNPT

INSTALLATION INSTRUCTIONS –

For complete installation instructions see NIBCO's "Installation and Design Manual" or for Brastic installation instructions reference form No. IM-BLBF-0910.



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3/4" 5011 TEES/ 1" alarm ELBOWS

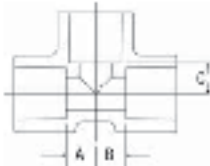
3/4" 5011 Tees
Model Number: 5011
Location: Main House
Weight: 0.17 lbs
Joint: SXSXS

1"5007 Elbows
Model Number: 5007
Location: Closet
Weight: 0.14 lbs
Joint: SXS

BlazeMaster® Fire Protection Fittings – STANDARD

TEES

5011
5011-R



Tees

UNIV. FIG. NO.	NOM. NOM. SIZE	APPROX. NET WT./LBS.	DIM. A INCHES	DIM. B INCHES	DIM. C INCHES	JOINT
5011	3/4"	0.10	0.67	0.67	0.67	ST/ST
5011	1"	0.17	0.89	0.89	0.89	ST/ST
5011	1-1/4"	0.28	0.89	0.89	0.89	ST/ST
5011	1-1/2"	0.38	1.06	1.06	1.06	ST/ST
5011	2"	0.62	1.26	1.26	1.26	ST/ST
5011	2-1/2"	1.08	1.83	1.83	1.83	ST/ST
5011	3"	2.14	1.84	1.84	1.84	ST/ST
5011-R	3/4"x3/4"x1/2"	0.14	0.70	0.70	0.73	ST/ST
5011-R	1"x1/2"x1/2"	0.16	0.81	0.81	0.84	ST/ST
5011-R	1"x3/4"x1/2"	0.20	0.76	0.89	0.78	ST/ST
5011-R	1-1/4"x1/2"	0.16	0.80	0.87	0.77	ST/ST
5011-R	1-1/4"x1-1/4"x1/2"	0.24	0.73	0.73	0.89	ST/ST
5011-R	1-1/4"x1-1/4"x3/4"	0.20	0.80	0.80	0.89	ST/ST
5011-R	1-1/4"x1-1/4"x1/2"	0.28	0.89	1.03	0.87	ST/ST
5011-R	1-1/4"x1"	0.24	0.71	0.80	0.89	ST/ST
5011-R	1-1/4"x1-1/4"	0.20	0.81	0.76	0.89	ST/ST
5011-R	1-1/4"x1-1/4"x1/2"	0.44	1.01	1.01	0.89	ST/ST
5011-R	1-1/2"x1-1/2"x1/2"	0.46	0.89	0.89	1.04	ST/ST
5011-R	1-1/2"x1-1/2"	0.64	0.77	0.77	0.86	ST/ST
5011-R	1-1/2"x1-1/2"x3/4"	0.60	0.87	0.87	1.04	ST/ST
5011-R	1-1/2"x1-1/4"	0.40	0.72	0.81	1.01	ST/ST
5011-R	1-1/2"x1-1/4"x3/4"	0.26	0.80	0.78	1.02	ST/ST
5011-R	1-1/2"x1-1/2"	0.88	1.20	1.20	1.14	ST/ST
5011-R	2"x2"x1/2"	0.86	1.06	1.06	1.27	ST/ST
5011-R	2"x2"x1/4"	0.87	1.00	1.00	1.28	ST/ST
5011-R	2"x2"	0.72	0.80	0.80	1.26	ST/ST
5011-R	2"x2"x3/4"	0.88	0.70	0.70	1.26	ST/ST
5011-R	2-1/2"x2-1/2"	1.83	1.83	1.83	1.83	ST/ST
5011-R	2-1/2"x2-1/2"x1/2"	1.84	1.83	1.83	2.08	ST/ST
5011-R	2-1/2"x2-1/2"x1/4"	1.86	1.83	1.83	2.47	ST/ST
5011-R	2-1/2"x2-1/2"	1.84	1.83	1.83	2.09	ST/ST
5011-R	3"x3"x1/2"	2.81	1.84	1.84	2.46	ST/ST
5011-R	3"x3"	1.86	1.26	1.26	1.82	ST/ST
5011-R	3"x3"x1/2"	2.87	1.84	1.84	2.66	ST/ST

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Review – Do's & Don'ts

Do's

- Installation should be made only by a qualified installer or contractor in accordance with all applicable codes and requirements.
- Read and follow the installation instructions.
- Follow recommended safe work practices.
- Make certain that thread sealants, gasket lubricants, or firestop materials are compatible with CPVC.
- Keep pipe and fittings in original packaging until needed.
- Cover pipe and fittings with an opaque tarp if stored outdoors.
- Follow proper handling procedures.
- Use tools specifically designed for use with plastic pipe and fittings.
- Use the proper solvent cement and follow application instructions.
- Use a drop cloth to protect interior finishes.
- Cut the pipe ends square.
- Deburr and bevel the pipe end with a chamfering tool.
- Rotate the pipe 1/4 turn when bottoming pipe in fitting socket.
- Make certain no solvent cement is on sprinkler head and adapter threads.
- Make certain that solvent cement does not run and plug the sprinkler head orifice.
- Follow the manufacturer's recommended cure times prior to pressure testing.
- Fill lines slowly and only at a proper pressure.
- Bleed the air from the system prior to pressure testing.
- Support sprinkler head properly to prevent lift up of the head through the ceiling when activated.
- Keep threaded rod within 1/16" of the pipe or use a surge arrestor.
- Install NIBCO® **BlazeMaster**® CPVC Fire Sprinkler Products in wet systems only.
- Use only insulation and/or glycerin and water solutions for freeze protection.
- Allow for movement due to expansion and contraction.
- Ensure installers have been properly trained per the NIBCO **BlazeMaster**® CPVC Fire Sprinkler System Installation and Design Manual and renew your training every three years at a minimum.

Don'ts

- Do not use edible oils such as Crisco® as a gasket lubricant.
- Do not use petroleum or solvent-based sealants, lubricants, or fire stop materials.
- Do not use any glycol-based solutions as an anti-freeze.
- Do not contaminate the CPVC system with cutting oils or compressor oils.
- Do not mix glycerin and water solutions in contaminated containers.
- Do not use solvent cement that exceeds its shelf life or has become discolored or jellied.
- Do not allow solvent cement to plug the sprinkler head orifice.
- Do not connect rigid metal couplers to CPVC grooved adapters.
- Do not thread or groove CPVC pipe.
- Do not use solvent cement near sources of heat, open flame, or when smoking.
- Do not pressure test with air.
- Do not pressure test until recommended cure times are met.
- Do not exceed proper pressure for testing.
- Do not use ratchet cutters below 50°F.
- Do not use CPVC pipe that has been stored outdoors, unprotected and is faded in color.
- Do not allow threaded rod to come in contact with the pipe.
- Do not install NIBCO **BlazeMaster**® CPVC Fire Sprinkler Products in cold weather without allowing for expansion.
- Do not install NIBCO **BlazeMaster**® CPVC Fire Sprinkler Products in dry systems.
- Do not allow puddling of cement in fittings and pipe.
- Do not use dull or broken cutting tool blades when cutting pipe.

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CPVC Cross Reference Sheet

STANDARD FITTINGS

	NIBCO FIG. NO.	SIZE	SPEARS FIG. NO.	TYCO FIG. NO.
ADAPTER	5001-G	1-1/4"	4233-012	80160
	5001-G	1-1/2"	4233-015	80161
	5001-G	2"	4233-020	80162
	5001-G	2-1/2"	4233-025	80163
	5001-G	3"	4233-030	80164
BUS HINGS	5018	1"x3/4"	4237-131	80200
	5018	1-1/4"x1"	4237-168	80202
	5018	1-1/4"x3/4"	4237-167	80201
	5018	1-1/2"x1-1/4"	4237-212	80205
	5018	1-1/2"x1"	4237-211	80204
	5018	1-1/2"x3/4"	4237-210	80203
	5018	2"x1-1/2"	4237-251	80209
	5018	2"x1-1/4"	4237-250	80208
	5018	2"x1"	4237-249	80207
	5018	2"x3/4"	4237-248	80206
	5018	2-1/2"x2"	4237-292	80211
	5018	2-1/2"x1-1/2"	4237-291	80213
	5018	2-1/2"x1-1/4"	4237-290	80214
	5018	2-1/2"x1"	N/A	80215
	5018	3"x2-1/2"	4237-339	80212
	5018	3"x2"	4237-338	80210
	5017	3/4"	4247-007	80100
	5017	1"	4247-010	80101
	5017	1-1/4"	4247-012	80102
	5017	1-1/2"	4247-015	80103
5017	2"	4247-020	80104	
5017	2-1/2"	4247-025	80105	
5017	3"	4247-030	80106	
COUPLINGS	5001	3/4"	4229-007	80075
	5001	1"	4229-010	80076
	5001	1-1/4"	4229-012	80077
	5001	1-1/2"	4229-015	80078
	5001	2"	4229-020	80079
	5001	2-1/2"	4229-025	80080
	5001	3"	4229-030	80081
	5001-R	1"x3/4"	4229-131	80220
	5001-R	1-1/4"x1"	4229-168	N/A
	5001-R	1-1/2"x3/4"	4229-210	N/A
5001-R	1-1/2"x1"	4229-211	N/A	
5001-R	1-1/2"x1-1/4"	4229-212	N/A	
5001-R	2"x1"	4229-249	N/A	
5001-R	2"x1-1/2"	4229-251	N/A	
CROSSES	5035	3/4"	4220-007	80009
	5035	1"	4220-010	80010
	5035	1-1/4"	4220-012	80011

STANDARD FITTINGS

	NIBCO FIG. NO.	SIZE	SPEARS FIG. NO.	TYCO FIG. NO.
CROSSES	5035	1-1/2"	4220-015	80012
	5035	2"	4220-020	80013
	5035	2-1/2"	4220-025	80014
	5035	3"	4220-030	80008
	5035-R	1"x3/4"x1"x3/4"	4220-131	80015
	5006	3/4"	4217-007	80050
	5006	1"	4217-010	80051
	5006	1-1/4"	4217-012	80052
	5006	1-1/2"	4217-015	80053
	5006	2"	4217-020	80054
ELBOWS	5006	2-1/2"	4217-025	80055
	5006	3"	4217-030	80056
	5007	3/4"	4206-007	80025
	5007	1"	4206-010	80026
	5007	1-1/4"	4206-012	80027
	5007	1-1/2"	4206-015	80028
	5007	2"	4206-020	80039
	5007	2-1/2"	4206-025	80030
	5007	3"	4206-030	80031
	5007-R	1"x3/4"	4206-131	80032
FLANGES	5019-H	3/4"	4253-007	N/A
	5019-H	1"	4253-010	N/A
	5019-H	1-1/4"	4253-012	N/A
	5019-H	1-1/2"	4253-015	N/A
	5019-H	2"	4253-020	N/A
	5019-H	2-1/2"	4253-025	N/A
	5019-H	3"	4253-030	N/A
	5051-A	3"	4254-030	N/A
	5051-2-A	3"	4256-030	N/A
	5051-H	3/4"	4251-007	N/A
TEES	5051-H	1"	4251-010	N/A
	5051-H	1-1/4"	4251-012	N/A
	5051-H	1-1/2"	4251-015	N/A
	5051-H	2"	4251-020	N/A
	5051-H	2-1/2"	4251-025	N/A
	5051-H	3"	N/A	N/A
	5011	3/4"	4201-007	8000
	5011	1"	4201-010	8001
	5011	1-1/4"	4201-012	8002
	5011	1-1/2"	4201-015	8003
5011	2"	4201-020	80004	
5011	2-1/2"	4201-025	8005	
5011	3"	4201-030	80006	
5011-R	3/4"x3/4"x1"	4201-102	80132	
5011-R	1"x1"x3/4"	4201-131	80260	

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CPVC Cross Reference Sheet

STANDARD FITTINGS

	NIBCO FIG. NO.	SIZE	SPEARS FIG. NO.	TYCO FIG. NO.
TEES	5011-R	1"x3/4"x1"	4201-126	80134
	5011-R	1"x3/4"x3/4"	4201-125	80133
	5011-R	1-1/4"x1-1/4"x1"	4201-168	80262
	5011-R	1-1/4"x1-1/4"x3/4"	4201-167	80261
	5011-R	1-1/4"x1"x1-1/4"	4201-159	80137
	5011-R	1-1/4"x1"x1"	4201-158	80136
	5011-R	1-1/4"x1"x3/4"	4201-157	80135
	5011-R	1-1/4"x1-1/4"x1-1/2"	4201-169	80138
	5011-R	1-1/2"x1-1/2"x1-1/4"	4201-212	80275
	5011-R	1-1/2"x1-1/2"x1"	4201-211	80264
	5011-R	1-1/2"x1-1/2"x3/4"	4201-210	80263
	5011-R	1-1/2"x1-1/4"x1"	4201-202	80140
	5011-R	1-1/2"x1-1/4"x3/4"	4201-201	80140
	5011-R	1-1/2"x1-1/2"x2"	4201-213	N/A
	5011-R	2"x2"x1-1/2"	4201-251	80274
	5011-R	2"x2"x1-1/4"	4201-250	80267
	5011-R	2"x2"x1"	4201-249	80266
	5011-R	2"x2"x3/4"	4201-248	80265
	5011-R	2-1/2"x2-1/2"x2"	4201-292	80276
	5011-R	2-1/2"x2-1/2"x1-1/2"	4201-291	80273
	5011-R	2-1/2"x2-1/2"x1-1/4"	4201-290	80272
	5011-R	2-1/2"x2-1/2"x1"	4201-289	80271
	5011-R	3"x3"x2-1/2"	4201-339	80269
	5011-R	3"x3"x2"	4201-338	80268
	5011-R	3"x3"x1-1/2"	4201-337	80270
	UNIONS	5033-E	3/4"	4257-007
5033-E		1"	4257-010	N/A
5033-E		1-1/4"	4257-012	N/A
5033-E		1-1/2"	4257-015	N/A
5033-E		2"	4257-020	N/A
5033-E		2-1/2"	N/A	N/A
5033-E		3"	N/A	N/A

THREADED FITTINGS

	NIBCO FIG. NO.	SIZE	SPEARS FIG. NO.	TYCO FIG. NO.	
ADAPTERS	5003-BI	3/4"	4235-007	80142	
	5003-BI	1"	4235-010	80145	
	5003-BI	1-1/4"	4235-012	80146	
	5003-BI	1-1/2"	4235-015	80147	
	5003-BI	2"	4235-020	80148	
	5003-2-BI	3/4"	4279-007	N/A	
	5003-2-BI	1"	4279-010	N/A	
	5003-S-BI	3/4"x1/2"	4235-101	80175E or 80175W	
	5003-S-BI	1"x1/2"	4235-130	80176E or 80175W	
	5003-S-BI	1"x3/4"	4235-131	80179	
	5003-2-S-BI	3/4"x1/2"	4239-101	N/A	
	5003-2-S-BI	1"x1/2"	4239-130	N/A	
	5004-BI	3/4"	N/A	80157	
	5004-BI	1"	N/A	80158	
	CROSSES	5035-3-S-BI-S	1"x1"x1/2"x1/2"	N/A	80462
5035-3-S-BI-L		1"x1"x1/2"x1/2"	N/A	80463	
5007-3-S-BI		3/4"x1/2"	4207-101	80199	
ELBOWS	5007-3-S-BI	1"x1/2"	4207-130	80198	
	5007-3-S-BI	1"x3/4"	4207-131	N/A	
	5007-3-S-BI	1-1/4"x1/2"	4207-166	N/A	
	5011-3-3-S-BI-S	1/2"x1/2"x1"	N/A	80460	
	5011-3-3-S-BI-L	1/2"x1/2"x1"	N/A	80459	
	5012-S-BI	1"	4202-010	N/A	
	5012-S-BI	3/4"x3/4"x1/2"	4202-101	80250	
	5012-R-S-BI	1"x3/4"x1/2"	4202-124	N/A	
	5012-S-BI	1"x1"x1/2"	4202-130	80251	
	5012-R-S-BI	1"x1"x1"	4203-122	N/A	
TEES	5012-R-S-BI	1-1/4"x1"x1/2"	4202-156	80256	
	5012-S-BI	1-1/4"x1-1/4"x1/2"	4202-166	80252	
	5012-R-S-BI	1-1/2"x1-1/4"x1/2"	4202-199	80257	
	5012-S-BI	1-1/2"x1-1/2"x1/2"	4202-209	80254	
	5012-S-BI	2"x2"x1/2"	4202-247	80253	
	5012-R-S-BI	2"x1-1/2"x1/2"	4202-237	80258	
	TEST PLUG	450-005	1/2"	4250-005	N/A
		TCBR-3	3/4"	N/A	N/A
	UNION CONNECTOR	TCBR-3	1"	N/A	N/A
		TCBR-3	1-1/4"	N/A	N/A
TCBR-3		1-1/2"	N/A	N/A	
TCBR-3		2"	N/A	N/A	
TCBR-3		3"	N/A	N/A	

BlazeMaster®

NIBCO LIMITED WARRANTY

Applicable to NIBCO INC. CPVC FIRE PROTECTION Plastic Fittings

NIBCO INC. warrants each NIBCO **BlazeMaster®** Fire Protection CPVC plastic fitting to be free from defects in materials and workmanship under normal use and service for a period of ten (10) years from the date of purchase.

In the event any defect occurs which the owner believes is covered by this Warranty, the owner should immediately contact NIBCO INC., Technical Services, either in writing or by telephone call, (888) 446-4226 or (574) 295-3000. The owner will be instructed to return said fitting or valve, at the owner's expense, to NIBCO INC. or an authorized NIBCO INC. representative for inspection. In the event said inspection discloses to NIBCO INC.'s satisfaction that said fitting or valve is defective, a replacement shall be mailed free of charge to the owner, and NIBCO INC. shall further pay the installing contractor the sum of ten (\$10.00) dollars to apply on the cost of installation of said replacement fitting.

TO THE EXTENT PERMITTED BY LAW, THIS WARRANTY SPECIFICALLY EXCLUDES INCIDENTAL AND CONSEQUENTIAL DAMAGES OF EVERY TYPE AND DESCRIPTION RESULTING FROM ANY CLAIMED DEFECT IN MATERIAL OR WORKMANSHIP, INCLUDING BUT NOT LIMITED TO, PERSONAL INJURIES AND PROPERTY DAMAGES. Some states do not allow the exclusion or limitations of incidental or consequential damages, so these limitations may not apply to you. **TO THE EXTENT PERMITTED BY LAW, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE LIMITED IN DURATION.**

This Warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

NIBCO® NIBCO INC. World Headquarters • 1516 Middlebury St. • Elkhart, IN 46516-4740 USA • www.nibco.com

how to order

NIBCO sells its products through select stocking distributors. Our distributors are knowledgeable about plastics fittings as well as the complete line of NIBCO Fire Protection Systems.

Please visit www.nibco.com for a complete listing of authorized NIBCO distributors in your area.

NIBCO INC. Customer Service
World Headquarters
1516 Middlebury Street
P.O. Box 1167
Elkhart, IN 46515-1167
USA
Phone: 800.234.0227
Fax: 800.234.0557

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BlazeMaster® is a registered trademark of The Lubrizol Corporation



JOSLYN CLARK RESIDENTIAL FIRE PUMP CONTROLLER

Model Number: P100-518

Location: Ground mounted by North Elevation

Flow range: 47 GPM

Rated: 35 PSI @ 30 GMP

Electrical:

Voltage: 230 V

Phase: 1 PH

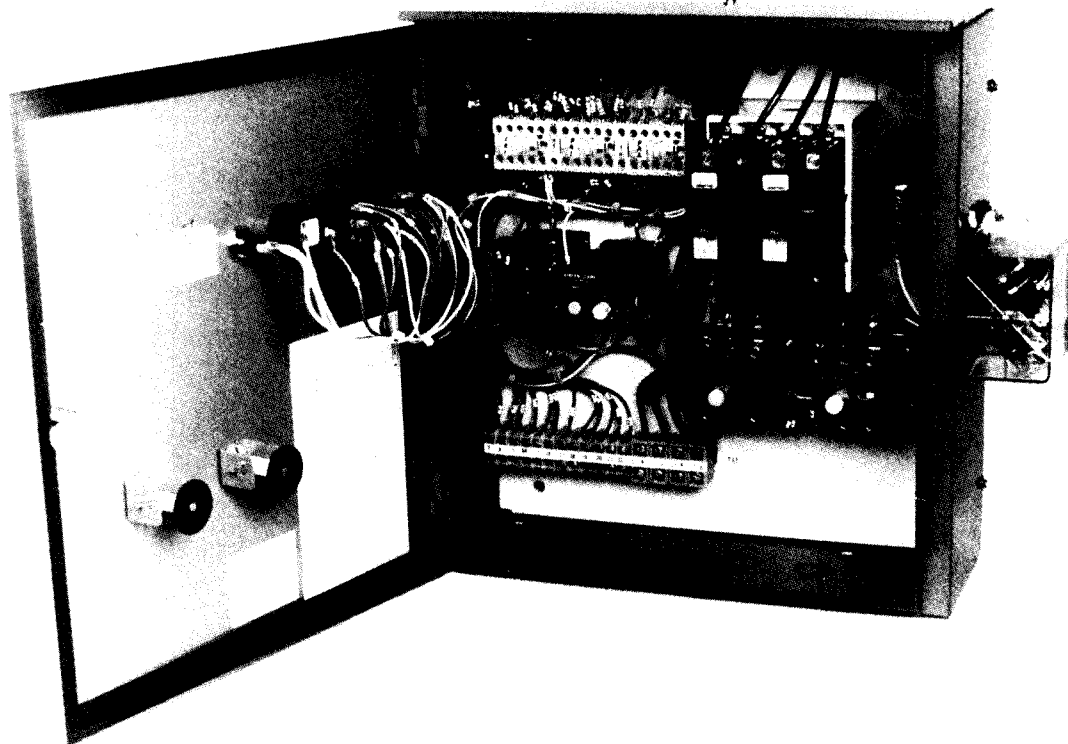
Joslyn Clark

Residential Fire Pump Controller

General

Joslyn Clark residential fire pump controllers are designed to provide reliable fire protection for one and two family dwellings. Single and dual pump control systems are available to provide sprinkler system design flexibility.

The controller provides for both automatic and manual start functions. A built in pressure switch monitors system pressure. When the pressure drops, the motor contactor is energized to start the pump motor. On dual pump systems there is a three second time delay between pump one and pump two. This delay permits motor starting without overloading the electrical supply. Audible and visual signals are provided to indicate that the pumps are running.



Standard Equipment & Performance

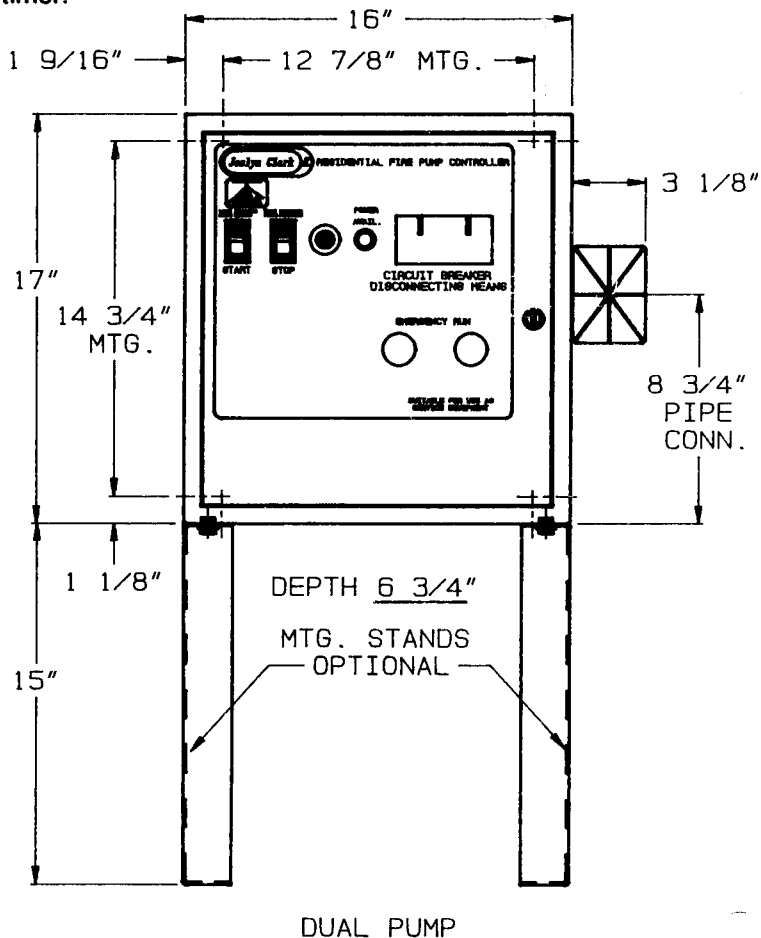
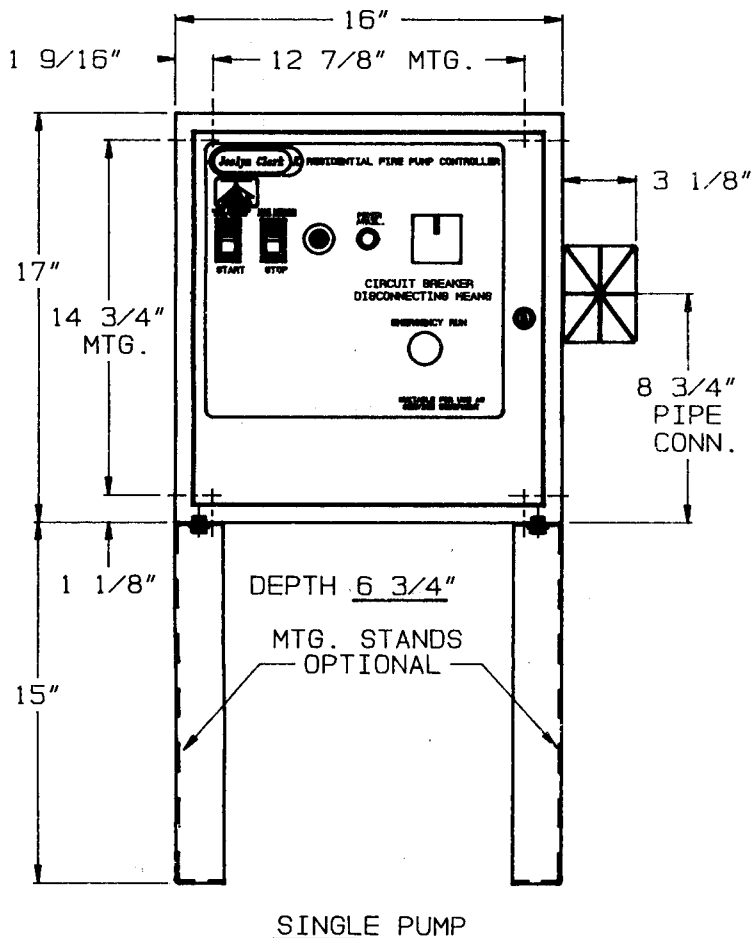
- Automatic start responsive to water pressure.
- Running period timer to prevent short cycling.
- Start & Stop switches for manual control.
- Emergency start buttons for each contactor.
- Circuit breaker provides overcurrent and locked rotor protection.
- Controllers are Suitable for Use as Service Equipment and rated for short circuit interrupt capacity of 10,000 Amp. RMS.
- Contacts for remote alarm of:
 1. Controller in pump running condition.
 2. Loss of line power.
- Fail safe drop out relay circuit.
- Nema 2 drip-proof enclosure with key lock.
- Conforms to all applicable domestic standards.

Catalog Selection

240 Volt Single Phase Residential Fire Pump Controller				
Motor HP	Single Pump System		Dual Pump System	
	Catalog No.	Price	Catalog No.	Price
.5	SFPCA2201		DFPCA2201	
.75	SFPCB2201		DFPCB2201	
1	SFPC2201		DFPC2201	
1.5	SFPCD2201		DFPCD2201	
2	SFPCE2201		DFPCE2201	
3	SFPCF2201		DFPCF2201	
5	SFPCG2201		DFPCG2201	
7.5	SFPC2201		DFPC2201	

Modifications

- Manual Stop - Omit running period timer - Deduct \$40. Change last digit in catalog number from 1 to 0.
- Floor mounting feet - add \$50.. Change second last digit from 0 to 1.
- **Example:**
DFPCF2210 is a dual pump system for two 3HP motors with floor mounting feet without running period timer.



Joslyn Clark Controls, Inc.

P.O. Box 945, Lancaster, South Carolina 29720

Telephone: (803) 286-8491 FAX: (803) 286-0885

**Discount
Schedule FA**



NPE END SUCTION CENTRIFUGAL PUMP

Model Number: 316L SS

Material: Stainless Steel

Inlet: 1 1/4"

Outlet: 1"



NPE

316L SS

NPE SERIES END SUCTION CENTRIFUGAL PUMPS

BOMBAS CENTRÍFUGAS DE SUCCIÓN FINAL SERIE NPE



Pumpcatalog.com (800)-810-1053

A FULL RANGE OF PRODUCT FEATURES UNA GAMA TOTAL DE CARACTERÍSTICAS DEL PRODUCTO

Superior Materials of Construction: Complete AISI 316L stainless steel liquid handling components and mounting bracket for corrosion resistance, quality appearance, and improved strength and ductility.

High Efficiency Impeller: Enclosed impeller with unique floating seal ring design maintains maximum efficiencies over the life of the pump without adjustment.

Casing and Adapter Features: Stainless steel construction with NPT threaded, centerline connections, easily accessible vent, prime and drain connections with stainless steel plugs. Optional seal face vent/flush available.

Mechanical Seal: Standard John Crane Type 21 with carbon versus silicon-carbide faces, Viton elastomers, and 316 stainless metal parts. Optional high temperature and chemical duty seals available.

Motors: NEMA standard open drip-proof, totally enclosed fan cooled or explosion proof enclosures. Rugged ball bearing design for continuous duty under all operating conditions.

The various versions of the NPE are identified by a product code number on the pump label. This number is also the catalog number for the pump. The meaning of each digit in the product code number is shown at left.

Materiales Superiores de Construcción: Componentes completos para manejo de líquidos en acero inoxidable AISI 316L y consola para el montaje para resistencia a la corrosión, apariencia de calidad, y fuerza y ductilidad mejoradas.

Impulsor de Eficiencia Superior: El impulsor encerrado con un diseño único de anillo del sello flotante, mantiene sin ajustes, la eficiencia máxima sobre la vida de la bomba.

Características de la Carcasa y del Adaptador: Construcción en acero inoxidable con NPT roscado, conexiones centrales, válvulas de fácil acceso, conexiones de cebado y drenaje con enchufes de acero inoxidable. Cara del sello válvula/chorro opcional disponible.

Sello Mecánico: Estándar John Crane Tipo 21 con carbón en contraste con caras de silicón-carbide, elastómeros de Viton, y partes metálicas de acero inoxidable 316. Sellos de alta temperatura y productos químicos están disponibles.

Motores: Estándar NEMA a prueba de goteo, ventilador totalmente encerrado o recintos a prueba de explosión. Diseño robusto de balineras de bolas para trabajo continuo en todas las condiciones de funcionamiento.

Las diferentes versiones de la NPE se identifican con un número de código del producto en la etiqueta de la bomba. Este número es también el número del catálogo para la bomba. El significado de cada dígito en el número de código del producto se muestra a la izquierda.

NPE PRODUCT LINE NUMBERING SYSTEM LÍNEA DE PRODUCTO NPE SISTEMA DE NUMERACIÓN

**Example Product Code,
Ejemplo Código del Producto**

1 ST 2 C 1 A 4 F

**Seal Vent/Flush Option,
Opción de Sello Válvula/Chorro Seal Ven
Mechanical Seal and O-ring**

4 = Pre-engineered standard
For optional mechanical seal modify catalog order no. with seal code listed below.

Sello Mecánico y Anillo 'O'

4 = Estándar aprobado
Para sello mecánico opcional modificar el número de orden del catálogo con el código del sello anotado abajo.

John Crane Type 21 Mechanical Seal (½" seal), Sello Mecánico John Crane Tipo 21 (sello de ½")					
Seal Code, Código del Sello	Rotary, Rotativo	Stationary, Estacionario	Elastomers, Elastómeros	Metal Parts, Partes Metálicas	Part No., Pieza Número
2			EPR	316 SS	10K18
4	Carbon	Silicon Carbide	Viton		10K55
5	Silicon Carbide		EPR		10K81
6			Viton		10K62

Impeller Option . . . No Adder Required

For optional impeller diameters modify catalog order no. with impeller code listed. Select optional impeller diameter from pump performance curve.

Código del Impulsor Opcional

Para impulsores con diámetros opcionales modificar el número de orden del catálogo con el código del impulsor anotado. Escoger el impul con diámetro opcional de la curva de funcionamiento de la bomba.

Impeller Code, Código del Impulsor	Pump Size, Tamaño de la Bomba		
	1 x 1¼ - 6 Diameter	1¼ x 1½ - 6 Diameter	1½ x 2 - 6 Diameter
K	-	6⅞	-
G	-	5⅞	5⅞
H	-	5½	5
A	6⅞	5¼	4¾
B	5¾	5⅞	4⅝
C	5⅞	4⅞	4⅞
D	4¾	4⅞	4⅞
E	4⅞	4¼	3⅞
F	4⅞	3⅞	-

Driver, Conductor

1 = 1 PH, ODP 7 = 3 PH, XP
2 = 3 PH, ODP 8 = 575 V, XP
3 = 575 V, ODP 9 = 3 PH, TEFC
4 = 1 PH, TEFC Premium Eff.
5 = 3 PH, TEFC 0 = 1 PH, XP
6 = 575 V, TEFC

HP Rating, HP Potencia

C = ½ HP E = 1 HP G = 2 HP J = 5 HP
D = ¾ HP F = 1½ HP H = 3 HP

Driver: Hertz/Pole/RPM,

Conductor: Hercios/Polos/RPM

1 = 60 Hz, 2 pole, 3500 RPM
2 = 60 Hz, 4 pole, 1750 RPM
3 = 60 Hz, 6 pole, 1150 RPM
4 = 50 Hz, 2 pole, 2900 RPM
5 = 50 Hz, 4 pole, 1450 RPM

Material

ST = Stainless steel, Acero inoxidable

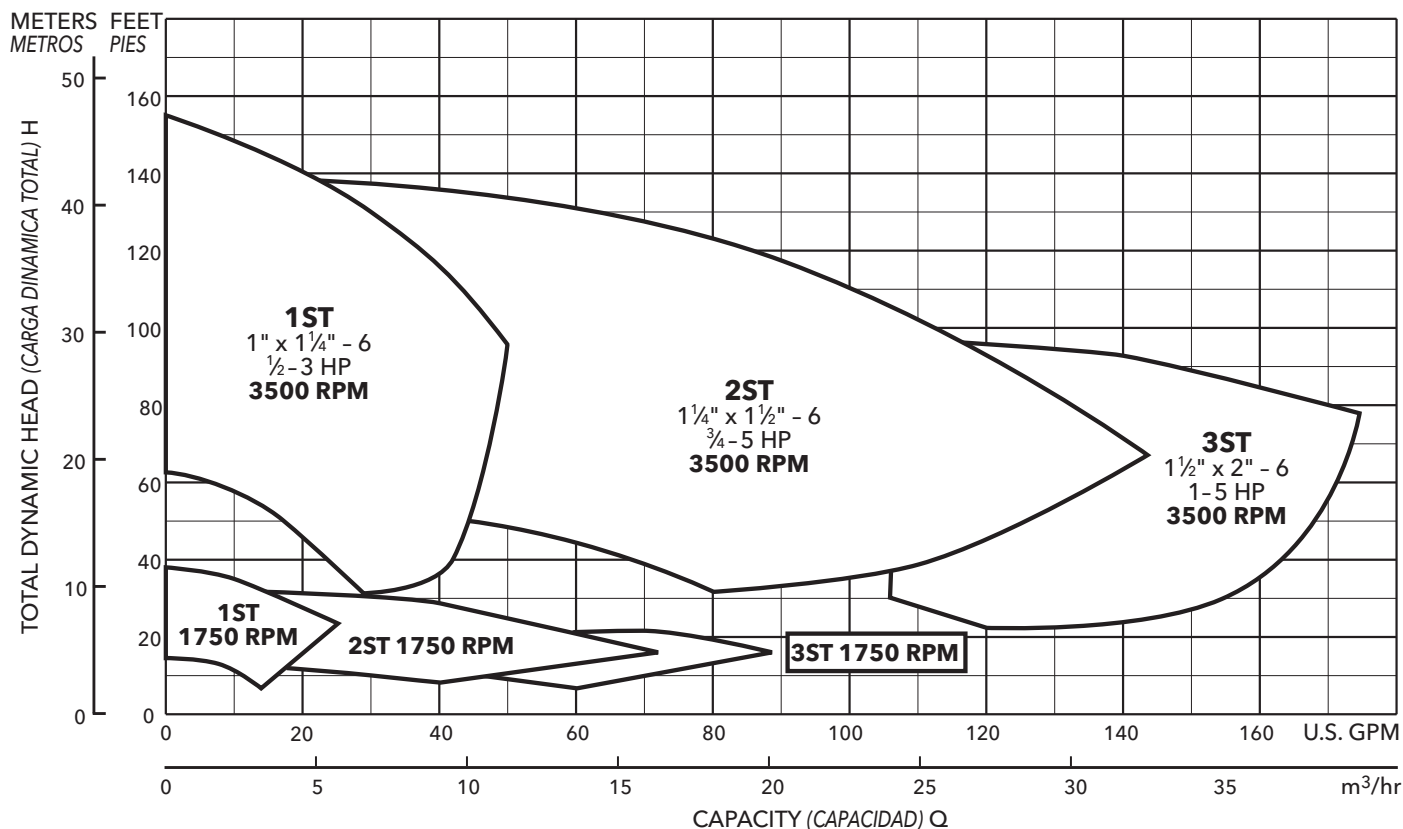
Pump Size, Tamaño de la Bomba

1 = 1 x 1¼ - 6 2 = 1¼ x 1½ - 6 3 = 1½ x 2 - 6

For frame mounted version, substitute the letters "FRM" in these positions.

Para la versión con el armazón montado, sustituya las letras "FRM" en estas posiciones.

PERFORMANCE COVERAGE (60 HZ) ALCANCE DE FUNCIONAMIENTO (60 HZ)



NOTES:

Not recommended for operation beyond printed H-Q curve.

For critical application conditions consult factory.

Not all combinations of motor, impeller and seal options are available for every pump model. Please check with G&L on non-cataloged numbers.

All standard 3500 RPM ODP and TEFC motors supplied by Goulds Pumps, have minimum of 1.15 service factor. Standard catalog units may utilize available service factor. Any motors supplied other than Goulds Pumps check available service factor.

NOTAS:

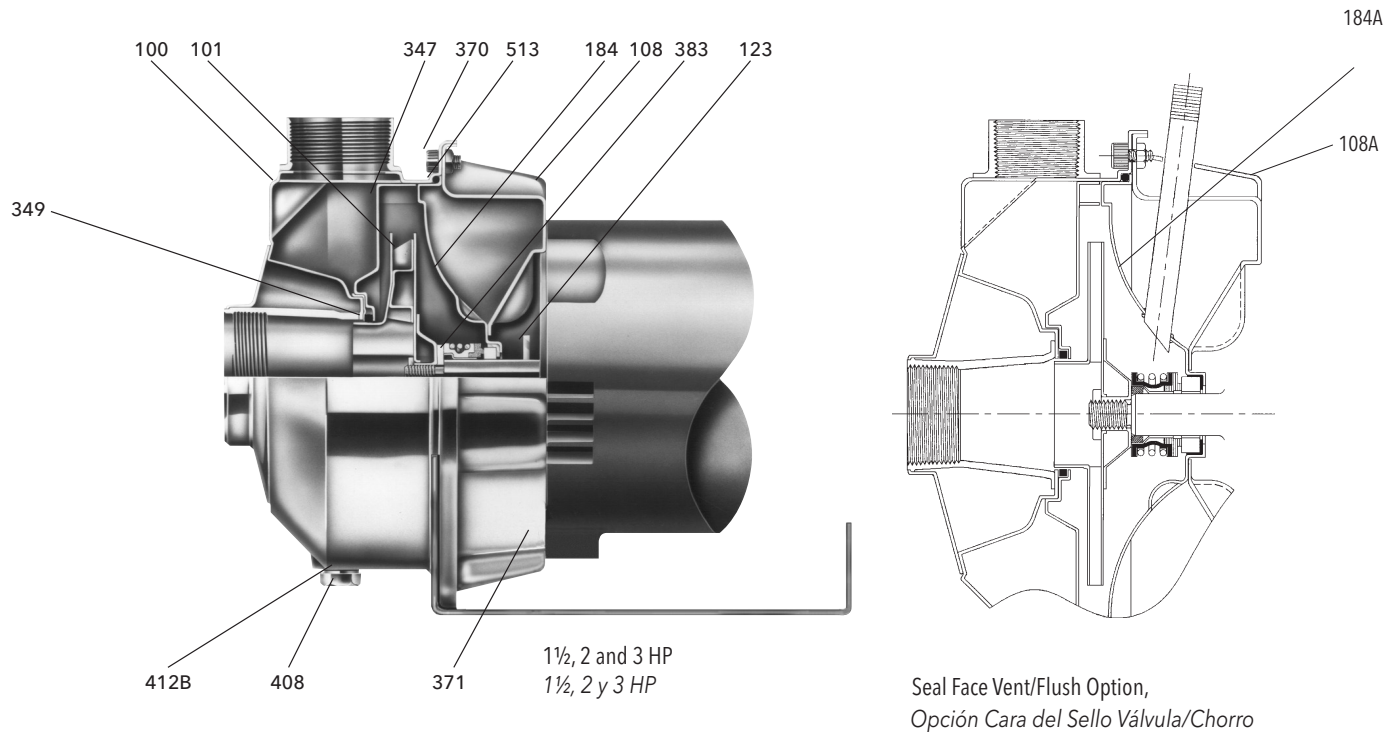
No se recomienda para funcionamiento superior al impreso en la curva H-Q.

Para condiciones de aplicaciones críticas consultar con la fábrica.

No todas las combinaciones de las opciones de motor, impulsor y sello están disponibles para cada modelo de bombas. Por favor verifique con G&L en los números no catalogados.

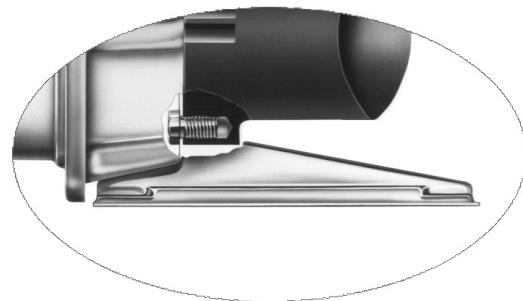
Todos los motores estándar de 3500 RPM, ODP (abiertos resguardados) y TEFC (totalmente encerrados con enfriamiento forzado) provistos por Goulds Pumps tienen un factor mínimo de servicio de 1,15. Las unidades estándar de catálogo pueden utilizar el factor de servicio disponible. Verificar el factor de servicio disponible de todo motor no provisto por Goulds Pumps.

NPE CLOSE COUPLED PUMP MAJOR COMPONENTS: MATERIALS OF CONSTRUCTION BOMBA CERRADA ACOPLADA NPE COMPONENTES PRINCIPALES: MATERIALES DE CONSTRUCCIÓN



Seal Face Vent/Flush Option,
Opción Cara del Sello Válvula/Chorro

Item No., Parte No.	Description, Descripción	Materials, Materiales
100	Casing; Carcasa	
101	Impeller; Impulsor	AISI 316L SS;
108	Motor adapter; Adaptador del motor	AISI 316L Acero inoxidable
108A	Motor adapter seal vent/flush; Sello válvula/chorro del adaptador del motor	
123	Deflector; Deflector	BUNA-N
184	Seal housing; Alojamiento del sello	AISI 316L SS;
184A	Seal housing seal vent/flush; Sello válvula/chorro del alojamiento del sello	AISI 316L Acero inoxidable
347	Guidevane; Difusor	
349	Seal ring, guidevane; Anillo del sello, difusor	Viton
370	Socket head screws, casing; Encajes cabezas de tornillos, carcasa	AISI 410 SS; AISI 410 Acero inoxidable
371	Bolts, motor; Tornillos, motor	Plated steel; Acero chapeado
383	Mechanical seal; Sello mecánico	**see chart, ver tabla
408	Drain and vent plug, casing; Enchufes de drenaje y válvula, carcasa	AISI 316L SS; AISI 316L Acero inoxidable
412B	O-ring, drain and vent plug; Anillo 'O', enchufe de drenaje y válvula	Viton (Standard, estándar) EPR (Optional, Opcional)
513	O-ring, casing; Anillo 'O', carcasa	
Motor	NEMA standard, 56J flange; Motor NEMA estándar, brida 56J	

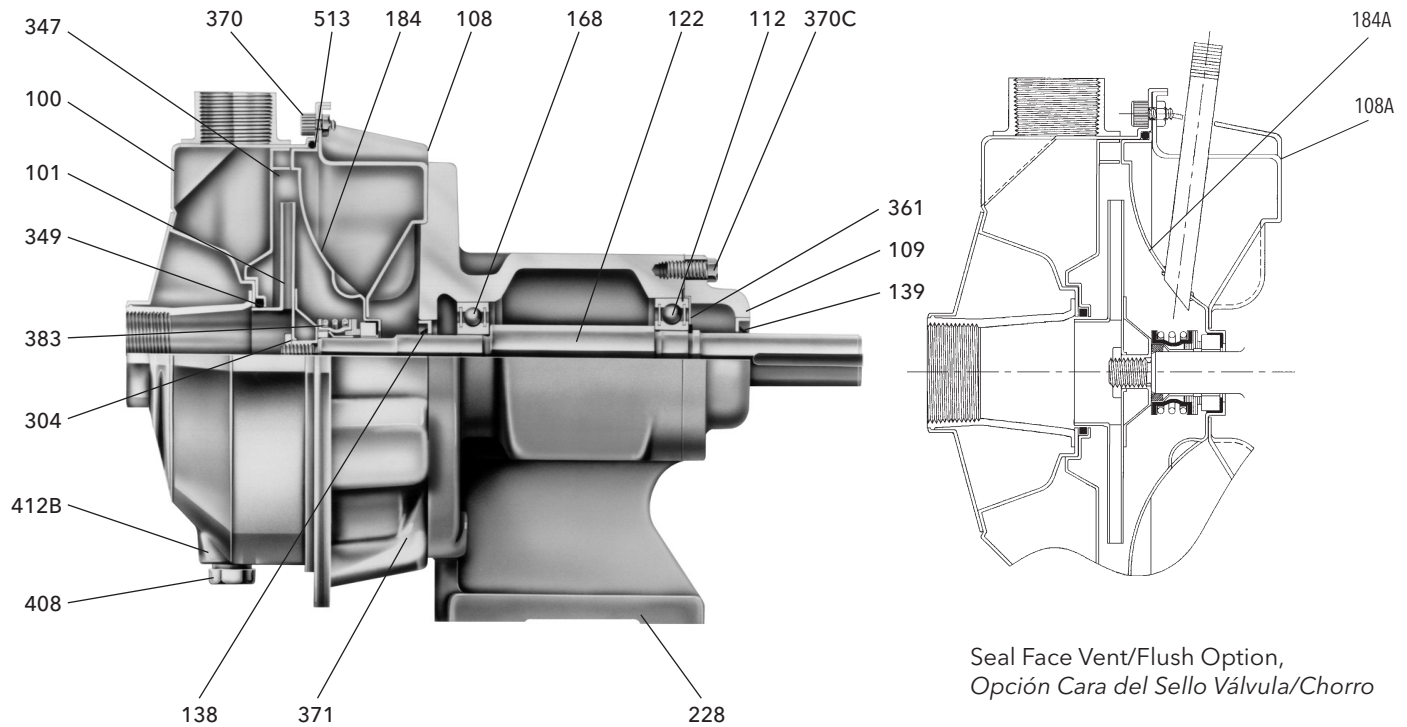


1/2, 3/4 and 1 HP
1/2, 3/4 y 1 HP

Footed motor for 5 HP ODP and TEFC, all explosion proof motors, see page 13.

Motor con pie para 5 HP ODP y TEFC, a prueba de explosiones motores, en la página 13.

NPE FRAME MOUNTED PUMP MAJOR COMPONENTS: MATERIALS OF CONSTRUCTION BOMBA NPE DE ARMAZÓN MONTADO COMPONENTES PRINCIPALES: MATERIALES DE CONSTRUCCIÓN

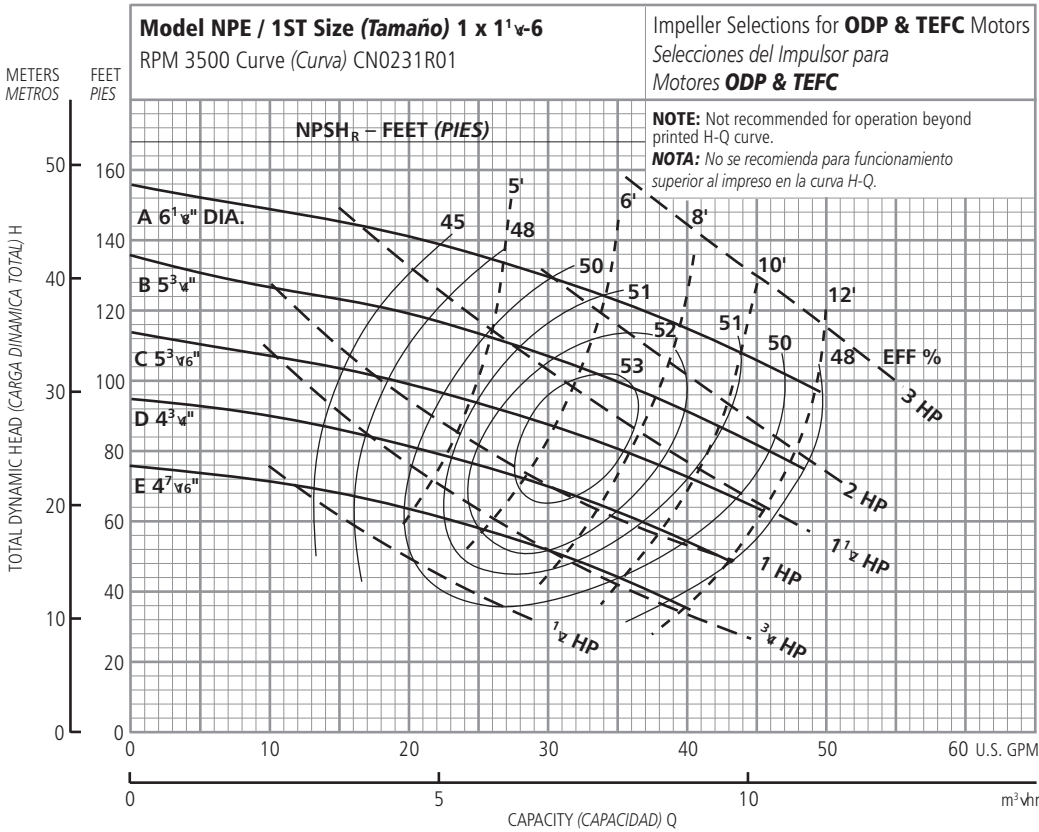


Seal Face Vent/Flush Option,
Opción Cara del Sello Válvula/Chorro

Item No., Parte No.	Description, Descripción	Materials, Materiales
100	Casing; Carcasa	
101	Impeller; Impulsor	AISI 316L SS;
108	Adapter; Adaptador	AISI 316L Acero inoxidable
108A	Motor adapter seal vent/flush; Sello válvula/chorro del adaptador del motor	
109	Bearing cover; Cubierta de balineras	Cast iron; Hierro fundido
112	Ball bearing (outboard); Balineras de bolas (exterior)	Steel; Acero
122	Shaft; Eje	AISI 316 SS; AISI 316 Acero inoxidable
138	Lip-seal (inboard); Sello cubierto (interior)	BUNA/steel; BUNA/acero
139	Lip-seal (outboard); Sello cubierto (exterior)	BUNA/steel; BUNA/acero
168	Ball bearing (inboard); Balineras de bolas (interior)	Steel; Acero
184	Seal housing; Alojamiento del sello	AISI 316L SS;
184 A	Seal housing seal vent/flush; Sello válvula/chorro del alojamiento del sello	AISI 316L Acero inoxidable
228	Bearing frame; Armazón de balineras	Cast iron, Hierro fundido

Item No., Parte No.	Description, Descripción	Materials, Materiales
304	Impeller locknut; Contratuerca del impulsor	AISI 316 SS;
347	Guidevane; Difusor	AISI 316 Acero inoxidable
349	Seal ring, guidevane; Anillo del sello, difusor	Viton
361	Retaining ring; Anillo de retención	Steel; Acero
370	Socket head screws, casing; Encaje cabeza del tornillo, carcasa	AISI 410 SS; AISI 410 Acero inoxidable
370C	Hex head screw, bearing cover; Tornillo de cabeza hexagonal, cubierta de balineras	Plated steel; Acero chapeado
371	Hex head screw, bearing frame; Tornillo de cabeza hexagonal, armazón de balineras	Plated steel; Acero chapeado
383	Mechanical seal; Sello mecánico	**see chart; ver tabla
400	Shaft key; Llave del eje	Steel; Acero
408	Drain and vent plug, casing; Enchufes de drenaje y válvula, carcasa	AISI 316 SS; AISI 316 Acero inoxidable
412B	O-ring, drain and vent plug; Anillo 'O', enchufe de drenaje y válvula	Viton (Standard, estándar) EPR (Optional, Opcional)
513	O-ring, casing; Anillo 'O', carcasa	

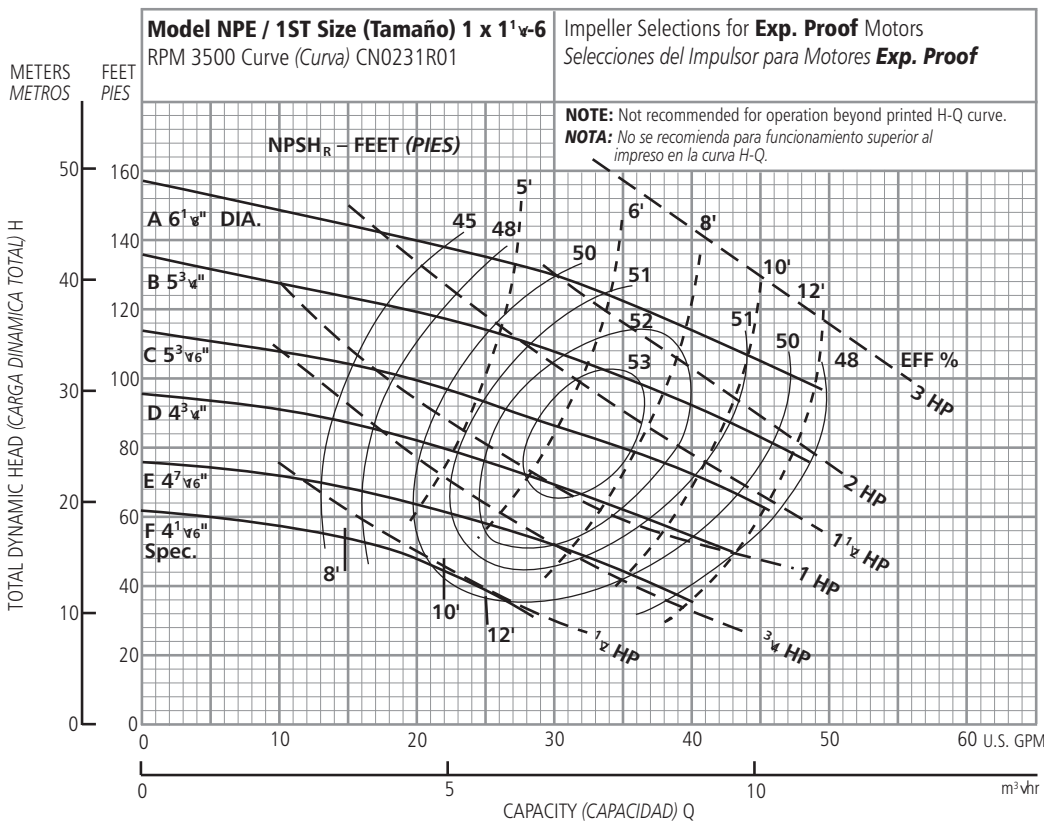
PERFORMANCE CURVES - 60 HZ, 3500 RPM CURVAS DE FUNCIONAMIENTO - 60 HZ, 3500 RPM



Ordering Code, Código de Pedido	Standard HP Rating, Estándar HP Potencia	Imp. Dia.
E	1/2	4 ⁷ / ₁₆ "
D	3/4	4 ³ / ₄ "
C	1	5 ³ / ₁₆ "
B	1 1/2	5 ³ / ₄ "
A	2	6 ¹ / ₈ "

NOTE: Although not recommended, the pump may pass a 1/16" sphere.

NOTA: Si bien no se recomienda, la bomba puede pasar una esfera de 1/16".

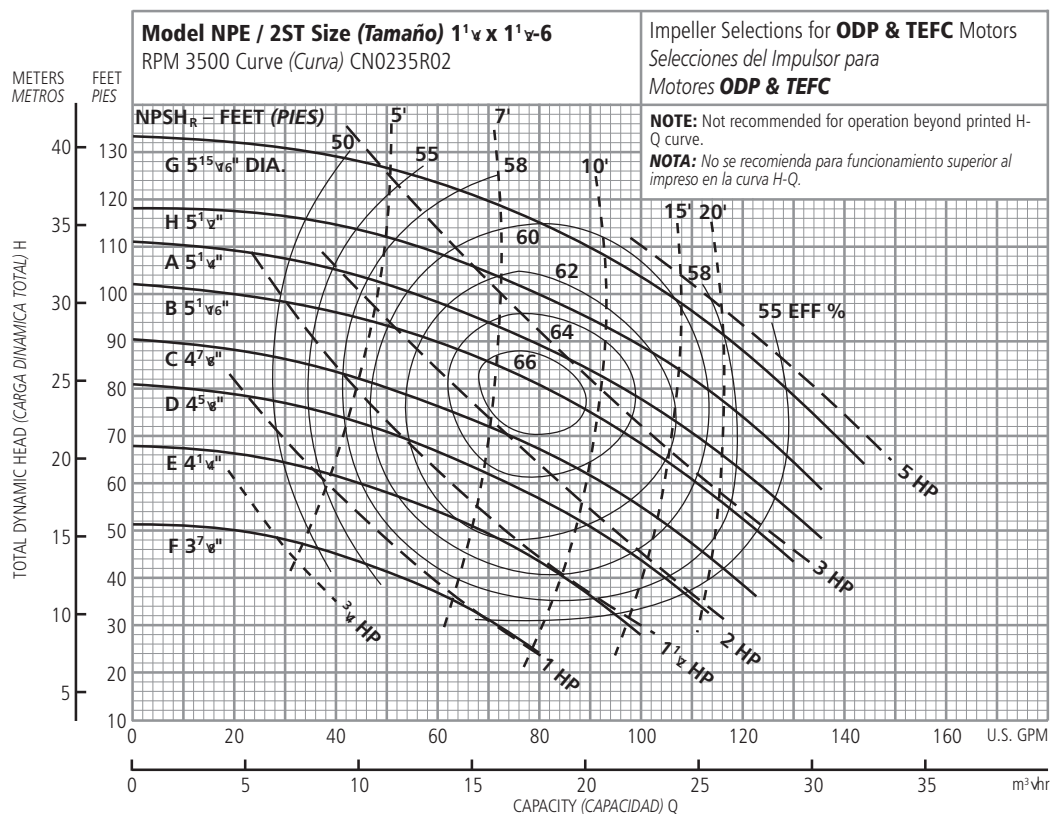


Ordering Code, Código de Pedido	Standard HP Rating, Estándar HP Potencia	Imp. Dia.
F	1/2	4 ¹ / ₁₆ " spec.
E	3/4	4 ⁷ / ₁₆ "
D	1	4 ³ / ₄ "
C	1 1/2	5 ³ / ₁₆ "
B	2	5 ³ / ₄ "
A	3	6 ¹ / ₈ "

NOTE: Although not recommended, the pump may pass a 1/16" sphere.

NOTA: Si bien no se recomienda, la bomba puede pasar una esfera de 1/16".

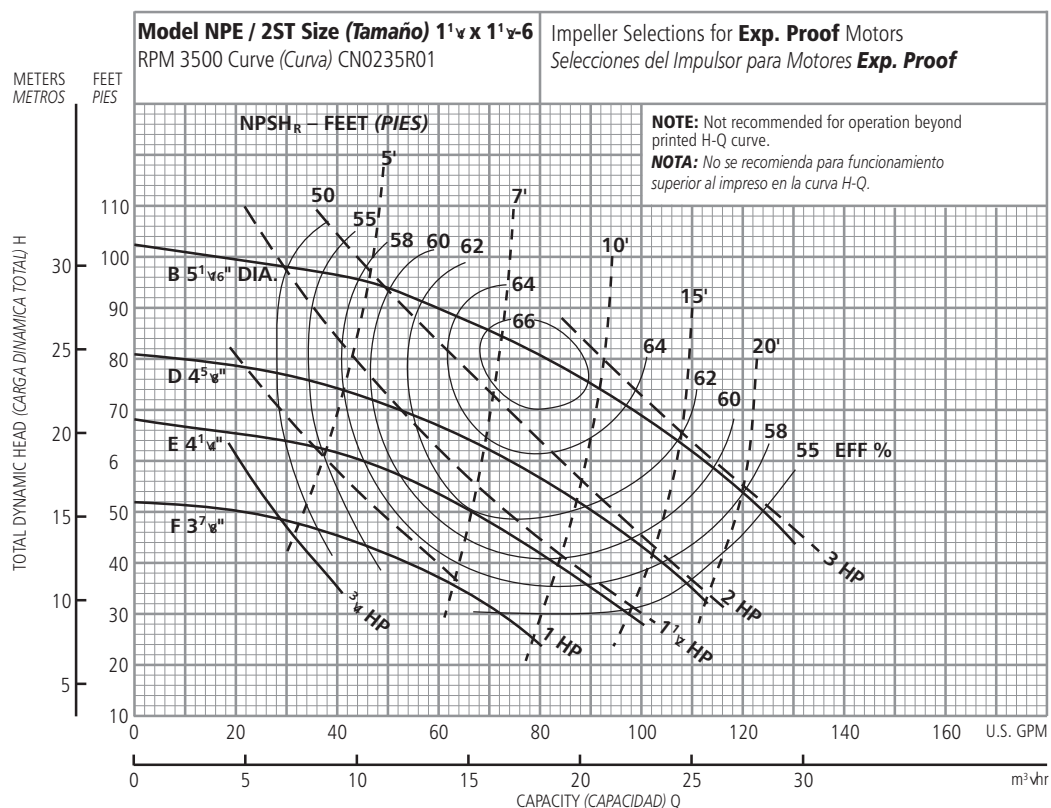
PERFORMANCE CURVES - 60 HZ, 3500 RPM CURVAS DE FUNCIONAMIENTO - 60 HZ, 3500 RPM



Ordering Code, Código de Pedido	Standard HP Rating, Estándar HP Potencia	Imp. Dia.
F	3/4	3 7/8"
E	1	4 1/4"
D	1 1/2	4 5/8"
C	2	4 7/8"
B	3	5 1/16"
A	3	5 1/4"
H	5	5 1/2"
G	5	5 15/16"

NOTE: Although not recommended, the pump may pass a 3/16" sphere.

NOTA: Si bien no se recomienda, la bomba puede pasar una esfera de 3/16".

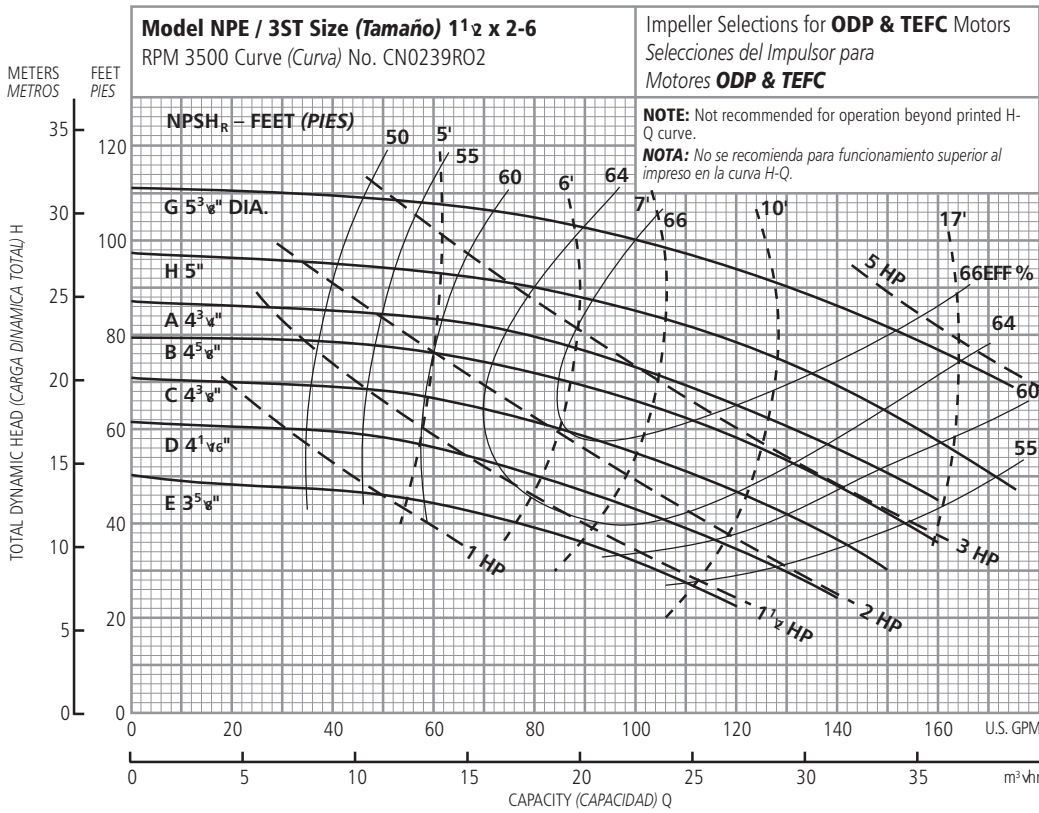


Ordering Code, Código de Pedido	Standard HP Rating, Estándar HP Potencia	Imp. Dia.
F	1	3 7/8"
E	1 1/2	4 1/4"
D	2	4 5/8"
B	3	5 1/16"

NOTE: Although not recommended, the pump may pass a 3/16" sphere.

NOTA: Si bien no se recomienda, la bomba puede pasar una esfera de 3/16".

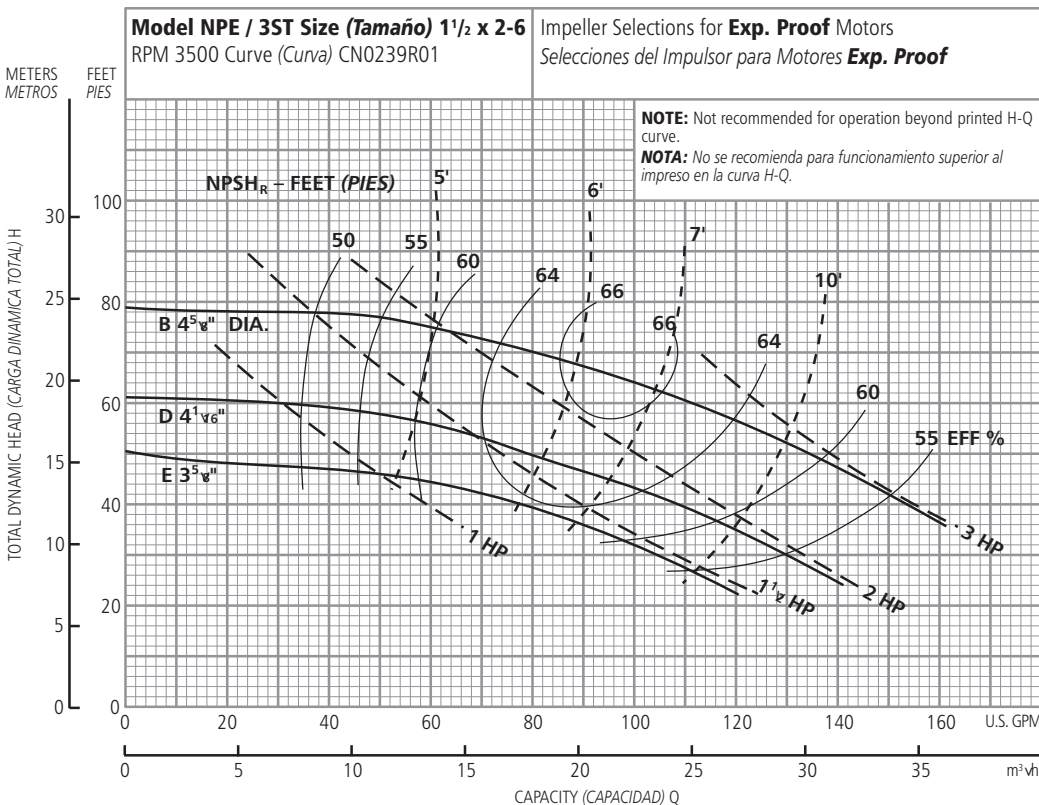
PERFORMANCE CURVES - 60 HZ, 3500 RPM CURVAS DE FUNCIONAMIENTO - 60 HZ, 3500 RPM



Ordering Code, Código de Pedido	Standard HP Rating, Estándar HP Potencia	Imp. Dia.
E	1	3 5/8"
D	1 1/2	4 1/16"
C	2	4 3/8"
B	3	4 5/8"
A	3	4 3/4"
H	5	5"
G	5	5 3/8"

NOTE: Although not recommended, the pump may pass a 1 1/32" sphere.

NOTA: Si bien no se recomienda, la bomba puede pasar una esfera de 1/32".

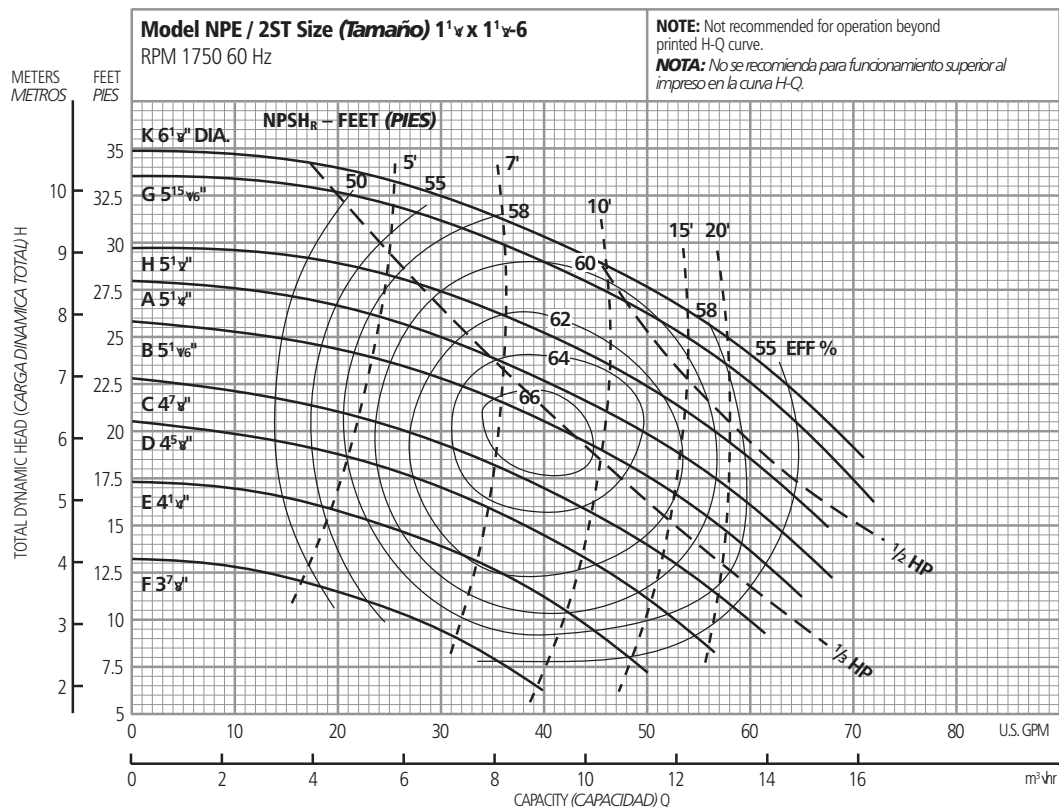
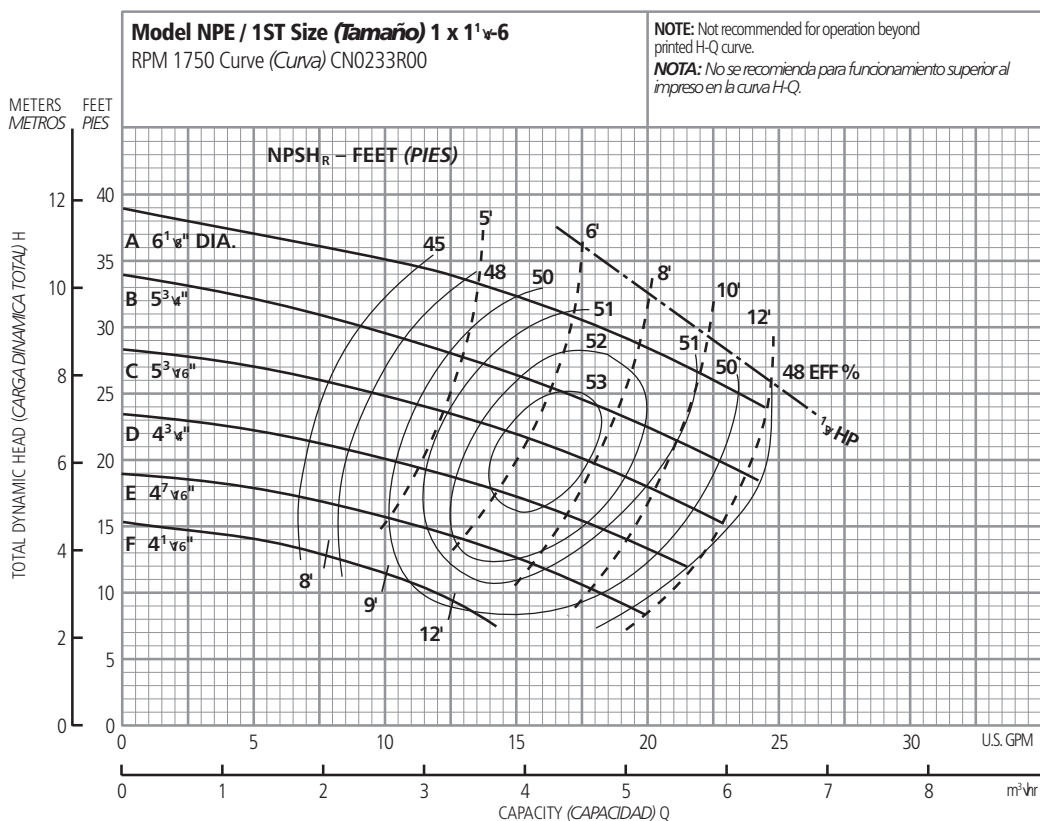


Ordering Code, Código de Pedido	Standard HP Rating, Estándar HP Potencia	Imp. Dia.
E	1 1/2	3 5/8"
D	2	4 1/16"
B	3	4 5/8"

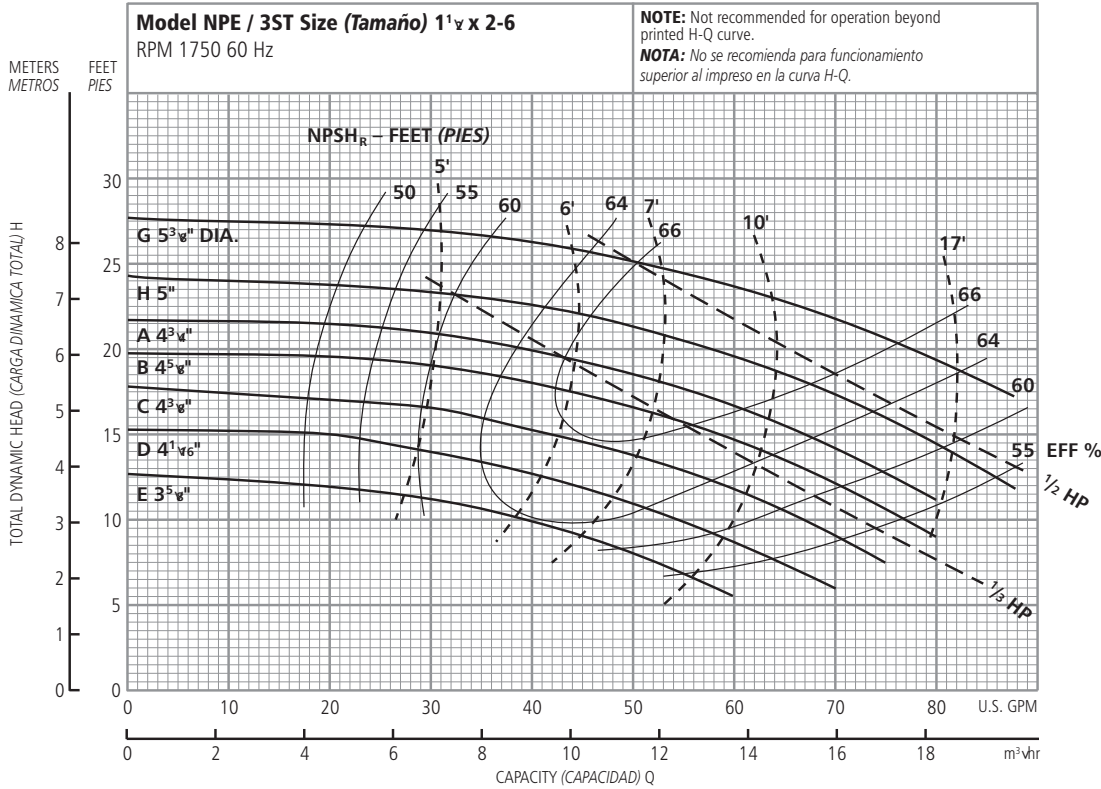
NOTE: Although not recommended, the pump may pass a 1 1/32" sphere.

NOTA: Si bien no se recomienda, la bomba puede pasar una esfera de 1/32".

PERFORMANCE CURVES - 60 HZ, 1750 RPM CURVAS DE FUNCIONAMIENTO - 60 HZ, 1750 RPM



PERFORMANCE CURVES - 60 HZ, 1750 RPM CURVAS DE FUNCIONAMIENTO - 60 HZ, 1750 RPM

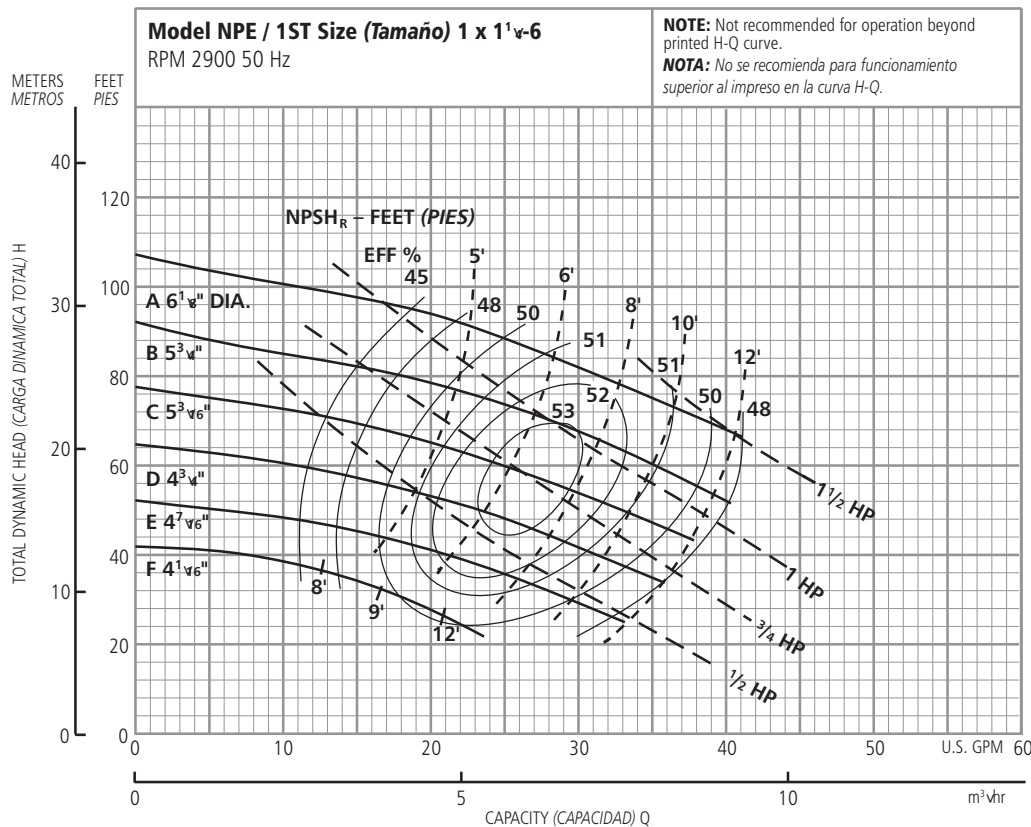


Optional Impeller, Impulsor Opcional	
Ordering Code, Código de Pedido	Dia.
G	5 3/8"
H	5
A	4 3/4
B	4 5/8
C	4 3/8
D	4 1/8
E	3 5/8

NOTE: Although not recommended, the pump may pass a 1 1/32" sphere.

NOTA: Si bien no se recomienda, la bomba puede pasar una esfera de 1 1/32".

PERFORMANCE CURVES - 50 HZ, 2900 RPM CURVAS DE FUNCIONAMIENTO - 50 HZ, 2900 RPM

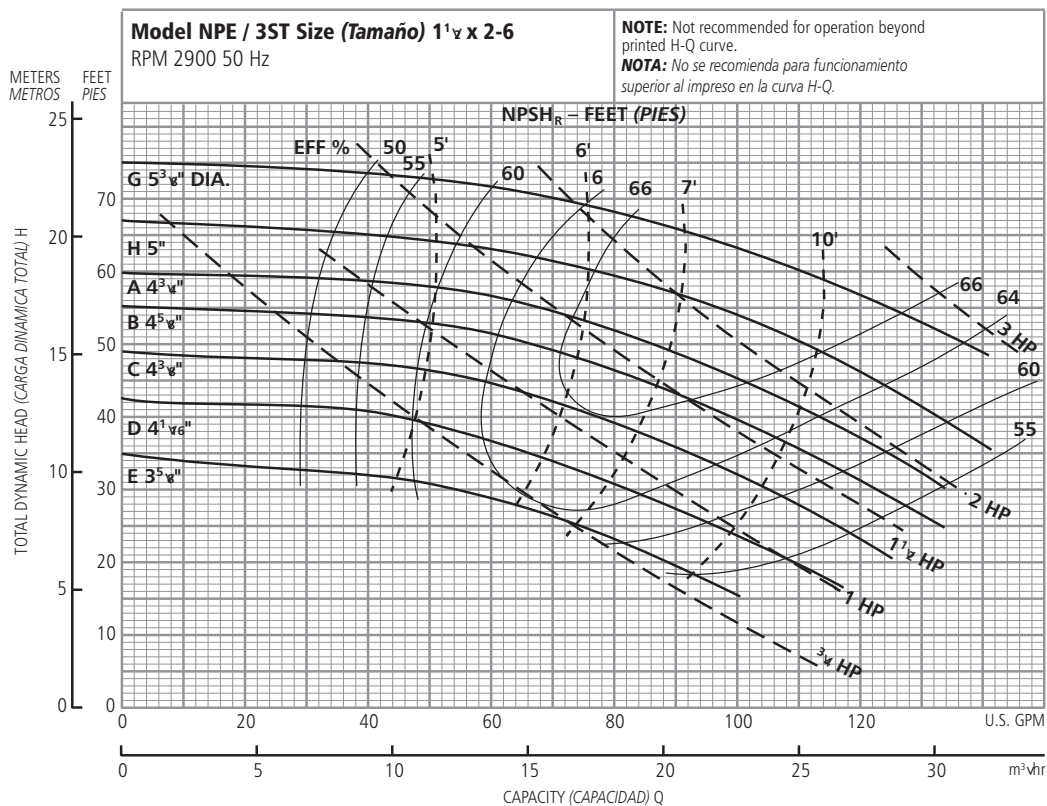
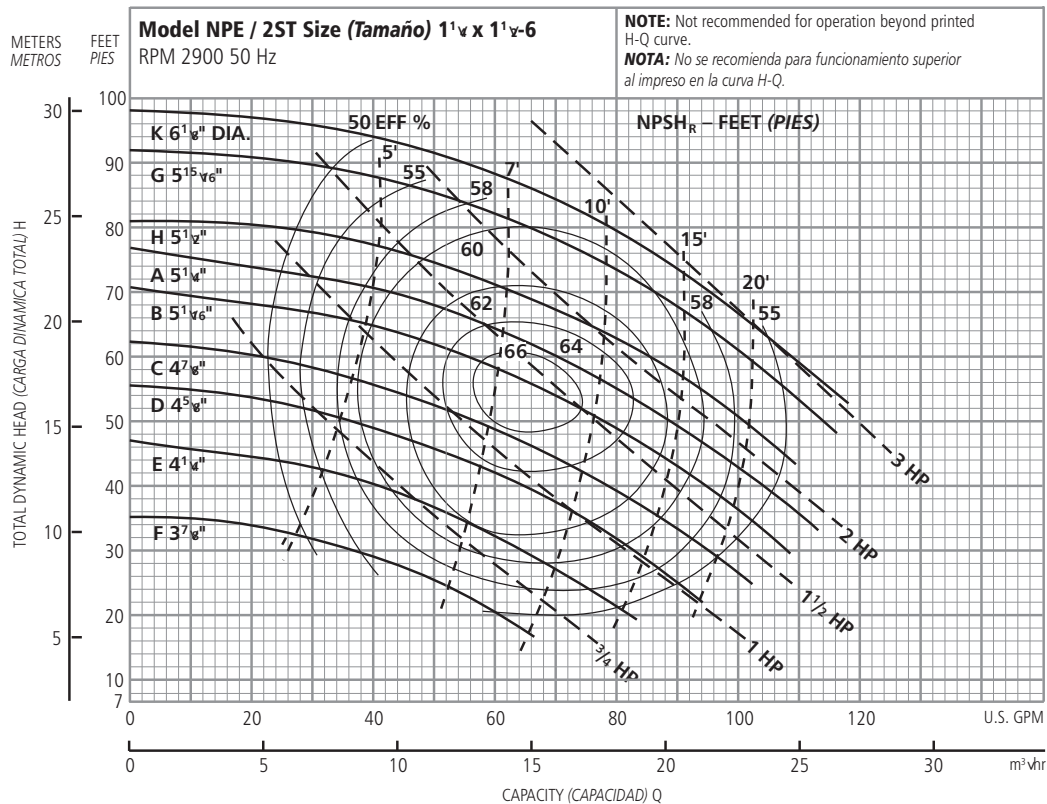


Optional Impeller, Impulsor Opcional	
Ordering Code, Código de Pedido	Dia.
A	6 1/8"
B	5 3/8
C	5 3/16
D	4 3/4
E	4 7/16
F	4 1/8

NOTE: Although not recommended, the pump may pass a 1/16" sphere.

NOTA: Si bien no se recomienda, la bomba puede pasar una esfera de 1/16".

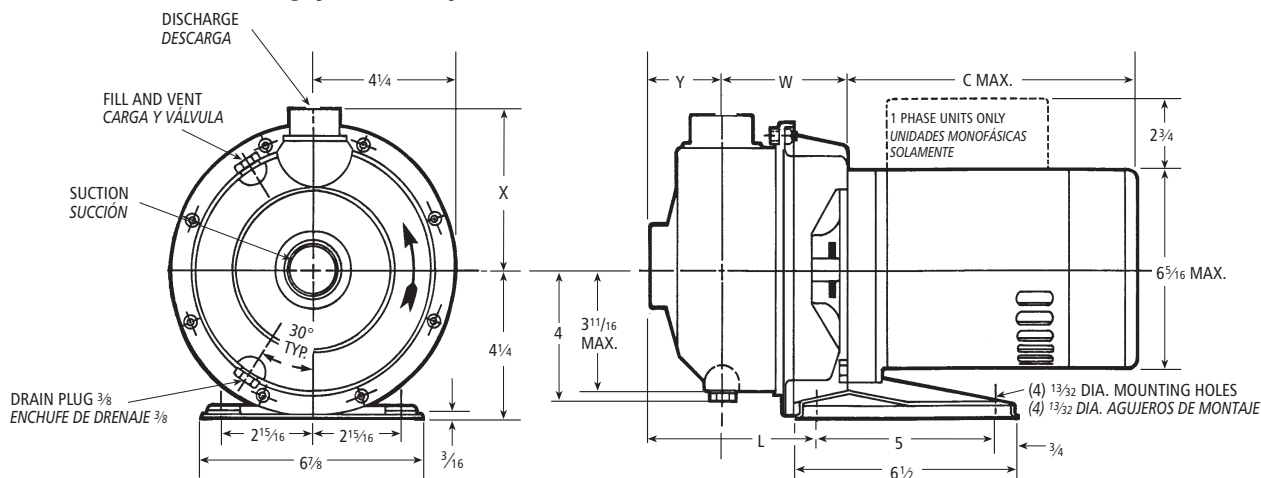
PERFORMANCE CURVES - 50 HZ, 2900 RPM CURVAS DE FUNCIONAMIENTO - 50 HZ, 2900 RPM



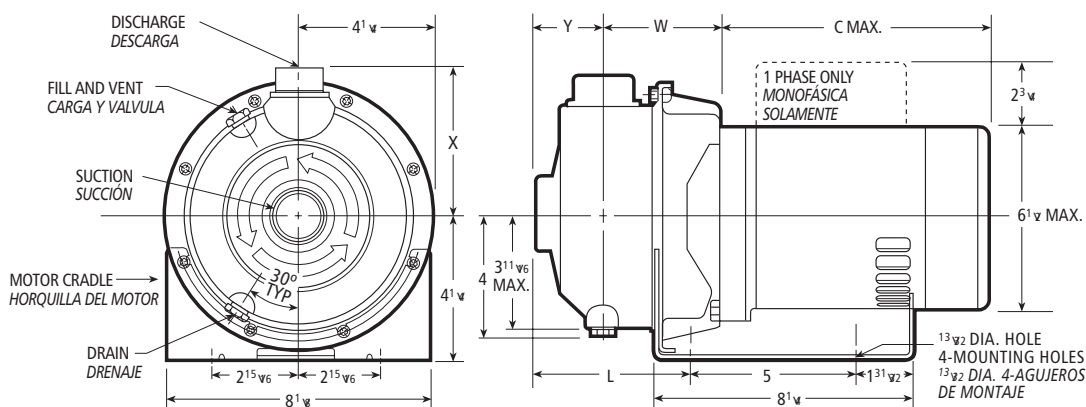
NPE CLOSE COUPLED - DIMENSIONS, WEIGHTS AND SPECIFICATIONS NPE ACOPLE CERRADO - DIMENSIONES, PESOS Y ESPECIFICACIONES

Clockwise Rotation Viewed from Drive End

Rotación en Dirección de las Agujas del Reloj Visto desde el Extremo del Motor



ODP and TEFC 1/2, 3/4 and 1 HP (standard), ODP y TEFC 1/2, 3/4 y 1 HP (estándar)



ODP and TEFC 1 1/2, 2 and 3 HP (standard), ODP y TEFC 1 1/2, 2 y 3 HP (estándar)

SPECIFICATIONS - ESPECIFICACIONES

Capacities to:

85 GPM (322L/min) at 1750 RPM
170 GPM (643L/min) at 3500 RPM

Heads to:

39 feet (12 m) at 1750 RPM
150 feet (46 m) at 3500 RPM

Working pressures to:

125 PSIG (9 bars)

Maximum temperatures to:

250° F (121° C)

Direction of rotation:

Clockwise when viewed from motor end.

Motor specifications:

NEMA 56J frame, 1750 RPM, 1/2 HP. 3500 RPM 1/2 through 5 HP. Open drip-proof, totally enclosed fan-cooled or explosion proof enclosures. Stainless steel shaft with ball bearings.

Single phase: Voltage 115/230 ODP and TEFC. (3 and 5 HP model - 230 V only) Built-in overload with auto-reset provided.

Three phase: Voltage 208-230/460 ODP, TEFC and EX PROOF.

NOTE: For three phase motors, overload protection must be provided in starter unit. Starter and heaters must be ordered separately.

Capacidades:

85 GPM (322L/min) a 1750 RPM
170 GPM (643L/min) a 3500 RPM

Cargas:

39 pies (12 m) a 1750 RPM
150 pies (46 m) a 3500 RPM

Presión de trabajo:

125 PSIG (9 baras)

Temperatura máxima:

250° F (121° C)

Dirección de rotación:

En dirección de las agujas del reloj visto desde el extremo final del motor.

Motores:

Armazón 56J NEMA, 1750 RPM 1/2 HP. 3500 RPM 1/2 a 5 HP. Cubiertas abiertas resguardadas, totalmente encerradas enfrías por ventilador o a prueba de explosiones. Eje de acero inoxidable con balineras de bolas.

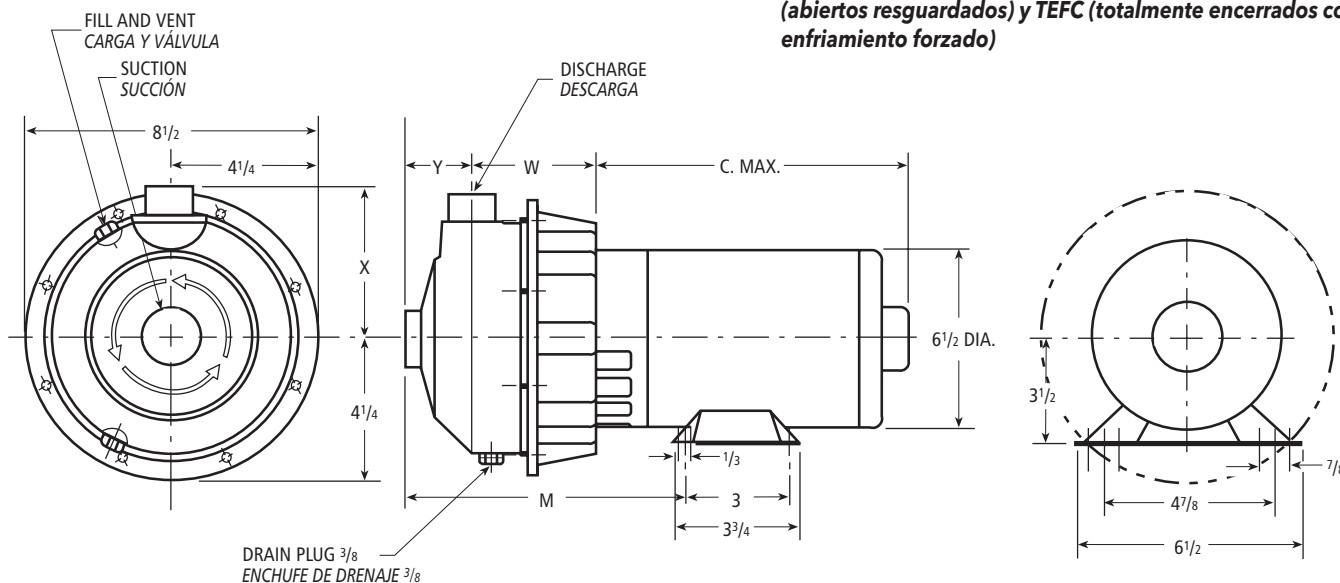
Monofásicos: Voltaje 115/230 ODP y TEFC. (modelo 3 y 5 HP - 230 voltios solamente) Se proporciona protección térmica contra sobrecarga construida con reseteo automático.

Trifásicos: Voltaje 208-230/460 ODP, TEFC y EX PROOF.

NOTA: Para motores trifásicos se debe de proporcionar la protección térmica contra sobrecarga en la unidad de arranque. El arrancador y los calentadores se deben pedir por separado.

NPE CLOSE COUPLED WITH FOOTED MOTOR, EXPLOSION-PROOF AND 5 HP MOTORS NPE ACOPLÉ CERRADO CON MOTOR CON PATAS, MOTORES A PRUEBA DE EXPLOSIÓN Y 5 HP

All Explosion Proof Motors and 5 HP ODP and TEFC
Todos los motores son a prueba de explosiones, 5 HP, ODP (abiertos resguardados) y TEFC (totalmente encerrados con enfriamiento forzado)



Dimensions - Determined by Pump, Dimensiones - Determinadas por la Bomba

Pump, Bomba	Suction, Succión	Discharge, Descarga	HP	W	X	Y	L	M
1ST	1 1/4	1	1/2 - 3	3 5/16	4 3/8	2	4 9/16	7 5/16
2ST	1 1/2	1 1/4	3/4 - 5	3 3/4	4 1/2	2 1/8	5 1/8	7 7/8
3ST	2	1 1/2	1 - 5	3 3/4	4 5/8	2 1/8	5 1/8	7 7/8

Available Motor Weights and Dimensions Pesos y Dimensiones Disponibles del Motor

HP	Motor Weights, Pesos del Motor						C Max. Length, (Longitud)
	1 Phase, Monofásicos			3 Phase, Trifásicos			
	ODP	TEFC	EXP	ODP	TEFC	EXP	
1/2	16	21	47	19	18	27	10 3/16
3/4	19	24	41	21	21	30	10 7/16
1	22	26	49	23	21	30	11 1/16
1 1/2	28	35	56	27	27	37	11 15/16
2	33	39	60	32	33	44	12 11/16
3	40	43	-	41	37	-	13 1/16
5	42	-	-	42	45	-	13 3/16

Dimensions in inches, weights in pounds.
Dimensiones en pulgadas, pesos en libras.

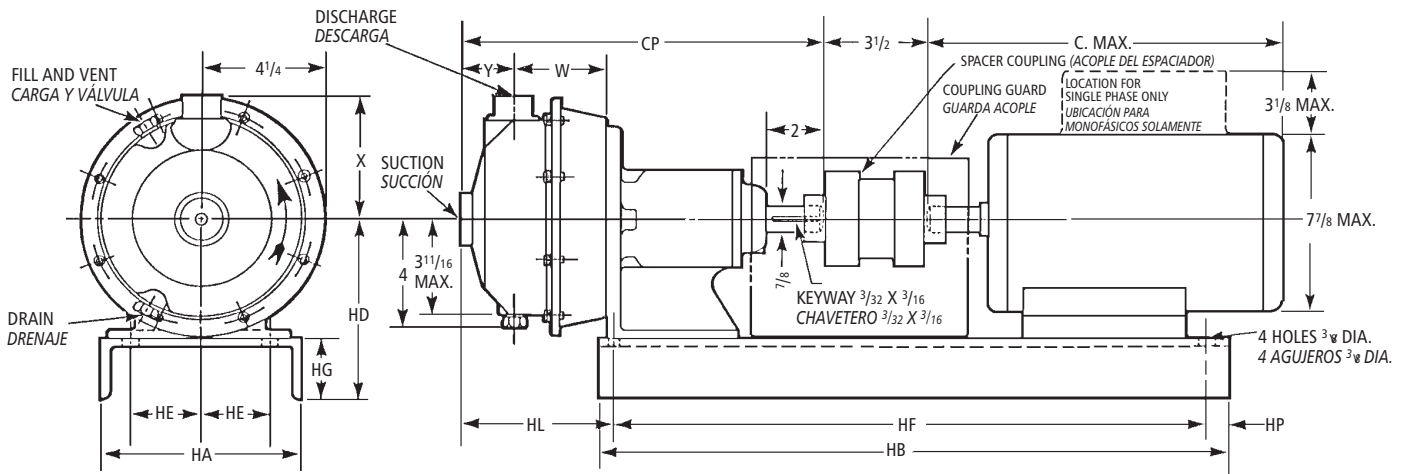
NOTES:

- Pump will be shipped with top vertical discharge position as standard. For other orientations, remove casing bolts, rotate discharge to desired position, replace and tighten 6mm bolts to 5 - 6 lbs.-ft.
- Motor dimensions may vary with motor manufacturers.
- Dimensions in inches, weights in pounds.
- For explosion proof motor dimensions consult factory for information.
- Not to be used for construction purposes unless certified.

NOTAS:

- Las bombas se transportarán con la descarga vertical superior como estándar. Para otras orientaciones, retirar los tornillos de la carcasa, rotar la descarga a la posición deseada, y reemplazar y apretar los tornillos de 6mm a 5 - 6 libras-pies.
- Las dimensiones del motor puede que varien con los fabricantes.
- Dimensiones en pulgadas, pesos en libras.
- Para las dimensiones de los motores a prueba de explosión consultar con la fábrica para información.
- No usar para propósitos de construcción sin certificar.

NPE FRAME MOUNTED - DIMENSIONS, WEIGHTS AND SPECIFICATIONS NPE ARMAZÓN MONTADO - DIMENSIONES, PESOS Y ESPECIFICACIONES



SPECIFICATIONS ESPECIFICACIONES

Capacities to:

85 GPM (322L/min) at 1750 RPM
170 GPM (643L/min) at 3500 RPM

Heads to:

39 feet (12 m) at 1750 RPM
150 feet (47 m) at 3500 RPM

Working pressures to:

125 PSIG (9 bars)

Maximum temperatures to:

250°F (121°C)

Direction of rotation:

Clockwise when viewed from motor end.

Motor specifications:

T-frame single and three phase. Open drip-proof, TEFC or explosion proof enclosures are available for 60 Hz, 3500 and 1750 RPM operation.

For three phase motors, overload protection must be provided in starter unit. Starter and heaters must be ordered separately.

Capacidades:

85 GPM (322L/min) a 1750 RPM
170 GPM (643L/min) a 3500 RPM

Cargas:

39 pies (12 m) a 1750 RPM
150 pies (47 m) a 3500 RPM

Presión de trabajo:

125 PSIG (9 bars)

Temperatura máxima:

250°F (121°C)

Dirección de rotación:

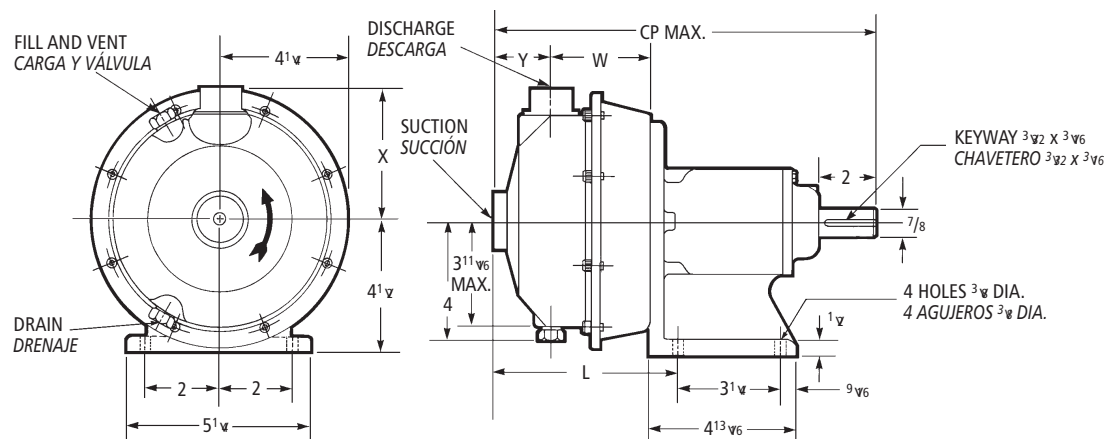
En dirección de las agujas del reloj visto desde el extremo final del motor.

Motores:

Armazón T- monofásico y trifásico. A prueba de goteo, TEFC o recintos a prueba de explosión están disponibles para funcionamiento de 60 Hz, 3500 y 1750 RPM.

Para motores trifásicos se debe de proporcionar la protección térmica contra sobrecarga en la unidad de arranque. El arrancador y los calentadores se deben pedir por separado.

NPE-F



Dimensions and Weights Dimensiones y Pesos

Dimensions and Weights - Determined by Pump,
Dimensiones y Pesos - Determinados por la Bomba

Dim. "HL" Determined by Pump and Motor,
Dim. "HL" Determinadas por la Bomba y el Motor

Pump, Bomba	Suct. NPT, Succión NPT	Disch. NPT, Descarga NPT	CP	L	W	X	Y	Wt., Peso	Frame, Armazón		
									56	140	180
1ST	1¼	1	12 ¹⁵ / ₁₆	6 ⁷ / ₁₆	3 ⁵ / ₁₆	4 ³ / ₈	2	22½	4 ⁹ / ₁₆	6 ⁷ / ₁₆	
2ST	1½	1¼	13½	7	3¾	4½	2 ¹ / ₈	23	5½	7	
3ST	2	1½				4 ⁵ / ₈					

Available Motor and Bedplate Dimensions and Weights,
Pesos y Dimensiones Disponibles de la Fundación y del Motor

Motor Frame, Armazón del Motor	HA	HB	HD	HE	HF	HG	HP	Wt. Max., Peso Máx	Shims, Deflector
56 143T 145T	8	26	6 ⁷ / ₈	3 ³ / ₈	22 ³ / ₈	2 ³ / ₈	1	30	1"
182T 184T	10	26	7¼	3¾	24	2¼	¾	43	-

Frame Size, Tamaño del Armazón	Horsepower, Fuerza				C Max.	Wt. Max., Peso Máx.
	3500 RPM					
	Single Phase, Monofásicos		Three Phase, Trifásicos			
	ODP	TEFC	ODP	TEFC		
56	½ - 1½	½ - 1½	½ - 1	½ - 1	13	45
143T	-	-	1½	1½	13 ³ / ₈	45
145T	2	2	1½ - 3	1½ - 2	14¼	52
182T	3	3	5	3	16 ⁵ / ₈	63
184T	5	5	-	5	18½	112

NOTES:

- Pump will be shipped with top vertical discharge position as standard. For other orientations, remove casing bolts, rotate discharge to desired position, replace and tighten 6mm bolts to 5 - 6 lbs.-ft.
- Motor dimensions may vary with motor manufacturers.
- Dimensions in inches, weights in pounds.
- For explosion proof motor dimensions consult factory for information.
- Not to be used for construction purposes unless certified.

NOTAS:

- Las bombas se transportarán con la descarga vertical superior como estándar. Para otras orientaciones, retirar los tornillos de la carcasa, rotar la descarga a la posición deseada, y reemplazar y apretar los tornillos de 6mm a 5 - 6 libras-pies.
- Las dimensiones del motor puede que varíen con los fabricantes.
- Dimensiones en pulgadas, pesos en libras.
- Para las dimensiones de los motores a prueba de explosión consultar con la fábrica para información.
- No usar para propósitos de construcción sin certificar.

TYPICAL APPLICATIONS, APLICACIONES TÍPICAS

Specifically designed for a broad range of general applications traditionally requiring various materials such as all iron, bronze fitted or all bronze construction.

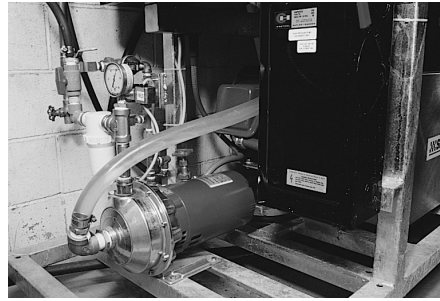
- Water circulation
- Booster service
- Liquid transfer
- Spray system
- Chillers
- Washing/cleaning systems
- Injection molding cooling
- Reverse osmosis
- Air scrubbers
- Heat exchangers
- Filtration systems
- Jockey pumps
- OEM applications
- General water services

Diseñadas específicamente para una amplia variedad de aplicaciones generales, requiriendo tradicionalmente varios materiales, tales como hierro, bronce empotrado o todas las construcciones de bronce.

- *Circulación de agua*
- *Aumento de presión*
- *Transferencia de líquidos*
- *Sistemas de aspersion*
- *Enfriadores*
- *Sistemas de lavado/limpieza por inyección*
- *Enfriamiento con molde por inyección*
- *Osmosis reversa*
- *Depuradores de aire*
- *Termopermutadores*
- *Sistemas de filtración*
- *Bombas auxiliares*
- *Aplicaciones OEM*
- *Servicios generales de agua*



Brewery, Fábrica de Cerveza



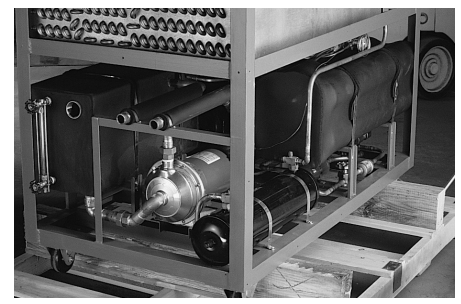
Car Wash, Lavadero de Autos



Pure Water/OEM, Agua Pura/OEM



Pressure Booster System, Sistema de Aumento de Presión



Chiller, Enfriador

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G&L SERIES

MODEL NPE/NPE-F

Installation, Operation and
Maintenance Instructions



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Owner's Information

Pump Model Number: _____

Pump Serial Number: _____

Dealer: _____

Dealer Phone No.: _____

Date of Purchase: _____

Date of Installation: _____

Current Readings at Startup:

1 Ø	3 Ø	L1-2	L2-3	L3-1
Amps: _____	Amps: _____	_____	_____	_____
Volts: _____	Volts: _____	_____	_____	_____

SAFETY INSTRUCTIONS

TO AVOID SERIOUS OR FATAL PERSONAL INJURY OR MAJOR PROPERTY DAMAGE, READ AND FOLLOW ALL SAFETY INSTRUCTIONS IN MANUAL AND ON PUMP.

THIS MANUAL IS INTENDED TO ASSIST IN THE INSTALLATION AND OPERATION OF THIS UNIT AND MUST BE KEPT WITH THE PUMP.



This is a **SAFETY ALERT SYMBOL**. When you see this symbol on the pump or in the manual, look for one of the following signal words and be alert to the potential for personal injury or property damage.



Warns of hazards that WILL cause serious personal injury, death or major property damage.



Warns of hazards that CAN cause serious personal injury, death or major property damage.



Warns of hazards that CAN cause personal injury or property damage.

NOTICE: INDICATES SPECIAL INSTRUCTIONS WHICH ARE VERY IMPORTANT AND MUST BE FOLLOWED.

THOROUGHLY REVIEW ALL INSTRUCTIONS AND WARNINGS PRIOR TO PERFORMING ANY WORK ON THIS PUMP.

MAINTAIN ALL SAFETY DECALS.



Hazardous fluids can cause fire, burns or death.

UNIT NOT DESIGNED FOR USE WITH HAZARDOUS LIQUIDS OR FLAMMABLE GASES. THESE FLUIDS MAY BE PRESENT IN CONTAINMENT AREAS.

DESCRIPTION & SPECIFICATIONS:

The Models NPE (close-coupled) and NPE-F (frame-mounted) are end suction, single stage centrifugal pumps for general liquid transfer service, booster applications, etc. Liquid-end construction is all AISI Type 316 stainless steel, stamped and welded. Impellers are fully enclosed, non-trimable to intermediate diameters. Casings are fitted with a diffuser for efficiency and for negligible radial shaft loading.

Close-coupled units have NEMA 48J or 56J motors with C-face mounting and threaded shaft extension. Frame-mounted units can be coupled to motors through a spacer coupling, or belt driven.

1. IMPORTANT:

- 1.1. Inspect unit for damage. Report any damage to carrier/dealer immediately.
- 1.2. Electrical supply must be a separate branch circuit with fuses or circuit breakers, wire sizes, etc., per national and local electrical codes. Install an all-leg disconnect switch near pump.



Always disconnect electrical power when handling pump or controls.

- 1.3. Motors must be wired for proper voltage. Motor wiring diagram is on motor nameplate. Wire size must limit maximum voltage drop to 10% of nameplate voltage at motor terminals, or motor life and pump performance will be lowered.
- 1.4. Always use horsepower-rated switches, contactor and starters.
- 1.5. Motor Protection
 - 1.5.1. Single-phase: Thermal protection for single-phase units is sometimes built in (check nameplate). If no built-in protection is provided, use a contactor with a proper overload. Fusing is permissible.
 - 1.5.2. Three-phase: Provide three-leg protection with properly sized magnetic starter and thermal overloads.
- 1.6. Maximum Operating Limits:

Liquid Temperature:	250° F (120° C)
Pressure:	125 PSI
Starts Per Hour:	20, evenly distributed
- 1.7. Regular inspection and maintenance will increase service life. Base schedule on operating time. Refer to Section 8.

2. INSTALLATION:

2.1. General

- 2.1.1. Locate pump as near liquid source as possible (below level of liquid for automatic operation).
- 2.1.2. Protect from freezing or flooding.
- 2.1.3. Allow adequate space for servicing and ventilation.
- 2.1.4. All piping must be supported independently of the pump, and must “line-up” naturally.



Never draw piping into place by forcing the pump suction and discharge connections.

- 2.1.5. Avoid unnecessary fittings. Select sizes to keep friction losses to a minimum.

2.2. Close-Coupled Units

- 2.2.1. Units may be installed horizontally, inclined or vertically.



Do not install with motor below pump. Any leakage or condensation will affect the motor.

- 2.2.2. Foundation must be flat and substantial to eliminate strain when tightening bolts. Use rubber mounts to minimize noise and vibration.
- 2.2.3. Tighten motor hold-down bolts before connecting piping to pump.

2.3. Frame-Mounted Units

- 2.3.1. It is recommended that the bedplate be grouted to a foundation with solid footing. Refer to Figure 1.

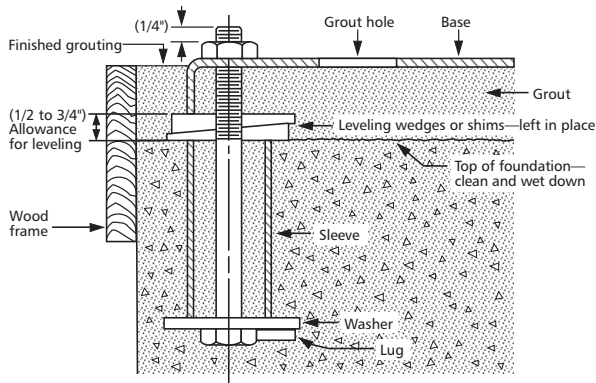


Figure 1

2.3.2. Place unit in position on wedges located at four points (two below approximate center of driver and two below approximate center of pump). Adjust wedges to level unit. Level or plumb suction and discharge flanges.

2.3.3. Make sure bedplate is not distorted and final coupling alignment can be made within the limits of movement of motor and by shimming, if necessary.

2.3.4. Tighten foundation bolts finger tight and build dam around foundation. Pour grout under bedplate making sure the areas under pump and motor feet are filled solid. Allow grout to harden 48 hours before fully tightening foundation bolts.

2.3.5. Tighten pump and motor hold-down bolts before connecting the piping to pump.

3. SUCTION PIPING:

3.1. Low static suction lift and short, direct, suction piping is desired. For suction lift over 10 feet and liquid temperatures over 120 F, consult pump performance curve for Net Positive Suction Head Required.

3.2. Suction pipe must be at least as large as the suction connection of the pump. Smaller size will degrade performance.

3.3. If larger pipe is required, an eccentric pipe reducer (with straight side up) must be installed at the pump.

3.4. Installation with pump below source of supply

3.4.1. Install full flow isolation valve in piping for inspection and maintenance.

CAUTION Do not use suction isolation valve to throttle pump.

3.5. Installation with pump above source of supply

3.5.1. Avoid air pockets. No part of piping should be higher than pump suction connection. Slope piping upward from liquid source.

3.5.2. All joints must be airtight.

3.5.3. Foot valve to be used only if necessary for priming, or to hold prime on intermittent service.

3.5.4. Suction strainer open area must be at least triple the pipe area.

3.6. Size of inlet from liquid source, and minimum submergence over inlet, must be sufficient to prevent air entering pump through vortexing. See Figures 2-5.

3.7. Use 3-4 wraps of Teflon tape to seal threaded connections.

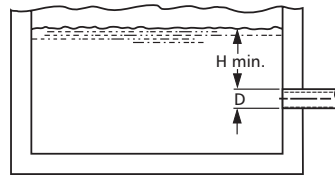


Figure 2

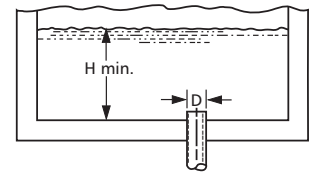


Figure 3

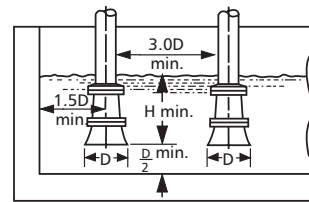


Figure 4

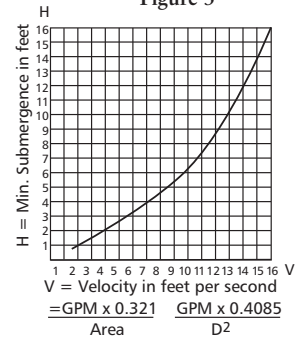


Figure 5

4. DISCHARGE PIPING:

4.1. Arrangement must include a check valve located between a gate valve and the pump. The gate valve is for regulation of capacity, or for inspection of the pump or check valve.

4.2. If an increaser is required, place between check valve and pump.

4.3. Use 3-4 wraps of Teflon tape to seal threaded connections.

5. MOTOR-TO-PUMP SHAFT ALIGNMENT:

5.1. Close-Coupled Units

5.1.1. No field alignment necessary.

5.2. Frame-Mounted Units

5.2.1. Even though the pump-motor unit may have a factory alignment, this could be disturbed in transit and must be checked prior to running. See Figure 6.

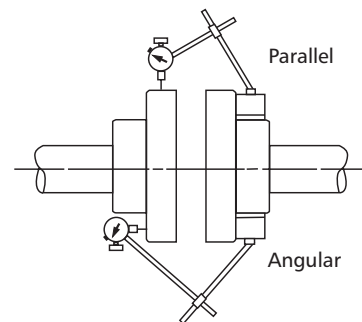


Figure 6

5.2.2. Tighten all hold-down bolts before checking the alignment.

5.2.3. If re-alignment is necessary, always move the motor. Shim as required.

- 5.2.4. Parallel misalignment - shafts with axis parallel but not concentric. Place dial indicator on one hub and rotate this hub 360 degrees while taking readings on the outside diameter of the other hub. Parallel alignment occurs when Total Indicator Reading is .005", or less.
- 5.2.5. Angular misalignment - shafts with axis concentric but not parallel. Place dial indicator on one hub and rotate this hub 360 degrees while taking readings on the face of the other hub. Angular alignment is achieved when Total Indicator Reading is .005", or less.
- 5.2.6. Final alignment is achieved when parallel and angular requirements are satisfied with motor hold-down bolts tight.

CAUTION Always recheck both alignments after making any adjustment.

6. ROTATION:

- 6.1. Correct rotation is right-hand (clockwise when viewed from the motor end). Switch power on and off quickly. Observe shaft rotation. To change rotation:
 - 6.1.1. Single-phase motor: Non-reversible.
 - 6.1.2. Three-phase motor: Interchange any two power supply leads.

7. OPERATION:

- 7.1. Before starting, pump must be primed (free of air and suction pipe full of liquid) and discharge valve partially open.

CAUTION Pumped liquid provides lubrication. If pump is run dry, rotating parts will seize and mechanical seal will be damaged. Do not operate at or near zero flow. Energy imparted to the liquid is converted into heat. Liquid may flash to vapor. Rotating parts require liquid to prevent scoring or seizing.

- 7.2. Make complete check after unit is run under operating conditions and temperature has stabilized. Check for expansion of piping. On frame-mounted units coupling alignment may have changed due to the temperature differential between pump and motor. Recheck alignment.

8. MAINTENANCE:

- 8.1. Close-Coupled Unit. Ball bearings are located in and are part of the motor. They are permanently lubricated. No greasing required.
- 8.2. Frame-Mounted Units
 - 8.2.1. Bearing frame should be regreased every 2,000 hours or 3 month interval, whichever occurs first. Use a #2 sodium or lithium based grease. Fill until grease comes out of relief fittings, or lip seals, then wipe off excess.
 - 8.2.2. Follow motor and coupling manufacturers' lubrication instructions.
 - 8.2.3. Alignment must be rechecked after any maintenance work involving any disturbance of the unit.

9. DISASSEMBLY:

Complete disassembly of the unit will be described. Proceed only as far as required to perform the maintenance work needed.

- 9.1. Turn off power.
- 9.2. Drain system. Flush if necessary.
- 9.3. Close-Coupled Units: Remove motor hold-down bolts.
- Frame-Mounted Units: Remove coupling, spacer, coupling guard and frame hold-down bolts.
- 9.4. Disassembly of Liquid End
 - 9.4.1. Remove casing bolts (370).
 - 9.4.2. Remove back pull-out assembly from casing (100).
 - 9.4.3. Remove impeller locknut (304).

CAUTION Do not insert screwdriver between impeller vanes to prevent rotation of close-coupled units. Remove cap at opposite end of motor. A screwdriver slot or a pair of flats will be exposed. Using them will prevent impeller damage.

- 9.4.4. Remove impeller (101) by turning counter-clockwise when looking at the front of the pump. Protect hand with rag or glove.

CAUTION Failure to remove the impeller in a counter-clockwise direction may damage threading on the impeller, shaft or both.

- 9.4.5. With two pry bars 180 degrees apart and inserted between the seal housing (184) and the motor adapter (108), carefully separate the two parts. The mechanical seal rotary unit (383) should come off the shaft with the seal housing.
- 9.4.6. Push out the mechanical seal stationary seat from the motor side of the seal housing.
- 9.5. Disassembly of Bearing Frame
 - 9.5.1. Remove bearing cover (109).
 - 9.5.2. Remove shaft assembly from frame (228).
 - 9.5.3. Remove lip seals (138 and 139) from bearing frame and bearing cover if worn and are being replaced.
 - 9.5.5. Use bearing puller or arbor press to remove ball bearings (112 and 168).

10. REASSEMBLY:

- 10.1. All parts should be cleaned before assembly.
 - 10.2. Refer to parts list to identify required replacement items. Specify pump index or catalog number when ordering parts.
 - 10.3. Reassembly is the reverse of disassembly.
 - 10.3.1. Impeller and impeller locknut assembled onto motor shaft with 10 ft-lbs of torque.
 - 10.4. Observe the following when reassembling the bearing frame.
 - 10.4.1. Replace lip seals if worn or damaged.
 - 10.4.2. Replace ball bearings if loose, rough or noisy when rotated.
 - 10.4.3. Check shaft for runout. Maximum permissible is .002" T.I.R.
 - 10.5. Observe the following when reassembling the liquid-end.
 - 10.5.1. All mechanical seal components must be in good condition or leakage may result. Replacement of complete seal assembly, whenever seal has been removed, is good standard practice.

It is permissible to use a light lubricant, such as glycerin, to facilitate assembly. Do not contaminate the mechanical seal faces with lubricant.
 - 10.5.2. Inspect casing O-ring (513) and replace if damaged. This O-ring may be lubricated with petroleum jelly to ease assembly.
 - 10.5.3. Inspect guidevane O-ring (349) and replace if worn.
- ▲ CAUTION** Do not lubricate guidevane O-ring (349). Insure it is not pinched by the impeller on reassembly.
- 10.6. Check reassembled unit for binding. Correct as required.
 - 10.7. Tighten casing bolts in a star pattern to prevent O-ring binding.

11. TROUBLE SHOOTING CHART:

MOTOR NOT RUNNING:

(See causes 1 thru 6)

LITTLE OR NO LIQUID DELIVERED:

(See causes 7 thru 17)

POWER CONSUMPTION TOO HIGH:

(See causes 4, 17, 18, 19, 22)

EXCESSIVE NOISE AND VIBRATION:

(See causes 4, 6, 9, 13, 15, 16, 18, 20, 21, 22)

PROBABLE CAUSE:

1. Tripped thermal protector
2. Open circuit breaker
3. Blown fuse
4. Rotating parts binding
5. Motor wired improperly
6. Defective motor
7. Not primed
8. Discharge plugged or valve closed
9. Incorrect rotation
10. Foot valve too small, suction not submerged, inlet screen plugged
11. Low voltage
12. Phase loss (3-phase only)
13. Air or gasses in liquid
14. System head too high
15. NPSHA too low:
Suction lift too high or suction losses excessive.
Check with vacuum gauge.
16. Impeller worn or plugged
17. Incorrect impeller diameter
18. Head too low causing excessive flow rate
19. Viscosity or specific gravity too high
20. Worn bearings
21. Pump or piping loose
22. Pump and motor misaligned

NPE STANDARD REPAIR PARTS LIST

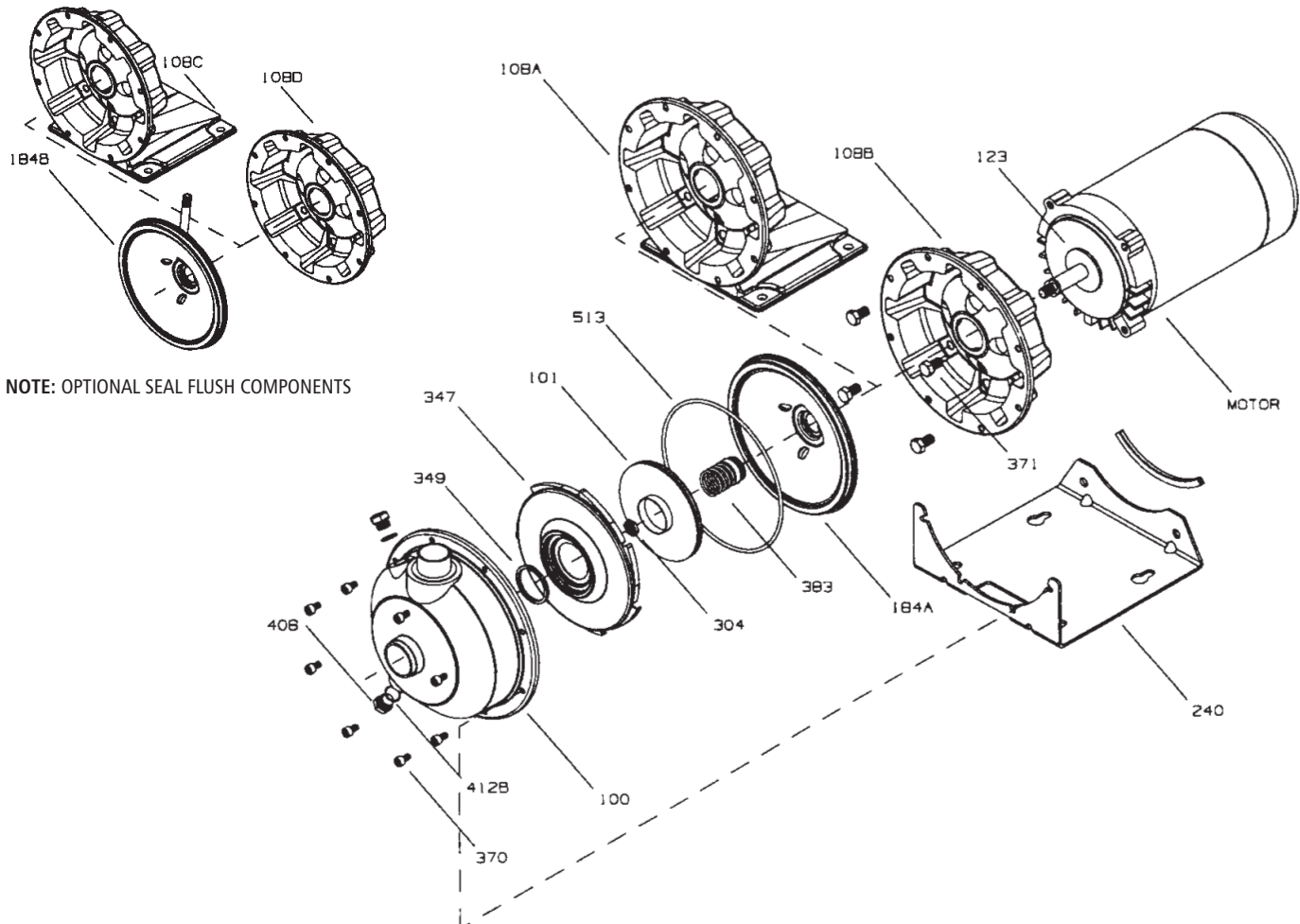
Item No.	Description	Materials of Construction
100	Casing	AISI 316L Stainless Steel
101	Impeller	
108A	Motor adapter with foot	
108B	Motor adapter less foot	
108C	Motor adapter with foot and flush	
108D	Motor adapter less foot with flush	BUNA-N
123	Deflector	
184A	Seal housing std.	
184B	Seal housing with seal flush	AISI 316L S.S.
240	Motor support	300 S.S.
	Rubber channel	Rubber
304	Impeller locknut	AISI 316 S.S.
347	Guidevane	AISI 316L S.S.
349	Seal-Ring, guidevane	Viton (standard)
		EPR
		BUNA
370	Socket head screw, casing	AISI 410 S.S.
371	Bolts, motor	Steel/plated
383	Mechanical seal	
408	Drain and vent plug, casing	AISI 316 S.S.
412B	O-Ring, drain plugs	Viton (standard)
		EPR
		BUNA
513	O-Ring, casing	Viton (standard)
		EPR
		BUNA

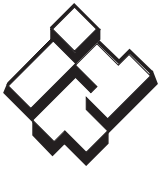
MECHANICAL SEAL APPLICATION CHART

Item 383 Mechanical Seal (5/8" seal)				
Rotary	Stationary	Elastomers	Metal Parts	Part No.
Carbon	Sil-Carbide	EPR	316SS	10K18
		Viton		10K55
EPR		10K81		
Viton		10K62		

NOTE: Close coupled units supplied with 1/2 HP 1750 RPM, 1/2 - 3 HP Explosion Proof or 5 HP motors, utilize motor adapter less foot and a footed motor.

NOTE: Frame mounted units (NPE-F) utilize the XS Power frame and motor adapter less foot. For repair parts for the power frame refer to the XS-Power frame repair parts page in the parts section of your catalog. To order the power frame complete order item 14L61.





ITT

Commercial Water

GOULDS PUMPS LIMITED WARRANTY

This warranty applies to all water systems pumps manufactured by Goulds Pumps.

Any part or parts found to be defective within the warranty period shall be replaced at no charge to the dealer during the warranty period. The warranty period shall exist for a period of twelve (12) months from date of installation or eighteen (18) months from date of manufacture, whichever period is shorter.

A dealer who believes that a warranty claim exists must contact the authorized Goulds Pumps distributor from whom the pump was purchased and furnish complete details regarding the claim. The distributor is authorized to adjust any warranty claims utilizing the Goulds Pumps Customer Service Department.

The warranty excludes:

- (a) Labor, transportation and related costs incurred by the dealer;
- (b) Reinstallation costs of repaired equipment;
- (c) Reinstallation costs of replacement equipment;
- (d) Consequential damages of any kind; and,
- (e) Reimbursement for loss caused by interruption of service.

For purposes of this warranty, the following terms have these definitions:

- (1) "Distributor" means any individual, partnership, corporation, association, or other legal relationship that stands between Goulds Pumps and the dealer in purchases, consignments or contracts for sale of the subject pumps.
- (2) "Dealer" means any individual, partnership, corporation, association, or other legal relationship which engages in the business of selling or leasing pumps to customers.
- (3) "Customer" means any entity who buys or leases the subject pumps from a dealer. The "customer" may mean an individual, partnership, corporation, limited liability company, association or other legal entity which may engage in any type of business.

THIS WARRANTY EXTENDS TO THE DEALER ONLY.



Goulds Pumps, G&L and the ITT Engineered Blocks Symbol are registered trademarks and tradenames of ITT Corporation.

SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.

IM013 Revision Number 8 April, 2008

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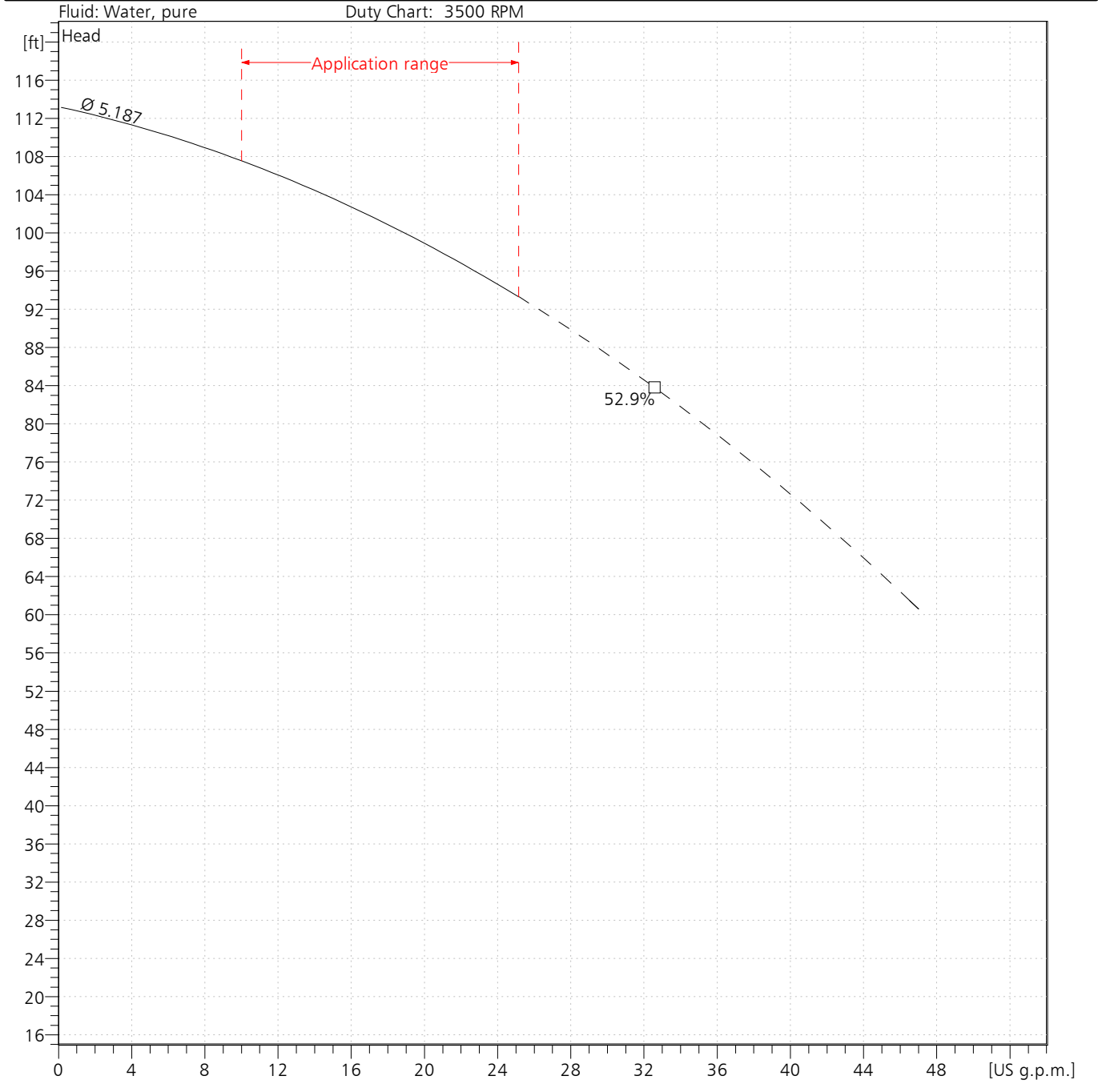
Engineered for life

Performance Data

NPE Stainless Steel End Suction MODEL: 1ST1E1C4 - FP

Hydraulic Data				Motor Data		NPE Model	Quantity
Maximum Flow	Flow at Duty Point	Maximum TDH	TDH at Duty Point	NPSH _R	Voltage / Phase / Enclosure	1ST1E1C4	1
47 US g.p.m.	0 US g.p.m.	113 ft	0 ft		230V 1PH ODP		

Submittal Prepared for: _____ Job: _____
 Engineer: _____ Contractor: _____
 Submittal Prepared by: _____ Company: _____
 Submittal Date: 2006-10-05 Approved by: _____ Date: _____





BUTTERBALL BUTTERFLY VALVES

Model Number: BB-SCS02 (threaded ends)

Model Number: NYC Indicator

Model Number: BBVSCS02 (3 piece with grooved ends)

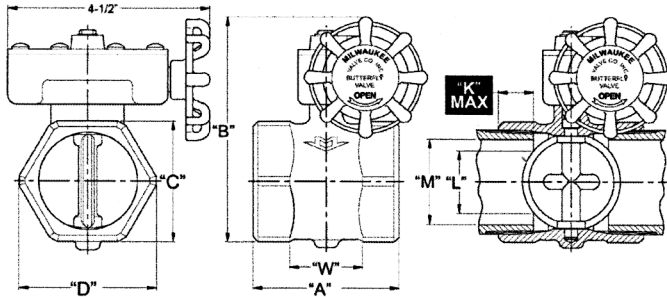
Size: 2"

Model Number: BBVCS02 (unibody with grooved ends)

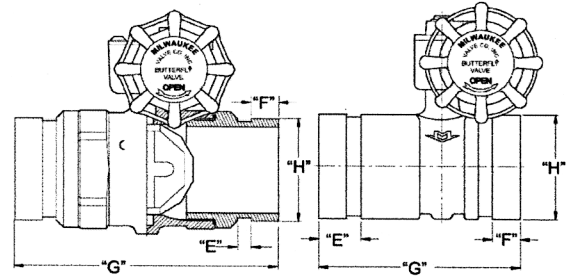
Size: 2 1/2"

INDOOR/OUTDOOR butterball® BUTTERFLY VALVES

VALVES LESS SUPERVISORY TAMPER SWITCH ASSEMBLY



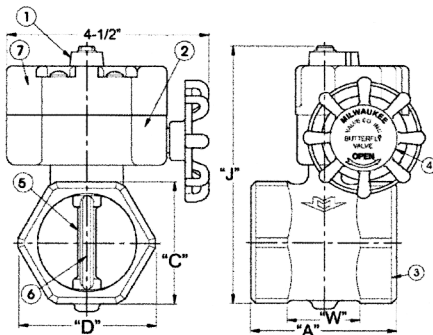
BB-SC100 (Threaded Ends)
Sizes 1", 1-1/4", 1-1/2", 2", 2-1/2"



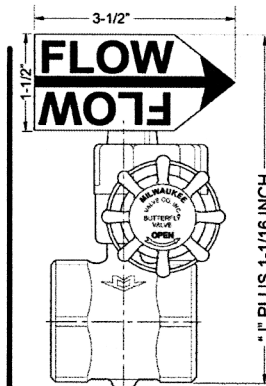
BBVSC100
3 piece with
Grooved Ends
Size 2"

BBVSC100
Uni-body with
Grooved Ends
Size 2-1/2"

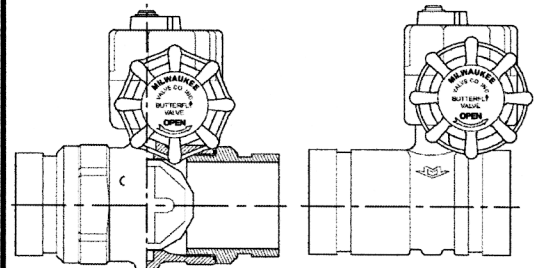
* VALVES WITH SUPERVISORY TAMPER SWITCH ASSEMBLY



THREADED ENDS
BB-SCS02



NYC INDICATOR
(Available on both switched and non-switched models.)



BBVSCS02
3 piece with
Grooved Ends
Size 2"

BBVSCS02
Uni-body with
Grooved Ends
Size 2-1/2"

ALL DIMENSIONS-INCHES

Threaded					Grooved		
SIZE	1"	1-1/4"	1-1/2"	2"	SIZE	2"	2-1/2"
A	2-1/8	2-5/8	2-7/8	3-1/4	A	-	4-1/8
B	3-15/16	4-9/32	4-1/2	5	B	5	5-13/32
C	1-9/16	1-15/16	2-3/16	2-3/4	C	2-3/4	3-3/16
D	1-23/32	2-7/64	2-3/8	3-1/16	D	3-1/16	3-1/2
J	4-15/16	5-1/8	5-19/32	6-1/8	E	5/8	15/16
K	.66	.73	.73	.79	F	5/16	5/8
L	.83	.90	.99	1.41	G	6	4-1/2
M-40	1.05	1.38	1.61	2.07	H	2-3/8	2-7/8
M-80	.96	1.28	1.50	1.94	J	6-1/8	6-1/4
N-40	2.25	2	2.5	2.25	K	.79	1.18
W	1-1/8	1-1/4	1-13/32	1-11/16	L	1.41	1.29
					M-40	2.07	2.47
					M-80	1.94	2.32
					N-40	2.25	10
					W	-	1-3/4

M-40 ARE DIMENSIONS USING SCHEDULE 40 PIPE

M-80 ARE DIMENSIONS USING SCHEDULE 80 PIPE

N-40 IS FLOW RESISTANCE EXPRESSED IN EQUIVALENT LENGTH OF SCHEDULE 40 PIPE

W IS THE WRENCH MAKE-UP LENGTH

MATERIAL LIST

NO.	PART	MATERIAL	SPECIFICATION
1	Indicator	Sintered Iron	F0008P
2	Housing	Bronze	ASTM 584
3	Body	Bronze	ASTM 584
4	Handle	Brass	
5	Disc	Stainless Steel	Type 304
6	Disc Seal	EPDM Elastomer	
7	Switch Housing	Die Cast Aluminum	



CONTROL BOX

Model Number: RPC-115230V-50A

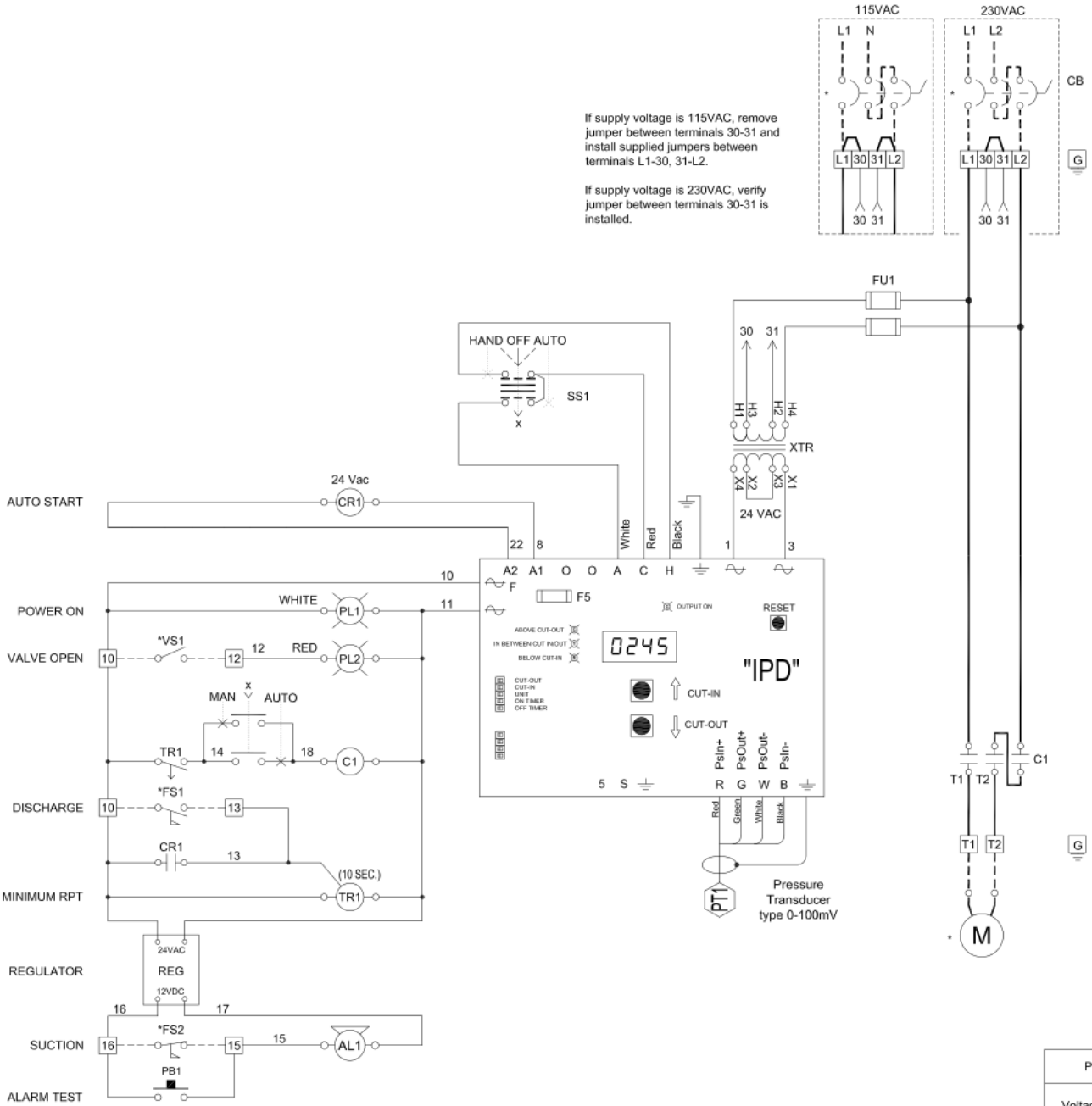
RESIDENTIAL PUMP CONTROLLER

MODEL : RPC

Wiring schematic

BUILT TO UL 508A STANDARDS

BRANCH CIRCUIT PROTECTION TO BE SUPPLIED BY OTHERS. PROTECT CIRCUIT IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE (UL508A 60.1)



Power Table	
Voltage	Max HP
115	3
230	7.5

* supplied by others

Drawing for information only.
 Manufacturer reserves the right to modify this drawing without notice.
 For drawing for approval or installation, please contact manufacturer.



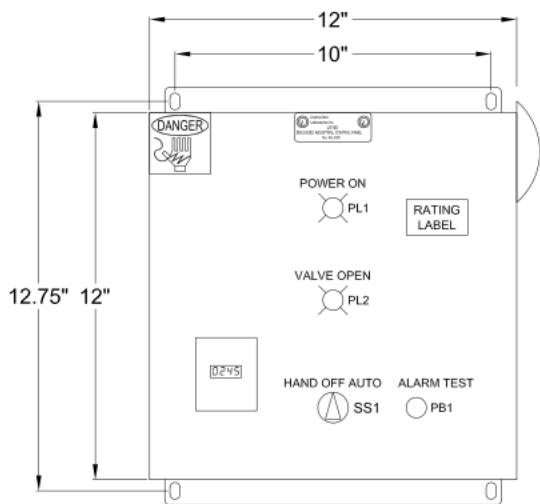
REV.	DATE	DESCRIPTION	APP.	DRAWING No.
0.	11/02/16	FIRST ISSUE	DES.	RPC-0000 1/2 /E
			VER.	
			APP.	

RESIDENTIAL PUMP CONTROLLER

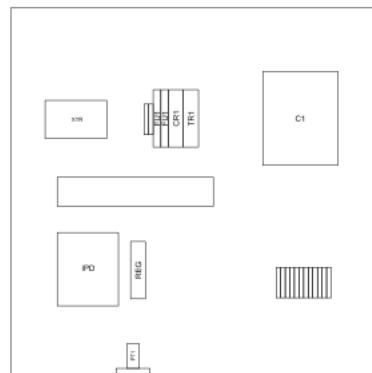
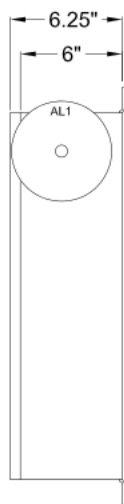
MODEL : RPC

Enclosure

BUILT TO UL 508A STANDARDS.

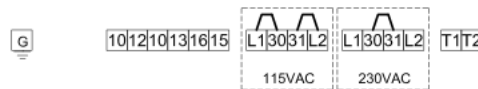


NEMA/CSA 2 ENCLOSURE



TERMINAL STRIP

- Dimension may change at manufacturer discretion.



LEGEND

- AL : ALARM BELL
- C : MOTOR CONTACTOR
- CB : CIRCUIT BREAKER
- CR : CONTROL RELAY
- FS : FLOW SWITCH
- FU : FUSE
- IPD : DIGITAL PRESSURE INTERFACE
- PB : PUSH-BUTTON
- PL : PILOT LIGHT
- PT : PRESSURE TRANSDUCER
- REG : REGULATOR AND RECTIFIER
- SS : SELECTOR SWITCH
- TR : TIME RELAY
- VS : VALVE SWITCH
- XTR : CONTROL TRANSFORMER

Drawing for information only.
 Manufacturer reserves the right to modify this drawing without notice.
 For drawing for approval or installation, please contact manufacturer.



REV.	DATE	DESCRIPTION	APP.	DRAWING No.
0.	11/02/16	FIRST ISSUE	DES.	RPC-0000 2/2 /E
			VER.	
			APP.	



ALARM SWITCH

Model Number: VSR-SF

Rating: UL-listed

Service Pressure: up to 250 psi

Minimum Flow Rate for Alarm: 10 GPM

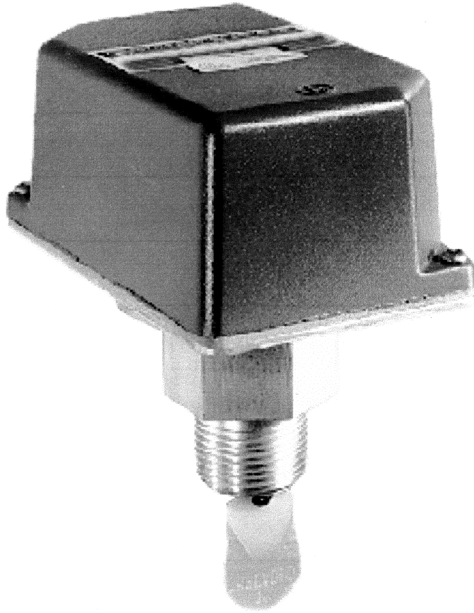
Contact Ratings: 15 Amps at 125/250 VAC



VSR-SF
VANE TYPE WATERFLOW
ALARM SWITCH WITH RETARD
FOR SMALL PIPE

Potter Electric Signal Company
 2081 Craig Road • St. Louis, MO 63146-4161
 (314) 878-4321 • (800) 325-3936
 www.pottersignal.com

Potter Electric Signal & Mfg., LTD.
 55 Glen Cameron Road
 Thornhill, Ontario, Canada L3T 1P2
 (905) 882-1833



UL, ULC, CSFM LISTED and NYMEA ACCEPTED

Service Pressure: Up to 250 PSI

Minimum Flow Rate for Alarm: 10 GPM

Maximum Surge: 18 FPS

Enclosure: Die-cast, red enamel finish

Cover held in place with tamper resistant screws

Contact Ratings: Two sets of SPDT (Form C)

15.0 Amps at 125/250 VAC

2.0 Amps at 30 VDC

Conduit Entrances: Two knockouts provided for 1/2" conduit.

Usage: Listed plastic, copper and schedule 40 iron pipe.

Fits pipe sizes - 1", 1 1/4", 1 1/2" and 2"

Note: 10 paddles are furnished with each unit, one for each pipe size of threaded and sweat TEE, one for 1" CPVC and one for 1 1/2" polybutylene.

(CTS-Copper tubing size)

Environmental Specifications:

- Suitable for indoor or outdoor use with factory installed gasket and die-cast housing.
- NEMA 4/IP55 rated enclosure - use with appropriate conduit fitting.
- Temperature range: 40° F to 120° F (4.5° C to 49° C)

Caution: This device is not intended for applications in explosive environments.

Service Use:

Automatic Sprinkler	NFPA-13
One or two family dwelling	NFPA-13D
Residential occupancy up to four stories	NFPA-13R
National Fire Alarm Code	NFPA-72

Stock No. 1113000

U.S. PAT. NO. 3921989, CANADIAN PAT. NO. 1009680
 OTHER PATENTS PENDING.

The Model VSR-SF is a vane type waterflow switch for use on wet sprinkler systems that use 1", 1 1/4", 1 1/2" or 2" pipe size. The unit may also be used as a sectional waterflow detector on large systems.

The unit contains two single pole double throw snap action switches and an adjustable, instantly recycling pneumatic retard. The switches are actuated when a flow of 10 gallons per minute or more occurs downstream of the device. The flow condition must exist for a period of time necessary to overcome the selected retard period.

INSTALLATION: These devices may be mounted in horizontal or vertical pipe. On horizontal pipe they should be installed on the top side of the pipe where they will be accessible. The units should not be installed within 6" of a valve, drain or fitting which changes the direction of the waterflow. The unit has a 1" NPT bushing for threading into a non-corrosive TEE. See Fig. 2 for proper TEE size, type and installation.

Screw the device into the TEE fitting as shown in Fig. 2. Care must be taken to properly orient the device for the direction of

waterflow.

The vane must not rub the inside of the TEE or bind in any way. The stem should move freely when operated by hand.

The device can also be used in copper or plastic pipe installations with the proper adapters so that the specified TEE fitting may be installed on the pipe run.

INSPECTION AND TESTING: Check the operation of the unit by opening the inspector's test valve at the end of the sprinkler line or the drain and test connection, if an inspector's test valve is not provided.

If there are no provisions for testing the operation of the flow detection device on the system, application of the VSR-SF is not recommended or advisable

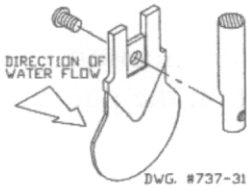
The frequency of the inspection and testing and its associated protective monitoring system should be in accordance with the applicable NFPA Codes and Standards and/or authority having jurisdiction (manufacturer recommends quarterly or more frequently).

FIG. 1

DO NOT LEAVE COVER OFF FOR EXTENDED PERIOD OF TIME

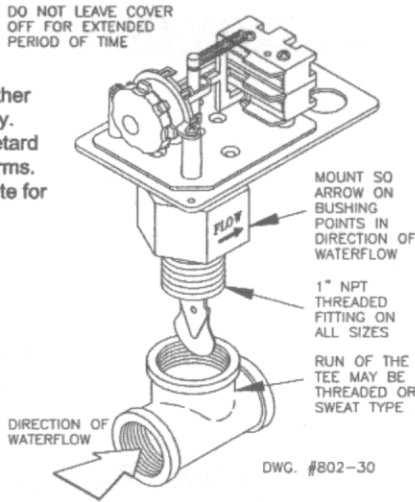
Retard Adjustment:

To change time, turn knob (either direction) for desired time delay. Use the minimum amount of retard necessary to prevent false alarms. A "B" setting is usually adequate for this. Factory set at "B".



Important:

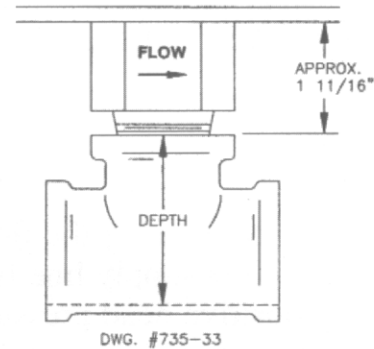
There are 10 paddles furnished with each unit. One for each size of threaded, sweat or plastic TEE as described in Fig. 2. These paddles have raised lettering that shows the pipe size and type of TEE that they are to be used with. The proper paddle must be used. The paddle must be properly attached (see drawing) and the screw that holds the paddle must be securely tightened.



CAUTION: TO PREVENT LEAKAGE APPLY TEFLON TAPE SEALANT TO MALE THREADS ONLY. DO NOT USE ANY OTHER TYPE OF LUBRICANT OR SEALANT.

APPROX. RETARD SETTINGS (IN SEC.)					
0	A	B	C	D	E
0	10-25	20-40	35-55	50-70	60-90

FIG. 2



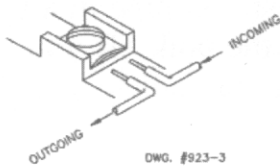
Screw the device into the TEE fitting as shown. Care must be taken to properly orient the device for the direction of the waterflow. On sweat TEE's no threaded bushings, inserts or adapters are permitted unless they comply with the dimensions listed in the chart below.

Important - The depth to the inside bottom of the TEE should

APPROXIMATE DEPTH REQUIREMENT				
TEE SIZE	THREADED	SWEAT	CTS, POLYBUTYLENE	CPVC
1" x 1" x 1"	2 1/16"	1 3/4"	N/A	2 7/16"
1 1/4" x 1 1/4" x 1"	2 7/16"	2 7/16"	N/A	N/A
1 1/2" x 1 1/2" x 1"	2 11/16"	2 1/4"	2 1/2"	N/A
2" x 2" x 1"	3 3/16"	2 3/4"	N/A	N/A

**SWITCH TERMINAL CONNECTIONS
CLAMPING PLATE TERMINAL**

FIG. 3

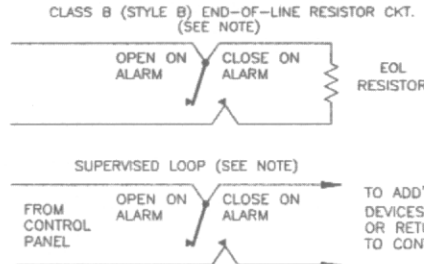
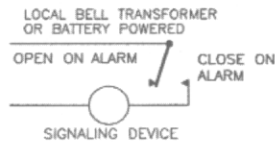


CAUTION:

An uninsulated section of a single conductor should not be looped around the terminal and serve as two separate connections. The wire must be severed, thereby providing supervision of the connection in the event that the wire becomes dislodged from under the terminal.

FIG. 4

TYPICAL ELECTRICAL CONNECTIONS



NOTE: FOR SUPERVISED CIRCUITS SEE "SWITCH TERMINAL CONNECTIONS" DRAWING AND CAUTION NOTE (FIG. 3).

DWG. #761-15

NOTE: The Model VSR-SF has two switches, one can be used to operate a central station, proprietary or remote signaling unit, while the other is used to operate a local audible or visual annunciator.

TESTING: The frequency of inspection and testing for the model VSR-SF and its associated protective monitoring system should be in accordance with applicable NFPA Codes and Standards and/or the authority having jurisdiction (manufacturer recommends quarterly or more frequently).



DIVISION 22 PLUMBING



CHARLOTTE PVC 400 SANITARY TEE

Model Number: PVC 400 03463

Location: Wet wall

Diameter: 1 1/2"

Available: Charlotte Pipe and Foundary Company

Price: \$7.82

Size	UPC# 611942-	No. Per Carton	No. Per Pallet	List Price Each	Size	UPC# 611942-	No. Per Carton	No. Per Pallet	List Price Each
------	-----------------	-------------------	-------------------	--------------------	------	-----------------	-------------------	-------------------	--------------------



**Part No. PVC 400
Sanitary Tee
(ALL HUB)**

1½	03462	25	2800	\$15.80
1½	03463	100	1800	7.82
2	03464	35	980	11.51
3	03465	30	360	30.25
4	03466	5	140	53.74
6	03467	6	72	224.21
8	03468	2	24	671.01



**Part No. PVC 400A
Straight Tee
(ALL HUB)**

8†	12189	2	24	\$289.84
10†	10018	9/half crate	16/crate	*
12†	10024	7/half crate	10/crate	*
14† ^(f)	12238	2/half crate	3/crate	*
16† ^(f)	12239	1/half crate	2/crate	*



**Part No. PVC 401
Sanitary Tee, Reducing
(ALL HUB)**

2x1½x1½	03469	25	1225	\$10.13
2x1½x2	03470	25	875	12.27
2x2x1½	03471	50	900	10.16
3x3x1½	03472	20	560	21.39
3x3x2	03473	10	490	22.62
4x4x1½	03474	5	280	57.86
4x4x2	03475	10	280	48.04
4x4x3	03476	10	180	65.27
6x6x4	03477	6	72	216.82
8x8x4**	11357	2	24	890.34
8x8x6**	11358	2	24	919.08

Note: Shading indicates new part.

- ^(f) Fabricated
- † Not a sanitary pattern
- * For pricing of this item, please see current PVC Large-Diameter DWV fitting list price schedule.
- ** Assembled from two molded components
- *** Assembled from three molded components



**Part No. PVC 401A
Straight Tee, Reducing
(ALL HUB)**

8x8x4†**	12253	2	24	\$208.81
8x8x6†**	12241	2	24	231.71
10x10x4†**	11353	7/half crate	10/crate	*
10x10x6†**	11354	10/half crate	20/crate	*
10x10x8†	10021	10/half crate	20/crate	*
12x12x4†***	12256	6/half crate	12/crate	*
12x12x6†**	11355	7/half crate	10/crate	*
12x12x8†	10028	7/half crate	10/crate	*
12x12x10†	10027	7/half crate	10/crate	*
14x14x4† ^(f)	12244	3/half crate	5/crate	*
14x14x6† ^(f)	12245	2/half crate	4/crate	*
14x14x8† ^(f)	12246	2/half crate	4/crate	*
14x14x10† ^(f)	12242	1/half crate	3/crate	*
14x14x12† ^(f)	12243	1/half crate	3/crate	*
16x16x4† ^(f)	12250	1/half crate	2/crate	*
16x16x6† ^(f)	12251	2/half crate	4/crate	*
16x16x8† ^(f)	12252	2/half crate	4/crate	*
16x16x10† ^(f)	12247	2/half crate	4/crate	*
16x16x12† ^(f)	12248	1/half crate	3/crate	*
16x16x14† ^(f)	12249	1/half crate	2/crate	*



**Part No. PVC 403
Sanitary Tee, Street
(SPG x H x H)**

1½	03479	20	1600	\$23.63
2	03480	25	875	22.94
3	03481	30	360	38.25
4	03482	10	160	99.86



**Part No. PVC 404
Sanitary Tee, Street, Reducing
(SPG x H x H)**

2x2x1½	03484	50	1400	\$20.00
3x3x1½	03485	10	490	43.53
3x3x2	03486	20	560	37.78
4x4x2	03487	5	280	67.13



WATTS WATERPEX TUBING WPTC08-10R

Model Number: WPTC08-10R

Location: Wet wall

Use: Hot & Cold water

Outside Diameter: 3/4"

Length: 20 foot

Available: WATTS

For Residential and Commercial Applications

Job Name _____
 Job Location _____
 Engineer _____
 Approval _____

Contractor _____
 Approval _____
 Contractor's P.O. No. _____
 Representative _____

LEAD FREE*

WaterPEX® Tubing

WaterPEX® Tubing is a cross-linked polyethylene tubing used for potable water applications. WaterPEX® is manufactured without an oxygen barrier.

Temperature – Pressure

Maximum Working Pressure:

160psi (11 bar) @ 73.4°F (23°C)

100psi (6.9 bar) @ 180°F (80°C)

80psi (5.5 bar) @ 200°F (93°C)

Specifications

System shall be plumbed using Watts WaterPEX® cross-linked polyethylene pipe, and all joints shall be made using Watts brass CrimpRing™ and/or Poly-alloy CrimpRing™ fittings using either the Watts copper CrimpRing™ or stainless steel CinchClamp™** crimping methods as outlined in the Watts WaterPEX® Installation Guidelines.

Installation Note

WaterPEX® must be installed in accordance with all Watts WaterPEX® installation procedures, including information provided in WaterPEX® installation manual and guidelines.

WaterPEX® Tubing is not approved for fire protection applications.

Connections

WaterPEX® is connected to WaterPEX® manifolds or barbed fittings using one of two connection systems, depending on manifold type or fitting system specified. See chart below:

✓ FITTING STYLE	DESCRIPTION
CrimpRing Fittings	Ductile Copper CrimpRing™ compressed over WaterPEX/CrimpRing fitting.
Compression Fittings	Brass Compression Nut tightened around WaterPEX® and CompNut™ fitting.

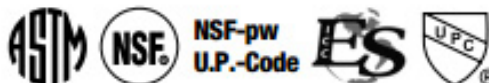
*The wetted surface of this product contacted by consumable water contains less than one quarter of one percent (0.25%) of lead by weight.

**Note: Watts WaterPEX CinchClamp™ fittings should not be used with wrought copper PEX fittings.



WPTC

Approvals



- Manufactured in accordance with American Society for Testing and Materials (ASTM International) F876 and F877 to SDR-9 dimensional standards
- Listed by the NSF International to NSF Standards 14 and 61 for use in potable water systems
- Listed by NSF International to be in compliant to the Uniform Plumbing Code™
- Labeled B137.5 which indicates that it is compliant to the CSA Standards B137.5
- Certified to PEX 5006 (replaces NSF CL-R) for use in continuous hot water recirculation systems
- ASTM E84 and CAN/ULC S102.2 smoke developed and flame spread classification
- Fire resistance per CAN/ULC S101 and ASTM E119-08

Dimensions – Weights

MODEL	NOMINAL TUBING SIZE		COIL/STICK LENGTH		BEND RADIUS		FLUID CAPACITY PER 100'		PKG. WEIGHT			
	I.D.	OD	ft.	cm.	in.	mm	gal.	lbs.	lbs.	kgs.		
Red Coils												
WPTC06-100R	3/8	10	1/2	15	100	3048	4	102	0.53	2.01	4.5	2.0
WPTC06-500R	3/8	10	1/2	15	500	15240	4	102	0.53	2.01	23	10.4
WPTC08-100R	1/2	15	3/8	16	100	3048	5	127	0.96	3.65	5.5	2.5
WPTC08-300R	1/2	15	3/8	16	300	9144	5	127	0.96	3.65	14.5	6.6
WPTC08-500R	1/2	15	3/8	16	500	15240	5	127	0.96	3.65	24	10.9
WPTC08-1000R	1/2	15	3/8	16	1000	30480	5	127	0.96	3.65	54.5	24.7
WPTC12-100R	3/4	20	7/8	22	100	3048	7	178	1.9	7.22	10.5	4.8
WPTC12-300R	3/4	20	7/8	22	300	9144	7	178	1.9	7.22	31	14.1
WPTC12-500R	3/4	20	7/8	22	500	15240	7	178	1.9	7.22	45	20.4
WPTC12-1000R	3/4	20	7/8	22	1000	30480	7	178	1.9	7.22	106	48.0
Blue Coils												
WPTC06-100B	3/8	10	1/2	15	100	3048	4	102	0.53	2.01	4.5	2.0
WPTC06-500B	3/8	10	1/2	15	500	15240	4	102	0.53	2.01	23	10.4
WPTC08-100B	1/2	15	3/8	16	100	3048	5	127	0.96	3.65	5.5	2.5
WPTC08-300B	1/2	15	3/8	16	300	9144	5	127	0.96	3.65	14.5	6.6
WPTC08-500B	1/2	15	3/8	16	500	15240	5	127	0.96	3.65	24	10.9
WPTC08-1000B	1/2	15	3/8	16	1000	30480	5	127	0.96	3.65	55	24.9
WPTC12-100B	3/4	20	7/8	22	100	3048	7	178	1.9	7.22	10.5	4.8
WPTC12-300B	3/4	20	7/8	22	300	9144	7	178	1.9	7.22	31	14.1
WPTC12-500B	3/4	20	7/8	22	500	15240	7	178	1.9	7.22	45	20.4
WPTC12-1000B	3/4	20	7/8	22	1000	30480	7	178	1.9	7.22	106	48.0
Tubing For Ice Makers – White Coils												
WPTC02-100W	1/4	16	1/4	8	100	3048	1 1/2	38	0.38	1.44	3	1.4
White Coils												
WPTC04-100W	1/4	8	3/8	10	100	3048	3	76	0.25	0.95	3.5	1.6
WPTC06-100W	3/8	10	1/2	15	100	3048	4	102	0.53	2.01	4.5	2.0
WPTC06-500W	3/8	10	1/2	15	500	15240	4	102	0.53	2.01	23	10.4
WPTC08-100W	1/2	15	3/8	16	100	3048	5	127	0.96	3.65	5.5	2.5
WPTC08-300W	1/2	15	3/8	16	300	9144	5	127	0.96	3.65	14.5	6.6
WPTC08-500W	1/2	15	3/8	16	500	15240	5	127	0.96	3.65	24	10.9
WPTC08-1000W	1/2	15	3/8	16	1000	30480	5	127	0.96	3.65	55	24.9
WPTC12-100W	3/4	20	7/8	22	100	3048	7	178	1.9	7.22	10.5	4.8
WPTC12-300W	3/4	20	7/8	22	300	9144	7	178	1.9	7.22	31	14.1
WPTC12-500W	3/4	20	7/8	22	500	15240	7	178	1.9	7.22	45	20.4
WPTC12-1000W	3/4	20	7/8	22	1000	30480	7	178	1.9	7.22	106	48.0
WPTC16-100W	1	25	1 1/2	29	100	3048	10	254	3.10	11.78	18	8.2
WPTC16-500W	1	25	1 1/2	29	500	15240	10	254	3.10	11.78	90	40.8
WPTC20-100W	1 1/4	32	1 3/4	35	100	3048	11	279	4.5	17.1	24	10.9
WPTC20-300W	1 1/4	32	1 3/4	35	300	9144	11	279	4.5	17.1	71	32.2
WPTC24-100W	1 1/2	38	1 3/4	41	100	3048	13	396	7	27	35	16
WPTC24-300W	1 1/2	38	1 3/4	41	300	9144	13	396	7	27	106	48
WPTC28-100W	2	51	2 1/4	54	100	3048	17	518	12.7	48	60	27
Red Sticks												
WPTS08-50R (50 sticks)	1/2	15	3/8	16	20	610	5	127	0.96	3.65	55	24.9
WPTS12-25R (25 sticks)	3/4	20	7/8	22	20	610	7	178	1.90	7.22	45	20.4
Blue Sticks												
WPTS08-50B (50 sticks)	1/2	15	3/8	16	20	610	5	127	0.96	3.65	55	24.9
WPTS12-25B (25 sticks)	3/4	20	7/8	22	20	610	7	178	1.90	7.22	45	20.4
White Sticks												
WPTS08-50W (50 sticks)	1/2	15	3/8	16	20	610	5	127	0.96	3.65	55	24.9
WPTS12-25W (25 sticks)	3/4	20	7/8	22	20	610	7	178	1.90	7.22	45	20.4
WPTS16-5W (5 sticks)	1	25	1 1/2	29	20	610	10	254	3.10	11.78	50	22.7
WPTS20-5W (5 sticks)	1 1/4	32	1 3/4	35	20	610	11	279	4.5	17.1	35	15.9
WPTS24-5W (5 sticks)	1 1/2	38	1 3/4	41	20	609	13	396	7	27	34	16
WPTS28-5W (5 sticks)	2	51	2 1/4	54	20	609	17	517	12.7	48	60	27



A Watts Water Technologies Company



ISO 9001-2008
CERTIFIED

USA: No. Andover, MA • Tel: (978) 688-1811 • Fax: (978) 794-1848 • www.watts.com
Canada: Burlington, ON • Tel: (905) 332-4090 • Fax: (905) 332-7068 • www.wattscanada.ca



4" F480 WELL CASING SCHEDULE 40

Model Number: SCHEDULE 40

Location: Wet wall

Outside Diameter: 4 1/2"

Inside Diameter: 4"

Available: JM Eagle



F480 WELL CASING

MEETS ASTM D1784 AND F480, AND ANSI/NSF STANDARD 61.



APPLICATIONS

JM Eagle F480 Well Casing is suitable for conveying water and other fluids in domestic, municipal, industrial and dewatering applications.



DESCRIPTION

JM Eagle F480 Well Casing is available in Schedule 40 2- through 12-inch diameters and SDR 32.5, 26, 21 and 17.

A solvent weld product, it is manufactured from the highest quality PVC compound and comes in 20-foot lengths.

It may be dual marked as pressure pipe.



BENEFITS

JM Eagle F480 Well Casing is lightweight, cost-effective and long-lasting.

- It can be field-cut with a power saw or ordinary handsaw without the use of expensive or complicated machinery.
- Easy to load, transport and handle, installers prefer it because it goes into the ground quickly, saving installation costs.
- A cured joint of JM Eagle solvent weld well casing offers a zero-leak joint that is structurally sound.



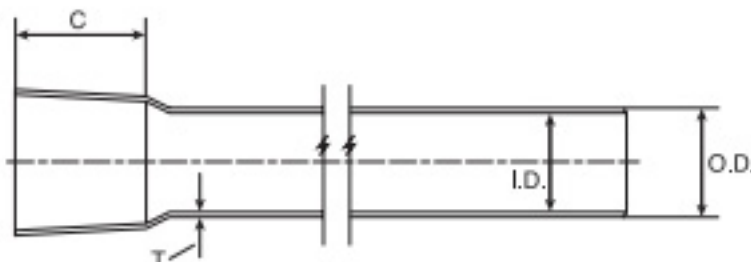
F480 WELL CASING

SUBMITTAL AND DATA SHEET

*ANSI/NSF 61-14

	NOMINAL PIPE (IN)	AVERAGE O.D. (IN)	APPROX. I.D. (IN)	MIN. T. (IN)	APPROX. WEIGHT (LBS/100')
SDR 32.5	4	4.500	4.20	0.138	130
	5	5.563	5.179	0.171	192
	6	6.625	6.18	0.204	270
	8	8.625	8.05	0.265	460
SDR 26	4	4.500	4.13	0.173	160
	4½	4.950	4.54	0.190	190
	5	5.563	5.10	0.214	240
	6	6.625	6.07	0.255	330
	8	8.625	7.91	0.332	590
	10	10.750	9.86	0.413	910
SDR 21	12	12.750	11.70	0.490	1280
	4	4.500	4.04	0.214	190
	4½	4.950	4.44	0.236	240
	5	5.563	4.99	0.265	300
	6	6.625	5.94	0.316	410
	8	8.625	7.74	0.410	690
	10	10.750	9.65	0.511	1110
SDR 17	12	12.750	11.45	0.606	1570
	4	4.500	3.906	0.265	234
	4½	4.950	4.32	0.291	290
	5	5.563	4.86	0.327	360
Schedule 40	6	6.625	5.79	0.390	520
	2	2.375	2.027	0.154	71
	4	4.500	3.99	0.237	210
	4½	4.950	4.41	0.248	250
	5	5.563	5.01	0.258	290
	6	6.625	6.02	0.280	370
	8	8.625	7.93	0.322	590
	10	10.750	9.96	0.365	780
	12	12.750	11.88	0.406	1030

Prior to ordering or specifying, please consult JM Eagle™ for product and/or listing availability.



I.D. : Inside Diameter
 O.D. : Outside Diameter
 T : Wall Thickness
 C : Bell Length in Inches
 Nominal 20-foot laying length
 All lengths are 20 feet plus depths of bell.

WELL CASING

SUBMITTAL AND DATA SHEET

*ANSI/NSF 61-14

	NOMINAL PIPE (IN)	AVERAGE O.D. (IN)	APPROX. I.D. (IN)	MIN. T. (IN)	APPROX. WEIGHT (LBS/100')
SDR 32.5	4	4.500	4.20	0.138	130
	5	5.563	5.179	0.171	192
	6	6.625	6.18	0.204	270
	8	8.625	8.05	0.265	460
SDR 26	4	4.500	4.13	0.173	160
	4 1/2	4.950	4.54	0.190	190
	5	5.563	5.10	0.214	240
	6	6.625	6.07	0.255	330
	8	8.625	7.91	0.332	590
	10	10.750	9.86	0.413	910
	12	12.750	11.70	0.490	1280
SDR 21	4	4.500	4.04	0.214	190
	4 1/2	4.950	4.44	0.236	240
	5	5.563	4.99	0.265	300
	6	6.625	5.94	0.316	410
	8	8.625	7.74	0.410	690
	10	10.750	9.65	0.511	1110
	12	12.750	11.45	0.606	1570
SDR 17	4	4.500	3.906	0.265	234
	4 1/2	4.950	4.32	0.291	290
	5	5.563	4.86	0.327	360
	6	6.625	5.79	0.390	520
Schedule 40	2	2.375	2.027	0.154	71
	4	4.500	3.99	0.237	210
	4 1/2	4.950	4.41	0.248	250
	5	5.563	5.01	0.258	290
	6	6.625	6.02	0.280	370
	8	8.625	7.93	0.322	590
	10	10.750	9.96	0.365	780
12	12.750	11.88	0.406	1030	

* Prior to ordering or specifying, please consult JM Eagle™ for product and/or listing availability.

Product Standard: ASTM F480
 Pipe Compound: ASTM D1784 Cells Class 12454
 Certifications: ANSI/NSF Standard 61
 End Finish: Belled End
 Pipe Length: 20 feet laying length
 Installation: JM Eagle™ Installation Guide



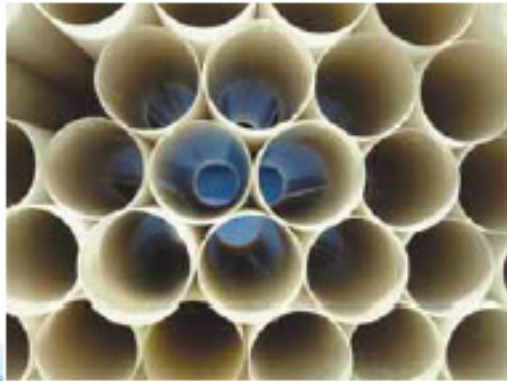
1 1/2" XIRTEC140 IPEX SCHEDULE 40 PVC

Location: Wet wall
Diameter: 1 1/2"
Maximum Pressure: 330 psi
Available: IPEX USA LLC

Pipe

IPEX features one of the most comprehensive ranges of thermoplastic pipe for today's industrial applications. Available in Schedule 40 and 80 with sizes ranging from 1/4" to 24", as well as SDR in sizes ranging from 1/2" to 48", IPEX vinyl pressure pipe exceeds the most stringent and demanding standards set by key standards organizations including ASTM, AWWA, CSA and NSF, to name a few.

But *unlike* almost all other pipe manufacturers in the world, IPEX's commitment to quality doesn't stop at the end of the manufacturing process or at our pipe yard. Xirtec and Corzan pipe are part of complete PVF systems. Dimensional matching, compatibility of compounds, chemical, physical and thermal properties and system accountability make IPEX pipe a key component of the high-performance Xirtec and Corzan systems.



PVC

Schedule 40 from 1/2" to 24";
 Schedule 80 from 1/4" to 24" and
 SDR (standard dimensional ratio) from 1/2" to 48"

CPVC

Schedule 40 and 80, 1/2" to 16"



Xirtec¹⁴⁰

All Xirtec¹⁴⁰ PVC Schedule 40 and 80 pipe shall meet ASTM D1785 and shall be third party certified to CSA B137.3 or NSF 14.

CORZAN[®]

All Corzan CPVC Schedule 40 and 80 pipe shall meet ASTM F441.



See Volume I:
 Vinyl Process Piping
 Systems for more details.

PVC SIZE RANGE

CPVC SIZE RANGE

Diameter (In.)	O.D. (In.)	IPEX SCHEDULE 40 PVC/CPVC			IPEX SCHEDULE 80 PVC/CPVC		
		Wall Thickness (In.)	I.D. (In.)	*Max. Pressure 73°F (psi)	Wall Thickness (In.)	I.D. (In.)	*Max. Pressure 73°F (psi)
1/4	.540	—	—	—	.119	.302	1,130
3/8	.675	—	—	—	.126	.423	920
1/2	.840	.109	.602	600	.147	.526	850
3/4	1.050	.113	.804	480	.154	.722	690
1	1.315	.133	1.029	450	.179	.936	630
1-1/4	1.660	.141	1.360	370	.191	1.255	520
1-1/2	1.900	.145	1.590	330	.200	1.476	470
2	2.375	.154	2.047	280	.218	1.913	400
2-1/2	2.875	.203	2.445	300	.276	2.290	420
3	3.500	.216	3.042	260	.300	2.864	370
4	4.500	.237	3.998	220	.337	3.786	320
6	6.625	.280	6.031	180	.432	5.709	280
8	8.625	.322	7.941	160	.500	7.565	250
10	10.750	.365	9.976	140	.593	9.493	230
12	12.750	.406	11.888	130	.687	11.294	230
14	14.000	.438	13.072	130	.750	12.412	220
16	16.000	.500	14.936	130	.843	14.224	220
18	18.000	.562	16.809	130	.937	16.014	220
20	20.000	.593	18.743	120	1.031	17.814	220
24	24.000	.687	22.544	120	1.218	21.418	210

*Pipe pressure ratings must be devalued for higher temperatures.



DAYTON SHALLOW WELL JET PUMP SYSTEM

Model Number: 5UXK8

Location: Asphalt on North side

Dimensions:

Length: 21.1875"

Width: 11.5"

Height: 20"

Tank: 6 galloons

Electrical:

Amps: 10.8/5.5

Voltage: 115/230 V

Available: Grainger Corporate Office

Price: \$445.25

Pumps > Well Pumps > Jet Pump Systems

DAYTON Shallow Well Jet Pump Sys, 1/2HP, 115/230V

☆☆☆☆☆ | [Write a Review](#) | [Read all Reviews](#) | [Read all Ask & Answer](#)

Shallow Well Jet Pump System, Motor Enclosure ODP, Pump Material Cast Iron, 1/2 HP, Voltage 115/230, 10.8/5.5 Amps AC, Inlet 1-1/4 In NPT, Outlet 1 In NPT, 6 Gal., 28 psi Tank, Suction Lift 25 Ft., Max. Case Pressure 123 psi, Shut Off 64 psi, Number of Stages 1, Motor Type Capacitor Start, Mechanical Seal, CSA-US, Includes Pump and Tank, 1 x 3/4 In. Adaptor, Ejector 5UXL4, Nozzle, Venturi

Grainger Item #	5UXK8
Price (ea.)	\$445.25
Brand	DAYTON
Mfr. Model #	5UXK8
UNSPSC #	40151511
Ship Qty. ?	1
Sell Qty. (Will-Call) ?	1
Ship Weight (lbs.)	100.0
Availability	Ready to Ship ?
Catalog Page No. ?	3926
Country of Origin	China
<small>(Country of Origin is subject to change.)</small>	



[+ Enlarge Image](#)

Qty.

Add Grainger TripleGuard® repair & replacement coverage [?](#) for \$89.95 each.

[Add to Order](#) [Add to Personal List](#) [Compare Alternates](#)

Price shown may not reflect your price. [Sign in](#) or [register](#).

When can I get it? Use your ZIP code to estimate availability.

Qty: ZIP code: [Go](#)

Tech Specs	Additional Information	Compliance & Restrictions	MSDS	Required Accessories	Optional Accessories	Alternate Products	Repair Parts
------------	------------------------	---------------------------	------	----------------------	----------------------	--------------------	--------------

Item	Shallow Well Jet Pump System						
HP	1/2						
Voltage	115/230						
Inlet	1-1/4" NPT						
Outlet	1" NPT						
Amps	10.8/5.5						
Tank (Gal.)	6						
Tank PSI	28						
GPM of Water @ 5 Ft @ 30, 50 PSI	14.3/7.8						
GPM of Water @ 10 Ft @ 30, 50 PSI	13.1/6.4						
GPM of Water @ 15 Ft @ 30, 50 PSI	10.9/5.1						
GPM of Water @ 20 Ft @ 30, 50 PSI	8.9/4.3						
Shut Off (PSI)	64						
Max. Inlet Pressure (PSI)	123						
Max. Case Pressure (PSI)	123						
Motor Type	Capacitor Start						
Seal Type	Mechanical						
Suction Lift (Ft.)	25						
Length (In.)	21.1875						
Width (In.)	11.5						
Height (In.)	20						
Compliance	CSA-US						
Includes	Pump and Tank, 1 x 3/4 In. Adaptor, Ejector 5UXL4, Nozzle, Venturi						

Customers Also Viewed



Shallow Well Jet Pump, Plastic, 1/2 HP

Brand: DAYTON
Grainger Item #: 4HEZ9
Price: \$513.50

Qty [Add to Order](#)



Shallow Well Jet Pump Sys, 3/4HP, 115/230V

Brand: DAYTON
Grainger Item #: 5UXK9
Price: \$490.50

Qty [Add to Order](#)



Shallow Well Jet Pump Sys, 1/3HP, 115/230V

Brand: DAYTON
Grainger Item #: 5UXK7
Price: \$390.00

Qty [Add to Order](#)



Convertible Jet Pump, Plastic, 3/4 HP

Brand: DAYTON
Grainger Item #: 4HFA4
Price: \$627.00

Qty [Add to Order](#)



LIBERTY COMMERCIAL SINK PUMP SYSTEM

Model Number: 405
Above Grade, 1/2 HP
Voltage: 115
Amps: 7.3
Max Temp: 180 degrees Fahrenheit

Pumps > Sump, Effluent and Sewage Pumps > Sink Pump Systems

LIBERTY Commercial Sink Pump System, 1/2 HP, 2 In

☆☆☆☆☆ | [Write a Review](#) | [Read all Reviews](#) | [Read all Ask & Answer](#)

[Share This Product](#)

Sink Drain Pump System, Above Grade, HP 1/2, Voltage 115, 7.3 Amps, 2 In Inlet, 2 In Outlet, Max. Head 34 ft., Max. Temp 180 Degrees F, Basin Height 14-1/8 In, Basin Capacity 5.5 gal., Cord Length 10 ft., Switch Type Wide Angle Float, Includes Piggyback Style Plug

Grainger Item #	1GEK5
Price (ea.)	\$429.25
Brand	LIBERTY
Mfr. Model #	405
UNSPSC #	40151510
Ship Qty. (?)	1
Sell Qty. (Will-Call) (?)	1
Ship Weight (lbs.)	22.77
Availability	Typically in Stock (?)
Catalog Page No.	4046 (?)
Country of Origin	USA
(Country of Origin is subject to change.)	



[Enlarge Image](#)

Qty.

Add Grainger TripleGuard® repair & replacement coverage [\(?\)](#) for \$89.95 each.

[Add to Order](#)

[Add to Personal List](#)

[Compare Alternates](#)

Price shown may not reflect your price. [Sign In](#) or [register](#).

Check Availability Use your ZIP code to estimate availability.

Qty: ZIP code: [Go](#)

Tech Specs	Additional Information	Compliance & Restrictions	MSDS	Required Accessories	Optional Accessories	Alternate Products	Repair Parts
Item	Sink Drain Pump System						
Type	Above Grade						
HP	1/2						
Voltage	115						
Amps	7.3						
Inlet	2"						
Outlet	2"						
Vent	2"						
GPM of Water @ 5 Ft. of Head	49						
GPM of Water @ 10 Ft. of Head	44						
GPM of Water @ 15 Ft. of Head	39						
GPM of Water @ 20 Ft. of Head	32						
Maximum Head	34 ft.						
Max. Temp.	180 Degrees F						
Basin Height	14-1/8"						
Basin Capacity	5.5 gal.						
Basin Material	Polyolefin						
Pump Material	Aluminum						
Shaft Seal	Mechanical						
Cord Length	10 ft.						
Impeller	Nylon						
Switch Type	Wide Angle Float						
Includes	Piggyback Style Plug						

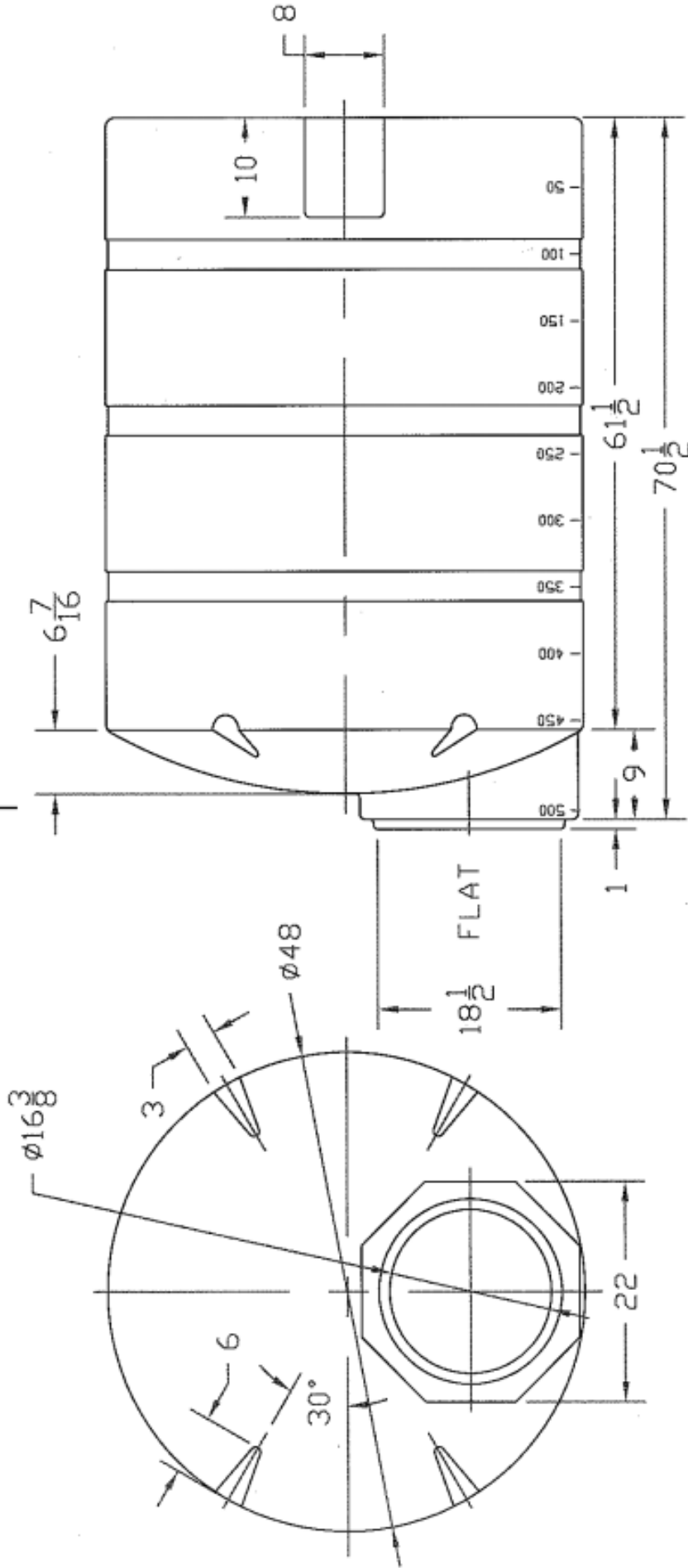


500 GALLON T VERTICAL WATER STORAGE TANKS

Model Number: N-43101
Location: Outside North Side
Quantity: 2
Dimensions:
 Height: 73"
 Diameter: 48"
Storage Capacity: 500 Gallons
Fill opening: 16"
Finish: Black
Available: The Tank Source

REVISIONS

ZONE	REV	DESCRIPTION	DATE	APPROVED
	B	REDRAWN	02 JAN 97	



NORWESCO
ST. BONIFACIUS, MN

500 GALLON VERTICAL TANK

JTP 02JAN97

SIZE A

FSCM NO.

DWG NO.

REV B

SCALE 1/16

SHEET



305 GALLON NORWESCO VERTICAL WATER STORAGE TANKS

Model Number: N-40702

Location: Outside North Side

Quantity: 1

Dimensions:

Height: 49"

Diameter: 46"

Storage Capacity: 305 Gallons

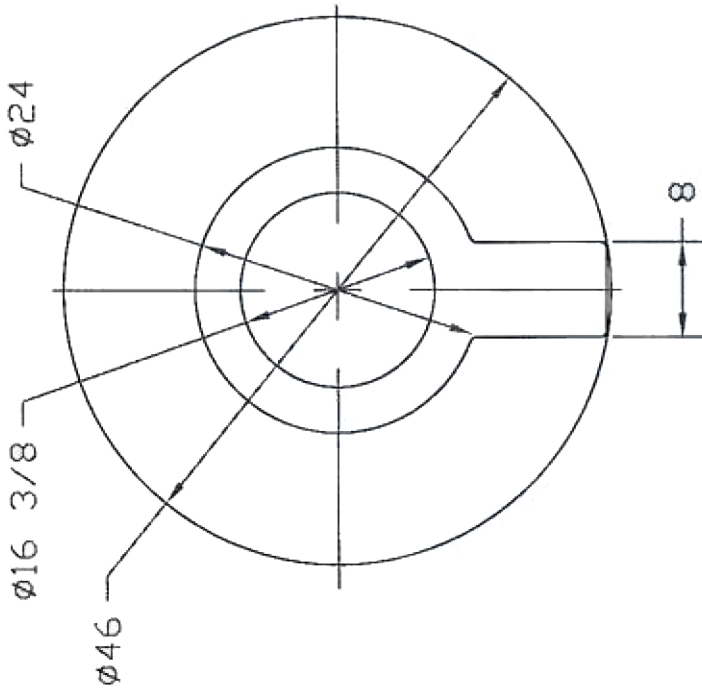
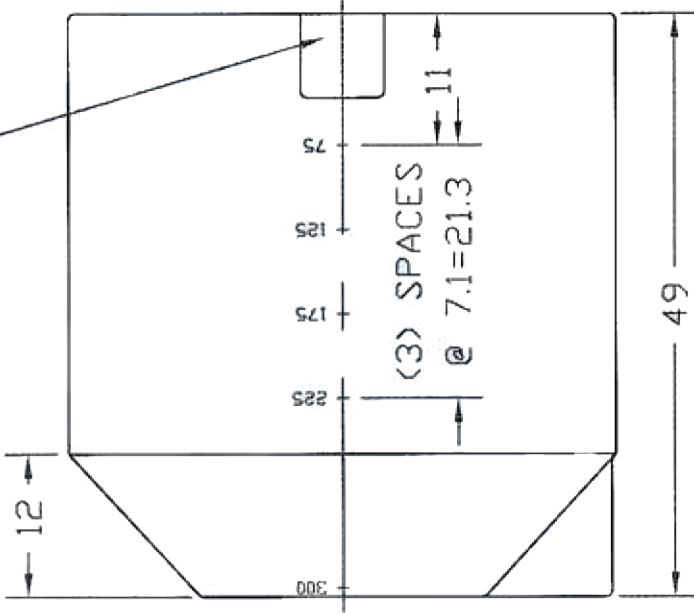
Fill opening: 16 3/8"

Finish: Black

REVISIONS

ZONE	REV	DESCRIPTION	DATE	APPROVED
	A	REDRAWN	16FEB97	

7 X 7 FLAT
(4) PLACES



866-310-2556

305 GALLON VERTICAL TANK

JTP 16FEB97

SIZE FSCM NO.

A

DWG NO.

REV

A

SCALE 1/16

SHEET



STEIBEL ELTRON TEMPRA 20 PLUS ELECTRIC TANKLESS WATER HEATER

Model Number: 094922100658

Location: Bathroom

Dimensions:

Diameter: 4 5/8"

Width: 16 5/8"

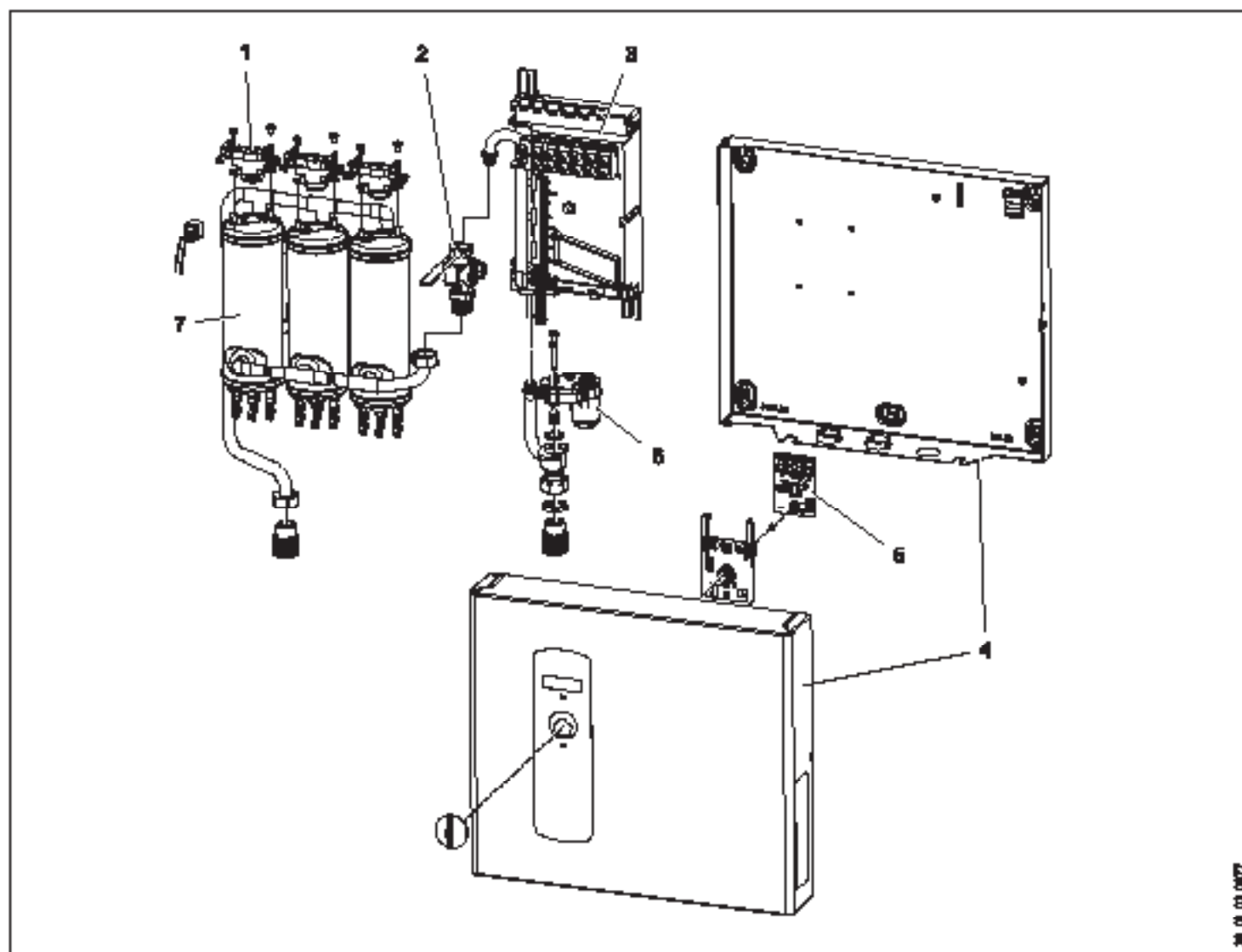
Height: 14 1/2"

Available: Steibel Eltron

Price:

Tempra® & Tempra® Plus Spare Parts List & Diagram

Model	No. Spare part						
	1	2	3	4	5	6	7
	Safety thermal cut unit	Flow sensor	Electronic control unit	Hotting	Electronic selector	Motor-operated valve	Heating system
TEMpra 12	286369	286461	286355	286306	286309	—	286368
TEMpra 15	286369	286461	286363	286306	286309	—	286363
TEMpra 20	286369	286461	286894	286306	286309	—	286362
TEMpra 24	286369	286461	286367	286306	286309	—	286364
TEMpra 12 Plus	286369	286461	286373	286378	286372	220882	286368
TEMpra 15 Plus	286369	286461	286377	286378	286372	220882	286363
TEMpra 20 Plus	286369	286461	286895	286378	286372	220882	286362
TEMpra 24 Plus	286369	286461	286376	286378	286372	220882	286364
TEMpra 25 Plus	286369	286461	286378	286378	286372	220882	286373
TEMpra 36 Plus	286369	286461	286373	286378	286372	220882	286376





PRE-CHARGED PRESSURE TANKS

Model Number: FP7100H-OH

Location: Pavement on North Wall

Dimensions:

12" x 14"

Tank Precharge: 40 psi Nitrogen-rich charge

Maximum Pressure Rating: 100 psi



Model FP7100

Pre-Charged Pressure Tank (Vertical) - 15 Gallons

Pre-charged pressure tanks require 50% less space than standard conventional tanks while providing greater water capacity between pump cycles for maximum system life.

KEY FEATURES

- › Convenient size for cabins and summer homes
- › Tough, appliance-like finish for extended life
- › Heavy gauge steel construction for maximum durability
- › Replaceable air/water separator for easy maintenance

WARRANTY

5 year limited warranty



SPECIFICATIONS

RESOURCES

BODY CONSTRUCTION: Heavy Gauge Steel
BODY FINISH: Electrostatically Applied Baked-On Polyester
TANK PRECHARGE: 40 psi Nitrogen-Rich charge
TANK CAPACITY: 6 gal
EQUIVLENCY RATING: 15 gal
DRAWDOWN WITH 20/40 SWITCH: 2.2 gal
DRAWDOWN WITH 30/50 SWITCH: 1.8 gal
DRAWDOWN WITH 40/60 SWITCH: 1.6 gal
BLADDER / WATER CELL: One-Piece Seamless PVC
TANK DIAMETER: 12"
TANK HEIGHT: 16"
FLANGE: Glass-Filled Polypropylene
PIPE TAP SIZE: 3/4" NPT
MAXIMUM PRESSURE RATING: 100 PSI



SHALLOW WELL JET PUMP

Model Number: FP401215H-10

Location: Pavement on North Wall

Max Pressure: 77psi

Maximum Capacity: 8 GPM

AMP Draw (full load): 9.4 amps

Maximum Water Temperature: 120 Degrees F



Model FP401215H-10

Thermoplastic Jet/Tank System 1/2 HP

Corrosion-resistant shallow well jet/tank system is ideal for compact installations where space is at a premium. Pump comes already mounted on tank.

KEY FEATURES

- > Superior performance at depths to water of 25' or less
- > Maximum pumping capacities up to 8 GPM at 40 PSI
- > Pre-charged 15 gallon tank is more efficient than conventional tanks of the same physical size, because it delivers up to twice the amount of water between pump cycles
- > Rugged construction of heavy gauge steel with baked-on finish on outside for maximum corrosion resistance

WARRANTY

1 year limited warranty



SPECIFICATIONS

RESOURCES

BODY CONSTRUCTION: Thermoplastic

HORSEPOWER: 1/2

MAXIMUM CAPACITY: 8 GPM

FLOW at 10' LIFT and 40 PSI: 6.4 GPH

MAX LIFT: 25'

MAX PRESSURE: 77 psi

PRESSURE SWITCH SETTING: 30/50

SUCTION PIPE SIZE: 1-1/4" NPT

DISCHARGE PIPE SIZE: 1" NPT

AMP DRAW (full load): 9.4 amps

VOLTAGE: 115v/230v, 60 Hz (factory preset to 115v)

RECOMMENDED BREAKER: 115V: 15 Amp / 230V: 15 Amp

MAXIMUM WATER TEMPERATURE: 120°F (49°C)

TANK DRAWDOWN: .6 Gal



ADJUSTABLE THREE WAY THERMOPLASTIC MIXING VALVE

Model Number: 521 SERIES

Setting Range: 85-150 Degrees

Max Working Pressure: 200 psi

Minimum Flow rate for optimal performance: 1.3 GPM

Thermostatic mixing valves with replaceable cartridge for centralized systems

5230, 5231 series



01080/13 NA

Replaces 01080/11 NA



Function

The thermostatic mixing valve is used in systems producing domestic hot water or in radiant panel heating systems. Its function is to maintain the temperature of the mixed water supplied to the user at a constant set value when there are variations in the supply pressure and temperature of the incoming hot and cold water or in the flow rate.

The 5230 and 5231 series thermostatic mixing valves are ASSE 1017 approved for point of distribution and are designed specifically for systems requiring high flow rates and precise, stable temperature control.



ASSE 1017

Product Range

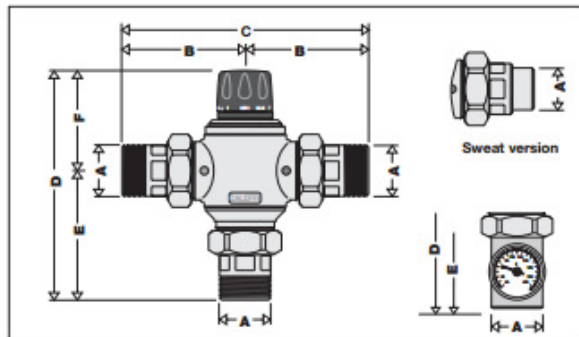
- Code 5230_0A Adjustable thermostatic mixing valve with replaceable cartridge connections 1", 1-1/4", 1-1/2", 2" NPT male union
- Code 5230_6A Adjustable thermostatic mixing valve with replaceable cartridge connections 1" sweat
- Code 5230_8A Adjustable thermostatic mixing valve with replaceable cartridge connections 3/4", 1", 1-1/4" sweat union
- Code 523178A Adjustable thermostatic mixing valve with replaceable cartridge and outlet temperature gauge connection 1-1/4" sweat union

Technical specification

Materials: - Body: Brass
 - Shutter: Brass, chemical nickel plated
 - Springs: Stainless steel
 - Seals: EPDM

Medium: Water
 Maximum percentage of glycol: 30% glycol solution

Setting range:
 See table on page 3
 Temperature stability: $\pm 5^\circ\text{F}$ ($\pm 3^\circ\text{C}$)
 Max working pressure (static): 200 psi (14 bar)
 Max working pressure (dynamic): 70 psi (5 bar)
 Hot water inlet temperature range: 120 - 185°F (49 - 85°C)
 Cold water inlet temperature range: 40 - 80°F (4.4 - 26.6°C)
 Maximum inlet pressure ratio (H/C or C/H): 2:1
 Minimum temperature difference between hot water inlet and mixed water outlet for optimum performance: 20°F (11°C)
 Maximum water hardness: 10 grains
 Approved for ASSE 1017



	Code	A	B	C	D	E	F	Weight (lb)
ASSE 1017	523058A	3/4" SW	2 3/4"	5 1/2"	6 1/8"	3 1/4"	2 15/16"	5
	523066A	1" SW	2 15/16"	5 7/8"	6 5/16"	3 7/16"	2 15/16"	5
	523060A	1" NPT	4 7/16"	8 7/8"	8 1/16"	4 5/8"	3 7/16"	7
	523068A	1" SW	3 9/16"	7 1/8"	7 3/16"	3 3/4"	3 7/16"	7
	523070A	1 1/4" NPT	4 5/8"	9 5/16"	8 1/4"	4 13/16"	3 7/16"	7.1
	523078A	1 1/4" SW	3 11/16"	7 5/16"	7 5/16"	3 13/16"	3 7/16"	7.1
	523178A	1 1/4" SW	3 11/16"	7 5/16"	7 15/16"	4 7/16"	3 7/16"	8.5
	523080A	1 1/2" NPT	5 3/16"	10 5/16"	9 3/4"	5 1/2"	4 1/4"	17
	523090A	2" NPT	5 3/16"	10 3/8"	9 3/4"	5 1/2"	4 1/4"	18



PEX PIPING



3/4" Blue PEX Tubing (100 ft Coil)

SKU: 075-100-B Brand: Rifeng



★★★★★ Read 65 Reviews | Write a Review

QTY	PRICE
<input type="text"/>	\$41.85 / each
<input type="text"/>	\$119.25 / box (3 units x \$39.75)

ADD TO CART

In Stock! Ships in 24-48 Hours
432 Available



- Overview
- Product Reviews
- Q & A
- Manuals
- Videos

Specs

Size:	3/4"
Color:	Blue
Length (Feet):	100'
Inside Diameter:	0.671"
Outside Diameter:	0.875"
Material:	PEX
Grade:	<input checked="" type="checkbox"/> PEX-b
Application:	Plumbing
Tubing Type:	Non-Oxygen Barrier
Warranty:	25 Years

Description for Rifeng 075-100-B

Rifeng PEX pipe is produced with crosslinked polyethylene. Crosslinking is obtained through a chemical process that increases the bonds between macromolecules to form a more complex structure than the normal polyethylene. Due to the crosslinking, the polyethylene's performance is greatly enhanced and maintains the excellent properties of thermoplastics. Offering excellent corrosion resistance, incredible flexibility and unusual toughness, Rifeng PEX pipe allows for fast and easy installation.



3/4" Red PEX Tubing (100 ft Coil)

SKU: 075-100-R Brand: Rifeng



★★★★★ Read 65 Reviews | Write a Review

QTY	PRICE
<input type="text"/>	\$41.85 / each
<input type="text"/>	\$119.25 / box (3 units x \$39.75)

ADD TO CART

In Stock! Ships in 24-48 Hours
395 Available



- Overview
- Product Reviews
- Q & A
- Manuals
- Videos

Specs

Size:	3/4"
Color:	Red
Length (Feet):	100'
Inside Diameter:	0.671"
Outside Diameter:	0.875"
Material:	PEX
Grade:	<input checked="" type="checkbox"/> PEX-b
Application:	Plumbing
Tubing Type:	Non-Oxygen Barrier
Warranty:	25 Years

Description for Rifeng 075-100-R

Rifeng PEX pipe is produced with crosslinked polyethylene. Crosslinking is obtained through a chemical process that increases the bonds between macromolecules to form a more complex structure than the normal polyethylene. Due to the crosslinking, the polyethylene's performance is greatly enhanced and maintains the excellent properties of thermoplastics. Offering excellent corrosion resistance, incredible flexibility and unusual toughness, Rifeng PEX pipe allows for fast and easy installation.



PENGUIN TOILETS HIGH EFFICIENCY WATER SENSE ROUND

Model Number: 509

Location: Connecting Device for Wooden Crates

Dimensions:

Diameter: 27.56"

Height: 30.51"

Width: 18.63"

Finish: Vitreous China

Available: Lowes

Price: \$129.00



MODEL 509

TWO-PIECE CLOSED COUPLE, ROUND BOWL,
12" ROUGH IN, GRAVITY FEED
ROUND TOILET WITH SECONDARY DRAIN SYSTEM
VITREOUS CHINA

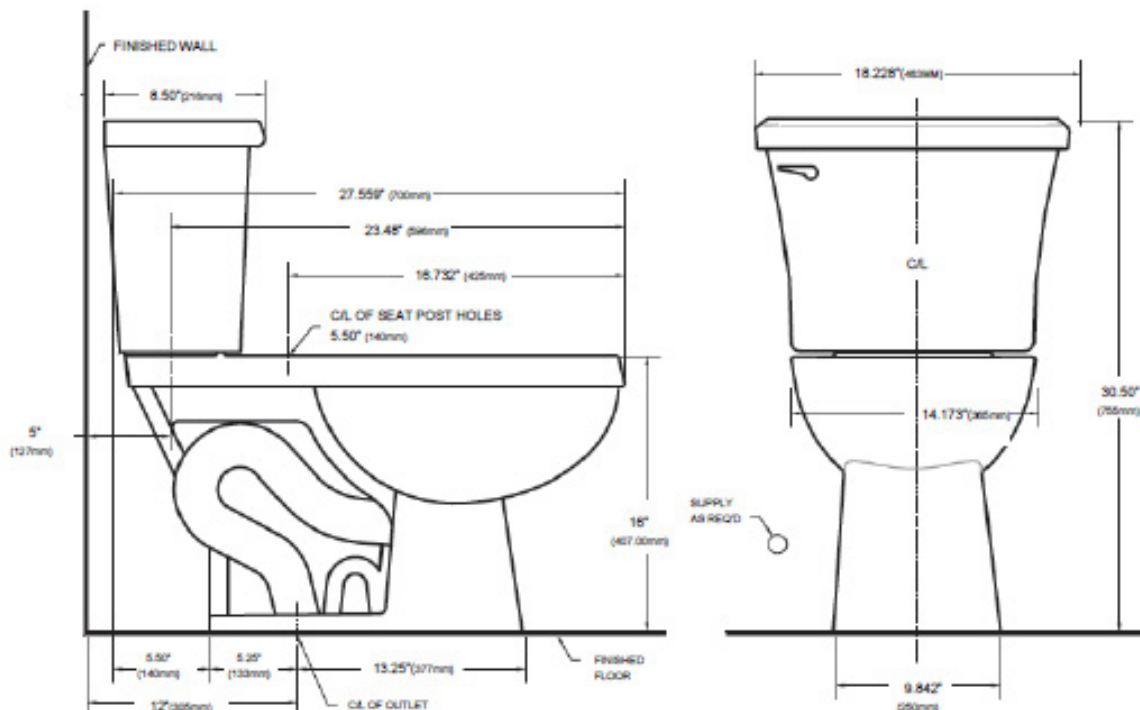
FEATURES:

- Exclusive Penguin Protection: secondary drain system that helps protect against toilet overflows
- HET 1.28gal/ 4.8Liter per flush WATERSENSE LISTED
- Drop in replacement for existing toilets with 12" rough-in
- New taller round bowl design that meet ADA with approved seat
- Fluidmaster 3" flushing system
- Fluidmaster fill valve
- Fully glazed trapway with Sani-Glaze
- Left hand trip lever



APPLICABLE CODES & STANDARDS:

- ASME A112.19.2
- IGC 252-07
- CSA B45-02 (Supplement No. 1-2004)
- IAPMO/ UPC
- ADA Compliant



NOTES:

THIS TOILET IS DESIGNED TO ROUGH-IN AT MINIMUM DIMENSIONS OF 12"(305mm) FROM FINISHED WALL TO C/L OF OUTLET. SUPPLY NOT INCLUDED WITH FIXTURE AND MUST BE ORDERED SEPARATELY.

*DIMENSION SHOWN FOR LOCATION OF SUPPLY IS SUGGESTED. FOR ADDITIONAL INFORMATION REFER TO INSTALLATION INSTRUCTIONS SUPPLIED.

28525 Beck Road, Suite 121, Wixom, MI 48393
www.penguintoilets.com





**KRAUS UNDER MOUNT SINGLE BOWL 15-GAUGE
STAINLESS STEEL KITCHEN SINK**

Model Number: KBU14

Location: Kitchen

Dimensions:

Length: 30"

Width: 18"

Height: 10"

Finish: Stainless Steel

Available: surplusdecor.com

Product Description and Measurements

Kitchen stainless steel sink

- ★ Exclusive Kraus Collection
- ★ 18 Gauge Stainless Steel
- ★ 30" X 18" X 10"
- ★ 20mm/0.75 Radius Coved Corners
- ★ Single Bowl under mount kitchen sink



In Accordance with Industry Codes & Standards for USA & Canada
All Kraus Stainless Steel Kitchen Sinks are Certified & Listed By UPC.



Thank You

Dear Valued Customer,

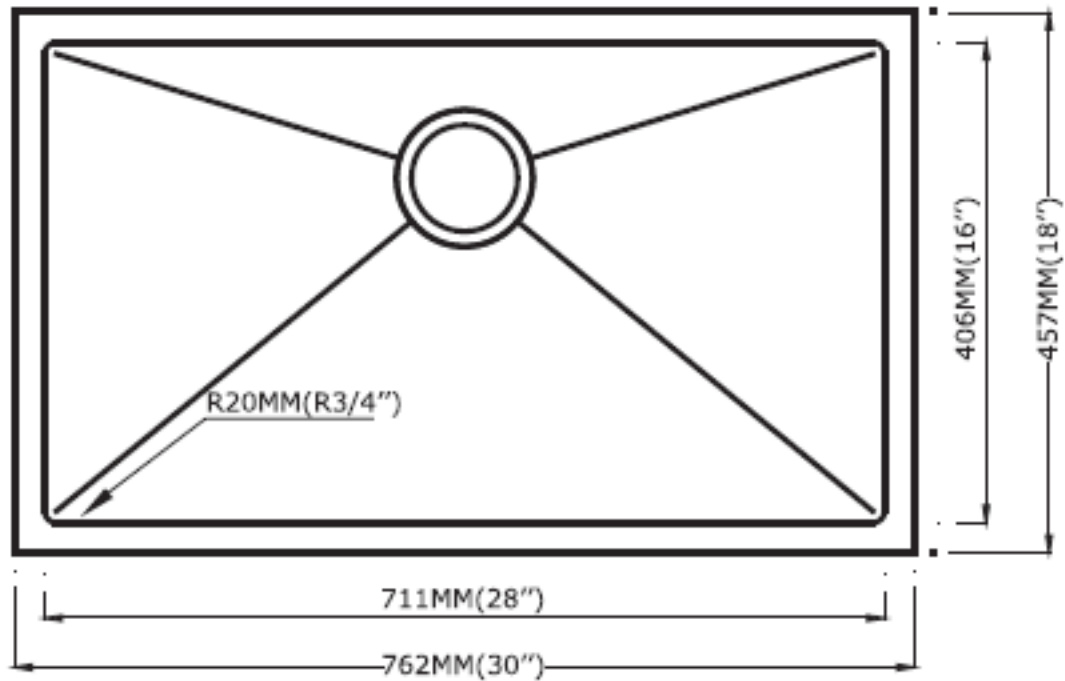
Kraus would like to take this opportunity to thank you for this purchase. It is our sincere hope that you are completely satisfied with your new product. We welcome any questions or comments that you may have and look forward to assisting you with your accessory needs in the future.

Sincerely,
Kraus customer service department.

Prior To Installation Steps

1. Unpack your new product and ensure that all the parts are contained in the packaging.
2. Keep the product in its original box until you ready to install it.
3. The counter top must be flat.
4. Shut off the water supply if replacing a previously-installed vessel sink.
5. Observe all plumbing and building codes in your area.
6. It is recommended that installation of the product be done by a professional plumber.

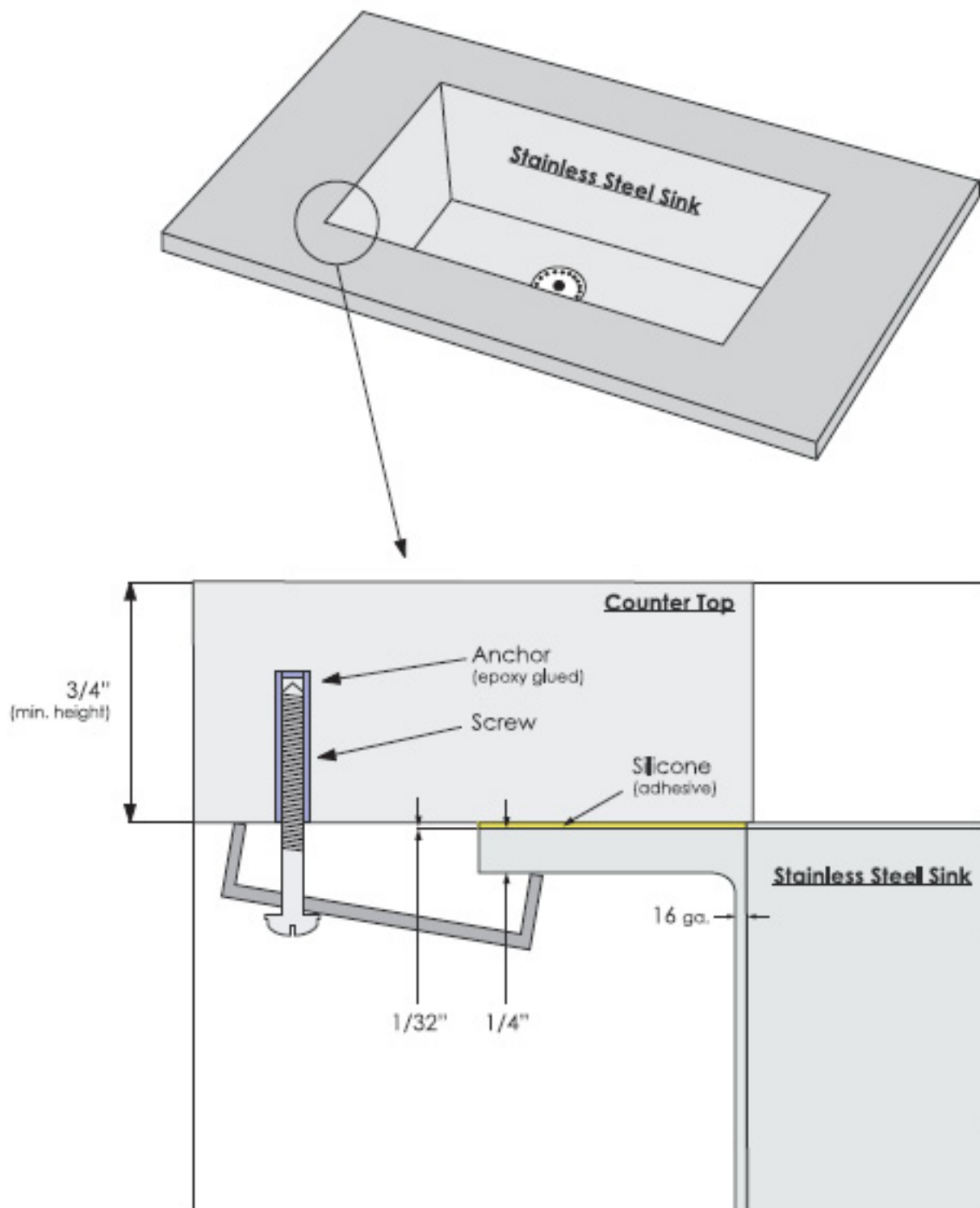
Rough-In Dimensions



Diagram



Under mount sink installation





Product Use & Care

A Kraus Guide to Use and Care of Stainless Steel Sinks

"The Do's"

- When it comes to maintenance, the best thing you can do is be consistent in your cleaning. It is preferable to clean a little on a frequent basis than a heavy duty cleaning once in a while.
- You should make sure that the sink is always clean and dry when not in use. This is the best method of preventative maintenance. Keep the sink water spot free and shiny by rinsing and towel drying after every use.
- Keep the single clog free to prevent standing water which can lead to mineral deposit build up.
- If a mineral build up should occur, use a mixture of vinegar and hot water to remove the deposit.
- To clean your sink, use a non abrasive cleaning cloth combined with a mild cleaning procedure.
 - Use a soft cloth and liquid detergent on a mirror finish deck.
 - DO NOT USE ANY ABRASIVE MATERIALS ON A MIRROR FINISH.
 - For tougher stains use a mild abrasive cleaner like Ajax or Comet.
- Wipe the sink dry after cleaning to discourage any water spotting.
- Follow the direction of the grain when cleaning or scrubbing away stains. Scrubbing against the grain will show as a scratch.

"The Don'ts"

- Avoid using any abrasive steel wood pads as they will leave an iron residue that will eventually lead to rust and corrosion.
- Do not leave any steel or cast iron cookware in the sink for a long period of time. This may also leave iron particles that will corrode the sink
- Do not leave any cleaning materials such as sponges or rags in the sink for an extended period of time. Anything left in the sink can trap moisture which will eventually lead to staining
- Avoid using any abrasive cleaning materials such as steel wool pads on the polished finish of the sink, this will lead to scratching.

About Kraus

Kraus is a leading designer and manufacturer of a broad selection of unique bathroom fixtures and accessories, including vessel sinks, faucets, showers, vanities and bathroom accessories. Kraus incorporates its distinguished style with superior functionality and affordability maintaining the highest standards of quality in its vast product line.

The Kraus brand name represents a fusion of leading-edge technology and an eye toward design. Our design team continuously explores broader markets, seeking new trends while maintaining superior quality at unprecedented prices. The Kraus collection has the widest selection of exquisite styles for any type of décor, ranging from modern residences to countryside homes.

For Kraus, durability and reliability have always been vital components for achieving the highest standards of excellence. Every model we offer undergoes rigorous testing and inspection prior to distribution.

The key element of our success is our customers' satisfaction. As a result, our products are in high demand with shoppers worldwide.



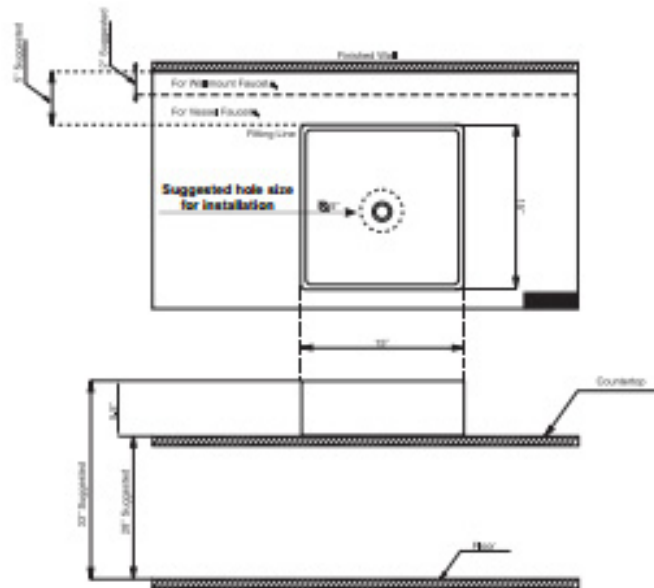
KRAUS 15" WHITE CERAMIC SQUARE BATHROOM SINK

Model Number: KCV-120-CH

Location: Bathroom

Price: \$120

Suggested opening size of the hole in the countertop for proper sink installation should be 5 inches.



NOTE: FAUCET AND WATER SUPPLY ARE NOT INCLUDED

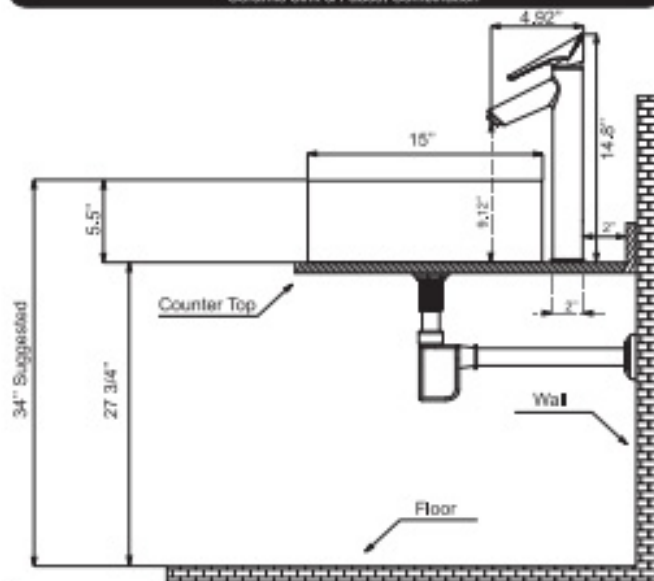
Kraus ceramic sinks are crafted from the highest quality materials which make them extremely durable and resistant to corrosion. However, despite the durability and strength of our sinks, they may still be damaged if proper measures are not taken in their care and maintenance.

In order to prolong the life of your ceramic sink, simple daily maintenance is the key to keep your ceramic sink in its original condition. We suggest cleaning your sink after each use with a soapy sponge then rinsing thoroughly with warm water. You may dry it with a towel or a dry cloth. This will eliminate water spots and streaks while the sink is in use.

Do not be alarmed in case you begin to notice stains on your sink. They are most often caused by various minerals contained in your water supply. These mineral deposits settle in the surface of the sink and may cause the surface to stain. In order to eliminate stain spots, use a non-abrasive or mild-abrasive cleaner as mentioned earlier. Remember not to apply force while cleaning your ceramic sink. Do not scrub the sink, as you may scratch the surface. When finished, rinse thoroughly with warm water and dry with a towel or a soft cloth. At KrausUSA, your satisfaction with the quality and durability of our products is extremely important to us. Therefore, we hope that you try to avoid prolonged sink contact with products containing high concentrations of acids, dishwashing detergents, or bleaches containing chlorine. These products may stain the surface of the sink. Rinse thoroughly if these products do come in contact with the sink surface and dry it with a towel or soft cloth.

PLEASE NOTE: KrausUSA utilizes the highest manufacturing standards in all of our products. However, slight variations in size and shape on select Ceramic Vessel Sinks may occur from time to time. We recommend not cutting any surfaces based on the sizes and dimensions provided until the product is received. KrausUSA shall not be held accountable for any custom installation issues. Under no circumstances will KrausUSA be held liable for the cost of the repair or replacement of installation materials including, but NOT limited to, marble, stone, granite countertops, tiles, etc. Deviations from recommended installations, misuse, neglect, abuse, modifications or alterations may void your warranty. We advise that you comply with your local building codes as they may vary from state to state.

Ceramic Sink & Faucet Combination



NOTE: FAUCET AND WATER SUPPLY ARE NOT INCLUDED

About Kraus

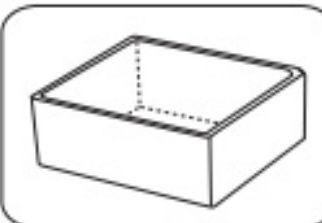
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The key element of our success is our customers' satisfaction. As a result, our products are in high demand with shoppers worldwide.

Product Description and Measurements



Installation Instruction

Ceramic Vessel Sink

MODEL-KCV-120

Tools You Will Need



- ★ Kraus Ceramic Collection
- ★ Square Ceramic Sink
- ★ 15" X 15" X 5" H
- ★ For Above Counter Installation

Thank You

Dear Valued Customer,
Kraus would like to take this opportunity to thank you for this purchase. It is our sincere hope that you are completely satisfied with your new product. We welcome any questions or comments that you may have and look forward to assisting you with your accessory needs in the future.

Sincerely,
Kraus customer service department.

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3. The countertop must be flat.
4. Shut off the water supply if replacing a previously-installed vessel sink.
5. Observe all plumbing and building codes in your area.
6. It is recommended that installation of the product be done by a professional plumber.



KRAUS SOAP DISPENSER

Model Number: SD-20
Location: Kitchen Sink
Color: Stainless Steel
Length: 4.5"
Height: 3"
Hole Diameter Required: 1.25"



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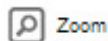
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Project: How-To

Sign In or Register Your Account

Home



KRAUS Soap Dispenser in Stainless Steel

Model # SD-20 Internet # 203058620

★★★★★ (5) | Write a Review

\$55.00 / each

This item cannot be shipped to the following state(s): GU,PR,VI

Free Shipping

Buy Online, Ship to Store

Quantity: 1

Ship to Home Free

Ship to Store Free

Available in 4 - 7 days plus order processing at Williston ... (Change Pick Up Store)

+ ADD TO CART

+ ADD TO MY LIST

Product Overview | Specifications | Customer Reviews | Shipping Options

PRODUCT OVERVIEW

Update the look of your kitchen with a functional and stylish soap dispenser from Kraus. Sleek dispenser is an ideal home improvement project. Kitchen fixture is extremely practical and beautifully designed.

- Soap dispenser features 100-percent solid stainless steel construction
- Supreme-satin stainless steel finish
- Discoloration and corrosion resistant
- Easy-push, self-priming pump
- MFG Model #: SD-20
- MFG Part #: SD-20

Info & Guides

Installation Guide

You will need Adobe® Acrobat® Reader to view PDF documents. Download a free copy from the Adobe Web site.

Return To Top

SPECIFICATIONS

Assembled Depth (in.)	8 in	Assembled Height (in.)	4 in
Assembled Width (in.)	14 in	Color/Finish	Stainless Steel
Color/Finish Family	Stainless Steel	Kitchen Product Type	Sink Accessory
Manufacturer Warranty	Limited Lifetime	Material	Stainless Steel
Product Depth (in.)	8	Product Height (in.)	4.0
Product Width (in.)	14.0	Returnable	90-Day
Rust Resistant	Yes	Sink Accessory Type	Other

Return To Top

CUSTOMERS WHO VIEWED THIS ITEM PURCHASED...



\$55.03

MOEN Soap/Lotion Dispenser in Classic Stainless

★★★★★ (50)

+ ADD TO CART



\$55.03

MOEN Soap/Lotion Dispenser in Stainless

★★★★★ (50)

+ ADD TO CART



\$50.00



**STERLING ACCLAIM WHITE OVAL RECTANGULAR SKIRTED
TUB**

Model Number: 71091128-0

Location: Bathroom

Dimensions:

Length: 60"

Width: 30"

Height: 15"

Finish: White

Available: Lowes

Price: \$290.16



[+ Enlarged Image](#)

Sterling 60-in x 30-in Acclaim White Oval Rectangular Skirted Tub

Item #: 89229 | Model #: 71091128-0

★★★★★ Be the first to write a review!

\$290.16



Do you have a question about this product?

[Get Help Now](#)

[Description](#) | [Specifications](#) | [Reviews](#) | [Community Q&A](#)

Material	Fiberglass/plastic composite
Proprietary Material	Vikrell
Actual Length (Inches)	60.0
Actual Width (Inches)	30.0
Actual Height (Inches)	15.0
Shape	Oval in rectangle
Style	Skirted
Drain Location	Right-hand
Drain Included	No

Color/Finish Family	White
Manufacturer Color Name	White
Collection Name	Acclaim
Tub Door Included	No
Integrated Seat	No
Soaking Depth (Inches)	12.0
ADA Compliant	No
Opening Size (Inches)	60.0

Items Required for Standard Installation	Tape measure, pencil, square, hammer, screwdrivers, safety glasses, wrench, pliers, power drill, level, silicone, pipe wrench
--	---



**KRAUS SINGLE HANDLE GOOSENECK KITCHEN FAUCET
WITH PULL OUT SPRAY**

Model Number: KPF-1621

Location: Kitchen

Dimensions:

Spout Height: 18.5"

Finish: Stainless Steel

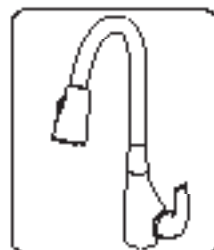
Available: faucetdirect.com

Price: \$69.95

Product Description and Measurements

Installation Instruction

Single Lever Pull Out Kitchen Mixer



Thank You

Dear Valued Customer,
Kraus would like to take this opportunity to thank you for purchasing Kraus products. It is our sincere hope that you are completely satisfied with your new purchase. We welcome any questions or comments you may have, and look forward to assisting you in the future.

Sincerely,
Kraus customer service department.

Prior To Installation Steps

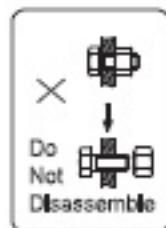
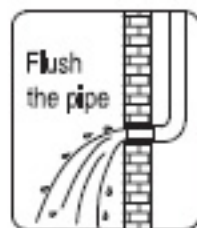
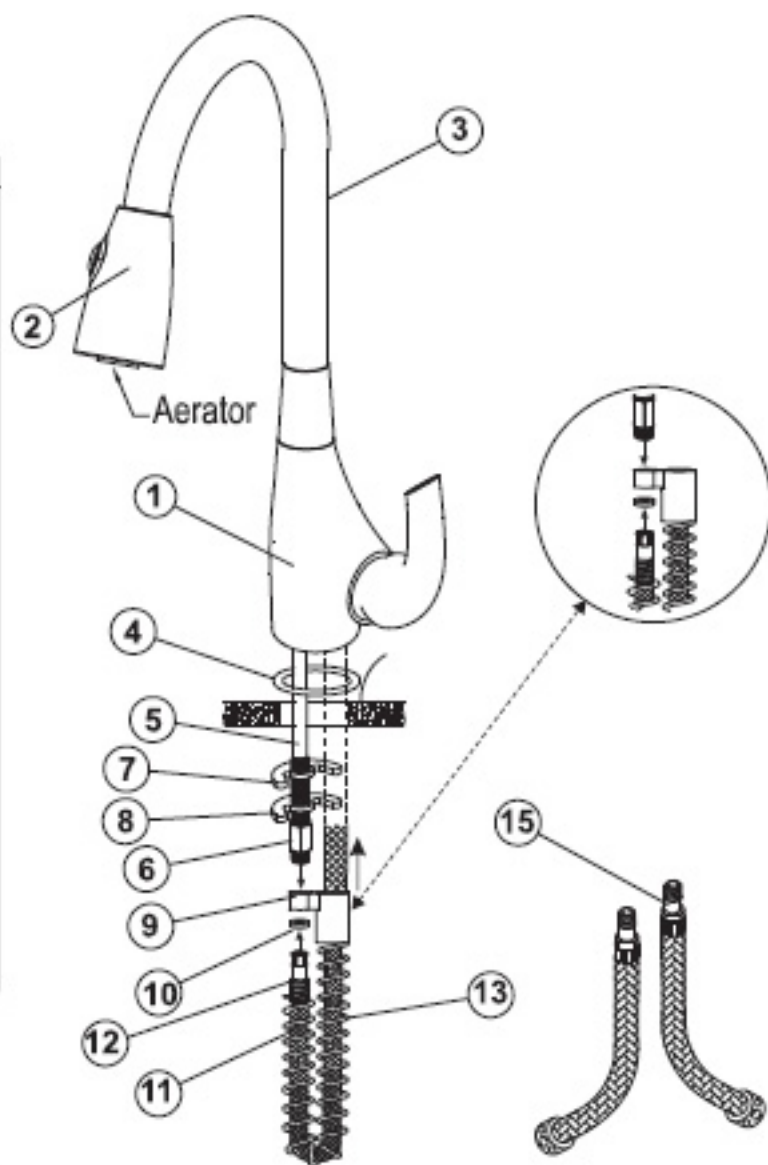
1. Unpack your new product and ensure that all the parts are contained in the packaging.
2. Keep the product in its original box until you are ready to install it.
3. Shut off the water supply if replacing a previously-installed faucet.
4. Observe all plumbing and building codes in your area.
5. It is recommended that installation of the product be done by a professional plumber.

Installation Steps

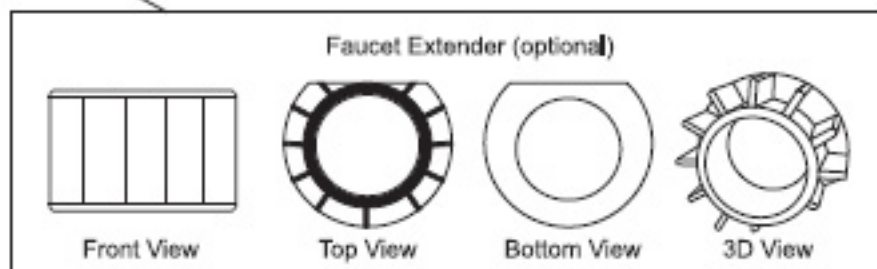
1. Shut off all water supply prior to installation.
2. Remove the metal spring (#13) by disassembling it from the hose.
3. Screw on the aerator head (#2) onto the spout (#3). Make sure that a black rubber washer is attached to the end of the hose prior to attaching the aerator head.
4. Place the black rubber o-ring (#4) onto the body (#1).
5. Unscrew the brass nut (#6) from the brass screw (#5).
6. Place the faucet on the countertop.
7. If the countertop is thin or the faucet is being mounted on the sink itself, place the countertop extender (#14) from underneath the countertop and tighten it onto the brass screw. ****Optional****
8. Place the rubber washer (#7) and then the metal washer (#8) onto the brass screw from underneath the countertop.
9. Tighten the brass nut (#6) onto the brass screw (#5).
10. Place the plastic enclosure (#9) onto the hose and situate the smaller opening onto the brass screw (#5).
11. Place the spring (#13) onto the hose.
12. Place the red hard washer (#10) into the hose inlet (#12) and screw the hose (#11) (with the spring already attached) onto the brass screw (#5).
13. Screw in the hot and cold waterlines (#15) and attach them to the water supply.

Specification Parts List

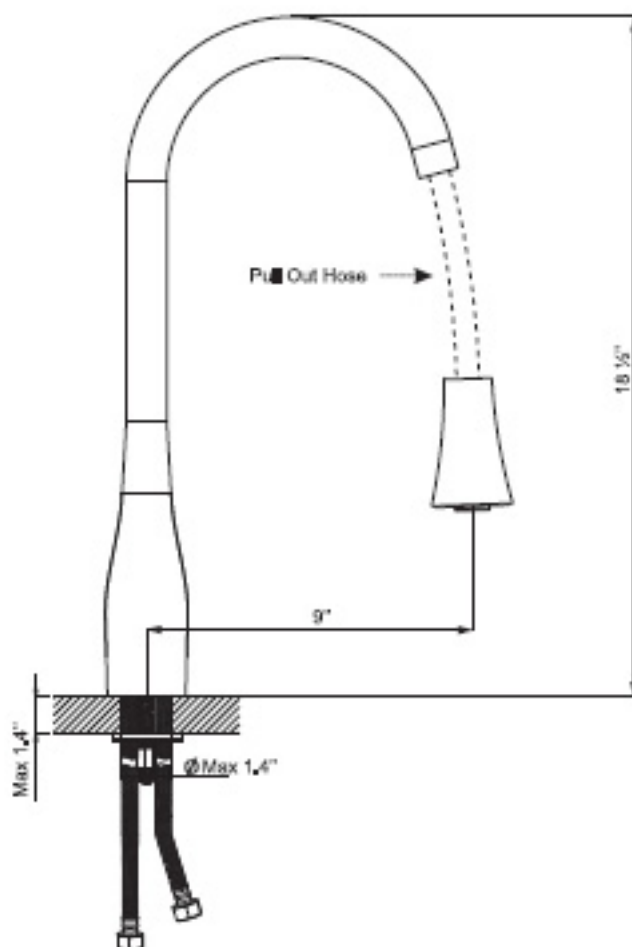
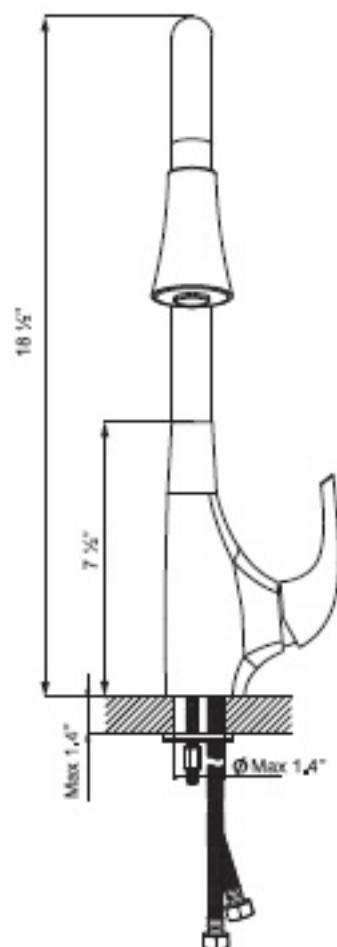
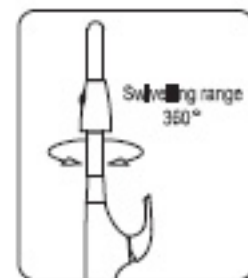
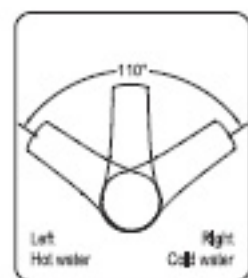
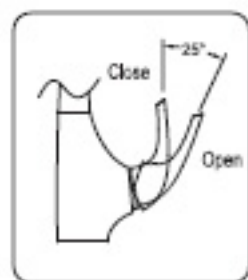
Code	Parts List	Quantity
1	Faucet Body	1
2	Aerator Head	1
3	Spout	1
4	Rubber O-Ring	1
5	Brass Screw	1
6	Brass Nut	1
7	Rubber Washer	1
8	Metal Washer	1
9	Plastic Enclosure	1
10	Red Hard Washer	1
11	Hose	1
12	Hose Inlet	1
13	Spring	1
14	Faucet Extender (optional)	1
15	Hot & Cold Water Lines	2



14



Installation Instructions



Care & Maintenance

In order to maintain your faucets original finish simply rinse with warm clean water and blot dry with a clean soft cloth only.

Avoid using corrosive detergents, polishers, scrapers or any other abrasive materials. In case a buildup of dirt or mineral deposits should occur, gently remove it using a mild detergent or a mixture of vinegar with water to soften the build up and clear it away. Rinse thoroughly and immediately with water to assure no detergent remains on the surface and dry with a soft cloth.

At Kraus your satisfaction with quality and durability of our products is extremely important to us. Therefore, we hope for you to keep our recommendation as a reminder, in order to prolong the lifespan of your faucet.



ELITE TALL SINGLE HANDLE SINK FAUCET

Model Number: F371023C

Location: Bathroom

Finish: Polished Chrome

Price: \$75.00

This Tall ELITE Single Handle Bathroom Vessel Sink Faucet offers outstanding performance, simplified installation and ease of cleaning. With custom-designed lever handles and a variety of durable ELITE finish options, it tastefully complements both classic and contemporary Decor.

- Specification data will show in image below and Installation guide in the box.
- Includes all installation hardware, and soft stainless steel water supply pipes.
- "SAIDEL" (All major brand use) ceramic disc valves exceed industry longevity standards two times for a lifetime of durable performance.
- Solid brass construction for durability and reliability.
- High-temperature limit stop allows you to preset a comfortable maximum temperature to eliminate scalding.
- **Availability:** Usually ship out next business day.
- **Warranty:** One year warranty against the manufacture defects.




Click to enlarge

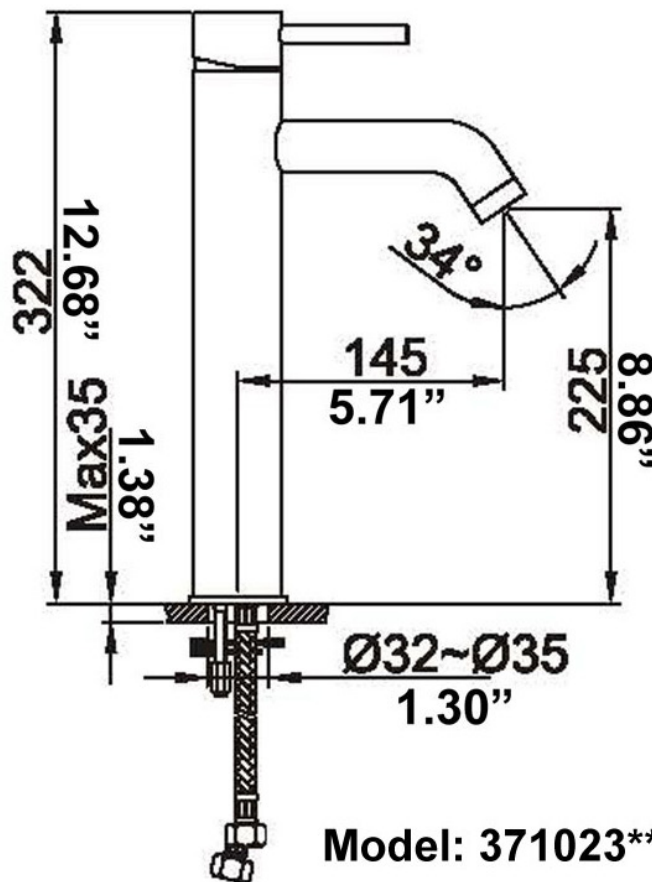


SHARE    ...

Available Options:

Finish:

Chrome 





**KOHLER CORALAIS POLISHED CHROME 1-HANDLE TUB
& SHOWER FAUCET TRIM KIT WITH SINGLE FUNCTION
SHOWERHEAD**

Model Number: T15601-7-CP

Location: Bathroom

Showerhead Width: 3.97"

Finish: Polished Chrome

Available: Lowes

Price:\$37.13



[+ Enlarged Image](#)

KOHLER Coralais Polished Chrome 1-Handle Tub & Shower Faucet Trim Kit with Single Function Showerhead

Item #: 89234 | Model #: T15601-7-CP

★★★★★ Be the first to write a review!

\$37.13

Valve sold separately



Do you have a question about this product?

[Get Help Now](#)

Description Specifications Info & Guides Reviews Q&A

Color/Finish Family	Chrome	WaterSense Certified	No
Manufacturer Color/Finish	Polished chrome	Faucet Type	Tub/shower
Collection Name	Coralais	Maximum Flow Rate (Showerhead) (GPM)	2.5
Number of Faucet Handles	1-handle	ADA Compliant	Yes
Handle Type	Knob	Valve Included	No
Pressure Balance/Scald Guard	No	Temperature Limit Control	No
Items Required for Standard Installation	Adjustable wrenches,	Integral Stops	No
	strap wrench, plumbers putty, thread sealant	Valve Model Required	Rite-Temp(R) pressure-balancing valve
Connection Type	NPT	Showerhead Width (Inches)	3.97
Drain Included	No	Body Sprays Included	No
Showerhead Type	Single function		



DIVISION 23 HEATING, VENTILATING, AND AIR-CONDITIONING



EMONITOR 24R

Model Number: 24R

Location: Electrical Panel/2nd Bedroom

Features

- xPod: external temperature/RH monitors

- 22 circuit monitors, plus 2 mains, plus one renewable energy circuit

- external RH & temperature sensors

Powerwise

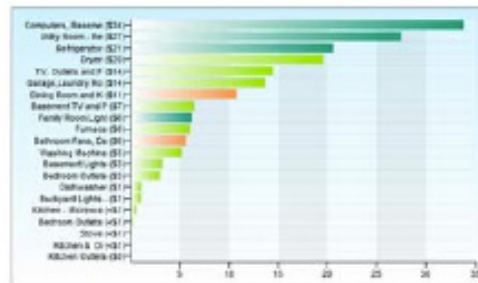
Residential eMonitor Features

- Overview
- Features**
- How It Works
- User Feedback
- FAQ
- Buy an eMonitor

- Circuit-level Monitoring**
- Easy-to-Read Interactive Graphs
- Targeted Recommendations
- Alerts by Text and E-Mail
- Appliance Health & Performance Monitoring
- Temperature Control from anywhere
- Renewable Energy Monitoring
- Carbon Footprint

Circuit-Level Monitoring

The only way to get the right level of granularity for informed decision-making

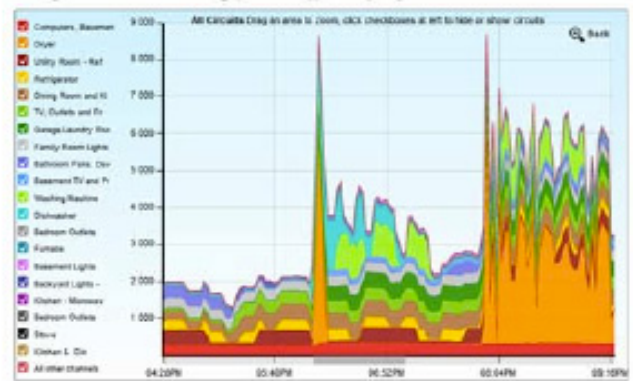


24x7 minute-by-minute monitoring of:

- Energy use
- Energy costs
- Carbon footprint

Supports monitoring of:

- Over 200 circuits
- 120v and 240v
- Multiple circuit panels





LUNOS E2

Model Number: e2

Location: pair- bathroom, bedrooms, living room & kitchen

Dimensions:

Length: 12"

Width: 6"

Height: 6"

Weight: 12.2 lbs

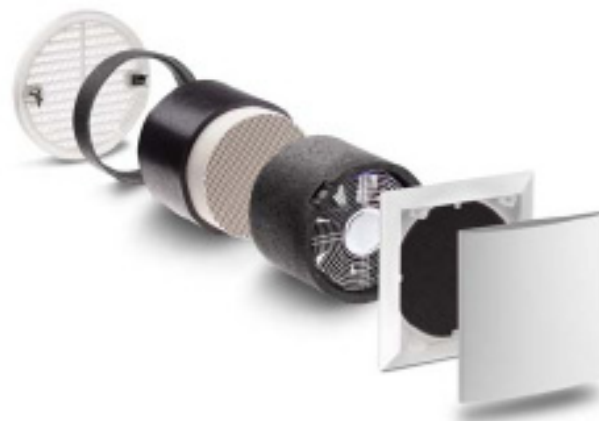
Humidity Recovery: 20%-30%

Decentralized ventilation system with built-in regenerative heat recovery core

Dimensions	
Diameter unit	5-7/8" – 150mm
Exterior diameter tube	6-3/8" – 163mm
Minimum wall thickness	12" – 300 mm
Installation tube (can be cut)	6"-3/18 to 19-1/2" - 160 to 500 mm
Inside cover	7-1/16" x 7-1/16" – 180 x 180 mm
Outside grill diameter	7-1/16" – 180 or LUNOthermn transferbox

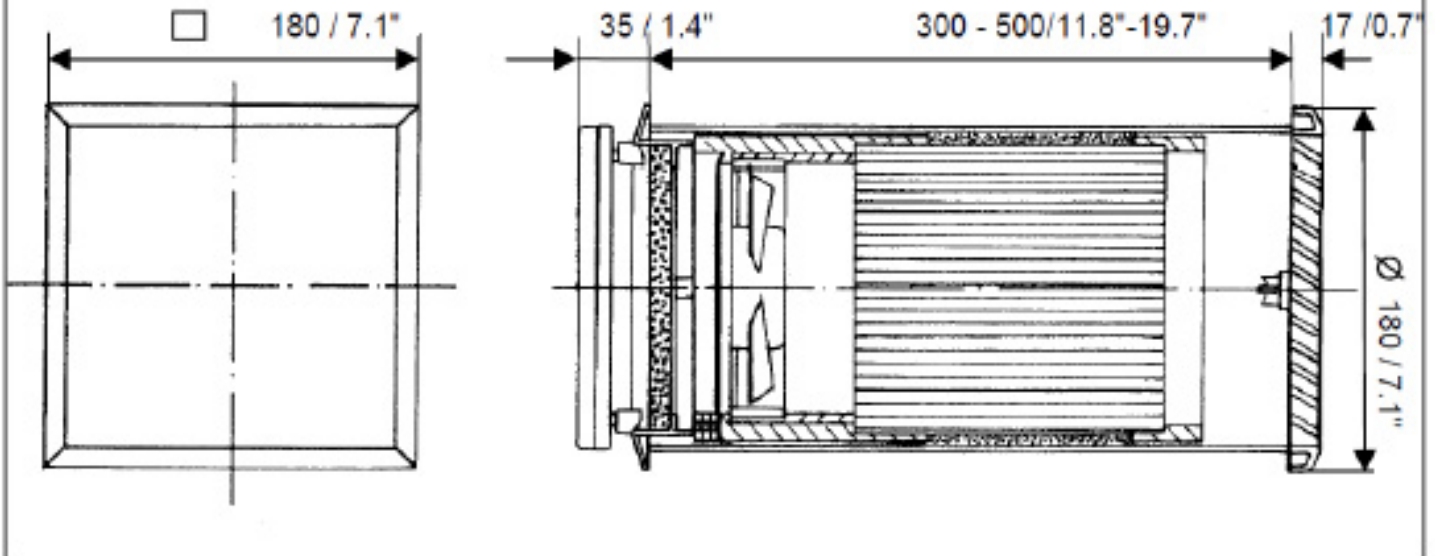
Operating and wired in groups of 2 or 4, these fans provide continuous ventilation without the need for ductwork - installed directly in the exterior wall. The regenerative core is charged every 70 seconds, after which the fan reverses and the incoming air absorbs the stored heat on its way in.

Technical Specs	
Heat recovery efficiency	90.6%
Humidity recovery	20-30%
Flow rates	17/32/38 m ³ /hr 10/18/22 CFM
Operating noise	16.5 dB at 17 m ³ /hr (10CFM) 19dB at 32 m ³ /hr (18 CFM) 26dB at 38 m ³ /hr (22CFM)
Power consumption	1.4 W (17 m ³ /hr)
Fan <0.1amp	2.8 W (32 m ³ /hr)
Fan efficiency	0.09 Wh/m ³
Filter	G3 or Pollen (F5)

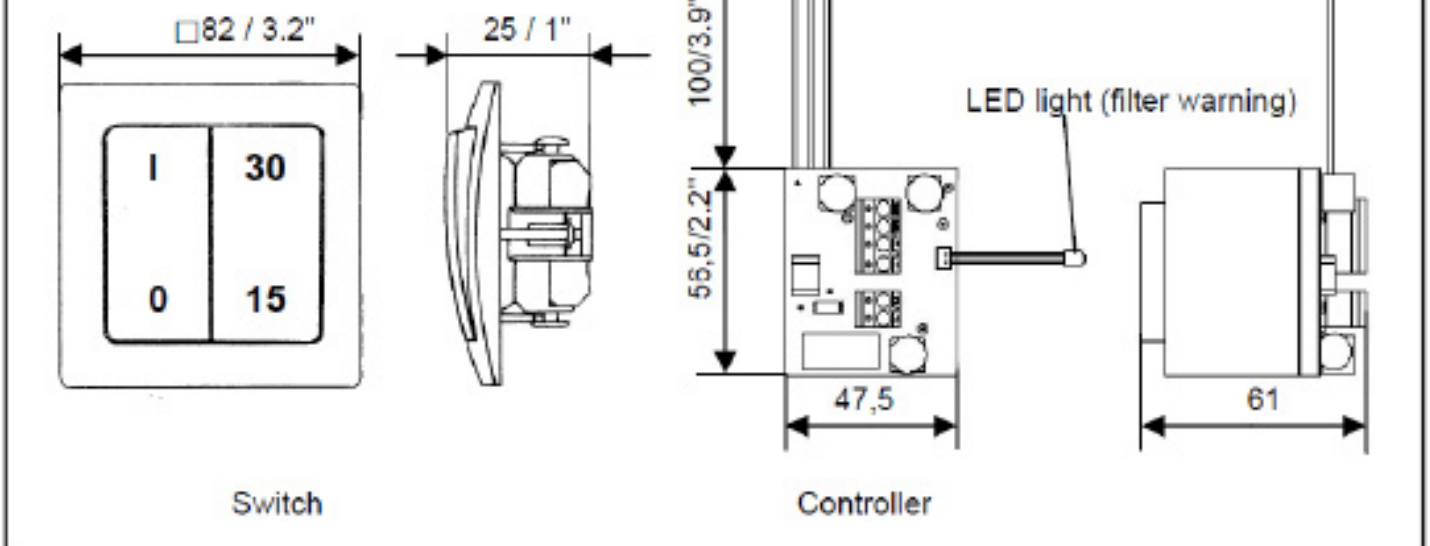


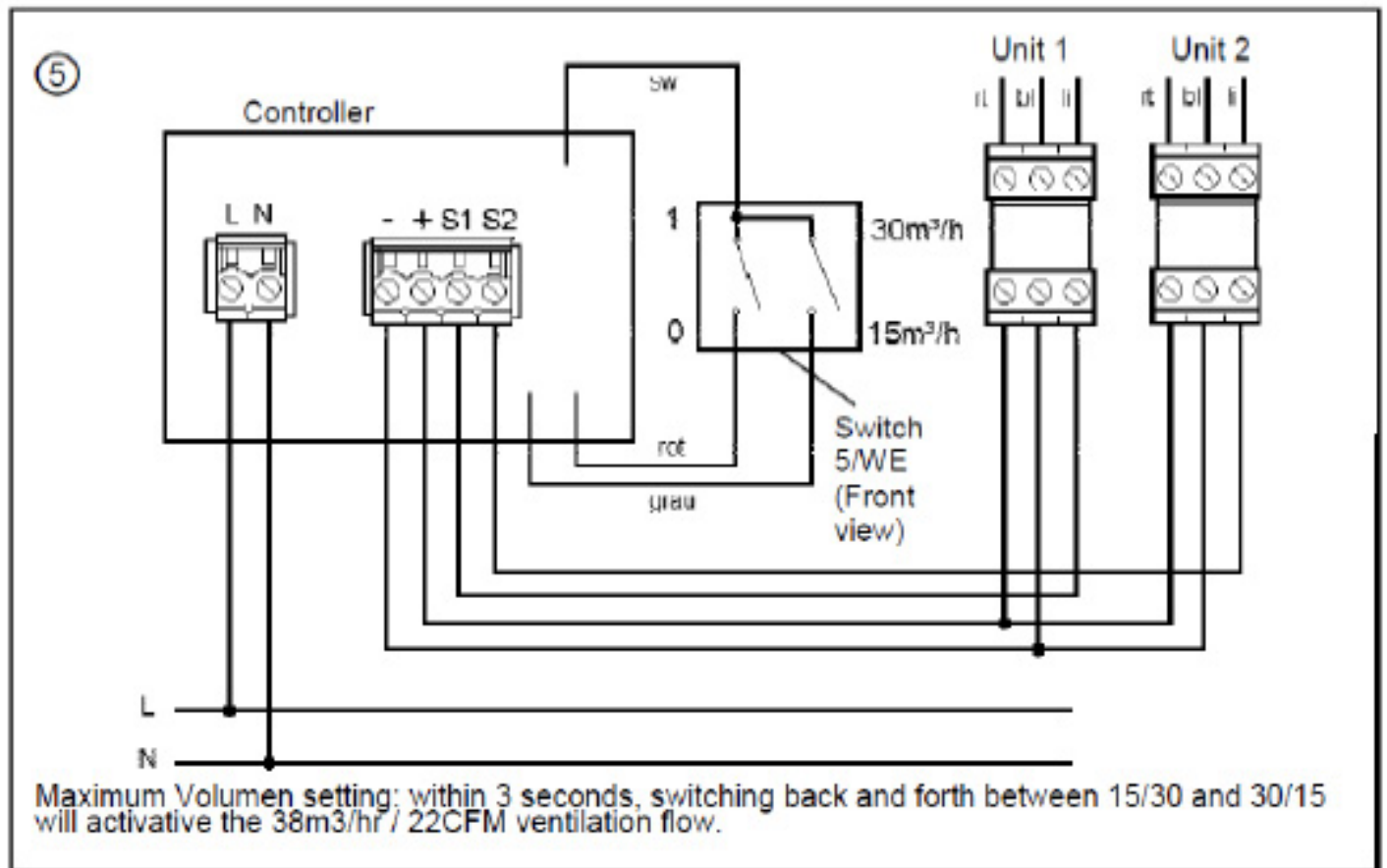
Dimensions (mm and inches)

e² heat recovery ventilator



Switch and controller





Basic fans assembly (039846) includes:
 Ceramic regenerative heat exchange core
 EPP- insulation rings
 12V – reversing fan
 Installation Tube
 G3 Filter
 White Interior cover
 White Exterior grill, with insect screen

Accessories:

Switch for up to four e²'s (TYP 5/SE), includes filter indicator and installation box.
 Serial switch 5/WE
 Exterior noise attenuator 9/SW
 Washable replacement filters (3 pack), G3 9/FIB-3R
 Pollenfilter F5 (3 pack) – 9/FIB-P
 Grey and red-brown exterior grills (1/GE180 and 1/RE180)
 LUNOthem tranferbox for hidden ventilation opening under/next to windows

Four Seven Five
 High Performance Building Supply
 131 Union St. Brooklyn, NY 11231
 info@foursevenfive.com
 718-622-1600



Installation Manual

Local Ventilation System with Heat Recovery – Type e²

- Please hand out to user -

Contents	Page:
About this manual, safety instructions	1
Technical Specifications, Disposal	1
Dimensional diagrams	2
Installation position	2
Shipping units	3
Assembly: Assembly pipe and outside grid	4
Assembly: Electric installation and electric connection	5
Assembly: Heat recovery unit and indoor blind	6
Assembly: Noise absorption set	7
Replacement ALD-R 160 / ALD-R 160 L for e ²	7
Filter replacement, Cleaning	8
Additional replacement parts	8

About this manual

- Read this manual carefully and completely before assembly. Abide by the general safety instructions and the safety symbols with information in the text.
- Hand out this manual to the user (tenant, proprietors, property management etc.) after completing assembly.

Symbols in this manual



This symbol is a danger warning in connection with risk of injury



This symbol is a danger warning in connection with risk of injury from electricity

Safety instructions



Beware! Any assembly work to the ventilation device may only be carried out after disconnecting all phases of supply voltage! The ventilation device is fitted with protective insulation according to Protection Class II, the protection connection is superfluous!



Attention! The electric connection may only be made by authorised qualified personnel and according to the applicable version of VDE 0100!



Attention! This device may not be operated by children and persons (filter replacement/cleaning) who are not able to operate the device safely due to their psychic, sensory or mental abilities or their inexperience or lack of knowledge. Children should be supervised to ensure that they do not play with the device.

Technical specifications

Supply voltage:	110 VAC 60 Hz
Device voltage:	12 VDC SELV
Type of protection:	IP 22
Volume flow:	15m ³ /h; 30m ³ /h, max.
Measuring sound pressure level	16,5 dB; 19,5 dB
Sound level difference:	42 dB

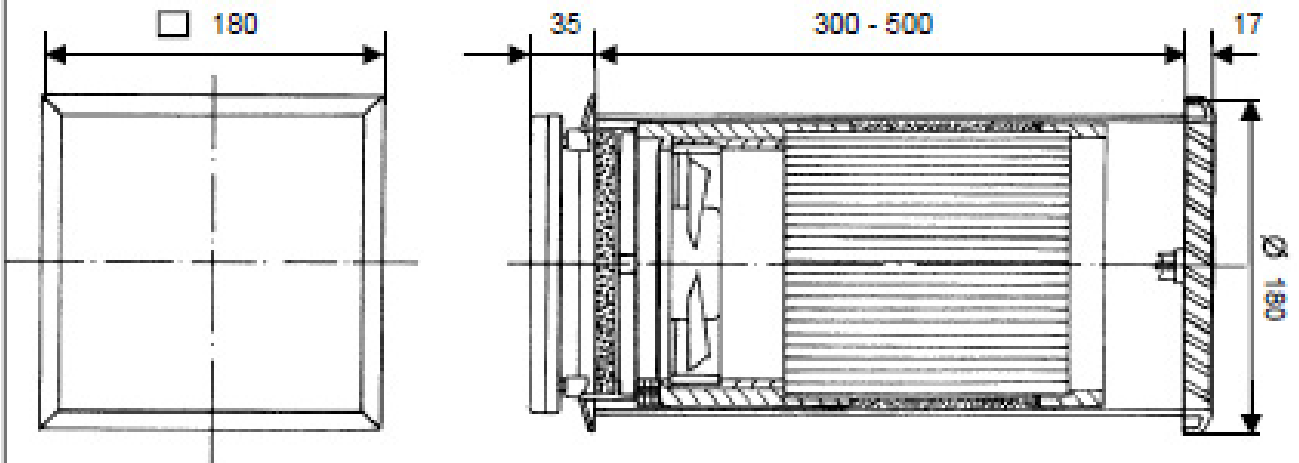
Disposal



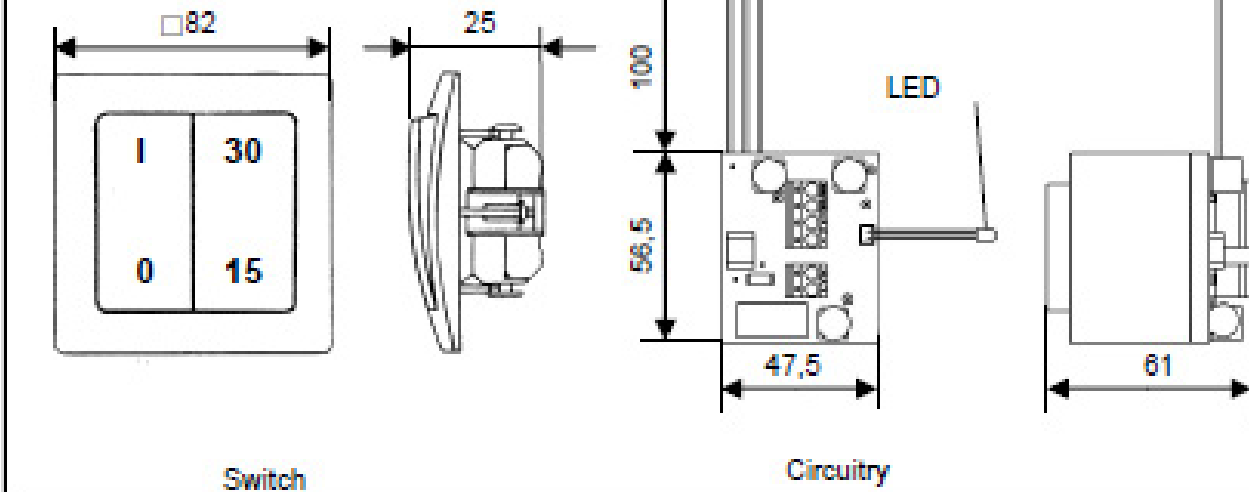
Dispose of the packaging correctly sorted. If you want to dispose of the device, abide by the current rules and regulations. The applicable municipal office will provide information.

Dimensional diagrams (all dimensions in mm)

Ventilation device



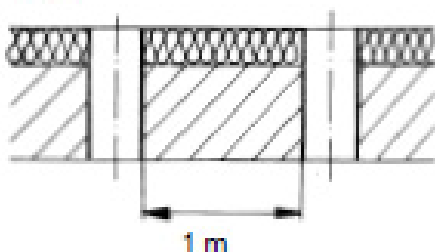
Switch and circuitry



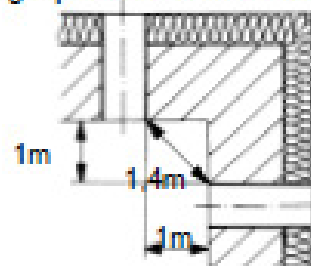
Installation position

Local ventilation devices with heat recovery of the type e² only function in pairs in bidirectional operation. A device operates 70 s in supply air operation, the other 70 s in exhaust air operation at the corresponding volume flow level as set. Then the air direction is changed. It is thus ensured that the total of the volume flow admitted is equal to the total of the exhausted volume flow. If a device pair operating in push-pull operation is installed in two different rooms of the flat and operated, a sufficiently dimensioned interconnection between the air movement must be provided by overflow air apertures.

Recommended minimum spacing when installing a pair of devices in a wall:



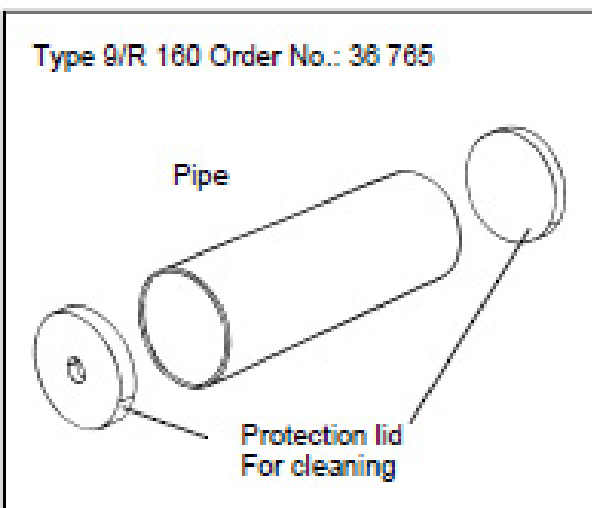
Recommended minimum spacing when installing a pair of devices across a corner:



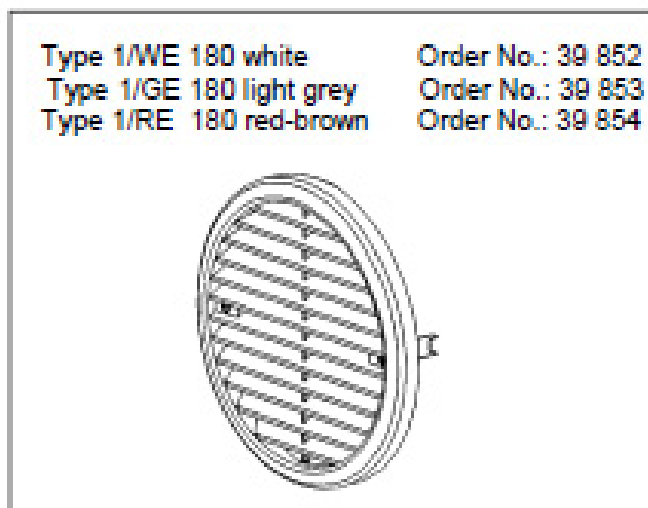
Shipping units

Check the supplies for completeness and perfect conditions!

Assembly pipe (min 2x, max 4x)

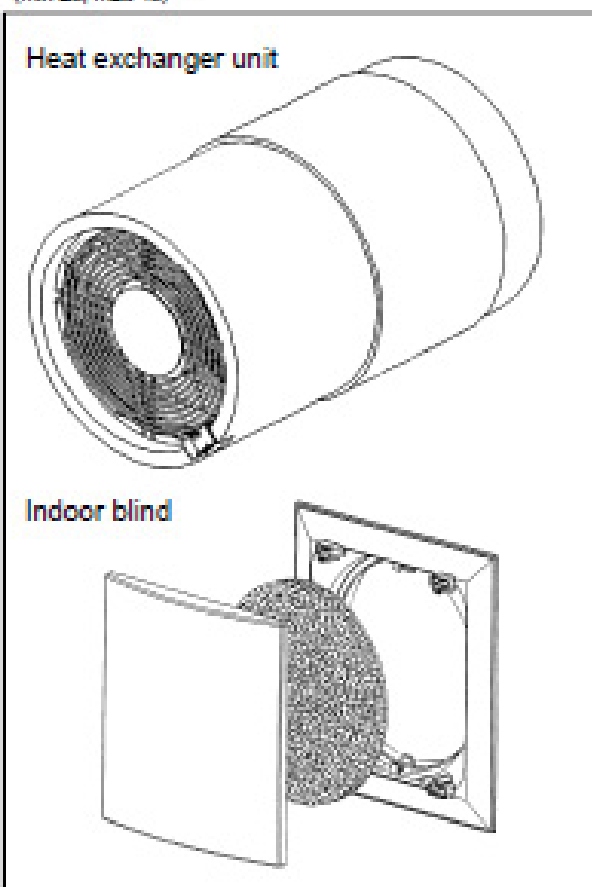


Outside grid (min 2x, max 4x)

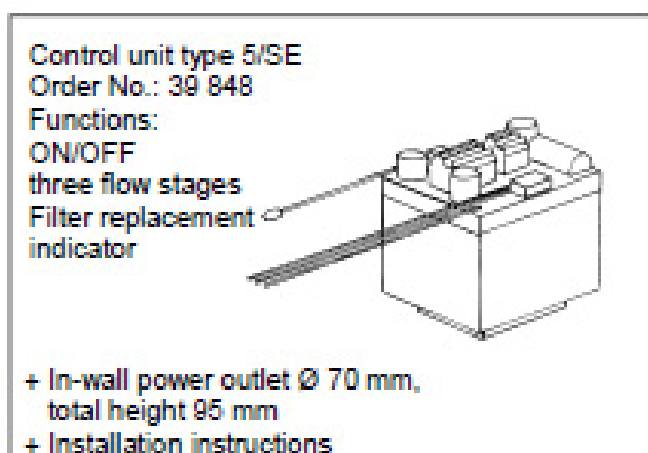
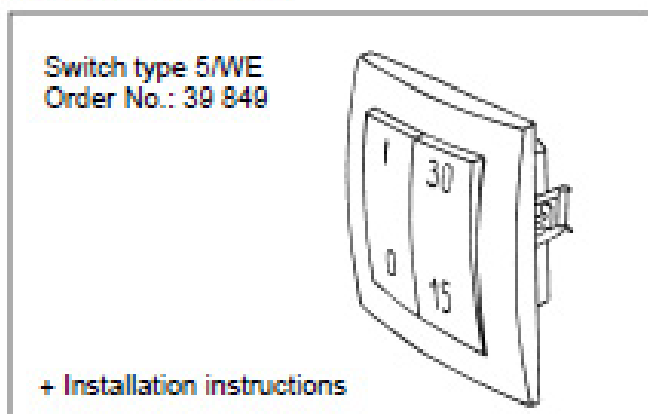


Heat exchanger unit – Indoor blind

(min 2x, max 4x)



Switch and circuitry



Assembly pipe, outdoor grid white, heat exchanger unit, indoor blind and installation instructions can be supplied as a complete set (Order No.: 39 846).

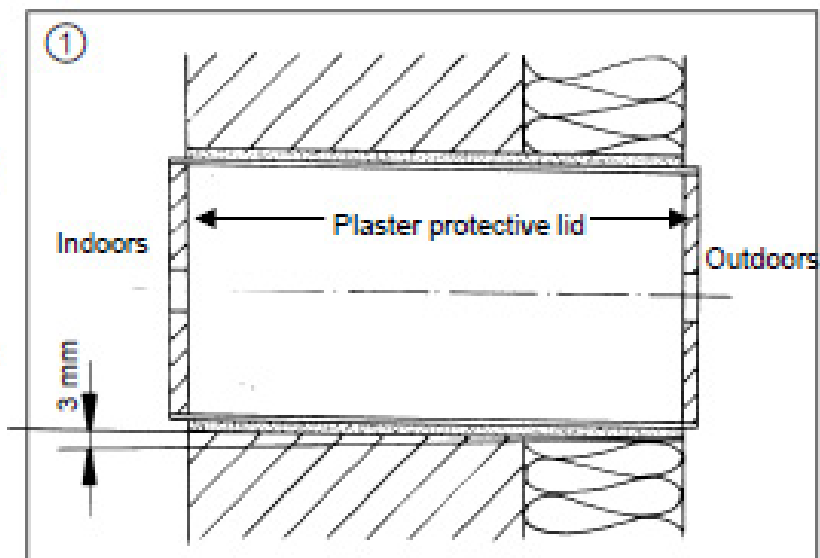
Heat exchanger unit, indoor blind and installation instructions can be supplied as replacement set of ALD-R160 (type WTB 160, Order No.: 39 847).

Assembly – Assembly pipes

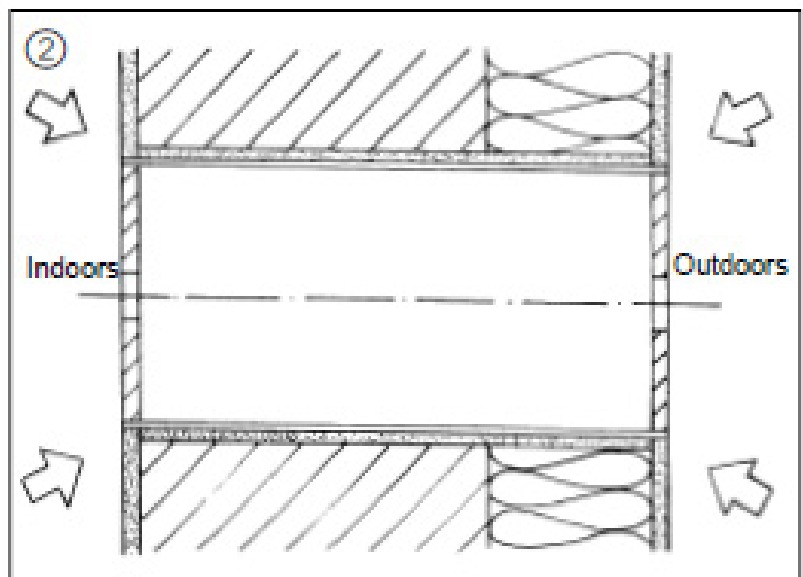
Attention! Assemble 1 pair minimum, 2 pairs maximum!

Make the wall openings for the assembly pipes (e.g. by coring, core bit \varnothing 162 mm).

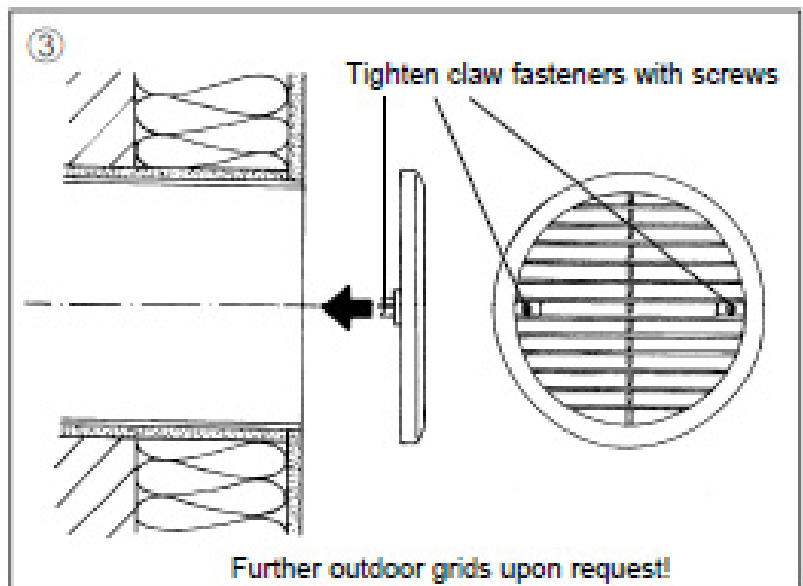
If necessary shorten the pipe to the required installation length (min. 300 mm). Take care that the pipe overlaps on both sides to cope with the plaster thicknesses (after plastering the pipe must close flush with the plaster). Insert the pipe and seal it all around (assembly glue Order No. 038 733).



Apply plaster indoors and outdoors. When outdoor closure is plastered first replace the plaster protection lid outdoors by an outdoor closure piece.







Remove the plaster protection lid outdoors. Assemble the outdoor grid using the integrated claw fasteners (tighten screws).



Assembly – electric installation and electric connection

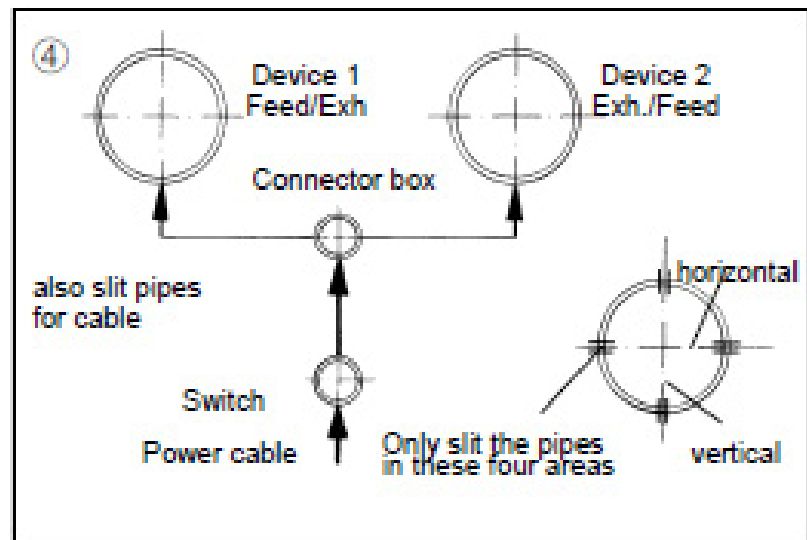
Safety instructions:

-  Beware! Any assembly work to the ventilation device may only be carried out when all phases of supply voltage have been disconnected!
-  Make sure that the supply voltage of all connection lines is dead! (separation from the power supply with a free space between contacts of at least 3 mm, e.g. all-phase disconnecting electr. protection).
-  Each electric circuit of this ventilation system must be fitted with a residual current protection (e.g. RCD)!
-  Electric connection only by a qualified person!

Attention, assemble 1 pair minimum, 2 pairs maximum per circuit.

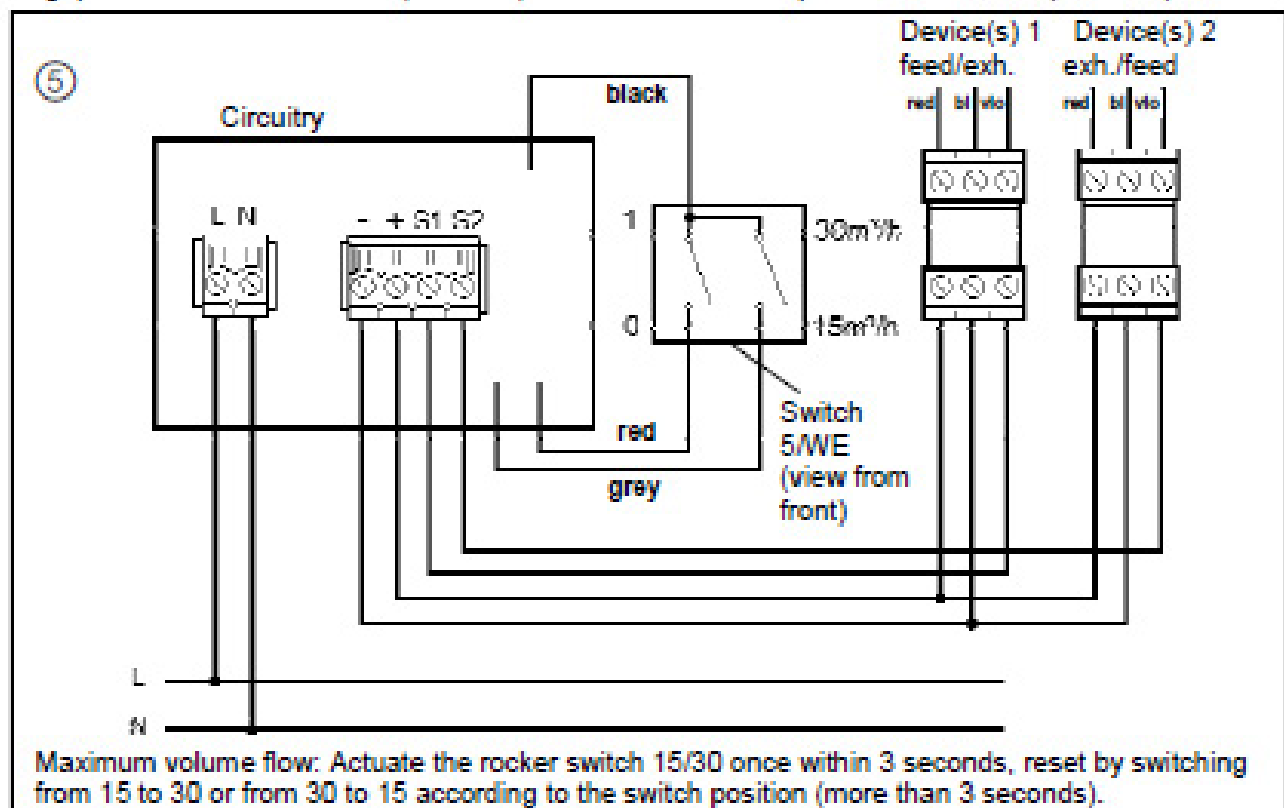
Select the position of the switch.
Install the socket (Ø 70 mm, total depth 95 mm).

Slit the cable ducts (power cable + cable to the device pairs). Lay the power cable (e.g. 3 x 1.5 mm²) and the cables to the pairs of devices (e.g. 3 x 0.75 mm²).

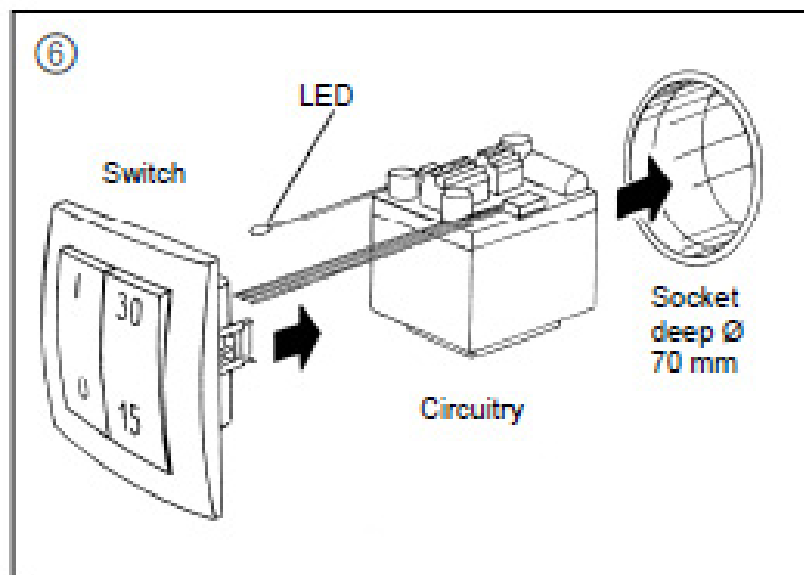


Connect the circuitry and switch according to connection diagram below.

e.g. power cable: 3 x 1.5 mm² (14 AWG), cables to the device pairs: 3 x 0.75 mm² (18 AWG).

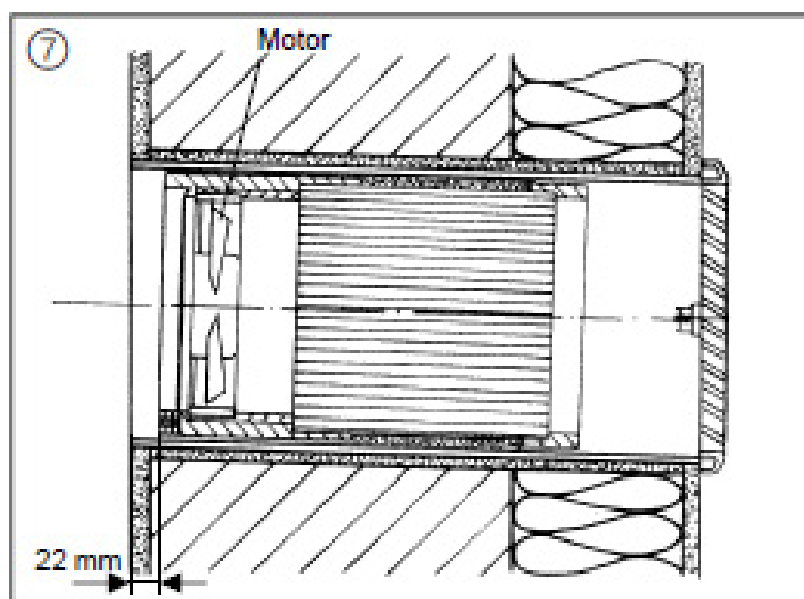


Assemble the switching system and switch in the switch socket.
Attention! The LED shows upward and is inserted in the circular opening on the underside of the switch offered by LUNOS!
 Please check when using customary two-circuit switch that an opening is available for the LED!

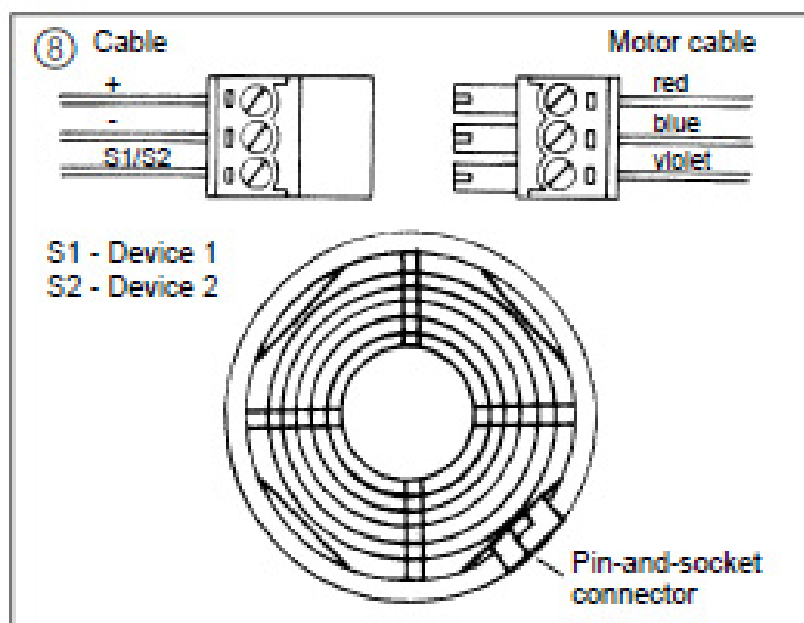


Assembly – Assembly of the ventilation insert and the indoor room blind

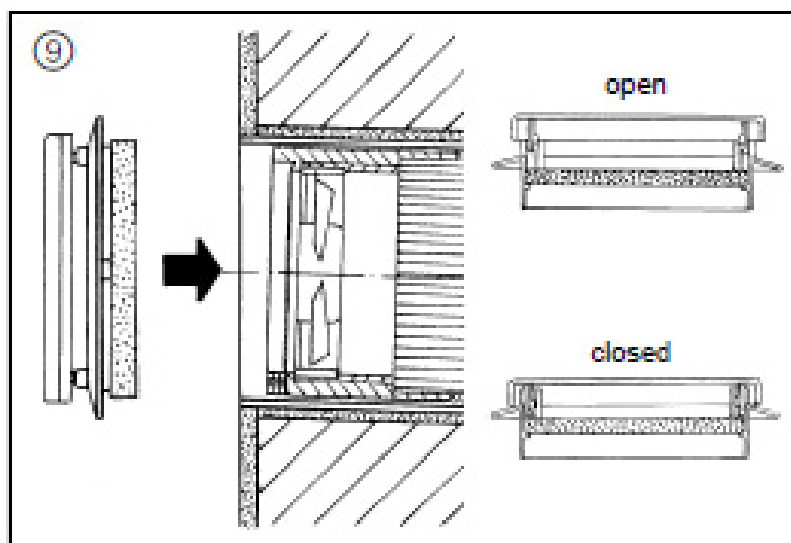
Remove plaster protection lid inside, insert heat exchanger unit into the assembly pipe, ensure there is a 22 mm spacing. Motor is on the inside. Using the loop on the inside of the heat exchanger unit the said unit may be pulled out for correction purposes.



Connect cables to plugs, insert pin and socket connectors into the recess of the heat exchanger casing.

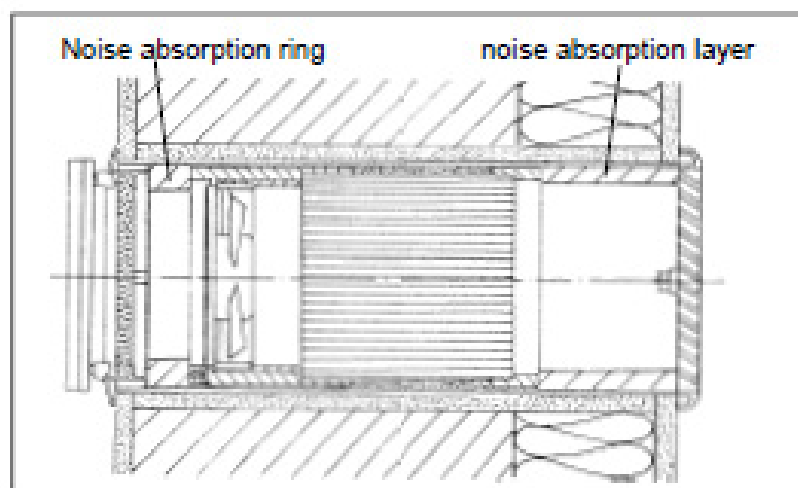


Insert indoor closure with filter casing, snap the indoor blind into place in open position!
Ready!



Assembly noise absorption set

Can be used as from a pipe length of 300 mm. Position noise absorption ring and noise absorption layer as depicted. The noise absorption layer can be shortened if necessary.

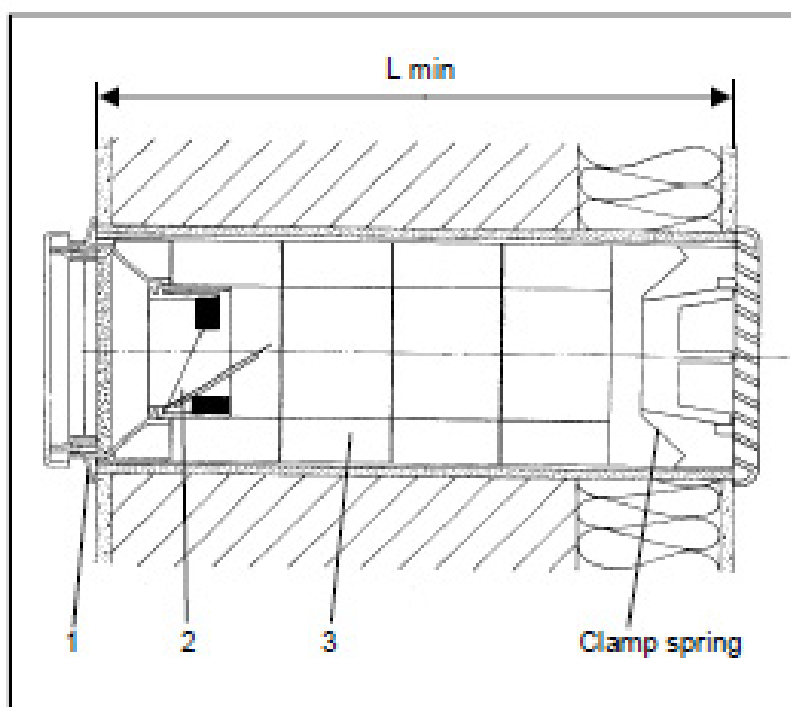


Replace ALD-R 160 / ALD-R 160 L by e²

When carrying out a replacement the following parts of ALD-R 160 are not required any more:

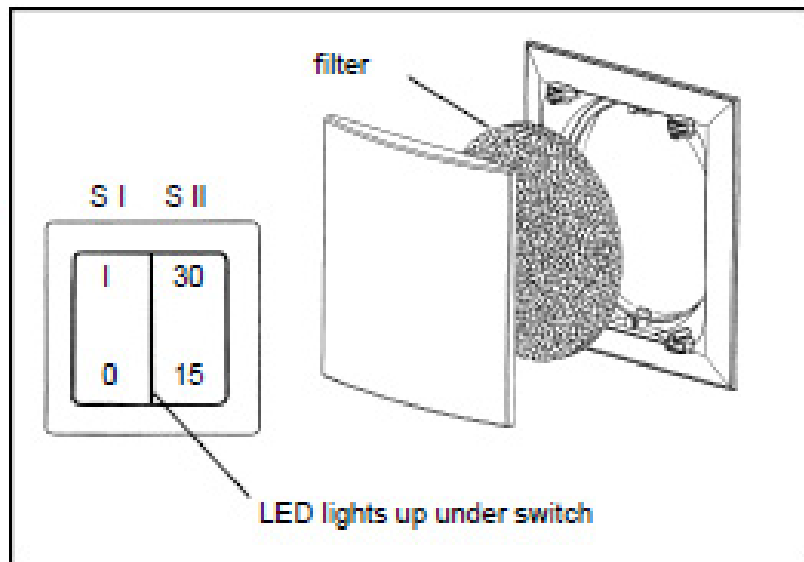
1. covering frame
2. wind pressure protection
3. noise absorber elements + noise absorber end fitting

The minimum length L_{min} of the assembly pipe should be 300 mm. When keeping the outside closure with clamp spring (types 1/R... 180) L_{min} is 320 mm. The assembly of the e² is then carried out as described in this manual page 5 onward



Filter replacement

The filter replacement LED below the switch lights up non-stop red when the filter is polluted.
 Remove indoor blind, remove filter, insert new or cleaned filter (the filter can, e.g. be cleaned with dishwasher detergent) insert indoor blind again.
 To reset the filter replacement LED actuate the rocker switch S II 3 times within 3 s – the red LED extinguishes.
 (rocker switch S I is in position "I")
 The ventilation openings may not be cluttered up or covered.



Please draw up the filter replacement below:

Filter replacement date	Expected filter replacement	Type of filter used

Cleaning

If necessary wipe the indoor blind and covering frame with a dry soft cloth.



Filter replacement and cleaning may neither be carried out by children nor by persons who are not able to operate the device safely due to their psychic, sensory or mental abilities or their inexperience or lack of knowledge.

Additional / replacement parts

Indoor blind compl. 9/IBE	Order No.: 39 851
Replacement filter G3, 9/FIB3R, pack of 3	Order No.: 37 214
Noise absorption set 9/SW	Order No.: 39 850
Wind pressure fuse 9/WDSE (for assembly pipe from 370 mm length)	Order No.: 39 860



Germany
 LUNOS Lüftungstechnik
 GmbH für Raumluftsysteme
 Wilhelmstr. 31
 13593 Berlin

Tel.: 0 30 / 36 20 01 - 0
 Fax: 0 30 / 36 20 01 - 89
 E-Mail: info@lunos.de
 Internet: <http://www.lunos.de>



MITSUBISHI MR. SLIM MINI SPLIT HEAT PUMP

Exterior:

Model Number: MXZ-2B20NA-1

Location: North Exterior Wall

Dimensions:

Width: 33 1/6"

Height: 27 15/16"

Diameter: 13"

Weight: 130 lbs

Interior:

Model Number: MSZ-FE09NA-8

Location: Kitchen

Dimensions:

Width: 33 1/6"

Height: 10 1/8"

Diameter: 11 5/8"

Weight: 27 lbs

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 E-Mail: msmith@hvac.mea.com • Web site: www.mrslim.com

All Categories > Air Conditioner Accessories > Mr. Slim Air Conditioner Accessories > Mr. Slim Controls > Item # MHK1



[larger image](#)

Item # MHK1, Controls

MKH1 Wireless Remote Controller Kit for use with compatible INVERTER-driven M-Series and P-Series Systems.

MKH1 REMOTE CONTROLLER KIT INCLUDES MRCH1 Wireless Remote Controller, MIFH1 Wireless Receiver and MRC1 Cable

MIFH1 WIRELESS RECEIVER

- Mounts next to or near indoor units to allow MRCH1 Remote Central Controller operation of P-Series NHA4 systems, SEZ-4/SUZ one-to-one systems, and SLZ/SUZ one-to-one systems
- Dimensions: 6-7/16" H x 3-1/4" W x 1-5/16" D (164 x 82.5 x 34 mm)

MRCH1 Remote Controller

- Backlit
- Supports both Fahrenheit and Celsius
- User functions allow user to set:
 - On/Off
 - Operation modes cool, heat, drying, fan
 - Set temperature (separate dual set points for heat and cool)
 - Fan speed setting
 - Airflow direction
- Day/Time display with a 12-hour clock
- Filter sign display
- Optimal start
- Adjustable auto deadband
- Space temperature offset adjustment
- Display outside temperature and humidity (requires optional MOS1, sold separately)
- Hold function
- Temporary schedule override
- Reset to factory default
- Auto lock display
- Timer Operation:
 - Daily Timer: On/Off times can be set up to 4 times per day in 15-minute increments.
 - Weekly Timer: On/Off times can be set up to 4 times per day of the week in 15-minute increments. Choice of 5-2 and 5-1-1 weekly schedules for heat, cool, auto (separate for each mode)
 - Auto-off Timer: Turns indoor unit Off at scheduled time up to 24 hours in advance
- Room Temperature: Displays room temperature sensed either at the indoor unit or at the remote controller (default)
- Set temperature range limits (dependent on the model connected):
 - Cooling from 50° to 99°F
 - Heating from 40° to 90°F
 - Auto from 50° to 90°F with dual temperature setting
- Diagnostics: Displays and records error codes
- No addressing required
- Can be integrated with other RedLINK™ devices
- Uses two "AA" alkaline batteries (included)

MIFH1 WIRELESS RECEIVER

- Mounts next to or near indoor unit to allow wireless communication operation on MRCH1 Wireless Remote Central Controller.
- Dimensions: 6-7/16" H x 3-1/4" W x 1-5/16" D (164 x 82.5 x 34 mm)

MRC1 CABLE

- Connects MIFH1 Wireless Receiver to fivepin CN105 connector on indoor unit control board
- Five-conductor wire with preterminated ends
- Length: 6-1/2' (2 m)

Specifications

Description	Wireless Remote Controller Kit
Use with	M-Series & P-Series Inverter Systems

[Print](#) [Back](#)

SUBMITTAL DATA: MSZ-FE09NA-8 9,000 BTUH WALL-MOUNTED INDOOR UNIT FOR MXZ MULTI-ZONE HEAT-PUMP SYSTEMS

Job Name:	Location:	Date:
Purchaser:	Engineer:	
Submitted to:	For <input type="checkbox"/> Reference <input type="checkbox"/> Approval <input type="checkbox"/> Construction	
System Designation:	Schedule No.:	

GENERAL FEATURES

- Highly energy-efficient system with quiet operation
- Updated sleek, compact indoor unit design
- Includes Standard, Platinum Deodorizing, and Anti-allergy Enzyme Filters for a complete air purifying system
- "Powerful Mode" function permits system to temporarily run at a lower/higher temperature with an increased fan speed, which quickly brings the room to the optimum comfort level
- Integrated i-see sensor automatically detects room air temperature
- Autochangeover for cooling and heating
- Hand-held Wireless Remote Controller
- Limited warranty: five years on parts and defects and seven years on compressors

OPTIONAL ACCESSORIES
Indoor Unit

- Condensate Pump (SI3100-230; 230V)
- Replacement Platinum Deodorizing Filter (MAC-308FT)
- Replacement Anti-allergy Enzyme Filters (MAC-418FT; MERV 8)

Controller Options

- Wireless Remote Controller Kit (MHK1) with Remote Controller (MRCH1), Wireless Receiver (MIFH1), and cable (MRC1)*
- Setback down to 50°F when used with MRCH1 Remote Controller
- Portable Central Controller (MCCH1; for use with Wireless Remote Controller Kit MHK1)*
- Outdoor Air Sensor (MOS1; for use with Remote Controller (MRCH1), Wireless Remote Controller Kit (MHK1) and Portable Central Controller (MCCH1)*

*See Submittal for information on each option.

- Wall-mounted Wired Remote Controller (PAR-21MAA; req. MAC-3971F)
- MA Contact Terminal Interface (MAC-3971F)
- M-NET Control Adapter (MAC-3991F)
- Remote Temperature Sensor (M21-JKO-307)
- Lockdown Bracket for Hand-held Controller (RCMKP1CB)

Cooling Capacity* 9,000 Btu/h

Heating Capacity* 10,900 Btu/h

* Rating Conditions (Cooling) - Indoor: 80°F (27°C) DB, 67°F (19°C) WB; Outdoor: 95°F (35°C) DB, 75°F (24°C) WB.

(Heating at 47°F) - Indoor: 70°F (21°C) DB, 60°F (16°C) WB; Outdoor: 47°F (8°C) DB, 43°F (6°C) WB.
 (For data on specific indoor units [all ducted, all non-ducted, and both ducted and non-ducted] combinations, see the MXZ Technical and Service Manual.)



Indoor Unit: MSZ-FE09NA-8



Wireless Remote Controller

Electrical Requirements

Power Supply 208 / 230V, 1-Phase, 60 Hz
 MCA 1 A

Voltage

Indoor - Outdoor S1-S2 AC 208 / 230V
 Indoor - Outdoor S2-S3 DC 12-24V

Fan Motor

. 0.76 F.L.A.

Airflow

Cooling (Lo - Med - Hi - Powerful) 162 - 226 - 339 - 381 Dry CFM
 144 - 202 - 307 - 343 Wet CFM
 Heating (Lo - Med - Hi - Powerful) 166 - 240 - 367 - 381 Dry CFM
 Sound Pressure Level (Lo - Med - Hi - Powerful)
 Cooling 22 - 31 - 39 - 42 dB(A)
 Heating 22 - 31 - 40 - 42 dB(A)

DIMENSIONS	UNIT INCHES / MM
W	31-3/8 / 799
D	10-1/8 / 257
H	11-5/8 / 295

Weight 27 lbs. / 12 kg

External Finish Munsell No. 1.0Y 9.2 / 0.2
 Field Drainpipe Size O.D. 5/8" / 15.88 mm

Refrigerant Type R410A
 Refrigerant Pipe Size O.D.

Gas Side 3/8" / 9.52 mm
 Liquid Side 1/4" / 6.35 mm
 Connection Method Flared

MXZ-B SERIES HEAT-PUMP OUTDOOR UNITS
MXZ-B MULTI-ZONE SYSTEMS CAN INCLUDE:

- Ducted Indoor Units:
 SEZ-KD09,12,15,18NA4, PEAD-A24AA4
 - Nonducted Indoor Units:
 MSZ-GE06,09,12,15,18NA-8,24NA,
 MSZ-FE09,12NA-8,18NA, MFZ-KA09,12,18NA,
 PCA-A24KA4, SLZ-KA09,12,15NA, and
 PLA-A12,18,24BA4
 - A combination of both Ducted and Nonducted Indoor Units
- Refer to the separate submittal forms for the MSZ-GE, MSZ-FE, MFZ-KA, SEZ-KD, SLZ-KA, PEAD, PCA, PLA Indoor Units, and MXZ Outdoor Units.



MULTI-ZONE OUTDOOR UNIT



MSZ-GE



SEZ and PEAD-A24AA4



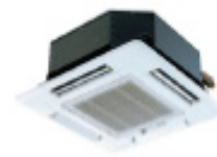
MSZ-FE



MFZ-KA



PCA-A24KA4

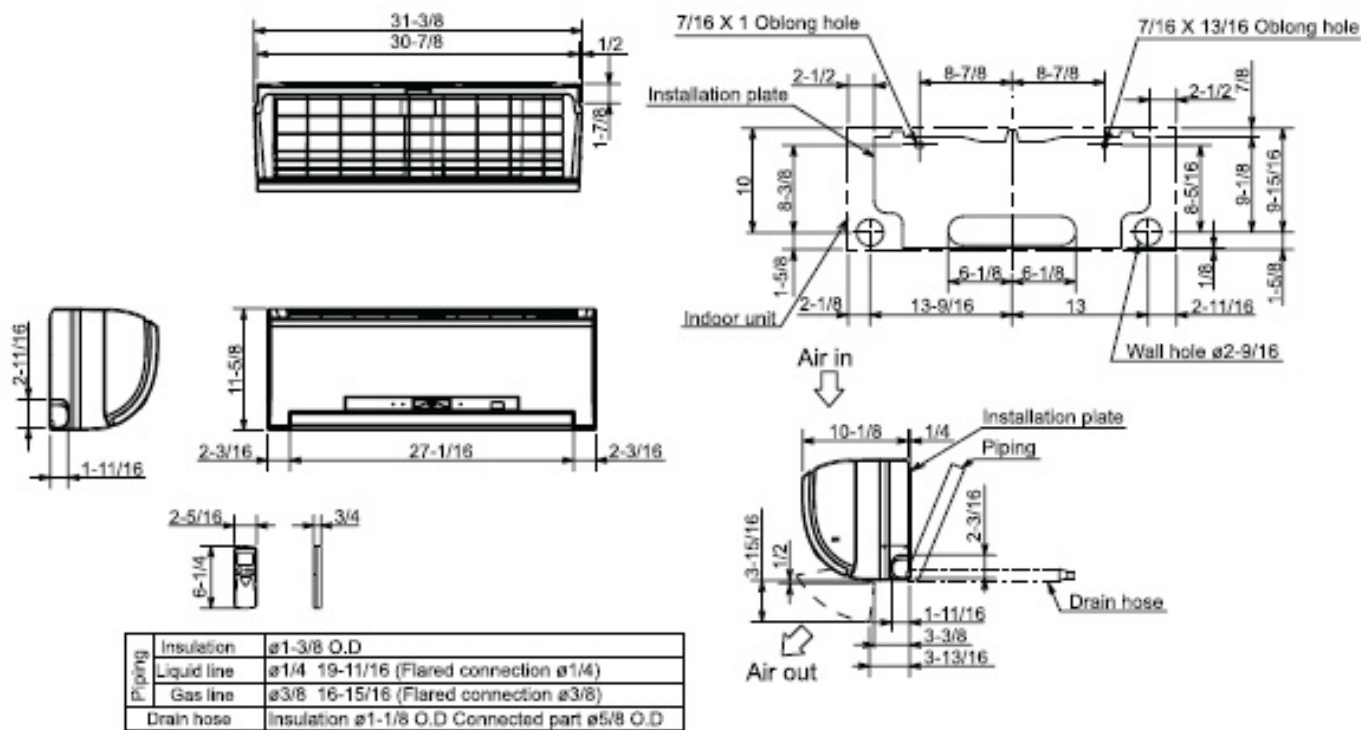


SLZ and PLA-A12,18,24BA4



DIMENSIONS: MSZ-FE09NA-8

Unit: inch



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SUBMITTAL DATA: MSZ-GE06NA-8 6,000 BTU/H WALL-MOUNTED INDOOR UNIT FOR MXZ-B MULTI-ZONE HEAT-PUMP SYSTEMS

Job Name:	Location:	Date:
Purchaser:	Engineer:	
Submitted to:	For <input type="checkbox"/> Reference <input type="checkbox"/> Approval <input type="checkbox"/> Construction	
System Designation:	Schedule No.:	

GENERAL FEATURES

- Wall-mounted indoor unit
- Standard Hybrid Catechin Prefilter is included with indoor unit
- Quiet operation
- Choice of fan speeds: Quiet, Low, Medium, High, and Super High
Auto fan speed control also included
- Hand-held Wireless Remote Controller
- Indoor unit powered from outdoor unit using A-Control
- Auto restart following a power outage
- Anti-allergy Enzyme Filter
- Limited warranty: five years on parts and defects and seven years on compressors

OPTIONAL ACCESSORIES
Indoor Unit

- ▣ Condensate Pump (230V; SI3100-230)

Controller Options

- ▣ Wireless Remote Controller Kit (MHK1) with Remote Controller (MRCH1), Wireless Receiver (MIFH1), and cable (MRC1)*
- ▣ Setback down to 50°F when used with MRCH1 Remote Controller
- ▣ Portable Central Controller (MCCH1; for use with Wireless Remote Controller Kit MHK1)*
- ▣ Outdoor Air Sensor (MOS1; for use with Remote Controller (MRCH1), Wireless Remote Controller Kit (MHK1) and Portable Central Controller (MCCH1)*

*See Submittal for information on each option.

- ▣ Wall-mounted Wired Remote Controller (PAR-21MAA requires MAC-397IF)
- ▣ MA Contact Terminal Interface (MAC-397IF)
- ▣ M-NET Control Adapter (MAC-399IF)
- ▣ Remote Temperature Sensor (M21-JKO-307)
- ▣ Lockdown Bracket for Hand-held Controller (RCMKP1CB)

Cooling Capacity* 6,000 Btu/h

Heating Capacity* 7,200 Btu/h

*Rating Conditions (Cooling) - Indoor: 80°F (27°C) DB, 67°F (19°C) WB; Outdoor: 95°F (35°C) DB, 75°F (24°C) WB.

(Heating at 47°F) - Indoor: 70°F (21°C) DB, 60°F (16°C) WB; Outdoor: 47°F (8°C) DB, 43°F (6°C) WB.

(For data on specific indoor units [all ducted, all non-ducted, and both ducted and non-ducted] combinations, see the MXZ-B Technical and Service Manual.)

Electrical Requirements

Power Supply 208 / 230V, 1-Phase, 60 Hz

MCA 1 A



Indoor Unit: MSZ-GE06NA-8

Voltage

Indoor - Outdoor S1-S2 AC 208 / 230V

Indoor - Outdoor S2-S3 DC 12-24V

Fan Motor 0.76 F.L.A.

Airflow (Quiet - Lo - Med - Hi - Super Hi)

Cooling 145 - 170 - 237 - 321 - 399 Dry CFM

109 - 134 - 201 - 286 - 364 Wet CFM

Heating 145 - 170 - 233 - 321 - 406 CFM

Sound Pressure Level (Quiet - Lo - Med - Hi - Super Hi)

Cooling 19 - 22 - 30 - 37 - 43 dB(A)

Heating 19 - 22 - 30 - 37 - 43 dB(A)

DIMENSIONS	UNIT INCHES / MM
W	31-7/16 / 799
D	9-1/8 / 232
H	11-5/8 / 295

Weight 22 lbs. / 10 kg

External Finish Munsell No. 1.0Y 9.2 / 0.2

Field Drainpipe Size O.D. 5/8" / 15.88 mm

Refrigerant Type R410A

Refrigerant Pipe Size O.D.

Gas Side 3/8" / 9.52 mm

Liquid Side 1/4" / 6.35 mm

Connection Method Flared

MXZ-B SERIES HEAT-PUMP OUTDOOR UNITS
MXZ-B MULTI-ZONE SYSTEMS CAN INCLUDE:

- Ducted Indoor Units:
SEZ-KD09, 12, 15, 18NA4, PEAD-A24AA4
- Nonducted Indoor Units: 4
MSZ-GE06, 09, 12, 15, 18NA-8, 24NA,
MSZ-FE09, 12NA-8, 18NA, MFZ-KA09, 12, 18NA,
PCA-A24KA4, SLZ-KA09, 12, 15NA, and
PLA-A12, 18, 24BA4
- A combination of both Ducted and Nonducted Indoor Units

Refer to the separate submittal forms for the MSZ-GE, MSZ-FE, MFZ-KA, SEZ-KD, SLZ-KA, PEAD, PCA, PLA Indoor Units, and MXZ Outdoor Units.



MSZ-GE



SEZ and PEAD-A24AA4



MULTI-ZONE OUTDOOR UNIT



MSZ-FE



MFZ-KA



PCA-A24KA4

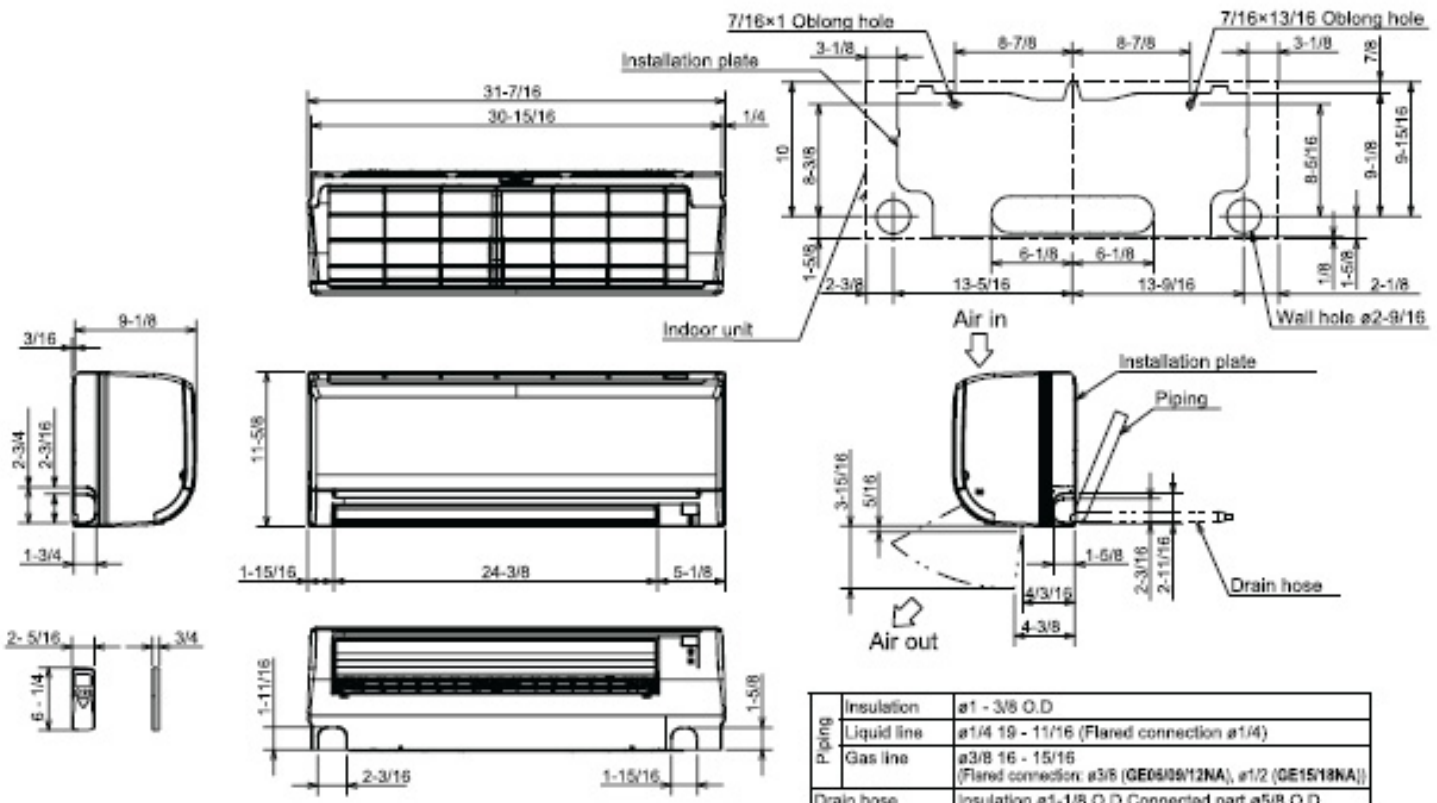


SLZ and PLA-A12, 18, 24BA4



DIMENSIONS: MSZ-GE06NA-8

Unit: inch



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Specifications are subject to change without notice.

SUBMITTAL DATA: MXZ-2B20NA-1 MULTI-INDOOR INVERTER HEAT-PUMP SYSTEM

Job Name:	Location:	Date:
Purchaser:	Engineer:	
Submitted to:	For <input type="checkbox"/> Reference <input type="checkbox"/> Approval <input type="checkbox"/> Construction	
System Designation:	Schedule No.:	

GENERAL FEATURES

- Compact side discharge outdoor unit
- Wireless or wired remote controller, depending on the indoor units used
- Quiet operation—both indoor and outdoor units
- Automatic fan speed control
- Auto restart following a power outage
- Self-check function—integrated diagnostics
- Advanced microprocessor control
- Limited warranty: five years on parts and defects and seven years on compressors



Outdoor Unit: MXZ-2B20NA-1

OPTIONAL OUTDOOR UNIT ACCESSORIES

- Air Outlet Guide (MAC-889SG)
- 3/8" x 1/2" Port Adapter (MAC-A454JP; for use with 15,000 Btu/h Indoor units)

Cooling*

Rated Capacity (Non-ducted/Ducted) . . . 18,000 Btu/h / 20,000 Btu/h
 Minimum Capacity (Non-ducted/Ducted) . . . 7,800 Btu/h / 7,800 Btu/h
 Total Input (Non-ducted/Ducted) 1,440 W / 2,190 W

Heating at 47°F*

Rated Capacity (Non-ducted/Ducted) . . . 22,000 Btu/h / 22,000 Btu/h
 Minimum Capacity (Non-ducted/Ducted) . . . 8,500 Btu/h / 8,500 Btu/h
 Total Input (Non-ducted/Ducted) 1,650 W / 1,780 W

Heating at 17°F*

Rated Capacity (Non-ducted/Ducted) . . . 12,500 Btu/h / 12,500 Btu/h
 Total Input (Non-ducted/Ducted) 1,350 W / 1,430 W

* Rating Conditions (Cooling) - Indoor: 80°F (27°C) DB / 67°F (19°C) WB, Outdoor: 95°F (35°C) DB / 75°F (24°C) WB.
 (Heating) - Indoor: 70°F (21°C) DB / 60°F (16°C) WB, Outdoor: 47°F (8°C) DB / 43°F (6°C) WB.
 (Heating at 17°F) - Indoor: 70°F (21°C) DB / 60°F (16°C) WB, Outdoor: 17°F (-8°C) DB / 15°F (-9°C) WB.

(For data on specific indoor units [all ducted, all non-ducted, and both ducted and non-ducted] combinations, see the Technical and Service Manuals.)

Electrical Requirements

Power Supply 208 / 230V, 1-Phase, 60 Hz
 Recommended Fuse/Breaker Size 20 A
 MCA 15 A

Voltage

Indoor - Outdoor S1-S2 AC 208 / 230V
 Indoor - Outdoor S2-S3 DC 12 - 24V

OPERATING RANGE

		Indoor Intake Air Temp.		Outdoor Intake Air Temp.
Cooling	Maximum	95°F (35°C) DB, 71°F (22°C) WB	115°F (46°C) DB	
	Minimum	67°F (19°C) DB, 57°F (14°C) WB	14°F (-10°C) DB	
Heating	Maximum	80°F (27°C) DB, 67°F (19°C) WB	75°F (24°C) DB, 65°F (18°C) WB	
	Minimum	70°F (21°C) DB, 60°F (16°C) WB	6°F (-14°C) DB, 5°F (-15°C) WB	

Compressor DC Inverter-driven Twin Rotary
 Fan Motor 0.96 F.L.A.

Sound Pressure Level

Cooling (Non-ducted/Ducted) 49 dB(A)
 Heating (Non-ducted/Ducted) 51 dB(A)

DIMENSIONS		INCHES / MM
W	33-1/16 / 840	
D	13 / 330	
H	27-15/16 / 710	

Weight 130 lbs. / 59 kg
 External Finish Munsell No. 3Y 7.8 / 1.1
 Refrigerant Type R410A
 Refrigerant Pipe Size O.D. — Two Ports
 Gas Side A, B: 3/8" / 9.52 mm
 Liquid Side 1/4" / 6.35 mm
 Max. Refrigerant Pipe Length 164' / 50 m
 Max. Piping Length for Each Indoor Unit 82' / 25 m
 Max. Refrigerant Pipe Height Difference
 If Indoor Unit is Above Outdoor Unit 49' / 15 m
 If Indoor Unit is Below Outdoor Unit 33' / 10 m
 Connection Method Flared

COMPATIBLE INDOOR UNITS
Horizontal-ducted Indoor Units:

SEZ-KD09,12,15NA4


Ceiling-cassette Indoor Units:

SLZ-KA09,12,15NA


Wall-mounted Indoor Units:

MSZ-GE06,09,12,15NA-8


Floor-standing Indoor Units:

MFZ-KA09,12NA


Wall-mounted Indoor Units:

MSZ-FE09,12NA-8



Refer to the separate submittal forms for the SEZ, SLZ, MSZ, and MFZ Indoor Units.

MXZ-2B20NA-1 ENERGY EFFICIENCIES

Indoor Unit Type	SEER	EER	HSPF	COP @ 47°F	COP @ 17°F
Non-ducted (09 + 09)	18.0	12.5	8.9	3.91	2.71
Ducted and Non-ducted	16.75	10.8	8.7	3.77	2.64
Ducted (09 + 12)	15.5	9.10	8.5	3.62	2.56



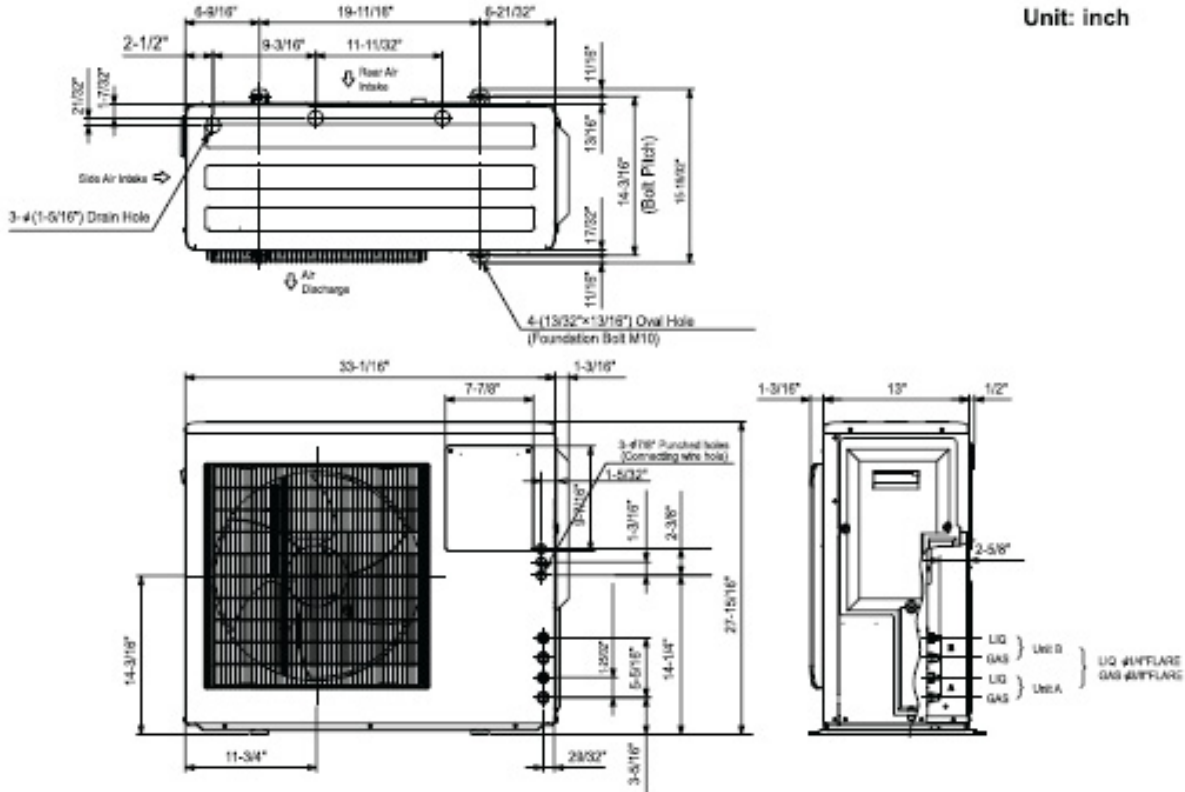
MXZ-2B20NA-1 OPERATION PERFORMANCE

- Minimum of two Indoor Units must be connected to the MXZ-2B20NA-1.
- Minimum installed capacity cannot be less than 12,000 Btu/h.
- System can operate with only one Indoor Unit turned on (see table below for single Indoor Unit performance).
- Indoor Units can be All Non-ducted, All Ducted, or a Combination of Non-ducted and Ducted (Select style as installation requires).
- Information provided at 208/230V. Refer to the MXZ Outdoor Unit Service Manual for detailed specifications and additional information per Indoor Unit Combination.

Operation Performance for Indoor Unit Combinations (Unit A + Unit B)	Cooling Capacity Range (Btu/h)			Power Usage Range (W)
	Heating Capacity Range (Btu/h)			
	Unit A	Unit B	Total Range	
6	6,000	-	5,400 - 9,000	490 - 680
	7,400	-	5,200 - 14,400	480 - 1,400
9	9,000	-	5,400 - 9,000	490 - 750
	10,900 - 11,000	-	5,200 - 15,400	480 - 1,430
12	12,000	-	5,400 - 12,000	490 - 1,010
	13,600	-	5,200 - 16,400	480 - 1,460
15	15,000	-	5,400 - 15,000	490 - 1,560
	18,000	-	5,200 - 21,100	480 - 2,100
6 + 6	6,000	6,000	7,800 - 15,000	510 - 1,820
	7,400	7,400	8,500 - 25,500	520 - 2,410
6 + 9	6,000	9,000	7,800 - 18,000	630 - 1,820
	7,400	10,900 - 11,000	8,500 - 25,500	520 - 2,520
6 + 12	6,000	12,000	7,800 - 20,000	630 - 1,820
	7,400	13,600	8,500 - 25,500	520 - 2,520
6 + 15	5,800	14,200	7,800 - 23,000	630 - 2,230
	6,400	15,600	8,500 - 25,500	520 - 2,520
9 + 9	9,000	9,000	7,800 - 20,000	630 - 1,820
	10,900 - 11,000	10,900 - 11,000	8,500 - 25,500	520 - 2,520
9 + 12	8,500	11,500	7,800 - 23,000	630 - 2,230
	9,500	12,500	8,500 - 25,500	520 - 2,520
9 + 15	7,500	12,500	7,800 - 23,000	630 - 2,230
	8,250	13,750	8,500 - 25,500	520 - 2,520
12 + 12	10,000	10,000	7,800 - 23,000	630 - 2,230
	11,000	11,000	8,500 - 25,500	520 - 2,520

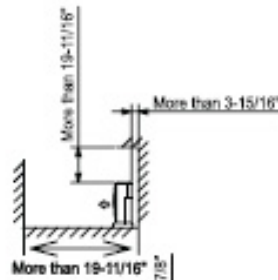
DIMENSIONS: MXZ-2B20NA-1

Unit: inch

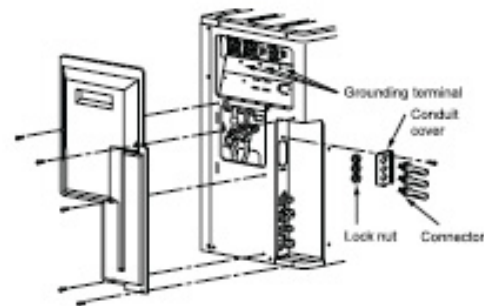
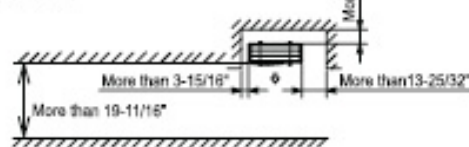


1. Installation space

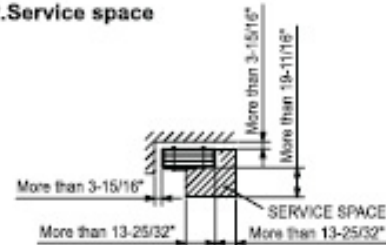
Note: Leave both sides free of obstruction.



Note: Leave overhead free of obstruction.



2. Service space

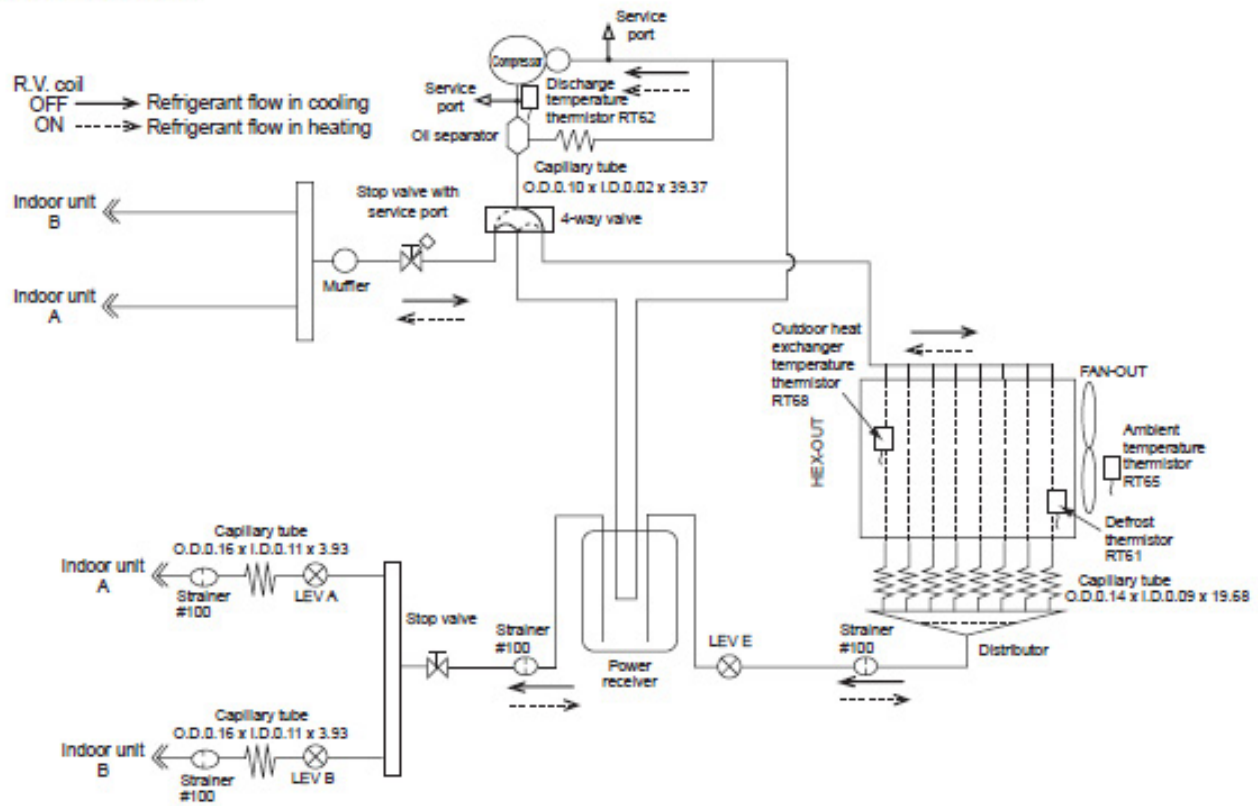


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Specifications are subject to change without notice.

MXZ-2B20NA

Unit: inch



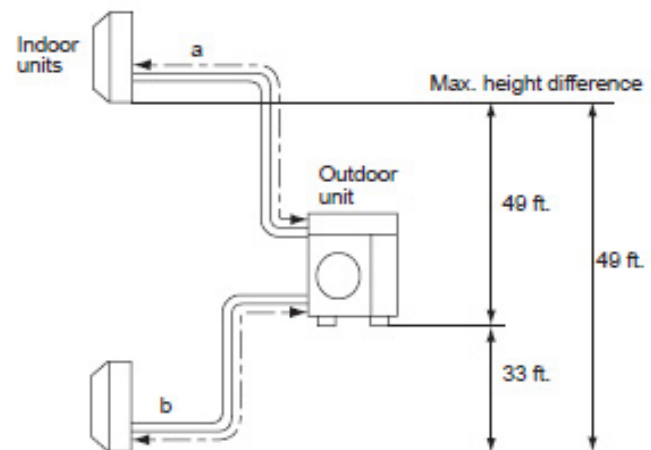
Operating Range MXZ-2B20NA

		Indoor intake air temperature	Outdoor intake air temperature
Cooling	Maximum	95°FDB, 71°FWB	115°FDB
	Minimum	67°FDB, 57°FWB	14°FDB
Heating	Maximum	80°FDB, 67°FWB	75°FDB, 65°FWB
	Minimum	70°FDB, 60°FWB	6°FDB, 5°FWB

MAX. REFRIGERANT PIPING LENGTH & PIPE SIZE SELECTION MXZ-2B20NA

Piping length each indoor unit (a, b)	82 ft. MAX.
Total piping length (a+b)	164 ft. MAX.
Bending point for each unit	25 MAX.
Total bending point	50 MAX.

*It is irrelevant which unit is higher.



- Refrigerant pipe diameter is different according to indoor unit to be connected. When using extension pipes, refer to the tables below.
- When the diameter of refrigerant pipe is different from that of outdoor unit union, use optional Different-diameter pipe. For further information on Different-diameter pipe, see the appropriate parts catalog, Optional parts "DIFFERENT DIAMETER PIPE"(2-1.).

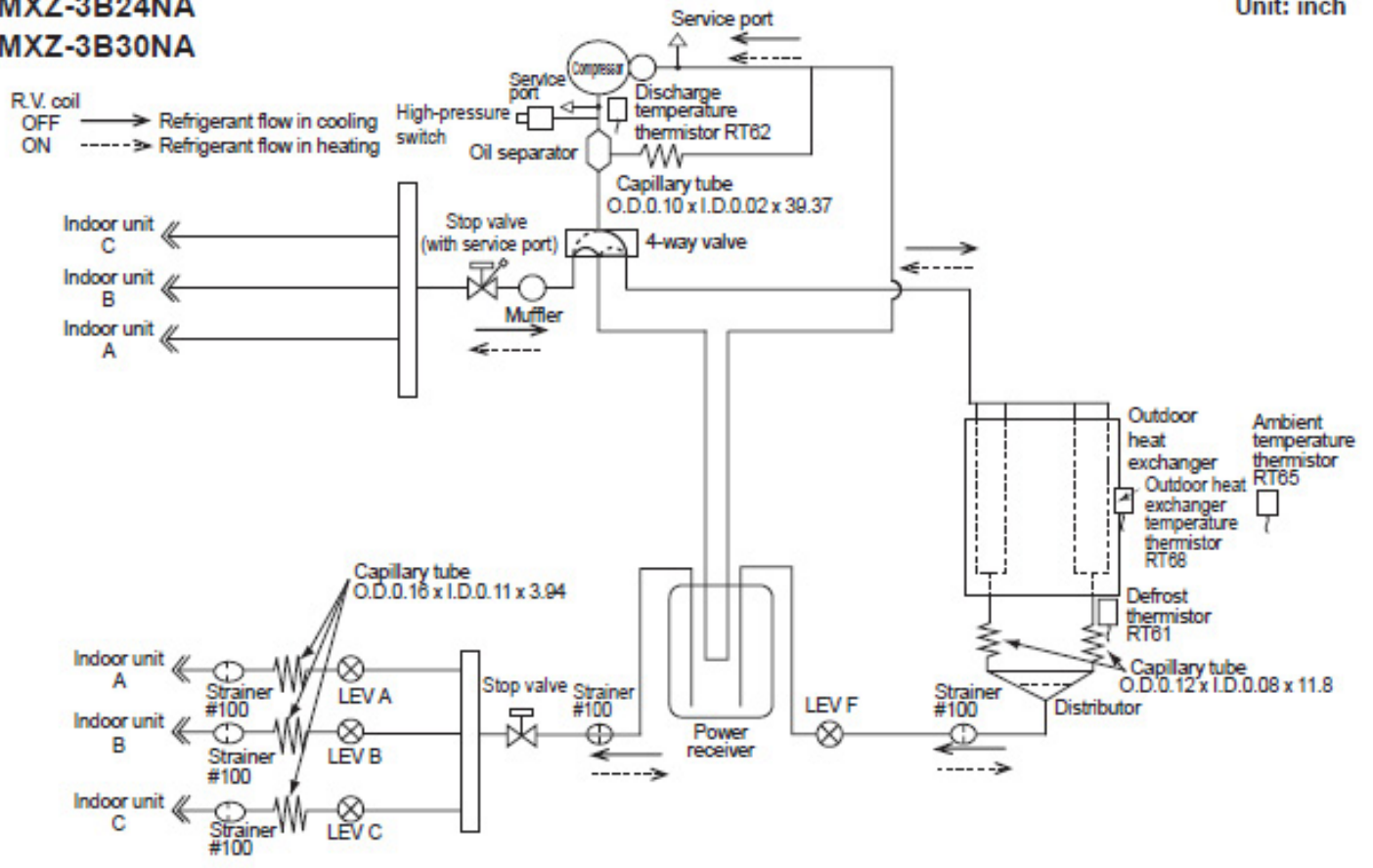
Unit: inch

Indoor unit class	Extension pipe diameter	
09 or less	Liquid	1/4
	Gas	3/8
12	Liquid	1/4
	Gas	3/8
15	Liquid	1/4
	Gas	1/2

Outdoor unit union diameter		
For		
Indoor unit A	Liquid	1/4
	Gas	3/8
Indoor unit B	Liquid	1/4
	Gas	3/8

MXZ-3B24NA
MXZ-3B30NA

Unit: inch



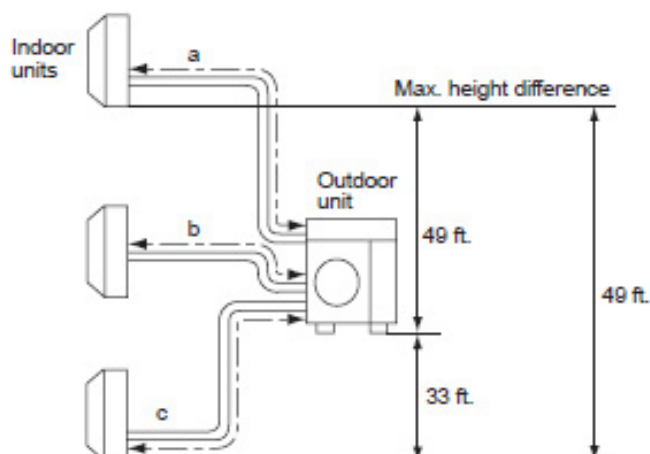
Operating Range MXZ-3B24NA MXZ-3B30NA

		Indoor intake air temperature	Outdoor intake air temperature
Cooling	Maximum	95°FDB, 71°FWB	115°FDB
	Minimum	67°FDB, 57°FWB	14°FDB
Heating	Maximum	80°FDB, 67°FWB	75°FDB, 65°FWB
	Minimum	70°FDB, 60°FWB	6°FDB, 5°FWB

MAX. REFRIGERANT PIPING LENGTH & PIPE SIZE SELECTION MXZ-3B24NA MXZ-3B30NA

Piping length each indoor unit (a, b, c)	82 ft. MAX.
Total piping length (a+b+c)	230 ft. MAX.
Bending point for each unit	25 MAX.
Total bending point	70 MAX.

※It is irrelevant which unit is higher.



- Refrigerant pipe diameter is different according to indoor unit to be connected. When using extension pipes, refer to the tables below.
- When the diameter of refrigerant pipe is different from that of outdoor unit union, use optional Different-diameter pipe. For further information on Different-diameter pipe, see the appropriate parts catalog, Optional parts "DIFFERENT DIAMETER PIPE"(2-1.).

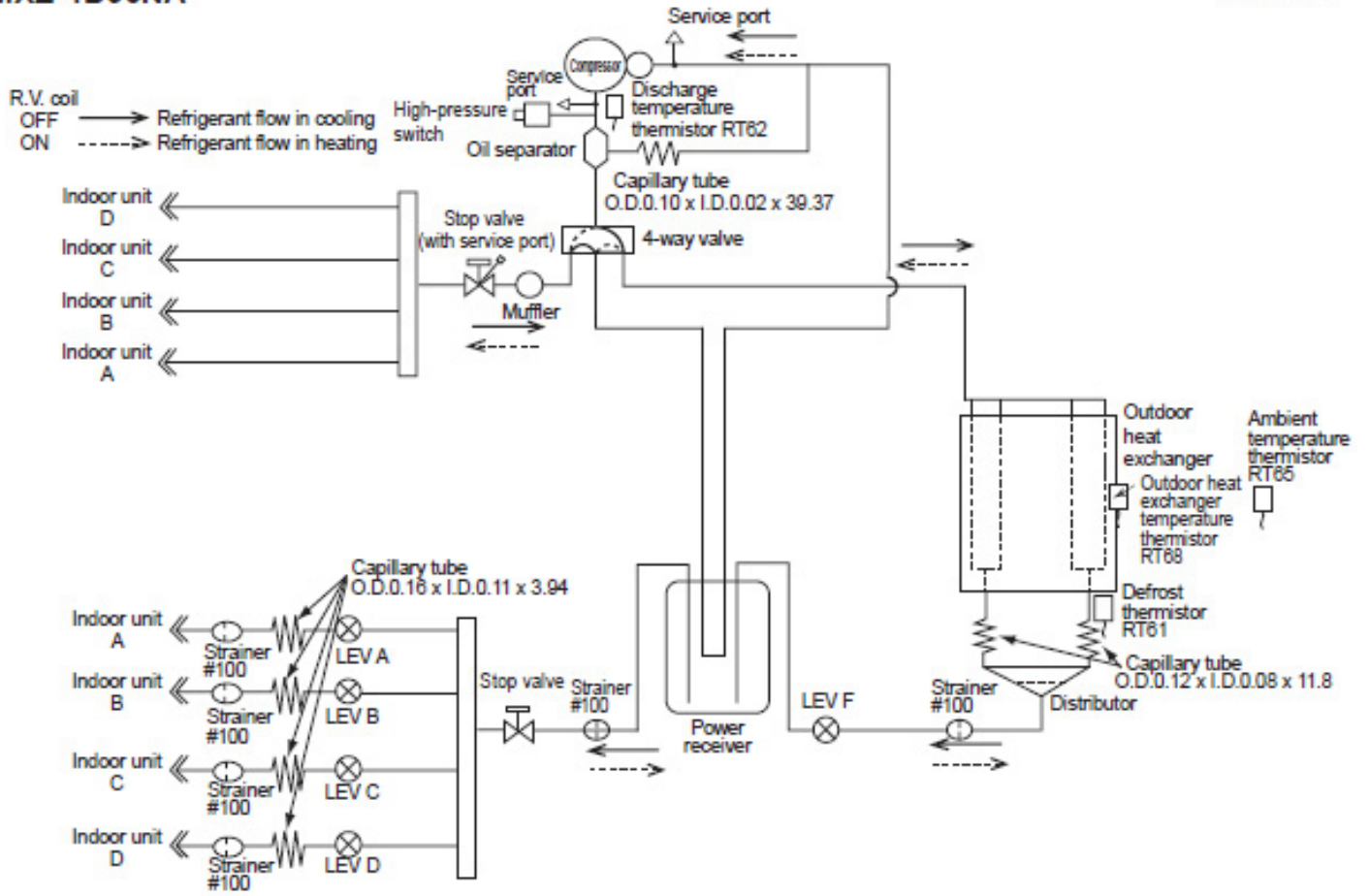
Unit : inch

Indoor unit class	Extension pipe diameter	
09 or less	Liquid	1/4
	Gas	3/8
12	Liquid	1/4
	Gas	3/8
15	Liquid	1/4
	Gas	1/2
17	Liquid	1/4
	Gas	1/2
18	Liquid	1/4
	Gas	1/2
24 (MXZ-3B30NA only)	Liquid	1/4
	Gas	5/8

Outdoor unit union diameter		
For		
Indoor unit A	Liquid	1/4
	Gas	1/2
Indoor unit B	Liquid	1/4
	Gas	3/8
Indoor unit C	Liquid	1/4
	Gas	3/8

MXZ-4B36NA

Unit: inch



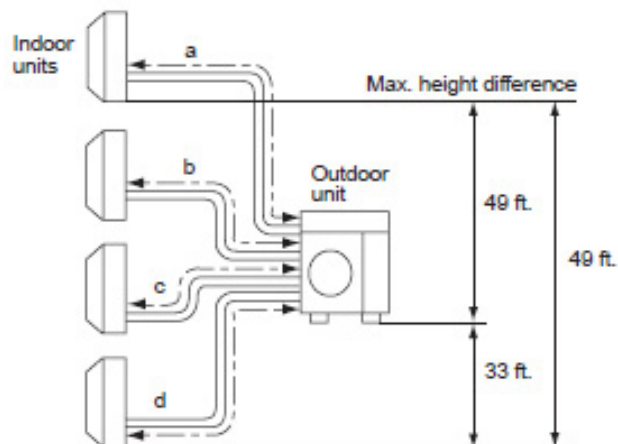
Operating Range MXZ-4B36NA

		Indoor intake air temperature	Outdoor intake air temperature
Cooling	Maximum	95°FDB, 71°FWB	115°FDB
	Minimum	67°FDB, 57°FWB	14°FDB
Heating	Maximum	80°FDB, 67°FWB	75°FDB, 65°FWB
	Minimum	70°FDB, 60°FWB	6°FDB, 5°FWB

MAX. REFRIGERANT PIPING LENGTH & PIPE SIZE SELECTION MXZ-4B36NA

Piping length each indoor unit (a, b, c, d)	82 ft. MAX.
Total piping length (a+b+c+d)	230 ft. MAX.
Bending point for each unit	25 MAX.
Total bending point	70 MAX.

*It is irrelevant which unit is higher.



- Refrigerant pipe diameter is different according to indoor unit to be connected. When using extension pipes, refer to the tables below.
- When the diameter of refrigerant pipe is different from that of outdoor unit union, use optional Different-diameter pipe. For further information on Different-diameter pipe, see the appropriate parts catalog, Optional parts "DIFFERENT DIAMETER PIPE"(2-1.).

Unit : inch

Indoor unit class	Extension pipe diameter	
	09 or less	Liquid
Gas		3/8
12	Liquid	1/4
	Gas	3/8
15	Liquid	1/4
	Gas	1/2
17	Liquid	1/4
	Gas	1/2
18	Liquid	1/4
	Gas	1/2
24	Liquid	1/4
	Gas	5/8

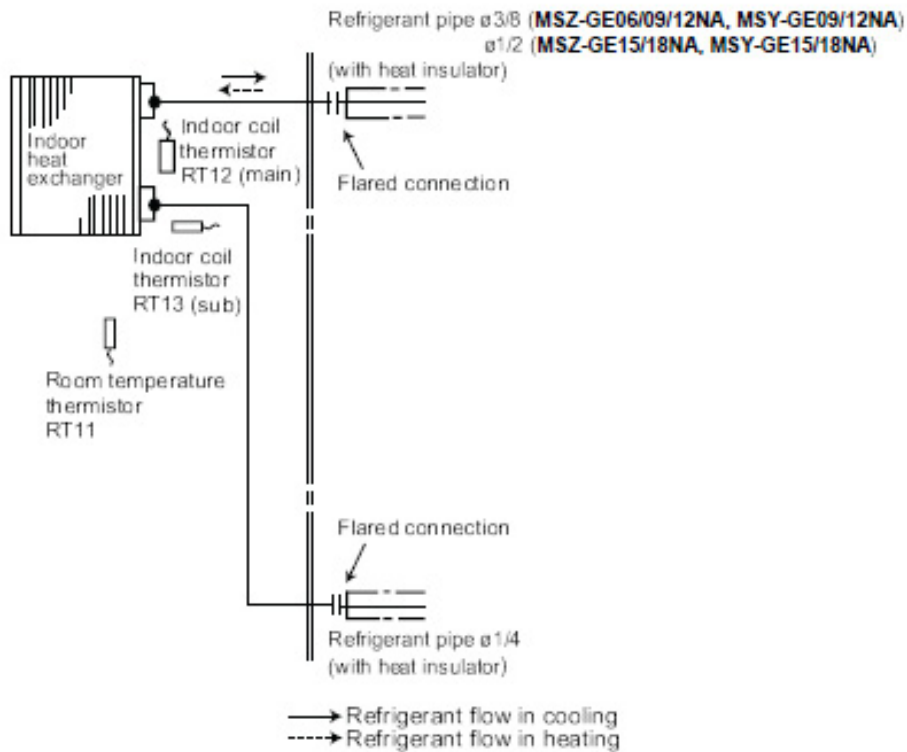
Outdoor unit union diameter		
For		
Indoor unit A	Liquid	1/4
	Gas	1/2
Indoor unit B	Liquid	1/4
	Gas	3/8
Indoor unit C	Liquid	1/4
	Gas	3/8
Indoor unit D	Liquid	1/4
	Gas	3/8

6

REFRIGERANT SYSTEM DIAGRAM

MSZ-GE06NA MSZ-GE09NA MSZ-GE12NA MSZ-GE15NA MSZ-GE18NA
MSY-GE09NA MSY-GE12NA MSY-GE15NA MSY-GE18NA

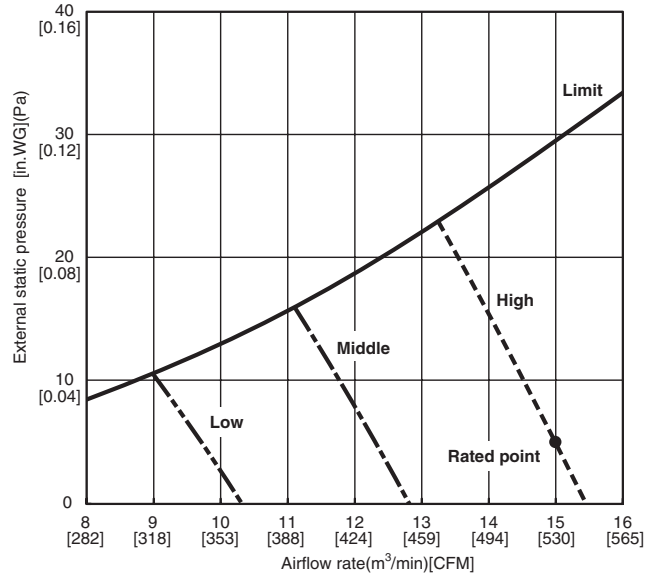
Unit: inch



SEZ-KD15NA INDOOR FAN PERFORMANCE AND CORRECTED AIR FLOW CHARTS

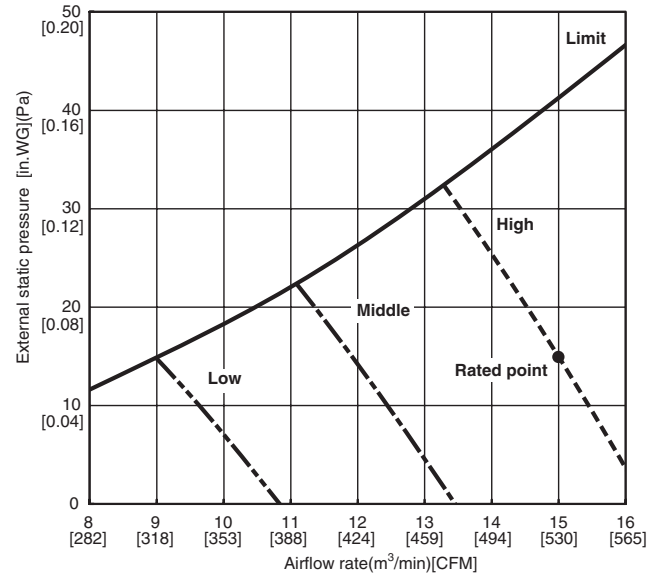
SEZ-KD15NA

(External static pressure 0.02[in.WG](5Pa)) 208/230V 60Hz



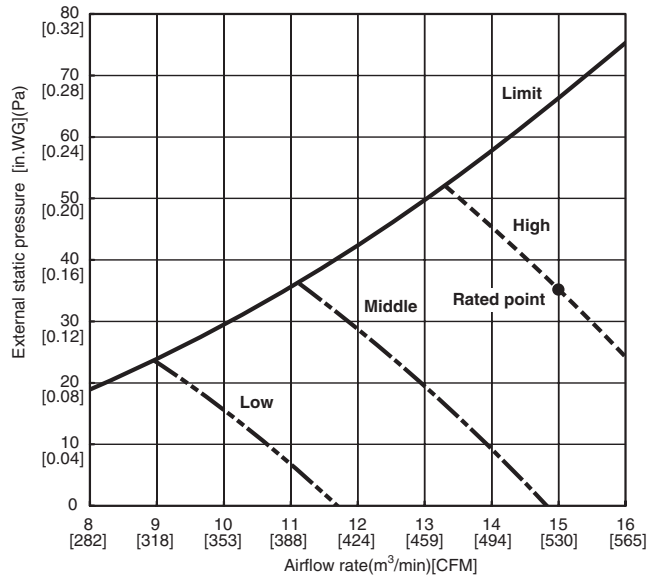
SEZ-KD15NA

(External static pressure 0.06[in.WG](15Pa)) 208/230V 60Hz



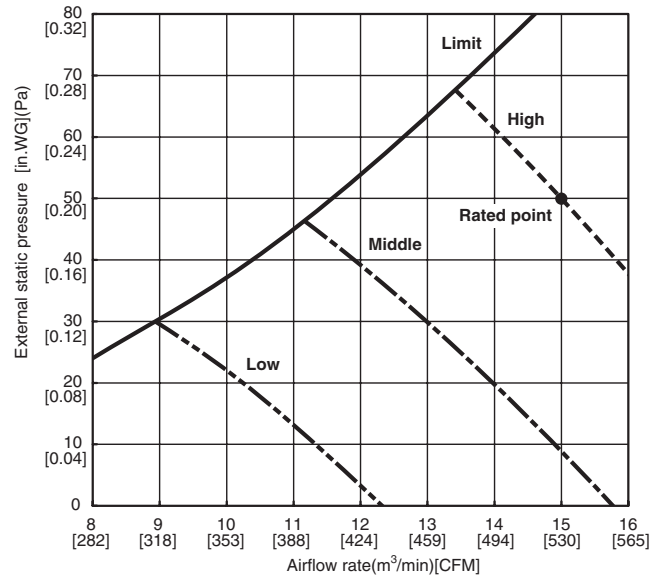
SEZ-KD15NA

(External static pressure 0.14[in.WG](35Pa)) 208/230V 60Hz



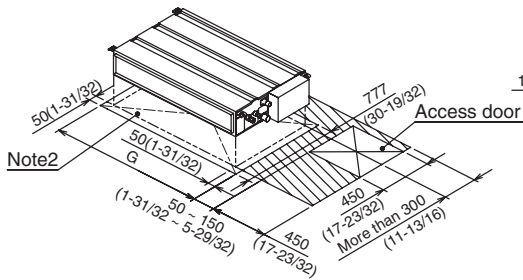
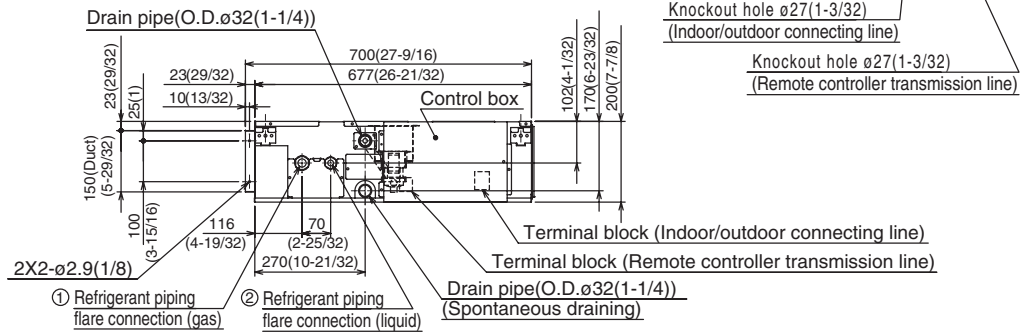
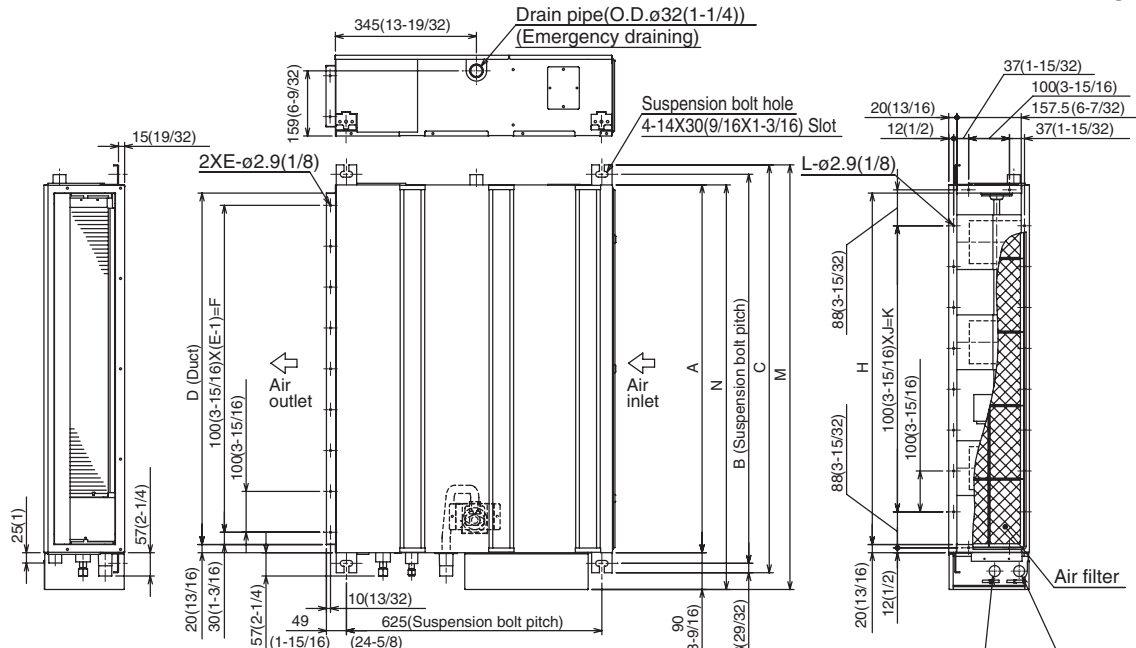
SEZ-KD15NA

(External static pressure 0.20[in.WG](50Pa)) 208/230V 60Hz

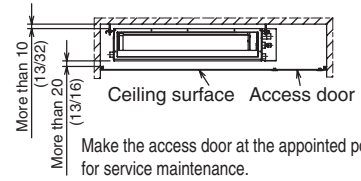
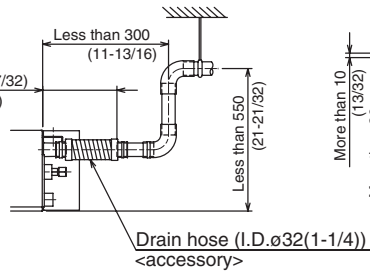


DIMENSIONS: SEZ-KD15NA

Unit : mm(in.)



Required space for service and maintenance



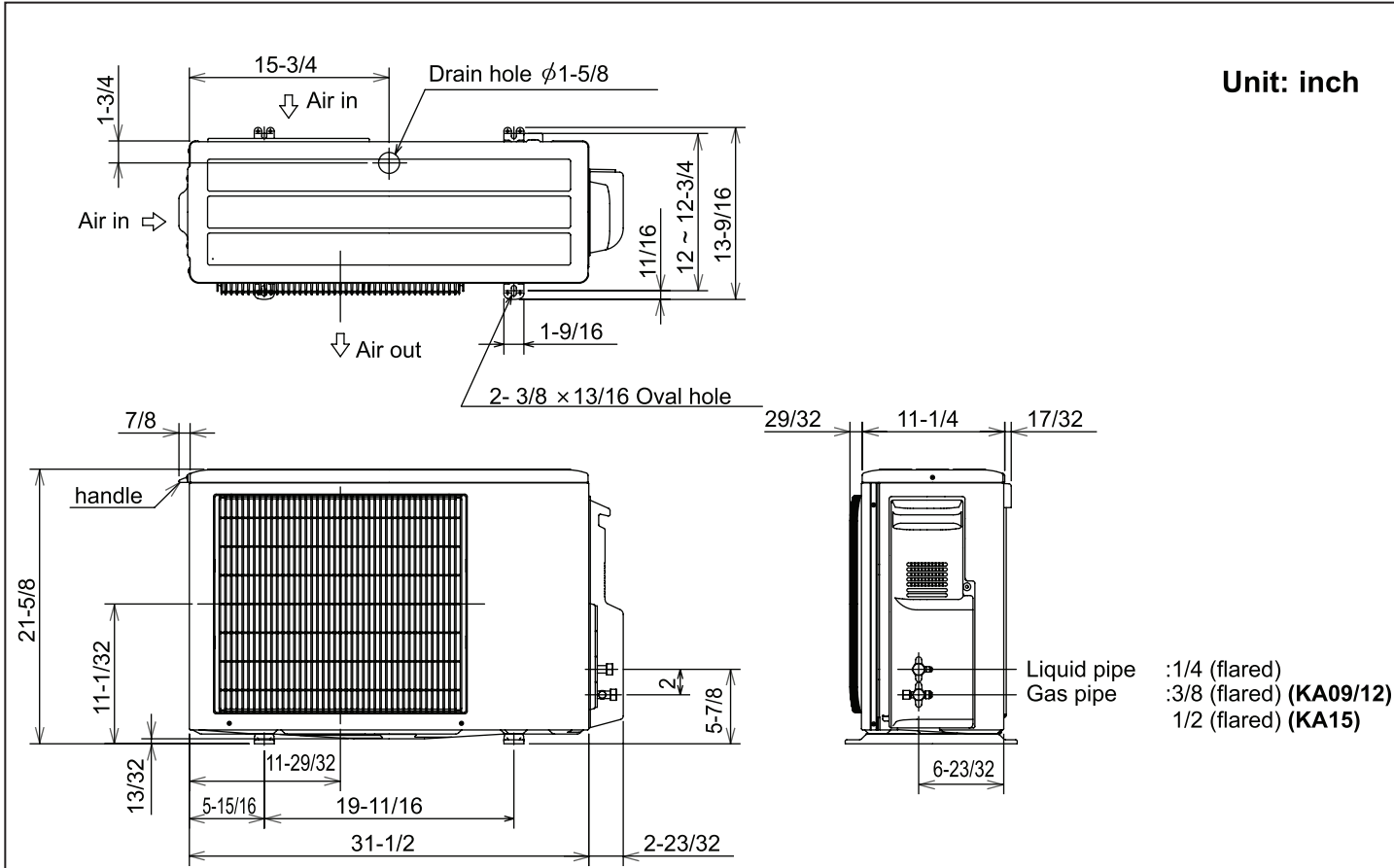
mm(in.)

Model	A	B	C	D	E	F	G	H	J	K	L	M	N	① Gas pipe	② Liquid pipe
SEZ-KD09NA	700 (27-9/16)	752 (29-5/8)	798 (31-7/16)	660 (26)	7	600 (23-5/8)	800 (31-7/16)	660 (26)	5	500 (19-11/16)	16	839 (33-1/16)	790 (31-1/8)	ø9.52(3/8)	ø6.35(1/4)
SEZ-KD12NA	900 (35-7/16)	952 (37-1/2)	998 (39-5/16)	860 (33-7/8)	9	800 (31-1/2)	1000 (39-3/8)	860 (33-7/8)	7	700 (27-9/16)	20	1039 (40-29/32)	990 (39)		
SEZ-KD15NA	1100 (43-5/16)	1152 (45-3/8)	1198 (47-3/16)	1060 (41-3/4)	11	1000 (39-3/8)	1200 (47-1/4)	1060 (41-3/4)	9	900 (35-7/16)	24	1239 (48-25/32)	1190 (46-7/8)		

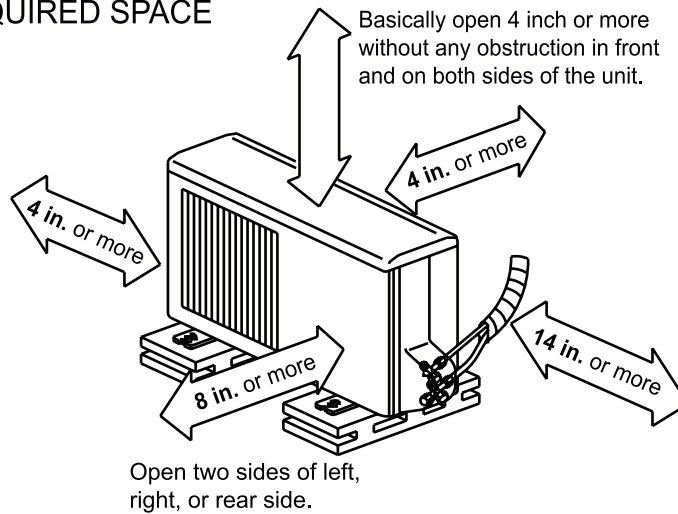
- Note1. Use M10 screw for the suspension bolt (field supply).
- 2. Keep the service space for the maintenance at the bottom.
- 3. This chart indicates for SEZ-KD15NA model, which has 3 fans.
SEZ-KD09, 12NA models have 2 fans.
SEZ-KD18NA models have 4 fans.
- 4. In case an inlet duct is used, remove the air filter (supply with the unit), then install the filter (field supply) at suction side.

DIMENSIONS: SUZ-KA15NA

Unit: inch



REQUIRED SPACE



HVAC Advanced Products Division

3400 Lawrenceville Suwanee Rd
 Suwanee, GA 30024

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Toll Free: 800-433-4822 (#3)

www.mehvac.com

Specifications are subject to change without notice.

*Delta T 90
HVAC Load Calculations*

for



RHVAC RESIDENTIAL
HVAC LOADS

Prepared By:

Brian Sager
ARC Mechanical Contractors, Inc.
229 Depot Street
Bradford, VT 05033
802-222-9255
Tuesday, August 06, 2013

Rhvac is an ACCA approved Manual J and Manual D computer program.
Calculations are performed per ACCA Manual J 8th Edition, Version 2, and ACCA Manual D.



Project Report

General Project Information

Project Title: Delta T 90
 Designed By: Brian Sager
 Project Date: Tuesday, February 07, 2012
 Company Name: ARC Mechanical Contractors, Inc.
 Company Representative: Brian Sager
 Company Address: 229 Depot Street
 Company City: Bradford, VT 05033
 Company Phone: 802-222-9255
 Company Fax: 802-222-5111
 Company E-Mail Address: bsager@arcmech.com
 Company Website: www.arcmech.com

Design Data

Reference City: Barre, Vermont
 Building Orientation: Front door faces North
 Daily Temperature Range: Medium
 Latitude: 44 Degrees
 Elevation: 600 ft.
 Altitude Factor: 0.979

	Outdoor Dry Bulb	Outdoor Wet Bulb	Outdoor Rel.Hum	Indoor Rel.Hum	Indoor Dry Bulb	Grains Difference
Winter:	-11	-11.42	n/a	n/a	72	n/a
Summer:	86	69	43%	50%	75	15

Check Figures

Total Building Supply CFM:	142	CFM Per Square ft.:	0.152
Square ft. of Room Area:	936	Square ft. Per Ton:	3,794
Volume (ft ³) of Cond. Space:	8,267		

Building Loads

Total Heating Required Including Ventilation Air:	11,081 Btuh	11.081 MBH
Total Sensible Gain:	2,135 Btuh	72 %
Total Latent Gain:	825 Btuh	28 %
Total Cooling Required Including Ventilation Air:	2,960 Btuh	0.25 Tons (Based On Sensible + Latent)

Notes

Rhvac is an ACCA approved Manual J and Manual D computer program.
 Calculations are performed per ACCA Manual J 8th Edition, Version 2, and ACCA Manual D.
 All computed results are estimates as building use and weather may vary.
 Be sure to select a unit that meets both sensible and latent loads according to the manufacturer's performance data at your design conditions.



Total Building Summary Loads

Component Description	Area Quan	Sen Loss	Lat Gain	Sen Gain	Total Gain
1G-hf-f: Glazing-Triple pane, fixed sash, heat-absorbing, insulated fiberglass frame, u-value 0.085, SHGC 0.3	152	1,073	0	1,006	1,006
11P: Door-Metal - Polyurethane Core	53.3	376	0	100	100
14B1-13.25s: Wall-structural insulated panel (SIP), R - 3.85 per inch EPS core, stucco or wood siding, interior finish, 13.25 inch R-49.02 SIP panels	1119.6	2,044	0	163	163
18B1-59c: Roof/Ceiling-Roof Joists Between Roof Deck and Ceiling or Foam Encapsulated Roof Joists, Spray Foam Insulation, White or Light Color Asphalt Shingle, Any Wood Shake, Dark or Medium Color Tile, Slate or Concrete, Light or Unpainted Metal, Light or Silver Membrane, Light Tar and Gravel, R-59 closed cell 2 lb. spray foam, 9.5 inches in 2 x 10 joist cavity, 1 inch on joist	936.2	1,321	0	207	207
20R1-31cp: Floor-Over open crawl space or garage, Radiant, spray foam insulation, R-31 closed cell 2 lb. spray foam insulation, 5 inches in 2 x 10 joist cavity, any cover	789.6	2,217	0	123	123
Subtotals for structure:		7,031	0	1,599	1,599
People:	0		0	0	0
Equipment:			0	0	0
Lighting:	0			0	0
Ductwork:		0	0	0	0
Infiltration: Winter CFM: 41, Summer CFM: 41		3,693	419	489	908
Ventilation: Winter CFM: 40, Summer CFM: 40		357	406	47	453
Exhaust: Winter CFM: 40, Summer CFM: 40					
Total Building Load Totals:		11,081	825	2,135	2,960

Check Figures

Total Building Supply CFM:	142	CFM Per Square ft.:	0.152
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Notes

Rhvac is an ACCA approved Manual J and Manual D computer program. Calculations are performed per ACCA Manual J 8th Edition, Version 2, and ACCA Manual D. All computed results are estimates as building use and weather may vary. Be sure to select a unit that meets both sensible and latent loads according to the manufacturer's performance data at your design conditions.



BIONAIRE SMALL SPACE MINI DEHUMIDIFIER

Model: BDQ01-UC

Location: Bathroom

Dimensions:

Depth: 6 1/2"

Height: 17 11/16"

Width: 9 13/16"

Available: Global Industrial

Price: \$42.95



Bonaire® Small Space Mini Dehumidifier BDQ01-UC

Availability: Usually ships same day

Stock No: WBB462657

Like 2



Price: \$42.95

Chat with a Salesperson

Add this item to your list



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Qty:

ADD TO CART



Product Specifications

CONSTRUCTION	Plastic
DEPTH INCHES	6-1/2
HEIGHT INCHES	17-11/16
VOLTS	12
WEIGHT LBS	5
WIDTH INCHES	9-13/16
AMPS	5
LIMITED WARRANTY YEARS	2
APPROVAL	cETLus Listed
DECIBELS	45
CORD TYPE	Standard UL Plug
CORD LENGTH FEET	6
GIFT ITEM	Yes
BRAND	Sunbeam by Jarden Consumer Solutions
COLOR FINISH	Gray/Blue
MANUFACTURER PART NUMBER	BDQ01-UC
WATTS	60



BONAIRE Dehumidifier Model: BDC001-UC

DEHUMIDIFIER SAFETY PLEASE READ AND SAVE THESE IMPORTANT SAFEGUARDS

- When using electrical appliances, basic safety precautions should always be followed to reduce the risk of fire, electric shock, and injury to persons, including the following:
1. Read all instructions before using the appliance.
 2. To avoid fire or shock hazard, plug the appliance directly into a 120V AC electrical outlet.
 3. Keep the cord out of heavy traffic areas. To avoid fire hazard, NEVER put the cord under rugs or near heat registers.
 4. DO NOT place dehumidifier near heat sources such as stoves, radiators, and heaters. Locate your dehumidifier on an inside wall near an electrical outlet. The dehumidifier should be at least 4" away from the wall for best results.
 5. NEVER place dehumidifier in an area where it is accessible to children.
 6. Never place anything over the top when the unit is running.
 7. NEVER drop or insert any object into any openings.
 8. DO NOT operate any appliance with a damaged cord or plug, after the appliance malfunctions, or if it has been dropped or damaged in any manner. Return appliance to manufacturer for examination, electrical or mechanical adjustment, or repair.
 9. Use appliance only for intended household use as described in this manual. Any other use not recommended by the manufacturer may cause fire, electric shock, or injury to persons. The use of attachments not recommended or sold by the manufacturer may cause hazards.
 10. DO NOT use outdoors.
 11. Always place dehumidifier on a firm, flat, level surface.
 12. Dehumidifier should be unplugged when not in use.
 13. NEVER RE-move, or attempt to empty unit while it is operating. Shut off and unplug before cleaning or moving the dehumidifier. Be sure to unplug the appliance by pulling on the plug and not the cord.
 14. NEVER use detergents, gasoline, glass cleaner, furniture polish, paint thinner, or other household solvents to clean any part of the dehumidifier.

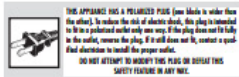


Instruction Leaflet

If after having read this leaflet, you have any questions or comments on your dehumidifier, call 1-800-253-2764 in North America, Tel: 3266-000-000

15. DO NOT attempt to repair or adjust any electrical or mechanical functions on this unit. Doing so will void your warranty. The inside of this dehumidifier contains no serviceable parts. All servicing should be performed by qualified personnel only.
16. Never place housing under water flow or immerse in liquids.
17. Do not plug in the cord with wet hands: electric shock could result.
18. NEVER operate the dehumidifier without the water reservoir in place.
19. Use both hands when carrying the water reservoir.

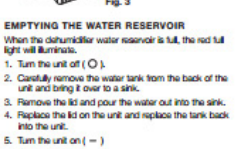
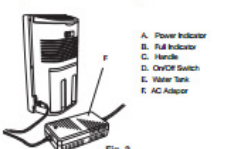
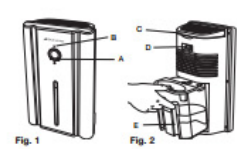
PLEASE SAVE THESE INSTRUCTIONS



THIS APPLIANCE HAS A POWERED PART (see label in water tank area). It is not to be used as a power tool. Do not use it to drill, saw, cut, or sand. It is not to be used to cut, sand, or drill. It is not to be used to cut, sand, or drill. It is not to be used to cut, sand, or drill.

HOW YOUR DEHUMIDIFIER WORKS
Your Bonaire mini dehumidifier draws moisture out of the air via a perforated disc. A paddle device operates by running an electric current across a heat pump making the surface cold. Moisture is then collected through condensation. Because no compressor is used, this unit is ultra quiet and is designed for small spaces including wardrobe closets and under the sink.

- #### OPERATING INSTRUCTIONS
1. Select a location for your dehumidifier, on a flat level surface.
 2. Plug the adapter into the back of the unit.
 3. Plug the other end of the adapter into a 120V AC electrical outlet.
 4. To turn the unit on simply press the (+) located on the back of the unit. A green light will appear on the front of the unit.
 5. To turn the unit off press the (-) located on the back of the unit.
 6. When the tank is full the unit will automatically turn off. A red light will appear on the front of the unit.



- #### EMPTYING THE WATER RESERVOIR
- When the dehumidifier water reservoir is full, the red full light will illuminate.
1. Turn the unit off (-).
 2. Carefully remove the water tank from the back of the unit and bring it over to a sink.
 3. Remove the lid and pour the water out into the sink.
 4. Replace the lid on the unit and replace the tank back into the unit.
 5. Turn the unit on (+).

CLEANING AND MAINTENANCE

1. Turn the dehumidifier off and unplug it from the electrical outlet.
2. Carry the water tank reservoir to a sink or tub and rinse with warm water.
3. Wipe the water tank reservoir and appliance dry with a clean cloth or paper towel.

STORAGE INSTRUCTIONS

At the end of the season, please follow these instructions to properly store your dehumidifier for use next season:

1. Turn the dehumidifier off and unplug it from the electrical outlet.
2. Clean and dry the dehumidifier thoroughly as per the cleaning instructions above.
3. Make sure all parts are dry before storing. Do not store the appliance with any water in the water tank reservoir.
4. Store upright in a cool, dry location.

2 YEAR WARRANTY

Sunbeam Products, Inc. doing business as Jarlan Consumer Solutions or in Canada, Sunbeam Corporation (Canada) Limited doing business as Jarlan Consumer Solutions (collectively "JCS") warrants that for a period of two years from the date of purchase, this product will be free from defects in material and workmanship. JCS, at its option, will repair or replace the product or any component of the product found to be defective during the warranty period. Replacement will be made with a new or manufactured product or component. If the product is no longer available, replacement may be made with a similar product of equal or greater value. This is your exclusive warranty. JCS does not attempt to repair or adjust any electrical or mechanical functions on this product. Doing so will void this warranty. This warranty is valid for the original retail purchaser from the date of initial purchase and is not transferable. Keep the original sales receipt. Proof of purchase is required to obtain warranty performance. JCS dealers, service centers, or retail stores selling JCS products do not have the right to modify, in any way, change the terms and conditions of this warranty.

What are the limits on JCS Liability?

JCS shall not be liable for any incidental or consequential damage caused by the limited warranty, implied or statutory warranty or condition. Except to the extent prohibited by applicable law, any implied warranty or condition of merchantability or fitness for a particular purpose is limited in duration to the duration of the above warranty. JCS disclaims all other warranties, conditions or representations, express, implied, statutory or otherwise. JCS shall not be liable for any damages of any kind resulting from the purchase, use or misuse of, or inability to use the product.

including incidental, special, consequential or similar damages, or loss of profits, or for any breach of contract, fundamental or otherwise, or for any claim brought against purchaser by any other party. Some provinces, states or jurisdictions do not allow the exclusion or limitation of incidental or consequential damages or limitations on how long an implied warranty lasts, so the above limitations or exclusion may not apply to you.

The warranty gives you specific legal rights, and you may also have other rights that vary from province to province, state to state or jurisdiction to jurisdiction.

How to Obtain Warranty Service in the U.S.A.

If you have any questions regarding your product, this warranty, or would like to obtain warranty service please visit our website at www.bonaire.com or call 1-800-253-2764 and a convenient service center address will be provided to you.

In Canada

If you have any questions regarding your product, this warranty, or would like to obtain warranty service please visit our website at www.bonaire.com or call 1-800-253-2764 and a convenient service center address will be provided to you.

In the U.S.A., this warranty is offered by Sunbeam Products, Inc. doing business as Jarlan Consumer Solutions located in Boca Raton, Florida 33431. In Canada, this warranty is offered by Sunbeam Corporation (Canada) Limited doing business as Jarlan Consumer Solutions, located at 20 D'Harbord Street, Brampton, Ontario L6Y 0M1. If you have any other problem or claim in connection with this product, please visit our Consumer Service Department.

PLEASE DO NOT RETURN THIS PRODUCT TO ANY OF THESE ADDRESSES ON THE PLACE OF PURCHASE

If you have any questions regarding your product or would like to learn more about Bonaire products, please contact our Consumer Service Department at 1-800-253-2764 or visit our website at www.bonaire.com.

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Printed in China

BONAIRE Déshumidificateur Modèle BDC001-UC

SECURITE DU DESHUMIDIFICATEUR VEUILLEZ LIRE ET CONSERVER CES MESURES DE SECURITE IMPORTANTES

- Lors de l'usage de tout appareil électrique, des précautions fondamentales doivent être observées pour réduire le risque d'incendie, de choc électrique ou de blessures, y compris celles-ci :
1. Lisez toutes les directives avant d'utiliser l'appareil.
 2. Pour éviter les risques d'incendie ou de choc électrique, branchez l'appareil directement dans une prise électrique CA de 120 V.
 3. Éviter de laisser traîner le cordon dans un endroit accidenté. Pour éviter les risques d'incendie, ÉVITEZ de placer le cordon d'alimentation sous les tapis, près des bouches de feu chaud.
 4. NE placez PAS l'humidificateur près d'une source de chaleur, tels qu'un poêle, un radiateur ou une chaudière. Placez votre déshumidificateur près d'un mur d'intérieur, à proximité d'une prise électrique. L'appareil devrait être à une distance de au moins 10 cm (4 po) du mur pour obtenir les meilleurs résultats.
 5. Ne placez JAMAIS le déshumidificateur à un endroit où les enfants peuvent y avoir accès.
 6. Ne placez JAMAIS d'objet sur la grille pendant que l'appareil fonctionne.
 7. N'ouvrez JAMAIS ou ne laissez JAMAIS tomber un objet dans une des ouvertures de l'appareil.
 8. Évitez d'utiliser l'appareil si sa fiche ou son cordon est endommagé, après un mauvais fonctionnement de l'appareil ou si celui-ci a été schéqué ou endommagé de quelque façon. Retournez l'appareil au fabricant à des fins d'examen, de mise au point électrique ou mécanique ou de réparation.
 9. Ce produit est conçu pour une utilisation domestique seulement telle que décrite dans ce guide. Tout autre usage non recommandé par le fabricant peut causer des risques d'incendie, de choc électrique ou de blessures. L'usage d'accessoires non recommandés ou non vendus par le fabricant peut présenter des dangers.
 10. N'utilisez pas l'appareil à l'extérieur.
 11. Placez toujours le déshumidificateur sur une surface plane, sèche et nivelée.
 12. Le déshumidificateur devrait être débranché lorsqu'il n'est pas en usage.
 13. N'ouvrez, ne déplacez et ne tentez JAMAIS de vérifier l'appareil lorsqu'il est en fonction. Éteignez et débranchez le déshumidificateur avant de le nettoyer ou de le déplacer. Prenez soin de débrancher l'appareil en tirant sur la fiche et non sur le fil.

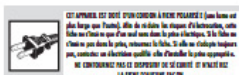


Guide d'utilisation

Lisez les instructions avant d'utiliser l'appareil. Conservez-les pour référence future.

14. N'utilisez JAMAIS des détergents, de l'essence, ou nettoyeur pour vitres, de la colle pour meubles, du blanc pour peinture ou un autre solvant domestique pour nettoyer toute partie de ce déshumidificateur.
15. Ne tentez PAS de réparer ou d'ajuster toute fonction électrique ou mécanique de ce appareil. Des anomalies votre garantie. Ce déshumidificateur ne contient aucune pièce réparables. Toute réparation devrait être confiée à un technicien qualifié.
16. Ne jamais placez la baffle sous l'eau courante ou l'immerger dans l'eau.
17. Évitez de broncher le cordon si vous voulez sont mouillés. Vous risquez un choc électrique.
18. Ne laissez JAMAIS fonctionner le déshumidificateur sans que le réservoir ne soit en place.
19. Servez-vous de vos deux mains pour transporter le réservoir d'eau.

VEUILLEZ CONSERVER CES DIRECTIVES

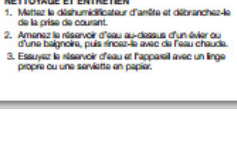
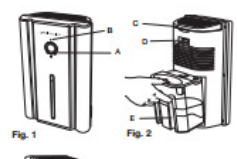


FONCTIONNEMENT DE VOTRE DESHUMIDIFICATEUR

Votre mini déshumidificateur Bonaire® extrait l'humidité de l'air grâce à un dispositif Peltier. Un dispositif Peltier fonctionne en faisant circuler un courant électrique à travers une pompe à chaleur ou qui refroidit la surface. L'humidité est ensuite recueillie par condensation. Dans la mesure où aucun compresseur n'est utilisé, cet appareil est extrêmement silencieux et est conçu pour des espaces réduits tels que des pendroches et des placards sous l'évier.

- #### INSTRUCTIONS D'UTILISATION
1. Choisissez un emplacement pour votre déshumidificateur, sur une surface plane et de niveau.
 2. Branchez l'adaptateur au dos de l'appareil.
 3. Branchez l'autre extrémité de l'adaptateur dans une prise électrique de 120 V AC.
 4. Pour mettre l'appareil sous tension, appuyez simplement sur l'interrupteur (+) situé au dos de l'unité. Un voyant vert apparaît à l'avant.

5. Pour mettre l'appareil hors tension, appuyez sur l'interrupteur (-) situé au dos de l'unité.
 6. Lorsque le réservoir est plein, l'appareil s'éteint automatiquement. Un voyant rouge apparaît à l'avant.
- #### VIDANGE DU RESERVOIR D'EAU
1. Mettez l'appareil hors tension (-).
 2. Retirez soigneusement le réservoir d'eau du dos de l'appareil et amenez-le au-dessus d'un évier.
 3. Enlevez le couvercle et versez l'eau dans l'évier.
 4. Remettez le couvercle et replacez le réservoir dans l'appareil.
 5. Mettez l'appareil sous tension (+).



- #### NETTOYAGE ET ENTRETIEN
1. Mettez le déshumidificateur d'arrêt et débranchez-le de la prise de courant.
 2. Amenez le réservoir d'eau au-dessus d'un évier ou d'une baignoire, puis enlevez-le avec de l'eau chaude.
 3. Essayez le réservoir d'eau et l'appareil avec un linge propre ou une serviette en papier.

INSTRUCTIONS DE RANGEMENT

À la fin de la saison, veuillez suivre ces instructions pour ranger adéquatement votre déshumidificateur jusqu'à la prochaine saison d'usage.

1. Mettez le déshumidificateur d'arrêt et débranchez-le de la prise de courant.
2. Nettoyez et séchez complètement le déshumidificateur selon les instructions plus haut.
3. Assurez-vous que toutes les pièces sont sèches avant le rangement. Ne rangez pas l'appareil s'il y a encore de l'eau dans le réservoir.
4. Rangez l'appareil à l'verticale dans un endroit frais et sec.

GARANTIE LIMITEE DEUX (2) ANS

Sunbeam Products, Inc. faisant affaire sous le nom de Jarlan Consumer Solutions, ou au Canada, Sunbeam Corporation (Canada) Limited, faisant affaire sous le nom de Jarlan Consumer Solutions (collectivement "JCS") garantit que pendant une période de deux ans à compter de la date d'achat ce produit sera exempt de défauts de matériaux ou de main d'œuvre. JCS, selon son choix, réparera ou remplacera un produit ou tout composant du produit qui serait défectueux pendant que la garantie sera en vigueur. Le remplacement sera réalisé au moyen d'un produit ou composant neuf ou reconstitué. Si le produit n'est plus disponible, un produit d'une valeur équivalente ou supérieure sera fourni en remplacement. Ceci est votre garantie exclusive. Veuillez PAS de réparer ou d'ajuster les fonctionnalités électriques ou mécaniques de ce produit. Si tel est le cas, votre garantie sera annulée. Cette garantie est accordée à l'acheteur au détail initial et émise en vertu d'un contrat de vente au détail initial. Elle n'est pas transférable. Garder votre preuve d'achat d'origine, car elle sera requise pour obtenir un service au titre de la garantie. Les marchandises, les centres de réparation ou les magasins au détail JCS vendant des produits JCS n'ont pas le droit de modifier les modalités des conditions générales de cette garantie. Cette garantie ne couvre pas l'usure normale des pièces ni les dommages occasionnés par une cause externe : mauvaise utilisation ou négligence de ce produit, branchements sur un courant ou une tension autre que ceux spécifiés, utilisation contraire aux instructions de fonctionnement, dommages, réparation ou modification par quiconque autre que JCS ou un Centre de réparation agréé JCS. De plus, la garantie ne couvre pas les cas de foudre, incendie, vol ou autres causes de dommages, ni les cas de force majeure, tels que les actes de terrorisme. Ne conservez et ne transférez pas les limites de responsabilité de JCS.

JCS ne sera pas responsable des dommages, quels qu'ils soient, résultant de l'achat, de l'utilisation, de l'absence d'utilisation du produit ou de l'impossibilité de l'utiliser, y compris les dommages directs, indirects, pécuniaires ou matériels et des pertes de revenus, de toute rupture de contrat, fortuite ou autre, ni de toute plainte déposée contre l'acheteur par une autre partie. Certaines provinces, états ou juridictions ne permettent pas l'exclusion ou la limitation des dommages directs ou indirects, ni les limitations de durée de garantie factuelle. Il est peut-être que ces lois s'appliquent et que les limitations ou exclusions stipulées dans les présentes ne s'appliquent pas à votre cas. Cette garantie vous donne des droits juridiques précis et il est peut-être que vous en avez d'autres qui peuvent varier d'un territoire, d'une province, d'un état ou d'une juridiction à l'autre. Pour obtenir un service au titre de la garantie, voir l'adresse ci-dessous.

PHÉ RENOVEZ PAS CE PRODUIT À UNE DE CES ADRESSES NI OÙ VOUS L'AVEZ ACHÉTÉ

Si vous avez des questions concernant votre produit ou cette garantie, ou si vous désirez obtenir un service couvert par la garantie, veuillez visiter notre site Web sur www.bonaire.com ou appelez le 1-800-253-2764 pour obtenir l'adresse de votre centre de service le plus proche.

Au Canada : Cette garantie est offerte par Sunbeam Products, Inc. faisant affaire sous le nom de Jarlan Consumer Solutions, situé à Boca Raton, Florida 33431. Au Canada, elle est offerte par Sunbeam Corporation (Canada) Limited faisant affaire sous le nom de Jarlan Consumer Solutions, situé au 20 D'Harbord Street, Brampton, Ontario L6Y 0M1.

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DIVISION 26 ELECTRICAL



SER 4/0 ALUMNAFLEX

Style: SER

Location: Line voltage power transfer to electrical device throughout house

Type: XHHW-2

600 Volts

Stranded Aluminum



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SEARCH



Southwire/ Product Catalog/ SIMpull THHN ® Cable With ALUMAFLEX ® Conductors

SIMPull THHN ® Cable with ALUMAFLEX ® Conductors



- › 600 Volts
- › AlumaFlex® aluminum (AA-8176) conductor
- › Thermoplastic insulation/SIM nylon sheath
- › Heat, moisture, gasoline, and oil resistant 1
- › Sunlight resistant
- › Also rated THWN-2
- › SIM Technology® for easier pulling

APPLICATIONS

Southwire SIMPULL THHN® cable with AlumaFlex® conductors are primarily used in conduit and cable trays for services, feeders, and branch circuits in commercial or industrial applications as specified in the 2011 National Electrical Code. When used as Type THHN, or T90 Nylon conductor is suitable for use in dry locations at temperatures not to exceed 90°C. When used as Type THWN-2 or TWN75, conductor is suitable for use in wet or dry locations at temperatures not to exceed 90°C or not to exceed 75°C when exposed to oil or coolant. Voltage for all applications is 600 volts. This cable should be installed without application of pulling lubricant.

- › [Product Specifications](#)

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XHHV
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- Residential
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- Distribution
- Renewables
- OEM
- CR Technologies
- Canada
- América Latina



green Spec™
RoHS Compliant

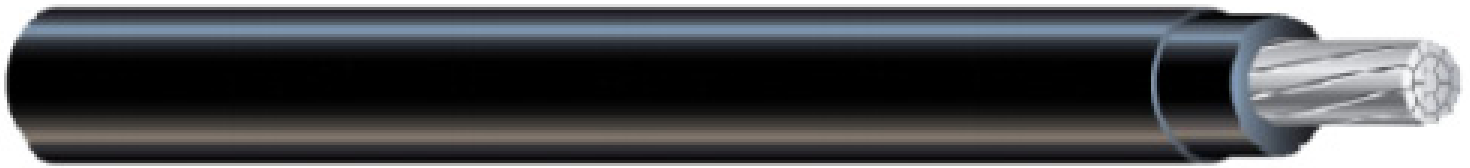


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SIMPull THHN®

600 Volts. AlumaFlex® Aluminum (AA-8176) Conductor, Thermoplastic Insulation/SIM Nylon Sheath, Heat, Moisture, Gasoline, and Oil Resistant II, Sunlight Resistant, Also Rated THWN-2. SIM Technology® for Easier Pulling



APPLICATIONS

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SPECIFICATIONS

Southwire SIMPULL THHN conductors comply with:

- ASTM B-800 and B-801
- UL Standard 83
- CSA
- Federal Specification A-A-59544
- VW-1 - Sizes 4 through 1 AWG
- CT - Sizes 1/0 AWG and larger Sizes Rated for CT use.
- FT1 - Sizes 4 AWG through 750 kcmil
- T90 Nylon - Sizes 4 AWG through 750 kcmil
- TWN 75 - Sizes 8 AWG through 750 kcmil
- NEMA WC-70 Construction Requirements
- National Electrical Code/NFPA 70, 2011 Edition
- RoHS/REACH Compliant

CONSTRUCTION

Southwire SIMPULL THHN conductors are AlumaFlex™ AA-8000 series aluminum alloy compact stranded. Insulated with a tough, heat and moisture resistant polyvinyl chloride (PVC), over which a SIM (SLIKQWIK® Infused Membrane) nylon (polyamide) or UL-listed equal jacket is applied. Phase conductors are available sizes 1/0 AWG-1000 kcmil in black, white, red, blue, brown, orange, yellow and gray. Grounds available sizes 4 AWG-900 kcmil in green. Conductor sizes 1/0 AWG and larger are listed and marked sunlight resistant in colors. Colors available on 2 awg and larger, some are subject to economic order quantity.

SIMPULL THHN® Cable with ALUMAFLEX® Conductors

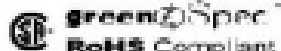
Conductor		Insulation Thickness (mils)	Jacket Thickness (mils)	Nominal O.D. (mils)	Approx. Net Weight Per 1000' (lbs.)	Allowable Ampacities+			Standard Package
Size (AWG or kcmil)	Number of Strands					60°C	75°C	90°C	
8	7	30	5	204	27	35	40	45	B
6	7	30	5	239	38	40	50	60	C
4	7	40	6	305	62	55	65	75	BCD
2	7	40	6	360	91	75	90	100	BC
1	18	50	7	413	117	85	100	115	BC
1/0	18	50	7	450	141	100	120	135	BCD
2/0	18	50	7	490	172	115	135	150	BCD
3/0	18	50	7	537	210	130	155	175	BCD
4/0	18	50	7	589	257	150	180	205	BCD
250	22	60	8	656	311	170	205	230	ABC
300	35	60	8	706	365	190	230	255	BC
350	35	60	8	752	418	210	250	280	BC
400	35	60	8	795	471	225	270	305	BC
500	35	60	8	872	576	260	310	350	BC
600	58	70	9	971	700	285	340	385	BC
700	58	70	9	1035	804	310	375	420	
750	58	70	9	1066	856	320	385	435	ABC
900	58	70	9	1139	1013	355	425	480	
1000	58	70	9	1218	1117	375	445	500	

+ Allowable ampacities shown are for general use as specified by the National Electrical Code 2011 Edition Section 310.15 and 240.4(D).
 Unless the equipment is marked for use at higher temperatures the conductor ampacities shall be limited to the following per NEC 110.14(C).
 60 °C - When terminated to equipment for circuits rated 100 amperes or less or marked for 14 through 1 AWG conductors.
 75 °C - When terminated to equipment for circuits rated over 100 amperes or marked for conductors larger than 1 AWG.
 90 °C - THHN dry locations and THWN wet or dry locations for ampacity adjustment purposes using NEC section 310.15 .

Package Codes
 A- 500'
 B- 2500'
 C- 1000'
 D- 5000'

RECOMMENDED SAMPLE SPECIFICATIONS:

Conductors shall be UL-listed Type THHN and THWN-2, suitable for operation at 600 volts, as specified in the National Electrical Code. Sizes 8 through 1 AWG shall be rated VW-1, larger sizes shall be rated for CT Use. Conductors shall be AlumaFlex aluminum alloy, insulated with high-heat and moisture resistant PVC, jacketed with abrasion, moisture, gasoline, and oil resistant nylon or UL-listed equivalent as manufactured by Southwire Company or approved equal.



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BLAZESTOP INTUMESCENT FIRESTOP CAULK

Model Number: WF320

Location: Inside Walls where gaps are formed from electrical wiring

ASTM E-814

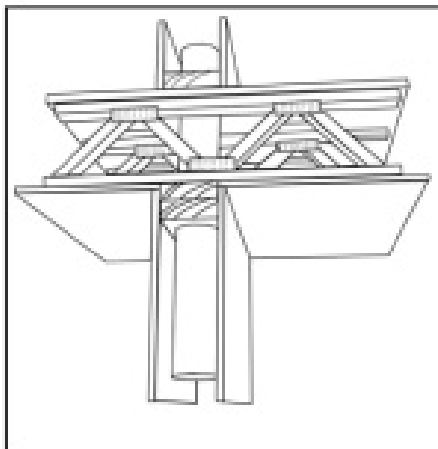
Rating: UL 1479



SERIES WF300 INTUMESCENT FIRESTOP CAULK

APPLICATIONS

Type WF300 Caulk is used to seal through penetrations and gaps in fire resistance rated wood frame construction such as floor/ceilings and walls or partitions. Most common penetrating items were successfully tested with WF300.



PRODUCT DESCRIPTION

Type WF300 Caulk is a latex based, high solids firestop caulk. This material, when properly installed, effectively seals penetration openings in wood frame construction against the spread of fire, smoke and combustion byproducts.

Type WF300 Caulk is a single stage intumescent. When exposed to elevated temperatures, WF300 expands rapidly to seal off voids left by the burning or melting of combustible materials.

Type WF300 Caulk is storage stable (when stored according to manufacturer's recommendations) and will not separate or shrink when dried. WF300 adheres tenaciously to common construction materials such as lumber and gypsum board as well as typical penetrant materials.

FEATURE	BENEFIT
• Water Based	Easy installation, cleanup and disposal
• Intumescent	Expands with heat
• Water-Resistant	Will not re-emulsify
• Paintable	

PERFORMANCE

Type WF300 Caulk is the basis for systems that meet the exacting criteria of ASTM E 814 (ANSUL1479) as well as the time/temperature requirements of ASTM E 119 (ANSUL263). UL Systems have been tested for wood frame construction and common penetrating items with ratings up to 2 hours. See UL Directory for system information.



	<p>FILL VOID OR CAVITY MATERIALS FOR USE IN JOINT SYSTEMS AND THROUGH-PENETRATION FIRESTOP SYSTEMS. SEE UL DIRECTORY OF PRODUCTS CERTIFIED FOR CANADA AND UL FIRE RESISTANCE DIRECTORY.</p>
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PHYSICAL PROPERTIES

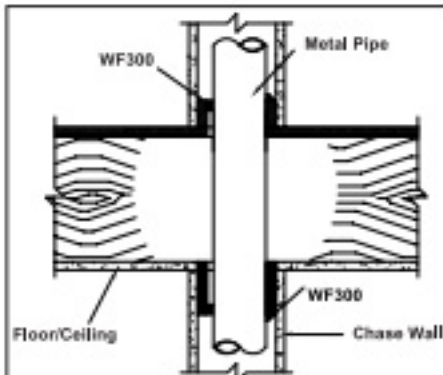
Properties	Series WF300
Color	Red
Odor	Mild Latex
Density	11.4 lb/gal (1.36 kg/L)
Solids Content	81%
pH	7.4 to 8.4
In Service Temperature	185°F (85°C)
Storage Temperature	40°F (4°C) - 95°F (35°C)

Properties	Series WF300
Flame Spread	0*
Smoke Developed	20*
STC Rating (ASTM E90/ASTM C919)	61
VOC Content (EPA Method 24/ASTM D3960)	33.3 lb/gal (40.0 g/L)
Expansion Begins	350°F (175°C)
Volume Expansion	>5X Free Expansion
Shelf Life	2 Years

*ASTM E 84 (UL723) @ 14% surface coverage (modified test for caulks and sealants)

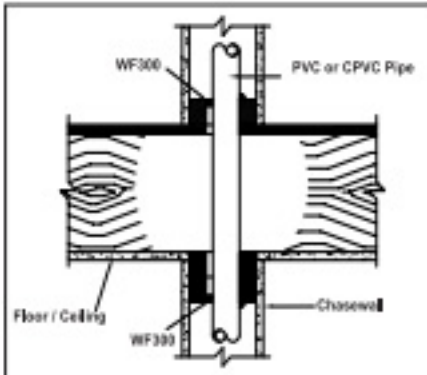


Fig 1: Metal Pipe, Conduit, Tube



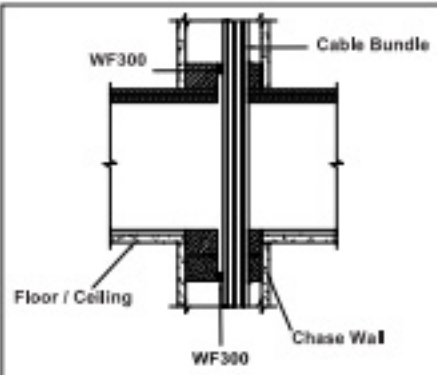
UL System No. F-C-1053
 F Rating: 1 hour • T Rating: 1 hour
 Steel, Iron, Copper, Conduit/EMT: 4"
 Annulus: 0" to 1/2"
 Sealant Depth: 3/4" top, 5/8" bottom

Fig 2: Plastic Pipe



UL System No. F-C-2014
 F Rating: 1 hour • T Rating: 1 hour
 PVS, CPVC (DWV or Closed): 2"
 Annulus: 0" to 1/2"
 Sealant Depth: 1/2" top, 1/2" bottom

Fig 3: Electrical/Telecom/Data Cables



UL System No. F-C-3010
 F Rating: 1 hour • T Rating: 1 hour
 Electrical, Telephone, or Data Cables
 Annulus: 0" to 1/2"
 Sealant Depth: 1/2" top, 1/2" bottom

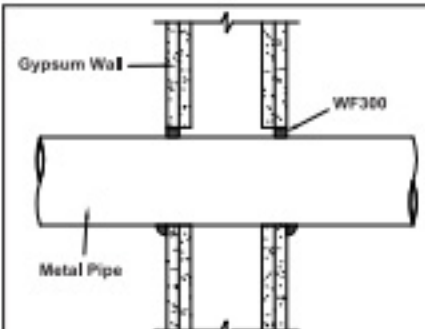
SPECIFICATIONS

The firestopping sealant shall be a water-resistant, intumescent, latex sealant Type WF Firestop Caulk. The sealant when exposed to high heat or flame shall exhibit a free expansion of up to 4 times its original volume. The firestopping sealant shall contain no water soluble nor hygroscopic ingredients. The sealant shall be UL Classified and tested to the requirements of ASTM E814 (UL1479) and shall meet Class A finish requirements when tested in accordance with ASTM E84 (UL723).

SPECIFIED DIVISIONS

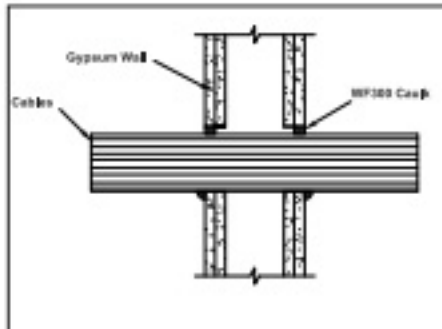
- DIV. 7 07840 Through-Penetration Firestopping
- DIV. 13 13900 Special Construction Fire Suppression & Supervisory Systems
- DIV. 15 15250 Mechanical Insulation – Fire Protection
- DIV. 16 16050 Basic Electrical Materials & Methods

Fig 4: Metal Pipe, Conduit, Tube



UL System No. W-L-1042
 F Rating: 1 or 2 hour • T Rating: 1/4 hour
 Steel, Iron, Copper, Conduit/EMT: 4"
 Annulus: 0" to 1/2"
 Sealant Depth: 5/8" both sides

Fig 5: Electrical/Telecom/Data Cables



UL System No. W-L-3036
 F Rating: 1 or 2 hour • T Rating: 1/2 hour
 Electrical, Telephone, or Data Cables
 Annulus: 0" to 3/4"
 Sealant Depth: 0" both sides

SEALANT REQUIREMENTS IN CUBIC INCHES PER 1/4 INCH OF INSTALLED DEPTH*

Pipe Size		Diameter of Opening (in.)											
		1.5	2.0	3.0	4.0	5.0	6.0	7.0	8.0	10	12	14	26
Trade Size	Pipe O.D.												
0.5"	0.840	0.3	0.6	1.6	3.0	4.8	6.9	9.5	12.4	19.5	28.1	38.3	132.6
1"	1.315	0.1	0.4	1.4	2.8	4.6	6.7	9.3	12.2	19.3	27.9	38.1	132.4
1.5"	1.900			1.1	2.4	4.2	6.4	8.9	11.9	18.9	27.6	37.8	132.0
2"	2.375			0.7	2.0	3.8	6.0	8.5	11.5	18.5	27.2	37.4	131.6
2.5"	2.875			0.1	1.5	3.3	5.4	8.0	10.9	18.0	26.7	36.9	131.1
3"	3.500				0.7	2.5	4.7	7.2	10.2	17.2	25.9	36.1	130.3
3.5"	4.000					1.8	3.9	6.5	9.4	16.5	25.1	35.3	129.6
4"	4.500					0.8	3.0	5.6	8.5	15.6	24.2	34.4	128.7
6"	6.625	Different Sealant Depth?						1.1	4.0	11.1	19.7	29.9	124.2
8"	8.625	1/2" Multiply by 2								4.9	13.6	23.8	118.0
10"	10.750	5/8" Multiply by 2.5									5.6	15.8	110.0
12"	12.750	1" Multiply by 4										6.6	100.8
24"	24.000	1-1/4" Multiply by 5											19.6

IMPORTANT NOTE: This table is for estimation purposes only. Consult UL Fire Resistance Directory or STI Product & Application Guide for specific installation requirements and limitations.
 Metric Estimation Table available upon request.

INSTALLATION INSTRUCTIONS

GENERAL: Areas to be protected must be clean and free of oil, loose dirt, rust or scale. Installation temperatures must be between 35° F to 100° F (2° C to 38° C). Allow product to dry a minimum of 24 hours before prior to exposure to moisture.

SYSTEM SELECTION: Select appropriate UL Classified System. Refer to UL Fire Resistance Directory for more information.

FORMING: Although not generally required, backing materials may be utilized to facilitate the installation of WF300 Caulk. In most wood frame construction applications, open or close cell polyethylene or polyurethane backer rod may be used.

FILL MATERIAL: Type WF300 Caulk may be installed by caulking using a standard caulk gun or from bulk containers using a bulk loading caulk gun, or by manually troweling using a mason's trowel or putty knife. If the sealant pulls back from surface, clean the surface with a damp rag or sponge and reapply. Work caulk into all areas and exercise care to eliminate voids or seams. Surface of caulk can be smoothed using a putty knife dipped in water. Adding water to caulk itself is not recommended. Type WF300 (when dry) may be sanded and painted using most non-solvent based paints. In gypsum board construction, overlapping onto gypsum board paper by a minimum 1/4" (6 mm) is recommended to assure adequate adhesion is maintained.

LIMITATIONS: Type WF300 Caulk is water based and cures through the evaporation of water. Low temperatures, high humidity, the use of non-porous or impermeable backing materials, cover plates or coatings may retard the drying process. Do not paint or seal in any way that prevents contact with air until caulk has dried through completely. Type WF300 Caulk has been designed to be safe for contact with plastics and has been used extensively and successfully with a variety of different types of plastic pipes, tubes, and plastic cable insulations or jackets. Variations in these materials, however, make it impossible to guarantee compatibility. STI strongly recommends that the user consult with the manufacturer of the pipe, tubing, or cable in question regarding any known sensitivities or potential restrictions before applying this product.

MAINTENANCE

Inspection: Installations should be inspected periodically for subsequent damage. Any damage should be repaired using Type WF300 Caulk per the original approved design.

Retrofit: When adding or removing penetrants, care should be taken to minimize damage to the seal. Reseal using Type WF300 Caulk per the original approved design. **NOTE:** New penetrants of a different nature than the original design may require a totally new firestop design or extensive modifications to the existing design. Reseal all openings as per the requirements of the modified design.

TECHNICAL SERVICE

Specified Technologies Inc. provides toll free technical support to assist in product selection and appropriate installation design. UL Systems, Material Safety Data Sheets and other technical information is available through the Technical Library at www.stifirestop.com.

PRECAUTIONARY INFORMATION

Consult Material Safety Data Sheet for additional information on the safe handling and disposal of this material. Wash areas of skin contact with soap and water. Avoid contact with eyes. SEALANT IS CONDUCTIVE UNTIL DRY.

AVAILABILITY

Type WF300 Caulk is available from authorized STI distributors. Visit the company website at www.stifirestop.com for complete list of names and locations of nearest sales representatives or distributors. Available packages and additional STI products for wood frame construction are listed below.

ORDERING INFORMATION

WF300 Intumescent Firestop Caulk is available in caulk tubes, sausages and pails.

Cat. No. Description

WF310	10.1 oz. Tube (300 ml) 18.2 cu.in.
WF329	29 oz. Tube (858 ml) 52 cu.in.
WF320	20 oz. Sausage (592 ml) 36 cu. in.
WF305	5 Gal. Pail (19.0 liters) 1,155 cu. in.

Additional STI Products for Wood Frame Construction...

SmokeBlock™ Sealer

A noncombustible caulk meeting ASTM E 136 for use in sealing penetrants and gaps in non-rated construction.

CITY OF NEW YORK MEA 440-04-M

IMPORTANT NOTICE: All statements, technical information, and recommendations contained herein are based upon testing believed to be reliable, but the accuracy and completeness thereof is not guaranteed.

WARRANTY

Specified Technologies Inc. manufactures its goods in a manner to be free of defects. Should any defect occur in its goods (within one year), Specified Technologies Inc., upon prompt notification, will at its option, exchange or repair the goods or refund the purchase price.

LIMITATIONS AND EXCLUSIONS:

THIS WARRANTY IS IN LIEU OF ALL OTHER REPRESENTATIONS EXPRESSED OR IMPLIED (INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR USE) AND UNDER NO CIRCUMSTANCES SHALL SPECIFIED TECHNOLOGIES INC. BE RESPONSIBLE FOR ANY INCIDENTAL OR CONSEQUENTIAL PROPERTY DAMAGE OR LOSSES. PRIOR TO USE, THE USER SHALL DETERMINE THE SUITABILITY OF THE PRODUCT FOR ITS INTENDED USE, AND THE USER ASSUMES ALL RISKS AND LIABILITY FOR SUBSEQUENT USE.

No statement or recommendation not contained herein shall have any force or effect unless in an agreement signed by officers of seller and manufacturer.

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Specified Technologies Inc.

210 Evans Way • Somerville, NJ 08876 USA | Toll Free: 800-992-1180 • F: 908.526.9623





Material Safety Data Sheet

04-JUNE-2010

Blazestop™ SERIES WF300 FIRESTOP CAULK

CHEMICAL PRODUCT/COMPANY IDENTIFICATION

Material Identification

PRODUCT NAME TYPE WF300 FIRESTOP CAULK
CHEMICAL FAMILY Mixture

Company Identification

MANUFACTURER/DISTRIBUTOR

Specified Technologies Inc.
210 Evans Way
Somerville, NJ 08876

PHONE NUMBERS

Product Information: 1-908-526-8000
Emergency: 1-800-255-3924

HAZARDS IDENTIFICATION

*****EMERGENCY OVERVIEW*****

* Possible skin and eye irritant. Paste. *

Potential Health Effects:

EYE: Contact may cause irritation.

SKIN: Contact may cause irritation.

INGESTION: Relatively non-toxic.

INHALATION: Irritation of the nose, throat, and lungs may result from over-exposure to vapors or mist.

CHRONIC (CANCER) INFORMATION: Not classified as carcinogenic.

LONG TERM TOXIC EFFECTS: None known.

COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENT NAME	CAS NUMBER
ACRYLIC POLYMER	82539-93-3
CALCIUM CARBONATE	1317-65-3
PETROLEUM DISTILLATES	64742-47-8
GRAPHITE	7782-42-5

FIRST AID MEASURES

First Aid

INHALATION: Remove to fresh air.

SKIN CONTACT: Wash thoroughly.

EYE CONTACT: Irrigate eyes with running water for at least 15 minutes. Get medical attention if irritation develops.

INGESTION: None applicable.

FIRE FIGHTING MEASURES

Not a fire hazard.

EXTINGUISHING MEDIA:.....Dry Chemical; Carbon Dioxide; Foam; Water spray for large fires.

SPECIAL FIRE FIGHTING PROCEDURES:..... As for surrounding fire.

ACCIDENTAL RELEASE MEASURES

Safeguards (Personnel)

NOTE: Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

HANDLING AND STORAGE

Store under ambient conditions. Do not freeze. No special handling required.

EXPOSURE CONTROLS/PERSONAL PROTECTION

EYE PROTECTION REQUIREMENTS:.....Safety glasses/goggles.

SKIN PROTECTION REQUIREMENTS:.....Gloves.

RESPIRATOR REQUIREMENTS:.....None.

VENTILATION REQUIREMENTS:..... If needed, use local exhaust ventilation to keep airborne concentrations below the TLV.

Exposure Guidelines

Exposure Limits

PEL(OSHA) : Particulates (Not Otherwise Classified) 15 mg/m³, 8 Hr. TWA, total dust 5 mg/m³, 8 Hr. TWA, respirable dust

TLV(ACGIH): None Established

PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL FORMPaste with minimal odor

SPECIFIC GRAVITY1.18 g/ml

PERCENT VOLATILES19 to 20

EVAPORATION RATE>1

BOILING POINT100 deg. C

SOLUBILITY IN WATER.....Infinitely dilutable

CARB VOC (Calculated)0.36 Wt%

SCAQMD VOC (US EPF Method 24).....53 Grams/Liter

STABILITY AND REACTIVITY

STABILITY:.....This is a stable material.

CONDITIONS TO AVOID.....Freezing or Storage >55 deg. C

HAZARDOUS POLYMERIZATION:.....Will not occur.

INCOMPATIBILITIES:.....None special.

TOXICOLOGICAL INFORMATION

Mixture not tested but based on components:

May be irritating to skin and eyes and may aggravate existing skin and eye conditions.

None of the components are listed as carcinogens.

ECOLOGICAL INFORMATION

No data.

DISPOSAL CONSIDERATIONS

Waste Disposal:

Treatment, storage, transportation, and disposal must be in accordance with applicable Federal, State/Provincial, and Local regulations.

TRANSPORTATION INFORMATION

DOT – not regulated.

REGULATORY INFORMATION

U.S. Federal Regulations

TSCA Inventory Status: Reported/Included.

Section 313 Supplier Notifications.

This product contains no toxic chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 and of 40 CFR 372:

OTHER INFORMATION

NPCA-HMIS Rating

Health;	1
Flammability;	0
Reactivity;	0

Personal Protection rating to be supplied by user depending on use conditions.

STATE RIGHT-TO-KNOW LAWS

No substances on the state hazardous substances list, for the states indicated below, are used in the manufacture of products on this Material Safety Data Sheet, with the exceptions indicated. While we do not specifically analyze these products, or the raw materials used in their manufacture, for substances on various state hazardous substances lists, to the best of our knowledge the products on this Material Safety Data Sheet contain no such substances except for those specifically listed below:

SUBSTANCES ON THE NEW JERSEY WORKPLACE HAZARDOUS SUBSTANCE LIST PRESENT AT A CONCENTRATION OF 1% OR MORE (0.1% FOR SUBSTANCES IDENTIFIED AS CARCINOGENS, MUTAGENS OR TERATOGENS): NJTSRN-WF300
GRAPHITE

WARNING: SUBSTANCES KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER:

None known.

WARNING: SUBSTANCES KNOWN TO THE STATE OF CALIFORNIA TO CAUSE BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM: None known.

This information relates to the specific material designated and may not be valid for such material used in combination with any other materials or in any process. Such information is to the best of our knowledge and belief accurate and reliable as of the data compiled. However, no representation, warranty, or guarantee is made as to its accuracy, reliability or completeness. It is the user's responsibility to satisfy himself as to the suitability and completeness of such information for his own particular use. We do not accept liability for any loss or damage that may occur from the use of this information.

Responsibility for MSDS :

Specified Technologies Inc.
210 Evans Way
Somerville, NJ 08876



WF300 INTUMESCENT FIRESTOP CAULK



Designed for use in sealing through-penetrations and gaps in fire resistance-rated wood frame construction.

Type WF300 Caulk is a latex based, high solids firestop caulk. This material, when properly installed, effectively seals penetration openings in wood frame construction against the spread of fire, smoke and combustion by-products.

Type WF300 Caulk is a single stage intumescent. When exposed to elevated temperatures, WF300 expands rapidly to seal off voids left by the burning or melting of combustible materials.

Type WF300 Caulk is storage stable (when stored according to manufacturer's recommendations) and will not separate or shrink when dried. WF300 adheres tenaciously to common construction materials such as lumber and gypsum board as well as typical penetrant materials.

Features & Benefits

- **Economical** – delivers maximum fire protection at the right price.
- **Water-Based** – easy installation, clean-up and disposal.
- **Water-Resistant** – will not re-emulsify.
- **Intumescent** – expansion fills gaps or voids caused by wood shrinkage, or burning or melting of combustible materials.
- **Meets ASTM E814 (ANSI/UL 1479).**
- **Acoustically tested** – reduces noise transmission.

APPLICATIONS

Type WF300 Caulk is used to seal through penetrations and gaps in fire resistance rated wood frame construction such as floor/ceilings and walls or partitions. Most common penetrating items were successfully tested with WF300.

- Through-penetrations and gaps in wood frame construction.



FILL, VOID, OR CAVITY MATERIALS FOR USE IN JOINT SYSTEMS & THROUGH-PENETRATION FIRESTOP SYSTEMS SEE UL DIRECTORY OF PRODUCTS FOR THE U.S. AND CANADA; UL FIRE RESISTANCE DIRECTORY

PERFORMANCE

Type WF300 Caulk is the basis for systems that meet the exacting criteria of ASTM E 814 (ANSI/UL1479) as well as the time/temperature requirements of ASTM E 119 (ANSI/UL263). UL Systems have been tested for wood frame construction and common penetrating items with ratings up to 2 hours. See UL Directory for system information.

Properties	Series WF300
Color	Red
Odor	Mild Latex
Density	11.4 lbs/gal (1.36 kg/L)
Solids Content	81%
pH	7.4 to 8.4
Max. In Service Temperature	120° F (49° C)
Flame Spread	0*

Properties	Series WF300
Smoke Developed	20*
STC Rating (ASTM E90/ ASTM C919)	61
VOC Content (EPA Method 24/ASTM D3960)	33.3 lb/gal. (40.0 g/L)
Expansion Begins	350°F (176°C)
Volume Expansion	>5X Free Expansion
Shelf Life	12 Months

*ASTM E 84 (UL723) @ 14% surface coverage (modified test for caulks and sealants)



ORDERING INFORMATION

Part #	Description	Packaging	Size
WF310	Intumescent Firestop Caulk	10.1 oz. Tube	18.2 cu in. (300ml)
WF329	Intumescent Firestop Caulk	29 oz. Tube	52 cu in. (858 ml)
WF320	Intumescent Firestop Caulk	20 oz. Sausage	36 cu. in. (592ml)
WF305	Intumescent Firestop Caulk	5 Gal. Pail	1,155 cu in. (19 liters)

WARRANTY

Specified Technologies manufactures its goods in a manner to be free of defects. Should any defect occur in its goods (within one year), Specified Technologies, Inc., upon prompt notification, will at its option, exchange or repair the goods or refund the purchase price.

LIMITATIONS AND EXCLUSIONS

THIS WARRANTY IS IN LIEU OF ALL OTHER REPRESENTATIONS EXPRESSED OR IMPLIED (INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY FOR FITNESS FOR USE) AND UNDER NO CIRCUMSTANCES SHALL SPECIFIED TECHNOLOGIES INC., BE RESPONSIBLE FOR ANY INCIDENTAL OR CONSEQUENTIAL PROPERTY DAMAGE OR LOSSES. PRIOR TO USE, THE USER SHALL DETERMINE THE SUITABILITY OF THE PRODUCT FOR ITS INTENDED USE, AND THE USER ASSUMES ALL RISKS AND LIABILITY FOR SUBSEQUENT USE.

No statement or recommendations not contained herein shall have any force or effect unless in an agreement signed by officers of seller and manufacturer.

MADE IN THE USA



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ZSTI3173



GALVAN COPPER COATED GROUND ROD

Ground Electrical System
Dimensions: 5/8"
Copper Coated

Copper Coated Ground Rods

- Galvan's copper coated rods have a heavy, uniform coating of copper metallurgically bonded to a rigid steel core.
- UL Listed rods have 10-mil minimum copper plating. UL/RUS models have 13-mil minimum of copper but 10-mil coating is acceptable.
- Galvan manufactures copper-coated rods under patent 6,527,934.
- Rods less than eight feet or less than 10 mils of copper, do not meet UL requirements, nor the NEC Code.
- Made in USA.

Catalog Number	Matching Threadless Coupling	Nominal Diameter X Length	Actual Diameter Inches	Sub & MasterBundle	Wt. per 100	NAED UPC No. 632591-	Color Code
5005	-	1/2" x 5'	0.471-0.481	5 / 100	305	61125-1	Green
5006	-	1/2" x 6'	0.471-0.481	5 / 100	370	61126-8	Green
5008L*	50-TC	1/2" x 8'	0.500-0.510	5 / 100	545	61138-1	Orange
5010L*	50-TC	1/2" x 10'	0.500-0.510	5 / 100	690	61130-5	Orange
6254	-	5/8" x 4'	0.555-0.565	5 / 100	340	61487-0	Red
6255	-	5/8" x 5'	0.555-0.565	5 / 100	424	61585-3	Red
6256	-	5/8" x 6'	0.555-0.565	5 / 100	508	61586-0	Red
6258*	60-TC	5/8" x 8'	0.555-0.565	5 / 100	680	61588-4	Copper
6258G13**	60-TC	5/8" x 8'	0.561-0.571	5 / 100	700	61217-3	Yellow
6260*	60-TC	5/8" x 10'	0.555-0.565	5 / 100	847	61580-8	Copper
6260G13**	60-TC	5/8" x 10'	0.561-0.571	5 / 100	860	61218-0	Yellow
6262*	60-TC	5/8" x 12'	0.555-0.565	5	1000	61474-0	Copper
6265*	60-TC	5/8" x 15'	0.555-0.565	5	1275	61475-7	Copper
7508*	70-TC	3/4" x 8'	0.673-0.683	5-50	992	61548-8	Black
7510*	70-TC	3/4" x 10'	0.673-0.683	5-50	1240	61340-8	Black
7512*	70-TC	3/4" x 12'	0.673-0.683	5	1475	61476-4	Black
7515*	70-TC	3/4" x 15'	0.673-0.683	5	1850	61477-1	Black
1010*	80-TC	1" x 10'	0.907-0.917	3/50	2248	61440-5	-

Notes:

*These rods are UL Listed

**These rods meet UL & RUS (13 mils minimum of copper).





GALVAN ROD CLAMP

Ground Electrical System
Dimensions: 5/8"
Copper Alloy

Ground Rod Clamps (Hex-Head)

- Bronze alloy or stainless steel hardware both UL listed approved for direct burial in earth and concrete
- Cast copper alloy body with hex head bolt provides simple trouble-free connection at low cost.



Catalog Number	Rod Size	Conductor Range	Sub & Master Pack	Wt. per100	NAED UPC No.632591-
G-3	3/8"	4 Str. - 10 Sol.	100 / 800	6	70706-0
G-4*(Use G-5)	1/2"	2 Str. - 10 Sol.	100 / 800	9	70707-7
G-5*§	5/8-1/2"	2 Str. - 10 Sol.	50 / 400	10	70708-4
G-6*†	3/4"	2 Str. - 10 Sol.	50 / 400	11	70709-1

*-These items UL and CSA Listed in US and Canada for direct burial in earth and concrete

†-The G-6 fits all 3/4-inch diameter rods regardless of actual or nominal diameter

§- This item UL Listed for use on 1/2" and 5/8" copper-coated and galvanized rods, and #4 (1/2") rebar, buried in earth or concrete. Also RUS Listed



GROUNDING ELECTRODE CONDUCTOR

Type: 4 AWG
Material: Copper

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4 AWG Stranded Black Copper THHN Wire (By-the-Foot)

Item #: 72610 | Model #: 20499001

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\$1.12

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Description Specifications Reviews Community Q&A

4 AWG Stranded Black Copper THHN Wire (By-the-Foot)

- Primarily used in conduit and cable trays for services, feeders, and branch circuits in commercial or industrial applications as specified in the NEC
- Conductors are annealed (soft) copper
- Insulated with tough, heat- and moisture-resistant PVC
- Jacket is abrasion, moisture, gasoline and oil resistant nylon
- For use as THWN-2 in wet or dry locations at temperatures not to exceed 194 ° Fahrenheit (90 ° Celsius) or not to exceed 167 ° Fahrenheit (75 ° Celsius) when exposed to oil or coolant
- Sold by-the-foot

Description Specifications Reviews Community Q&A

Wire Type	Stranded	UL Safety Listing	Yes
THHN Wire Gauge	4 AWG	CSA Safety Listing	No
Max Amps (Amps)	85.0	ETL Safety Listing	No
Volt Rating (Volts)	600.0	Jacket Material	Polyvinyl chloride
THHN Jacket Color	Black	Conductor Material	Copper
Each Order Quantity Equals	1 ft	Insulation Color	Black
Maximum Roll Length (Feet)	500.0	Insulation Material	PVC (polyvinyl chloride)

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Your order can be available for pickup in **Lowe's Of S Burlington, VT** today.
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Lowe's Truck Delivery
Your order will be ready for delivery to you from your selected store.

Parcel Shipping
Unavailable for This Order
Sent by carriers like UPS, FedEx, USPS, etc.

4 AWG Stranded Black Copper THHN Wire (By-the-Foot) **\$1.12**

Subtotal: \$1.12

Qty.:

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Related Items

Galvan 5/8" x 8' Copper Coated



RACEWAY AND CONDUIT

Electric Non-metallic Tubing used as raceway or conduit through walls of house
Rigid PVC Schedule 40 Conduit

PVC Industrial Pipe: Schedule 40

Application:

Corrosion resistant pressure pipe, IPS sizes 1/8" through 24", for use at temperatures up to and including 140° F. Pressure rating (120 psi to 810 psi) varies with schedule, pipe size, and temperature as stated in Georg Fischer Harvel LLC engineering bulletin (Product Bulletin 112/401). Pipe is also suitable for PVC plastic drain, waste, and vent (DWV) applications. Generally resistant to most acids, bases, salts, aliphatic solutions, oxidants, and halogens. Chemical resistance data is available and should be referenced for proper material selection. Pipe exhibits excellent physical properties and flammability characteristics (independently tested flame and smoke characteristics-ULC). Typical applications include: chemical processing, plating, high purity applications, potable water systems, water and wastewater treatment, drainage, irrigation, agricultural, and other applications involving corrosive fluid transfer.

Scope:

This specification outlines minimum manufacturing requirements for Polyvinyl Chloride (PVC) Schedule 40 iron pipe size (IPS) pressure pipe. This pipe is intended for use in applications where the fluid conveyed does not exceed 140° F. This pipe meets and or exceeds the industry standards and requirements as set forth by the American Society for Testing and Materials (ASTM D1785 & D2665) and the National Sanitation Foundation (NSF International STD 61 & Std 14).

PVC Materials:

The material used in the manufacture of the pipe shall be domestically produced rigid polyvinyl chloride (PVC) compound, Type I Grade I, with a Cell Classification of 12454 as defined in ASTM D1784, trade name designation H707 PVC. This compound shall be white or gray in color as specified, and shall be approved by NSF International for use with potable water (NSF Std 61).

Dimensions:

All sizes of PVC Schedule 40 pipe shall be manufactured in strict accordance to the requirements of ASTM D1785 for physical dimensions and tolerances. PVC Sch 40 pipe sizes 1-1/4" through 24" diameters shall also meet the requirements of ASTM D2665 Standard Specification for PVC plastic drain, waste and vent (DWV) pipe and shall be dual marked as such. Each production run of pipe manufactured in compliance to the standard, shall also meet or exceed the test requirements for materials, workmanship, burst pressure, flattening, and extrusion quality defined in ASTM D1785 and ASTM D2665 as applicable. All belled-end pipe shall have tapered sockets to create an interference-type fit, which meet or exceed the dimensional requirements and the minimum socket length for pressure-type sockets as defined in ASTM D2672. All PVC Schedule 40 pipe must also meet the requirements of NSF Standard 14 and CSA Standard B137.3 rigid PVC pipe for pressure applications, and shall bear the mark of these Listing agencies. This pipe shall have a flame spread rating of 0-25 when tested for surface burning characteristics in accordance with CAN/ULC-S102-2-M88 or equivalent.

Marking:

Product marking shall meet the requirements of ASTM D1785 and ASTM D2665 as applicable and shall include: the manufacturer's name (or the manufacturer's trademark when privately labeled); the nominal pipe size; the material designation code; the pipe schedule and pressure rating in psi for water @ 73° F; the ASTM designation D1785; the ASTM designation D2665 (when dual marked); the independent laboratory's seal of approval for potable water usage; and the date and time of manufacture.

Sample Specification:

All PVC Schedule 40 pipe shall be manufactured from a Type I, Grade I Polyvinyl Chloride (PVC) compound with a Cell Classification of 12454 per ASTM D1784. The pipe shall be manufactured in strict compliance to ASTM D1785 and D2665 (where applicable), consistently meeting and/or exceeding the Quality Assurance test requirements of these standards with regard to material, workmanship, burst pressure, flattening, and extrusion quality. The pipe shall be manufactured in the USA, using domestic materials, by an ISO 9001 certified manufacturer. Standard lengths of pipe sizes 6" and larger shall be beveled each end by the pipe manufacturer. All pipe shall be stored indoors after production at the manufacturing site until shipped from factory. This pipe shall carry the National Sanitation Foundation (NSF) seal of approval for potable water applications. All pipe shall be manufactured by Georg Fischer Harvel LLC.



PVC Industrial Pipe: Schedule 40

Schedule 40 Dimensions

Nom. Pipe Size (in.)	O.D.	Average I.D.	Min. Wall	Nom. Wt./Ft.	Max. W.P.
1/8	0.405	0.249	0.068	0.051	810
1/4	0.540	0.344	0.088	0.086	780
3/8	0.675	0.473	0.091	0.115	620
1/2	0.840	0.602	0.109	0.170	600
3/4	1.050	0.804	0.113	0.226	480
1	1.315	1.029	0.133	0.333	450
* 1-1/4	1.660	1.360	0.140	0.450	370
* 1-1/2	1.900	1.590	0.145	0.537	330
* 2	2.375	2.047	0.154	0.720	280
* 2-1/2	2.875	2.445	0.203	1.136	300
* 3	3.500	3.042	0.216	1.488	260
* 3-1/2	4.000	3.521	0.226	1.789	240
* 4	4.500	3.998	0.237	2.118	220
5	5.563	5.016	0.258	2.874	190
* 6	6.625	6.031	0.280	3.733	180
* 8	8.625	7.942	0.322	5.619	160
* 10	10.750	9.976	0.365	7.966	140
* 12	12.750	11.889	0.406	10.534	130
* 14	14.000	13.073	0.437	12.462	130
* 16	16.000	14.940	0.500	16.286	130
* 18	18.000	16.809	0.562	20.587	130
* 20	20.000	18.743	0.593	24.183	120
* 24	24.000	22.544	0.687	33.652	120

* Denotes these sizes are dual marked as being in compliance with both ASTM D1785 (pressure pipe) and ASTM D2665 (drain, waste & vent pipe- DWV).

The pressure ratings given are for water, non-shock, @ 73 °F. The following temperature de-rating factors are to be applied to the working pressure ratings (WP) listed when operating at elevated temperatures.

Multiply the working pressure rating of the selected pipe at 73 °F, by the appropriate de-rating factor to determine the maximum working pressure rating of the pipe at the elevated temperature chosen.

De-Rating Factor	
Operating Temp (°F)	De-Rating Factor
73	1.00
80	0.88
90	0.75
100	0.62
110	0.51
120	0.40
130	0.31
140	0.22

EX:
10" PVC SCH 40 @ 120 °F = ?
140 psi x 0.40 = 56 psi max.
@ 120 °F

THE MAXIMUM SERVICE TEMPERATURE FOR PVC IS 140 °F.

Solvent-cemented joints should be utilized when working at or near maximum temperatures. GF Harvel does not recommend the use of PVC for threaded connections at temperatures above 110 °F; use flanged joints, unions, or roll grooved couplings where disassembly is necessary at elevated temperatures.

Threading of Schedule 40 PVC pipe is not a recommended practice due to insufficient wall thickness. Thread only Schedule 80 or heavier walls. *Threading requires a 50% reduction in pressure rating stated for plain end pipe @ 73 °F.*

Chemical resistance data should be referenced for proper material selection and possible de-rating when working with fluids other than water. Refer to GF Harvel 112/401 Product Bulletin for chemical resistance, installation data, and additional information.

ASTM STANDARD D1784 MATERIAL EQUIVALENTS:

Cell Classification 12454 = PVC Type I Grade I = PVC1120

Pipe sizes shown are manufactured in strict compliance with ASTM D1785 and ASTM D2665 where applicable.



LEGRAND P122RN SWITCH & OUTLET BOX

Model Number: P122RN

Location: Main house

Dimensions:

Depth: 3.375"

Width: 2.25"

Available: Legrand/ Pass & Seymour

Switch & Outlet Box

P122RN



Single Gang, Deep Switch and Outlet Box, Reverse Angled Captive Mounting Nails on Each End, Two Quick/Click Entries on Each End. Extra deep for dimmers, GFCIs and thermostats, yet suitable for 2x4 construction. 100 pack.

features & benefits

- Durable, impact-resistant thermoplastic box.
- Threaded mounting holes.
- Innovative extras that cut installation time.
- Quick/Click feature secures devices quickly and easily.
- Does not strip when over-torqued.



specifications

General Info

Size: Deep
Type: new-work

Listing Agencies/Third Party Information

CSA Listing Info: No
CUL Listing No: No
cU Lus: No
cU Rus: No

Federal Spec: No
UL Listing No: Yes
U N SPS C: 39121308
U R: No

Dimensions

Depth U S: 3.375
Volume: 22.5
Width U S: 2.25

Technical Information

Mounting: Captive mounting nails

Buy American Act Compliance

Country of Origin: UNITED-STATES-OF-AMERICA
Buy American Act Status: Buy American Act Compliant



WIREWAY STRAIGHT SECTION COVER

Model Number: 6648 GRT NK

Type: 3R

UL 870 listed

Material: 16 gauge steel

Dimensions: 6" x 6" x 36"

Knockout Quantity: 15

Wiring Troughs Type 3R Screw Cover, Painted & Galvanized Data and Illustration Sheet



Finish

- Wash and phosphate undercoat or galvanized steel
- ANSI 61 gray acrylic electrocoat finish

Accessories

- Sealing devices
- Touch-up paint
- See Accessories section

Construction

- Wireway body and cover are fabricated from (16) gauge galvaneal steel for painted or galvanized steel
- Wireway body has embossed mounting holes on the back
- Wireway is available with or without knockouts on the bottom end only, (see table)
- Cover is held secure by sliding it under the top end flange and fastening it with plated screws on the bottom end flange
- Sealing screws and lances are located at each end of the wireway cover
- Wireway exceeding 72 inches in length has two covers, a removable center channel and body supports

Application

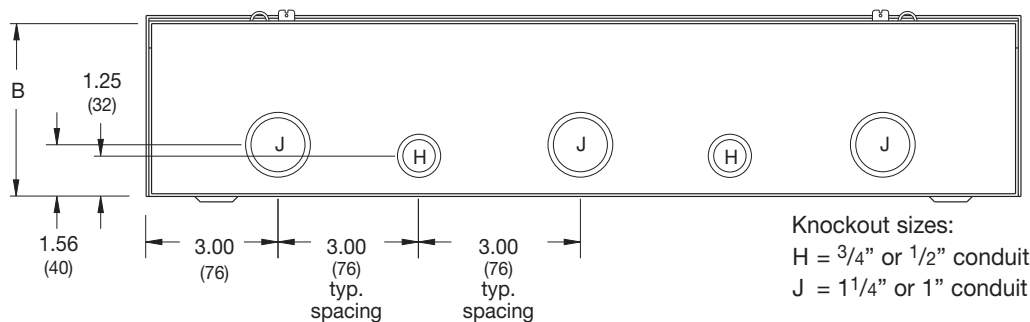
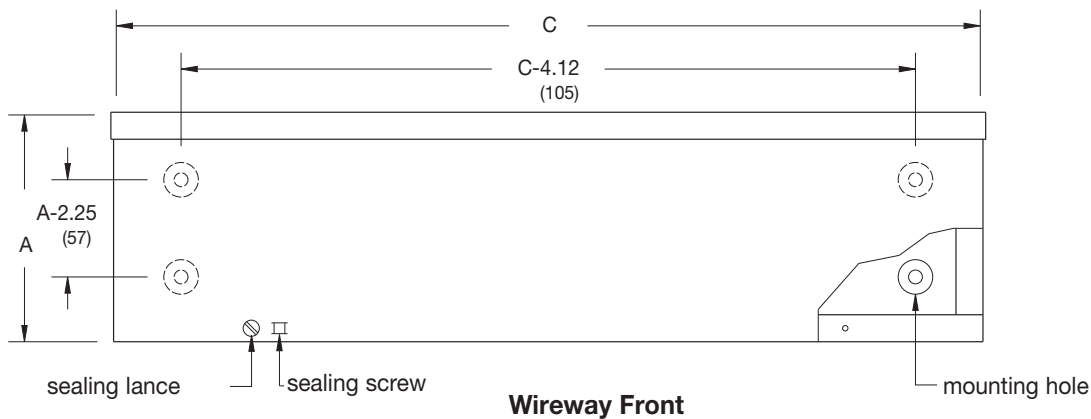
- Houses runs of control and power cable
- Used for cable and wire junction, distribution and termination

Standards

- UL 870 listed, Type 3R
- CSA C22.2 No. 26 certified, Type 3R
- Conforms to NEMA standard for Type 3R

Discount Schedule: A2

Subclass: AM1 & Z50



Notes: Cooper B-Line can provide special sizes, finishes and other modifications. Consult the factory for your special requirements.

Wiring Troughs Type 3R Screw Cover, Painted & Galvanized Catalog Number

Wireway Catalog Number				Wireway Size		Knockout Quantity
Painted		Galvanized		Height x Depth x Length		
KO	No KO	KO	No KO	A x B x C		
				in.	mm	
						Bottom
4412 GRT	4412 GRT NK	--	4412 GRTGV NK	4.00 x 4.00 x 12.00	102 x 102 x 305	3
4418 GRT	4418 GRT NK	--	--	4.00 x 4.00 x 18.00	102 x 102 x 457	5
4424 GRT	4424 GRT NK	--	4424 GRTGV NK	4.00 x 4.00 x 24.00	102 x 102 x 610	7
4436 GRT	4436 GRT NK	--	4436 GRTGV NK	4.00 x 4.00 x 36.00	102 x 102 x 914	11
4448 GRT	4448 GRT NK	--	4448 GRTGV NK	4.00 x 4.00 x 48.00	102 x 102 x 1219	15
4460 GRT	4460 GRT NK	--	4460 GRTGV NK	4.00 x 4.00 x 60.00	102 x 102 x 1524	19
4472 GRT	4472 GRT NK	--	4472 GRTGV NK	4.00 x 4.00 x 72.00	102 x 102 x 1829	23
--	4496 GRT NK	--	--	4.00 x 4.00 x 96.00	102 x 102 x 2438	31
--	44120 GRT NK	--	44120 GRTGV NK	4.00 x 4.00 x 120.00	102 x 102 x 3048	35
6612 GRT	6612 GRT NK	--	6612 GRTGV NK	6.00 x 6.00 x 12.00	152 x 152 x 305	3
6618 GRT	6618 GRT NK	--	6618 GRTGV NK	6.00 x 6.00 x 18.00	1152 x 152 x 457	5
6624 GRT	6624 GRT NK	--	6624 GRTGV NK	6.00 x 6.00 x 24.00	152 x 152 x 610	7
6636 GRT	6636 GRT NK	--	6636 GRTGV NK	6.00 x 6.00 x 36.00	152 x 152 x 914	11
6648 GRT	6648 GRT NK	--	6648 GRTGV NK	6.00 x 6.00 x 48.00	152 x 152 x 1219	15
6660 GRT	6660 GRT NK	--	6660 GRTGV NK	6.00 x 6.00 x 60.00	152 x 152 x 1524	19
6672 GRT	6672 GRT NK	--	6672 GRTGV NK	6.00 x 6.00 x 72.00	152 x 152 x 1829	23
--	6696 GRT NK	--	--	6.00 x 6.00 x 96.00	152 x 152 x 2438	31
--	66120 GRT NK	--	66120 GRTGV NK	6.00 x 6.00 x 120.00	152 x 152 x 3048	35
8812 GRT	8812 GRT NK	--	8812 GRTGV NK	8.00 x 8.00 x 12.00	203 x 203 x 305	3
8818 GRT	8818 GRT NK	--	--	8.00 x 8.00 x 18.00	203 x 203 x 457	5
8824 GRT	8824 GRT NK	--	8824 GRTGV NK	8.00 x 8.00 x 24.00	203 x 203 x 610	7
8836 GRT	8836 GRT NK	--	8836 GRTGV NK	8.00 x 8.00 x 36.00	203 x 203 x 914	11
8848 GRT	8848 GRT NK	--	8848 GRTGV NK	8.00 x 8.00 x 48.00	203 x 203 x 1219	15
8860 GRT	8860 GRT NK	--	8860 GRTGV NK	8.00 x 8.00 x 60.00	203 x 203 x 1524	19
8872 GRT	8872 GRT NK	--	8872 GRTGV NK	8.00 x 8.00 x 72.00	203 x 203 x 1829	23
--	8896 GRT NK	--	8896 GRTGV NK	8.00 x 8.00 x 96.00	203 x 203 x 2438	-
--	88120 GRT NK	--	88120 GRTGV NK	8.00 x 8.00 x 120.00	203 x 203 x 3048	-
--	101024 GRT NK	--	101024 GRTGV NK	10.00 x 10.00 x 24.00	254 x 254 x 610	-
--	101036 GRT NK	--	101036 GRTGV NK	10.00 x 10.00 x 36.00	254 x 254 x 914	-
--	101048 GRT NK	--	101048 GRTGV NK	10.00 x 10.00 x 48.00	254 x 254 x 1219	-
--	101060 GRT NK	--	101060 GRTGV NK	10.00 x 10.00 x 60.00	254 x 254 x 1524	-
--	101072 GRT NK	--	101072 GRTGV NK	10.00 x 10.00 x 72.00	254 x 254 x 1829	-
--	101096 GRT NK	--	101096 GRTGV NK	10.00 x 10.00 x 96.00	254 x 254 x 2438	-
--	1010120 GRT NK	--	1010120 GRTGV NK	10.00 x 10.00 x 120.00	254 x 254 x 3048	-
--	121224 GRT NK	--	121224 GRTGV NK	12.00 x 12.00 x 24.00	305 x 305 x 610	-
--	121236 GRT NK	--	121236 GRTGV NK	12.00 x 12.00 x 36.00	305 x 305 x 914	-
--	121248 GRT NK	--	121248 GRTGV NK	12.00 x 12.00 x 48.00	305 x 305 x 1219	-
--	121260 GRT NK	--	121260 GRTGV NK	12.00 x 12.00 x 60.00	305 x 305 x 1524	-
--	121272 GRT NK	--	121272 GRTGV NK	12.00 x 12.00 x 72.00	305 x 305 x 1829	-
--	121296 GRT NK	--	121296 GRTGV NK	12.00 x 12.00 x 96.00	305 x 305 x 2438	-
--	1212120 GRT NK	--	1212120 GRTGV NK	12.00 x 12.00 x 120.00	355 x 355 x 3048	-
--	1414148 GRT NK	--	1414148 GRTGV NK	14.00 x 14.00 x 48.00	355 x 355 x 1219	-

Notes: Dimensions are in inches. Millimeters shown are for reference only. Data subject to change without notice.



ROYAL JUNCTION BOX

Model Number: RJB88L

Location: Roof

Dimensions: 8"x 8"

131 Regalcrest Court
 Woodbridge, ON L4L 8P3
 Tel: (905) 856-7550
 Fax: (905) 856-4367
 Toll free: 1-800-263-2353

TECHNICAL SPECIFICATION

PVC Rigid Conduit Fittings Junction Boxes

SCOPE

This specification covers the requirements for Rigid PVC junction boxes. These boxes are certified to the Canadian Standards Association (CSA) standard C22.2 No. 40 and 94 and Underwriters Laboratories (UL) Standard 50.

MATERIALS

The PVC material used in the manufacture of junction boxes is UV and impact resistant.

MARKING

Junction box markings are as specified in CSA C22.2 No. 40 and 94 and UL 50.

BOX RATINGS

Royal PVC junction boxes are listed with UL as suitable for use in Type 1, 2, 3, 4 and 4X environments and CSA as suitable for use in Type 1, 2, 3, 4, 4X, 12 and 13 environments. Royal junction boxes also meet NEMA 250 for Type 1, 2, 3, 4 and 4X environments.

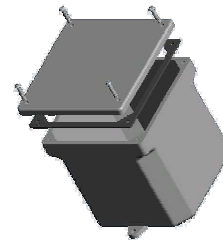
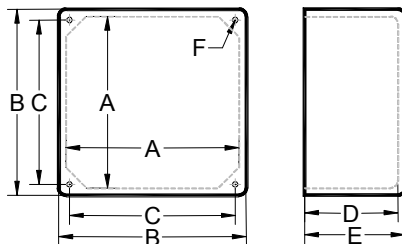
TEST REQUIREMENTS

Quality testing is as per Royal's Quality Control program and in accordance with CSA C22.2 No. 40 and 94 and UL 50.

BOX DIMENSIONS

Box dimensions are as per drawing and table.

Nominal Size (in)	Part Number (CAN)	A (in)	B (in)	C (in)	D (in)	E (in)	F
4 x 4 x 2	RJB442	3.675	4.000	3.450	2.000	2.125	8-32
4 x 4 x 4	RJB444	3.675	4.000	3.450	3.750	4.188	8-32
4 x 4 x 6	RJB446	3.675	4.000	3.450	6.000	6.225	8-32
5 x 5 x 2	RJB552	4.680	5.000	4.485	1.845	2.000	8-32
6 x 6 x 4	RJB664	6.000	6.375	5.813	4.000	4.188	10-32
6 x 6 x 6	RJB666	6.000	6.375	5.813	6.000	6.188	10-32
8 x 8 x 4	RJB884	8.075	8.625	7.996	4.005	4.230	1/4-20
8 x 8 x 7	RJB887	8.100	8.625	7.996	7.035	7.250	1/4-20
12 x 12 x 4	RJB12124	12.085	12.580	11.874	4.030	4.256	1/4-20
12 x 12 x 6	RJB12126	12.085	12.580	11.874	6.025	6.240	1/4-20
12 x 12 x 8	RJB12128	12.085	12.580	11.874	8.025	8.250	1/4-20





MILBANK 200 AMP RINGLESS METER MAIN

Model Number: U5898-0-200

Location: Approximately 5 feet above grade on North wall

200 Amp Main Breaker

Dimensions:

Depth: 4.5"

Width: 17"

Height: 34.5"



More saving. More doing.

Your Store: Williston #4501 (Change)

Tool & Truck Rental | Get it Installed | For the Pros | Gift Cards | Help | Cart

Store Finder | Local Ad | Credit Center | Savings Center

Shop By Department

Search All What can we help you find?



Project: How-To

Sign In or Register Your Account

Home



Milbank 200 Amp Ringless Overhead/Underground Meter Socket

Model # R7040-XL-TG Store SKU # 762787

Write The First Review

\$44.97 / each

This item cannot be shipped to the following state(s): AK, GU, HI, PR, VI

Store Only

Buy Online, Pick Up In Store Today Check Store Inventory

Quantity: 1

Item must be picked up in store

Pick Up In Store Free

Available for Pick Up: TODAY 4 in stock at Williston ...

+ ADD TO CART

+ ADD TO MY LIST

Product Overview Specifications Customer Reviews Shipping Options

PRODUCT OVERVIEW

For the installation of a power consumption measurement device, the Milbank 200 Amp Ringless Overhead/Underground Meter Socket is equipped with #6-350 kcmil line-side and load-side lay-in lugs and a single equipment ground. Designed for outdoor applications, this steel enclosure is NEMA type-3R, rated with a powder-coat finish.

- Outdoor type-3R enclosure with a pre-galvanized steel shell and a powder-coat finish
Hub opening accepts 1 - 2-1/2 in. hub or closing plate (closing plate included)
Concentric knockouts for 2-1/2 in. maximum conduit size
Rated for 200 Amp s continuous, 250 Amp s maximum and up to 600 VAC
UL listed for safety
Must be installed by a licensed electrician
Includes #6-350 kcmil line-side and load-side lay-in lugs and a single equipment ground
Up to 600 volt AC rated
UL listed
MFG Model # : R7040-XL-TG
MFG Part # : R7040-XL-TG

Info & Guides

Warranty

You will need Adobe Acrobat Reader to view PDF documents. Download a free copy from the Adobe Web site.

Return To Top

SPECIFICATIONS

Table with 4 columns: Specification Name, Value 1, Specification Name, Value 2. Rows include Assembled Depth, Assembled Width, Electrical Product Type, Manufacturer Warranty, Number of Gangs, Number of phases, Product Height, Product Width, Assembled Height, Certifications and Listings, Main Breaker, Maximum Amperage, Number of Spaces, Product Depth, Product Weight, and Service feed type.

CUSTOMERS WHO VIEWED THIS ITEM PURCHASED...



\$178.00

OPTIX 48 in. x 96 in. x 1/4 in. Clear Acrylic Sheet-Glass

5 stars (5)

+ ADD TO CART



\$97.96

48 in. x 96 in. x 1/8 in. Acrylic Sheet

5 stars (3)

+ ADD TO CART



\$167.00

LEXAN 48 in. x 96 in. x .113 in. Clear Polycarbonate Sheet

5 stars (3)

+ ADD TO CART



SINGLE PHASE MAIN CIRCUIT BREAKER BR4040B200

Model Number: BWH25KAIC
Location: Auxiliary Bedroom
Size: L1
200 Amp Main Breaker
40 breaker slots

3-48 Loadcenters & Circuit Breakers

Cutler-Hammer

January 2001
Vol. 1, Ref. No. [0064]

Type BR

3-Phase — Main Circuit Breaker Loadcenters 10,000/22,000/100,000 Amperes Interrupting Capacity

Table 3-72. 3-Phase 4-Wire — 208Y/120V AC or 240V AC Insulated/Bondable Neutral

Main Breaker Type	Main Ampere Rating	Maximum Number 1-inch (25.4 mm)		Enclosure Type	Box Size	Wiring Diagram Figure Number	Wire Size Range Cu/Al 60°C or 75°C for Main Breaker	Loadcenter Catalog Number ^{①②}		Price U.S. \$
		Spaces	Poles					With Combination or NEMA Type 3R Cover	With Surface Cover	
BR 10 kAIC	100	12	24	Indoor Outdoor	C1 C1R	65	#4 – 1/0	3BR1224B100	3BR1224B100S	625.
		12	24					3BR1224B100R ^③	—	710.
CC 10 kAIC	125	30	42	Indoor Outdoor	L1 L1R	41	#1 – 2/0	3BR3042B125	3BR3042B125S	1,160.
								150	30	42
	3BR3042B150R ^③	—	1,335.							
	200	30	42	Indoor Outdoor	L1 L1R	41	#1 – 250 kcmil	3BR3042B200	3BR3042B200S	1,215.
								3BR3042B200R ^③	—	1,340.
		42	42	Indoor Outdoor	L2 L2R	43	43	3BR4242B200	3BR4242B200S	1,285.
								3BR4242B200R ^③	—	1,575.
	225	42	42	Indoor Outdoor	L2 L2R	43	#1 – 300 kcmil	3BR4242B225	3BR4242B225S	1,345.
3BR4242B225R ^③								—	1,695.	

- ① All main circuit breaker loadcenters are listed for use as service entrance equipment and are shipped with a neutral bonding strap pre-attached (commercial loadcenters do not have a pre-attached bonding strip). The maximum main rating of the panel is the main circuit breaker rating when used as service entrance equipment.
- ② Ground bar kits priced separately. See **Page 3-61**.
- ③ Rainproof loadcenters are furnished with hub closure plates. For rainproof hubs, refer to **Page 3-60**.

Table 3-73. 3-Phase, 4-Wire — 208Y/120V AC or 240V AC Insulated Bondable Neutral

Main Breaker Type	Main Ampere Rating	Maximum Number 1-inch (25.4 mm)		Enclosure Type	Box Size	Wiring Diagram Figure Number	Wire Size Range for Main Cu/Al	Loadcenter Catalog Number ^{④⑤}		Price U.S. \$
		Spaces	Poles					With Combination Cover	With Surface Cover	
BRH 22 kAIC ^⑥	100	12	24	Indoor	C1	65	#4 – 1/0	3BR1224H100	3BR1224H100S	791.
CHH 100 kAIC ^⑦	150	30	42	Indoor	L1	41	#1 – 250 kcmil	3BR3042H150	3BR3042H150S	1,465.
CHH 100 kAIC ^⑦	200	30	42	Indoor Indoor	L1 L2	41 43	#1 – 250 kcmil	3BR3042H200	3BR3042H200S	1,475.
								3BR4242H200	3BR4242H200S	1,570.

- ④ All main circuit breaker loadcenters are listed for use as service entrance equipment and are shipped with a neutral bonding strap pre-attached (commercial loadcenters do not have a pre-attached bonding strip). The maximum main rating of the panel is the main circuit breaker rating when used as service entrance equipment.
- ⑤ Ground bar kits priced separately. See **Page 3-61**.
- ⑥ 22,000 AIC series combination rating is obtained when Types BD, BR, BQ, BQC and GFCB branch breakers are used with BRH main.
- ⑦ 100,000 AIC series combination rating is obtained when Types BD, BR, BQ, BQC and GFCB branch breakers are used with CHH main.

Box Sizes..... **Pages 3-76 through 3-78**
 Wiring Diagrams **Pages 3-79 through 3-88**
 Discount Symbol **22-CD**



For more information contact Cutler-Hammer at: www.ch.cutler-hammer.com/catalog

CAT.200.01.T.E

Cutler-Hammer

January 2001
Vol. 1, Ref. No. [0055]

Loadcenters & Circuit Breakers

3-39

Type BR

Application Description

Loadcenter Construction

Cutler-Hammer Type BR loadcenters have standard tin-plated aluminum bus with a limited availability of copper bus. The sum of the handle ratings connected to any stab is limited to 150 amperes maximum on the 100 and 125 ampere loadcenters, and 200 amperes on loadcenters with 150 ampere or higher main bus. NEMA Type 1 boxes or enclosures are manufactured from galvanized steel. Raintight boxes are manufactured from galvanized steel, then finished using an electrostatic powder coat, baked urethane paint process.

Neutrals

Cutler-Hammer Type BR loadcenters have three types of neutrals:

Factory Bonded Split Neutrals

Certain single-phase main circuit breaker panels are supplied with a factory-bonded twin neutral. When used as a sub panel, the bonding strap should be removed, and the bonding screw should be reinstalled. The bonded side is now the ground, and the un-bonded side is the neutral. When used as a service entrance panel, the unused neutral holes on either side may be used for terminating ground wires.

Insulated Split Neutrals

Most single-phase panels (12 circuit and greater) are supplied with a twin neutral with an insulated cross strap. These panels are shipped in an un-bonded state. For service entrance applications, the neutral must be bonded utilizing the bonding strap supplied with the panel. For sub-feed applications, the panel may be installed as is. Separate ground bars are provided on these panels.

Single Neutral

Single-phase 2-8 circuit, three-phase and commercial loadcenters are supplied with a single insulated/bondable neutral. The three-phase loadcenter neutral is movable to the other side if desired. The neutral is bondable in the field by means of a bonding strap that is supplied with each loadcenter. For sub-feed applications, a separate ground bar must be used. In a service entrance application, where the neutral is bonded, unused neutral connections may be used for equipment ground protectors.

Grounds

In service entrance applications where the neutral is bonded, unused neutral holes may be used for terminating ground conductors. In sub-feed panels, the neutral must be isolated (non-bonded), and ground wires must be terminated on a separate ground bar.

The Factory Bonded Split Neutral panels have sufficient terminations for both ground and neutral conductors. The Insulated Split Neutral panels are supplied with a separate factory-installed ground bar if the catalog number contains a "G." If not, a separate ground bar should be installed. Insulated/Bondable Single Neutral panels are supplied without a ground bar (unless otherwise noted), and ground bar kits if needed must be purchased separately.

Neutral and Ground Terminals

The standard terminals on grounds and neutrals are rated to accept (3) — #14 — #10 Cu/Al or (1) — #14 — 4. For larger cables, add-on neutral lugs may be ordered from the accessories on **Page 3-61**.

Note: NEC allows only one current carrying conductor per hole on neutrals unless otherwise noted.

Bottom Fed Loadcenters

Where power cable is brought into the loadcenter from below the panel, main lug panels, and single-phase, 225 ampere and below loadcenters can be rotated 180 degrees to allow straight-in wiring of power cables to the main terminals. Because the main circuit breaker handle operates horizontally, the orientation of the main circuit breaker handle is consistent with the requirements of NEC Article 240-81.

Gutter Splicing

Loadcenters are not UL listed as wiring troughs. Therefore, gutter splicing of riser cables to tap off to the main device is not permitted. Refer to NEC article 373-8.

Fire Rating

Due to the numerous openings in both loadcenter boxes and trims, they should not be mounted in firewalls. There is no approved method for sealing the enclosures for this application.

Date Code

The date of manufacture of each loadcenter is printed on the outside of the carton as well as inside the loadcenter. On the carton, the date code is printed on the end carton label. In the loadcenter, the date code is located on the small white label located on the right side wall (with the main device on top).

The date code is in the following format: F # # # &. The "F" is the numeric code for the Lincoln, IL plant, and the three numbers are the year and week of manufacture e.g., 023. The "&" sign at the end signifies the decade of the 2000s. Therefore, the date code F023& would indicate that the product was manufactured in the 23rd week of 2000. The 1980s are represented by a "+" sign and the 1990s are represented by a "=" at the end of the code.

Surge Protectors

The BRSURGE Surge Protector has indicating lights that indicate when the units should be replaced. The CHSA01 and CHSA03 Surge Protectors internally short, causing the circuit breaker feeding the surge protector to trip. All but the BRSURGE Surge Protector should be wired to the load side of 15 or 20 ampere feeder circuit breakers mounted adjacent to the main incoming device.

The CHSPCH Cutler-Hammer Home Surge Protector is an externally mounted TVSS unit that provides industrial level surge protection in a residential design.

Circuit Breaker Case Interrupting Capacity

- 10,000 AIC Black
- 22,000 AIC Gray

Extended Residential Warranty Highlights

Note: See Cutler-Hammer Publication Number SA-365 for complete details.

- Five-year branch breaker warranty.
- Five-year loadcenter warranty.
- Both the loadcenter and branch circuit breaker warranties are extended to 10 years if a functioning surge protector is installed in the loadcenter.

Standards and Certifications

UL Listings

All Cutler-Hammer Type BR loadcenters are listed under UL file E52977 except the 2 – 8 circuit loadcenters, up through and including 125 amperes, which are listed under UL file E8741.

3



3-40 Loadcenters & Circuit Breakers

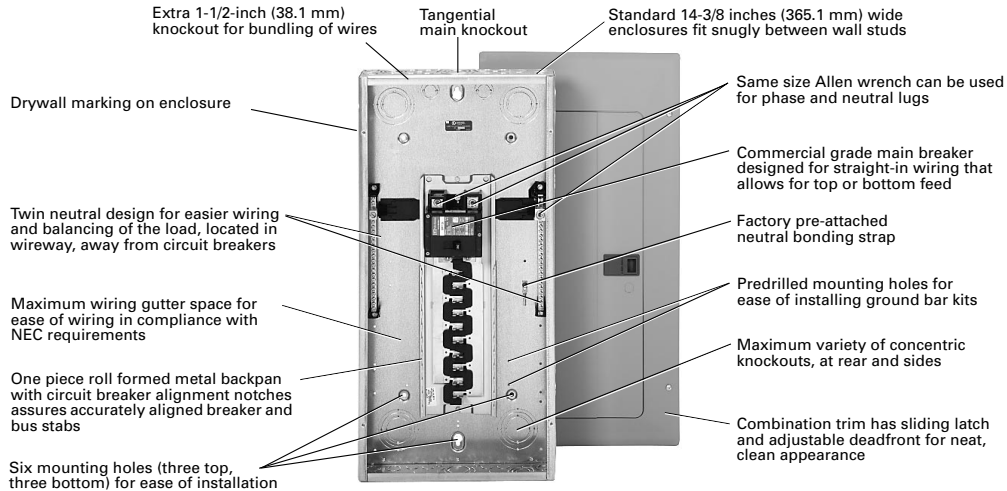
Cutler-Hammer

January 2001
Vol. 1, Ref. No. [0056]

Type BR

Features, Benefits and Functions

3



Product Selection

Table 3-64. BR Loadcenter Selection Chart

Service	<ul style="list-style-type: none"> Single-phase, three-wire, 120/240V AC 	<ul style="list-style-type: none"> Three-phase, four-wire, 208Y/120V AC Three-phase, three-wire, 240V AC delta
Short Circuit Current Rating	<ul style="list-style-type: none"> 10,000 AIC: All single- and three-phase loadcenters 70 through 225 amperes, 8 to 42 circuits. 22,000 AIC: All convertible loadcenters using 125 amperes rated Type BRH main breakers or selected factory installed 125 ampere rated Type BRH main breaker. 	<ul style="list-style-type: none"> 25,000 AIC: All convertible and factory installed single-phase loadcenters rated 150 and 200 amperes using Type BWH main breakers.
Main Breaker/Main Lug Loadcenters	<p>Single-Phase</p> <ul style="list-style-type: none"> Main Breaker: 100, 125, 150, 200, 225, 400, 600 amperes. Main Lugs: 70, 125, 150, 200, 225, 400, 600 amperes. 	<p>Three-Phase</p> <ul style="list-style-type: none"> Main Breaker: 100, 125, 150, 200, 225, 400, 600 amperes. Main Lugs: 100, 125, 150, 200, 225, 400, 600 amperes.
Convertible Loadcenters	<ul style="list-style-type: none"> Main Breaker: Single-phase up to 200 amperes and three-phase up to 225 amperes Main Lugs: Single-phase up to 200 amperes and three-phase up to 150 amperes 	
Branch Breakers	<ul style="list-style-type: none"> Types BR, BRH, and BRH: 10 to 125 amperes. One-, two-, and three-pole. Selected amperages available in switching duty, HACR, shunt trip, and high magnetic setting. Type GFCB: 15 to 50 amperes. One- and two-pole ground fault breakers. Types BJ, and BJH: 125 to 225 amperes Two- and three-pole. Type BD Twin: 10 to 50 amperes Two of one-pole. Take one 1-inch (25.4 mm) space. 	<ul style="list-style-type: none"> Type BQ and BQC Multibreaker: 15 to 30 amperes. Two of two-pole or one two-pole and two one-pole. Takes two 1-inch (25.4 mm) spaces. Type BRW: 15 to 30 amperes. Two-pole water heater breakers. Type BRSN: 15 to 30 amperes. Two-pole switching neutral breakers. Type BR 15 to 100 amperes. Two-pole, 240V AC delta breakers. BR-AFCI arc fault circuit interrupter.
Enclosures	<ul style="list-style-type: none"> NEMA Type 1 indoor. NEMA Type 3R outdoor. 	<ul style="list-style-type: none"> Meets or exceeds UL requirements for indoor or outdoor applications
Loadcenter and Breaker Accessories	<ul style="list-style-type: none"> Branch Circuit Breaker Auxiliary components. Hold Down Kits. Handle ties. Lockoffs. Lockdogs. Complete Line of Ground Bar Kits 5, 10, 14, and 21 circuit, some with additional #2/0 lugs. Each terminal will accommodate: (3) #14 - #10 Cu/Al or (1) #14 - #4 Cu/Al Main and Sub-feed Lugs 125, 150, 225 amperes — two- and three-pole. Shunt Trips 	<ul style="list-style-type: none"> Surge Protection <ul style="list-style-type: none"> Single-phase plug-on surge protector. Single-phase bottle type surge protector. Three-phase bottle type surge protector. Single-phase whole home surge protector. Universal Rainproof Conduit Hubs <ul style="list-style-type: none"> Group One: 3/4, 1, 1-1/4, 1-1/2, 2 inches (19.1, 25.4, 31.8, 38.1, 50.8 mm) Group Two: 2, 2-1/2, 3 inches (50.8, 63.5, 76.2 mm) Adapter plate.
Bussing	<ul style="list-style-type: none"> Tin-plated aluminum as standard. Some copper bus panels available. 	



For more information contact Cutler-Hammer at: www.ch.cutler-hammer.com/catalog

CAT.200.01.T.E

Cutler-Hammer

January 2001
Vol. 1, Ref. No. [0059]

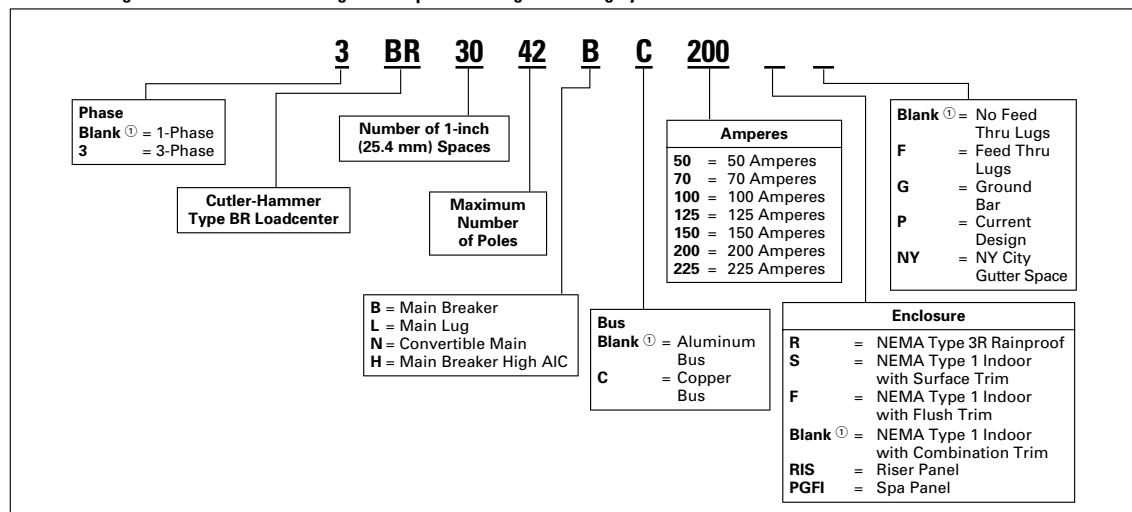
Loadcenters & Circuit Breakers

3-43

Type BR

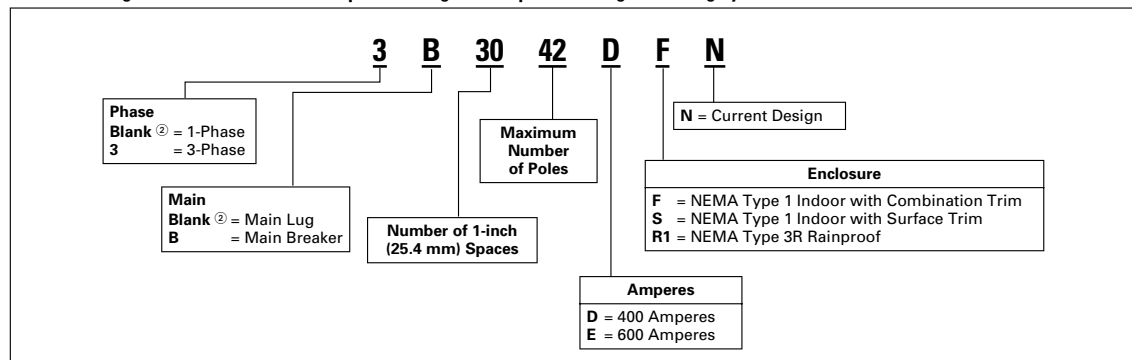
Product Selection

Table 3-65. Single- and Three-Phase Through 225 Amperes Catalog Numbering System



① No character space used.

Table 3-66. Single- and Three-Phase 400 Amperes Through 600 Amperes Catalog Numbering System



② No character space used.

Example No. 1: BR1224L125G

1-Phase Cutler-Hammer Type BR Loadcenter Rated at 125 Amperes with Main Lugs, 12 Spaces Allowing 24 Poles, Indoor Combination Enclosure, Aluminum Bus, and Ground Bar.

Example No. 2: BR24L70RP

1-Phase Cutler-Hammer Type BR Loadcenter Rated at 70 Amperes with Main Lugs, 2 Spaces Allowing 4 Poles, Rainproof Enclosure with Aluminum Bus.

Example No. 3: 3B4242EFN

3-Phase Cutler-Hammer Type BR Loadcenter Rated at 600 Amperes with Main Breaker, 42 Spaces Allowing 42 Poles, Indoor Combination Enclosure.



MILBANK RINGLESS METER SOCKET

Model Number: U5898-0-200

Location: Approx. 5 feet above grade on north wall

200 Amp Main Breaker

Dimensions:

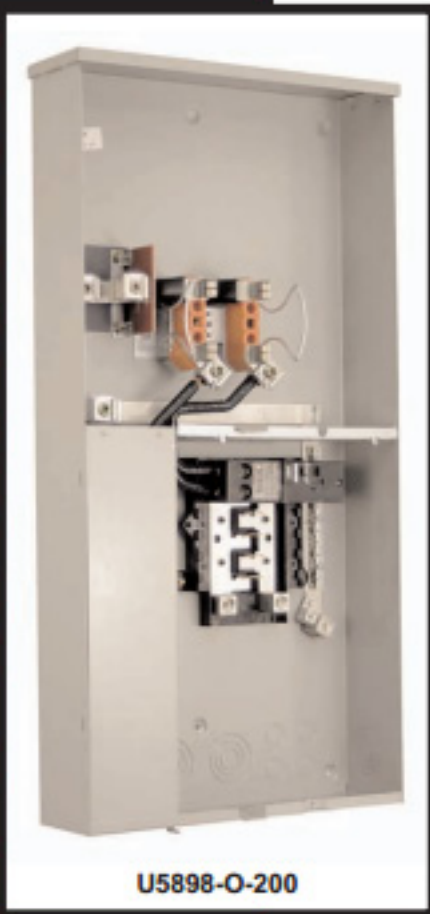
Depth: 4.5"

Width: 17"

Height: 34.5"

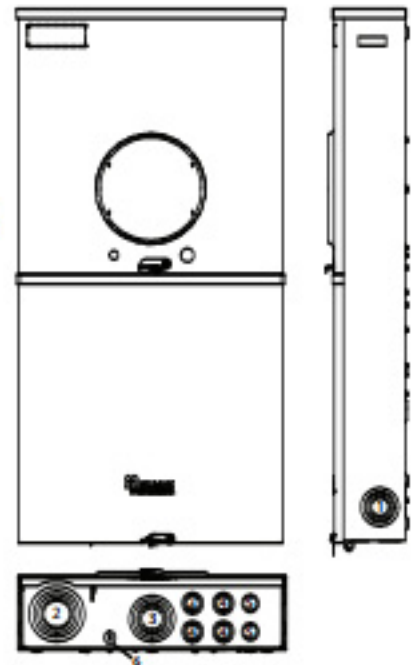
200 Amp Ringless Meter Main

U5898-O-200



U5898-O-200

- 200 amp continuous rating
- 200 amp Siemens main breaker
- Side wireway for easy underground installation
- 4-terminal, 1Ø3W
- Rated 22K AIC
- Universal 8-circuit copper interior breaker panel
- Sub-feed lugs included



200 AMP METER MAIN WITH BREAKERS — 1 Ø3W — RINGLESS — 120/240V

CATALOG NUMBER	SERVICE	CONNECTORS CU/AL		DIMENSIONS			CONCENTRIC K.O.'S					
		LINE	LOAD	D*	W*	H*	1	2	3	4	5	6
U5898-O-200	UG	#6-350 kcmil	#6-350 kcmil	4½	17	34½	2	3	2½	1	½,¾	¼,½

FIFTH TERMINAL: For field-installed fifth terminal, order separately catalog number **K5T**. Available with factory-installed fifth terminal – add suffix **-5T9** for 9:00 position. Can be rotated to 6:00 position.

INTERLOCK KIT: For generator auxiliary circuit breaker interlock for large frame **QN** with small frame **Q** order **K5815**; for large frame **QN** with large frame **QN** order **K5820**.

816.483.5314 phone

816.483.6357 fax

www.milbankmfg.com

5898 03/10 (600)



MILBANK



SINGLE PHASE MAIN CIRCUIT BREAKER BR4040B200

Model Number: BWH25K or equal

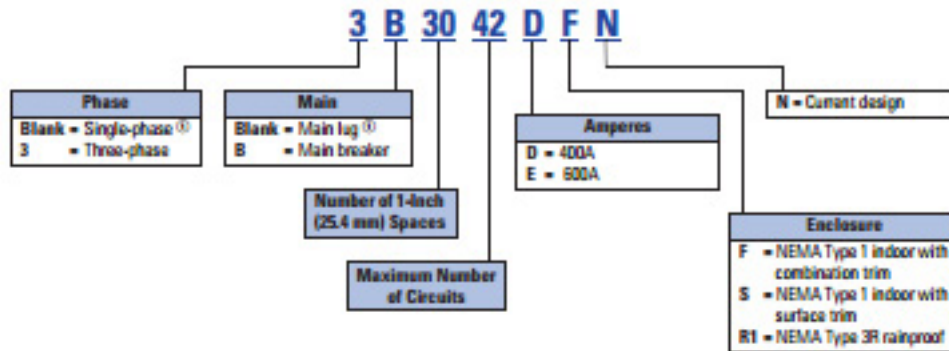
Location: Main house

Size: L1

Amperage Rate: 200

Available: Eaton

Single- and Three-Phase 400–600A



Example No. 1: BR1224L125G

Single-phase Type BR loadcenter rated at 125A with main lugs, 12 spaces allowing 24 poles, indoor combination enclosure, aluminum bus and ground bar.

Example No. 2: BR24L70RP

Single-phase Type BR loadcenter rated at 70A with main lugs, two spaces allowing four poles, rainproof enclosure with aluminum bus.

Example No. 3: 3B4242EFN

Three-phase Type BR loadcenter rated at 600A with main breaker, 42 spaces allowing 42 poles, indoor combination enclosure.

Product Selection

Single-Phase—Main Circuit Breaker Loadcenters—10/25 kAIC

BR4040B200


Single-Phase, Three-Wire—120/240 Vac—Factory-Bonded Split Neutral

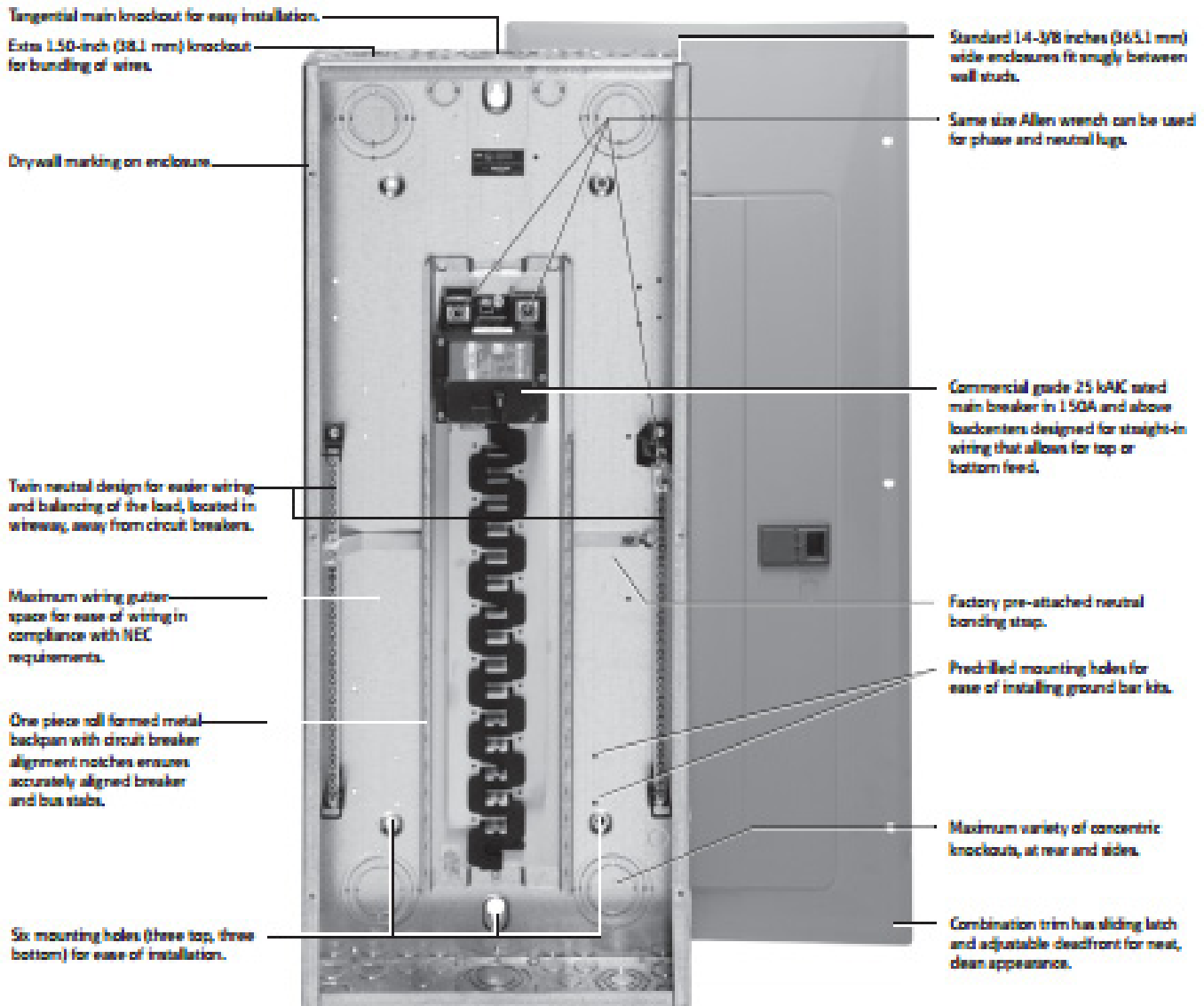
Main Breaker Type	Main Ampere Rating	Maximum Number 1-inch (25.4 mm) Space		Enclosure Type	Box Size	Wire Size Range Cu/Al 60°C or 75°C for Main Breaker	Loadcenter Catalog Number with Combination Cover ②
BR 10 kAIC	100	20	20	Indoor	C2	#4–1/0	BR2020B100
	100	16	24	Indoor	C1		BR1624B100
BWH 25 kAIC	150	30	30	Indoor	G1	#2–300 kcmil	BR3030B150
	200	20	40	Indoor	D1	#2–300 kcmil	BR2040B200
	200	30	40	Indoor	G1		BR3040B200
	200	40	40	Indoor	L1		BR4040B200

Notes

- ① No character space used.
- ② Combination style covers may be used in surface or flush applications.

All main circuit breaker loadcenters are listed for use as service entrance equipment. Loadcenters are factory-bonded for service entrance applications. Remove bonding strap for separate neutral and ground bars for sub-feed applications.

Type BR Loadcenter — BR4040B200



Single-Phase Three-Wire — 120/240 Vac — Insulated/Bondable Neutral



Main Breaker Type	Main Ampere Rating	Maximum Number 1-inch (25.4 mm) Spaces		Enclosure Type	Box Size	Wire Size Range Cu/Al 60°C or 75°C for Main Breaker	Loadcenter Catalog Number with Combination (1) or NEMA Type 3R Cover				
		Circuits	Circuits								
BR100 10 kAIC	100	8	18	Indoor	B1	#4–1/0 (2)	BR100100				
			20	Indoor	A1		BR1000100S11				
			30	Indoor	A1		BR1000100F11				
		10	30	Outdoor	B2R		BR1000100RF (3)(4)				
			12	12	Indoor		B2	BR12120100			
			20	Indoor	B2		BR12200100				
		12	24	Outdoor	B2R		BR12240100R (5)				
			18	18	Indoor		C1	BR16160100			
			20	Indoor	C1		BR16200100				
		18	24	Outdoor	C1R		BR16240100R (6)				
			20	24	Outdoor		C3R	BR20240100R (6)			
			30	30	Indoor		(8)	(8)			
		125	125	18	24		Indoor	C1	#4–3/0	BR16240125	
					20		Indoor	C1		BR20240125	
					20		Outdoor	C3R		BR20240125R (4)	
BRH (8)	22 kAIC	20	24	Indoor	C2	#4–1/0	BR2024H100 (8)				
BR200 25 kAIC	150	8	18	Outdoor	C3R	#2–300 kcmil	BR200150RF (10)(11)				
			18	30	Indoor		C4	BR16300150			
			30	30	Indoor		C4	BR20300150			
		20	30	Outdoor	D1R		BR20300150R (9)				
			20	40	Indoor		D1	BR20400150			
			20	40	Outdoor		D1R	BR20400150R (9)			
		24	30	Indoor	D1		BR24300150				
			30	30	Outdoor		D1R	BR20300150R (4)			
			30	40	Indoor		D1	BR20400150			
		200	200	4	8		Outdoor	BR	#2–300 kcmil	BR400200RF (10)(11)	
					8		18	Outdoor		C3R	BR2100200RF (10)(11)
				18	32		Indoor	C4		BR16320200	
					20		40	Outdoor		D1R	BR20400200R (9)
					24		40	Indoor		D1	BR24400200
				30	40		Outdoor	D1R		BR20400200R (9)	
					40		40	Outdoor		L1R	BR40400200R (9)
		225	225	42	42		Indoor	L2	#1–250 kcmil	BR42420225	
					42		42	Outdoor		L2R	BR42420225R (4)

Notes

- (1) Combination style covers may be used in surface or flush applications.
- (2) Wire range size for BR10000100SP is #6–#1 Cu/Al.
- (3) Includes through-feed lugs for both phase and neutral conductors.
- (4) Rainproof panels are furnished with hub closure plates. For rainproof hubs, refer to Page V1-T1-32.
- (5) See copper bus offering, Page V1-T1-30.
- (6) 22 kAIC series combination rating is obtained when Types BD, BR, BQ, BOC and GFCB 10 kAIC branch breakers are used in series with Type BRH main breaker.
- (7) 25 kAIC series combination rating is obtained when Types BD, BR, BQ, BOC and GFCB 10 kAIC branch circuit breakers are used in series with Type BRH main breaker.
- (8) Supplied with adapter plate to use OS Group1 hubs on Page V1-T1-32. If 2.50-inch (63.5 mm) hub is needed, remove adapter and use ARPO0007CH2S hub.
- (9) Neutral is bonded—suitable for service entrance only—cannot be converted for sub-feed application.

All main circuit breaker loadcenters are listed for use as service entrance equipment and are shipped with neutral bonding strap preattached. The maximum rating of the panel is the main circuit breaker rating when used as service entrance equipment. Ground bar lugs priced separately. See Page V1-T1-32.



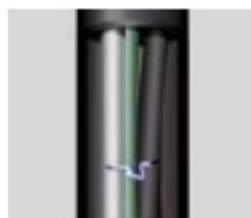
QO ARC FAULT CIRCUIT BREAKER

Model Number: QO120CAFIC
Amps: 20

QO Circuit Breakers – AFCI



Series Arc Fault



Parallel Arc Fault

> New Technology Designed for Safety

The Square D brand Arc Fault Circuit Interrupter (AFCI) is designed to detect arcs that are caused by damaged, aged or improperly used wires or cords and to disconnect the power. In addition, they can also detect overloads and short circuits.

Arc faults cannot be detected by standard circuit breakers or fuses and have been identified as an early event in the cause of many electrical fires. These electrical arcs may be as hot as 10,000°F and can easily ignite combustible materials located nearby such as wood frames, insulation, etc.

Square D brand AFCIs will fit into our existing load centers and can be used as a direct replacement for standard circuit breakers for remodeling or as direct installation items with the exception of ground fault circuit interrupters (GFCI).

The 2008 National Electrical Code requires that combination AFCIs be installed on all circuits that supply a dwelling unit living area. Arc Faults can occur on any type of circuit where you may have wire that has deteriorated insulation or has been damaged (such as during pulling, service or installation) or in worn extension or appliance cords. For more information, visit www.SquareD.com/afci or www.afcisafety.org.



AFCI Breakers

- UL Listed, CSA Approved
- 120/240 Vac
- 10,000 AIR
- Branch feed AFCI:
 - Green Reset Button
- Combination AFCI:
 - White Reset Button

Arc Fault Circuit Interrupters* Visi-Trip Indicator

Amps	1-Pole Catalog #	UPC Code
15	QO115AFIC	7-85901-90133-2
20	QO120AFIC	7-85901-90134-9

Combination Arc Fault Circuit Interrupters* Visi-Trip Indicator

Amps	1-Pole Catalog #	UPC Code
15	QO115CAFIC	7-85901-61044-1
20	QO120CAFIC	7-85901-69818-0



QO120AFIC

QO120CAFIC

* "C" denotes Clam Shell packaging. All 15A and 20A single-pole arc fault circuit interrupters are UL listed and can be used on circuits requiring standard QO or Homeline circuit breakers. AFCI circuit breakers cannot be used on circuits requiring GFCI breakers.



CONVENIENCE RECEPTACLE

Model: BR20W-L or equal

Tamper resistant, in compliance with NEC 406.12

Weather resistant, in compliance with NEC 406.9 (A) and (B)



Tamper & Weather Resistant Receptacles

Proven safety solutions for compliance with 2011 National Electrical Code® requirements

COOPER Wiring Devices



2011 NEC® Receptacle Requirements

Code compliant protection from electrical injury

The 2011 National Electrical Code has been updated to ensure proper receptacle safety in Dwelling Units, Guest Suites, and Child Care facilities.

2011 NEC® Requirements for Receptacles

406.12 Tamper Resistant Receptacles in Dwelling Units

All non-locking type 15A and 20A, 125V receptacles in a dwelling unit (210.52) must be Listed as Tamper Resistant, excluding the following locations:

- Receptacles located more than 5 ½ ft above the floor
- Receptacles that are part of a luminaire or appliance
- Receptacles located within dedicated space for an appliance that in normal use isn't easily moved
- Non-grounding receptacles used for replacements as permitted in 406.4(D)(2)(a)

406.13 Tamper Resistant Receptacles in Guest Rooms and Guest Suites

All non-locking type 15A and 20A, 125V receptacles in guest rooms and guest suites must be Listed as Tamper Resistant.

406.14 Tamper Resistant Receptacles in Child Care Facilities

All non-locking type 15A and 20A, 125V receptacles in child care facilities (406.2) must be Listed as Tamper Resistant.

406.9 Weather Resistant Receptacles

All 125 and 250 volt, 15 and 20 ampere non-locking receptacles shall be Listed as weather resistant type in damp and wet locations.

- Weather protective covers alone do not guarantee protection against potential exposure; in damp and wet locations weather resistant receptacles in weather protective covers must be used.
- Outdoor weather resistant receptacles must provide resistance to temperature extremes, excessive ultraviolet light and the effects of aging.
- UL Listed devices must have a "WR" marking clearly visible when installed.



Each year, more than 2,400 children are injured by inserting foreign objects into receptacles.

According to a 10-year study of National Electronic Injury Surveillance System (NEISS) data.



"TR" mold mark provides quick visual confirmation of tamper resistance when installed.



"WR" identifier quickly indicates during inspections that a weather resistant device has been installed.



Both the "TR" mold mark and "WR" identifier are clearly visible in the finished installation, indicating double-layer protection for maximum safety.



Tamper Resistant Receptacles

Tamper Resistant receptacles feature a built-in UL Listed safety shutter system that prevents the insertion of foreign objects into the receptacle openings. The safety shutters will only open when a two-bladed plug presses simultaneously against the two shutters.



TR Receptacle Internal Components: Receptacle openings are restricted by internal shutters (show above).



Blocked Insertion: Insertion of object in any one side will not open shutters.



Successful Insertion: Insertion of two-bladed plug at the same time will open shutters.



Weather Resistant Receptacles

Weather Resistant receptacles offer protection from rain, snow, ice, moisture, & humidity when properly installed in an approved weather protective or while-in-use cover. The design of the Weather Resistant receptacles is distinctive because of the durable nylon housing and corrosion resistant metal components. Combine WR receptacles with any of our WeatherBox™ While-in-Use Protective Covers for tough protection against the elements in any residential or commercial outdoor application.



Weather Resistant Receptacles with corrosion resistant metal components



WeatherBox Cast Aluminum While-in-Use Protective Cover, Single-Gang



WeatherBox Polycarbonate While-in-Use Protective Cover, Single or 2-Gang



Tamper & Weather Resistant Receptacles

Tamper and Weather Resistant Receptacles provide both tamper resistant safety and ensure weather resistance in wet and damp outdoor locations.

Areas that demand the use of Tamper & Weather Resistant Receptacles include:



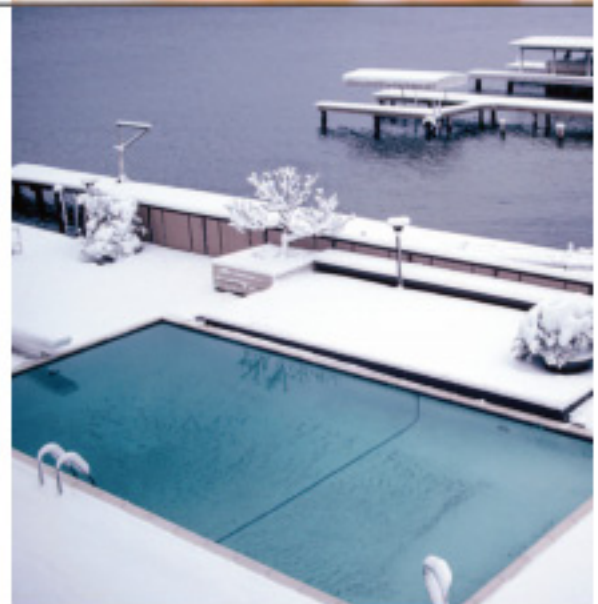
Homes & Apartments



Assisted Living Facilities & Retirement Communities



Public Facilities & Recreational Areas



TR Receptacles

Project Name:	Prepared By:
Project Number:	Date:
Catalog Number:	Type:



Tamper Resistant Receptacles

2-Pole, 3-Wire
15A, 125V/AC
20A, 125V/AC



Single & Duplex Receptacles

FEATURES

- Provides compliance with 2011 NEC® Articles 406.12 – 406.14 for Tamper Resistant Receptacles.
- “TR” designation provides visual identification.
- Side-wire terminals accept up to #10 solid or stranded wire.
- Push-in terminals accept #14 solid wire (TR270, TR1107, TR780, & 9500TR duplex devices only).
- Automatic grounding system eliminates need for bonding jumper in grounded metal enclosure, provides redundant measure of ground continuity where jumper used (TRCR only).
- Durable impact-resistant thermoplastic face and back body is virtually unbreakable.

Residential Grade, Single and Duplex



A	V/AC	NEMA	Description	Catalog No.	Available Colors
15A	125V	5-15R	Duplex Receptacle	□ TR270__	A, B, BK, LA, V, W
			Duplex Receptacle, Auto Grounding	□ TR270-9__	A, B, BK, LA, V, W
			Decorator Duplex Receptacle	□ TR1107__	A, B, BK, GY, LA, V, W
			Decorator Duplex Receptacle, Auto Grounding	□ TR1107-9__	A, B, BK, GY, LA, V, W

Commercial Grade, Single & Duplex



A	V/AC	NEMA	Description	Catalog No.	Available Colors
15A	125V	5-15R	Single Receptacle, Side Wire	□ TR817__	A, B, BK, GY, LA, V, W
			Duplex Receptacle, Side Wire	□ TRCR15__	A, B, BK, GY, LA, V, W
			* Duplex Receptacle, Back & Side Wire	□ TRBR15__	A, B, BK, GY, LA, V, W
			Decorator Single Receptacle, Back & Side Wire	□ TR6250__	A, B, BK, GY, LA, V, W
			* Decorator Duplex Receptacle, Back & Side Wire	□ TR6252__	A, B, BK, GY, LA, V, W
20A	125V	5-20R	Single Receptacle, Side Wire	□ TR1877__	A, B, BK, LA, V, W
			Duplex Receptacle, Side Wire	□ TRCR20__	A, B, BK, GY, LA, V, W
			* Duplex Receptacle, Back & Side Wire	□ TRBR20__	A, B, BK, GY, LA, RD, V, W
			Decorator Single Receptacle, Back & Side Wire	□ TR6350__	A, B, BK, GY, LA, V, W
			* Decorator Duplex Receptacle, Back Side Wire	□ TR6352__	A, B, BK, GY, LA, V, W

Commercial Floor Box



A	V/AC	NEMA	Description	Catalog No.	Available Colors
15A	125V	5-15R	Single Floor Box Assembly	□ TR5797	Black, Brass Assembly

For ordering, include Cat. No. followed by the color code: A (Almond), B (Brown), BK (Black), GY (Gray), LA (Light Almond), RD (Red), V (Ivory), W (White)

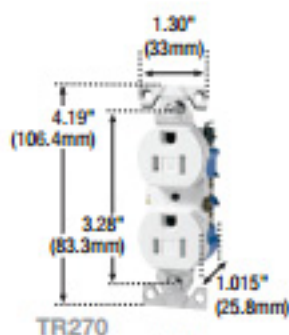
NAFTA Compliant

TESTING & CODE COMPLIANCE

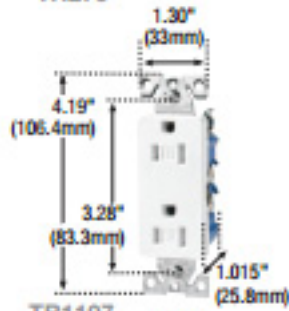
- cULus Listed to UL498, UL943 file nos. E60120 (TRVGF, 9566, 9569), E15058 UL948 (all others).
- cUL Certified to CSA C22.2, no. 42.
- TRBR, UL verified to Fed. Spec. WC-596G.
- NOMANSI Certified.
- TR5797, cULus File E92122, UL498 & UL514C cUL to CSA C22.2 No. 18, CSA C22.2 No 42

MATERIAL CHARACTERISTICS

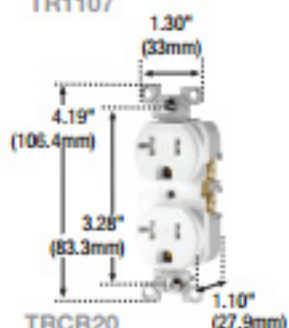
- Environmental: Flammability meets UL94 requirements; TR817, TR1877, TR6250, TR6252, TR6350, TR6352, TRBR, TR270, TR1107, TRCR V2 rated; TR5797 V0 rated.
- Temperature Rating: TR270, TR1107, TRCR: -20°C to 60°C (-4°F to 140°F); TR817, TR1877, TR6250, TR6252, TR6350, TR6352, TRBR: -20°C to 70°C (-4°F to 158°F); TR5797: -40°C to 65°C (-40°F to 149°F)



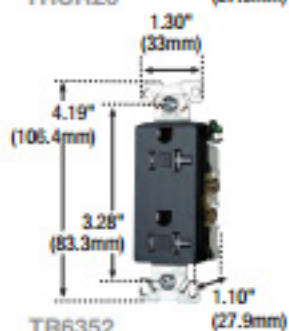
TR270



TR1107



TRCR20



TR6352



TR5797

TR Receptacles

Project Name:	Prepared By:
Project Number:	Date:
Catalog Number:	Type:



Tamper Resistant Receptacles

2-Pole, 3-Wire
15A, 125V/AC
20A, 125V/AC



Single & Duplex Receptacles

FEATURES

- Provides compliance with 2011 NEC® Articles 406.12 – 406.14 for Tamper Resistant Receptacles.
- “TR” designation provides visual identification.
- Side-Wire terminals accept up to #10 solid or stranded wire.
- Push-in terminals accept #14 solid wire (TR270, TR1107, TR780, & 9500TR Duplex devices only).
- Automatic grounding system eliminates need for bonding jumper in grounded metal enclosure, provides redundant measure of ground continuity where jumper used (Combination Devices only).
- Durable impact-resistant thermoplastic face and back body is virtually unbreakable.
- Combination LED Nightlight features dimmable nightlight that turns on in the dark and off in the light. (TR7735)

Construction Grade



A	V/AC	NEMA	Description	Catalog No.	Available Colors
15A	125V	5-15R	Duplex Receptacle	□ TR5262	B, GY, LA, V, W
20A	125V	5-20R	Duplex Receptacle	□ TR5362	B, GY, LA, V, W

Specification Grade, Combination



A	V/AC	NEMA	Description	Catalog No.	Available Colors
15A	125V	5-15R	Combination Single Pole Switch & Receptacle	□ TR274	A, B, BK, LA, V, W
			Combination 3-Way Switch & Receptacle	□ TR293	A, B, BK, LA, V, W
			Decorator Combination Single Pole & Receptacle	□ TR7730	A, BK, LA, V, W
			Decorator Combination LED Nightlight & Receptacle	□ TR7735	A, LA, V, W
20A	125V	5-20R	Combination Single Pole Switch & Receptacle	□ TR291	A, B, BK, LA, V, W

Specification Grade, GFCI



A	V/AC	NEMA	Description	Catalog No.	Available Colors
15A	125V	5-15R	Duplex GFCI	□ TRVGF15	A, B, BK, GY, LA, RD, V, W
20A	125V	5-20R	Duplex GFCI	□ TRVG20	A, B, BK, GY, LA, RD, V, W

Hospital Grade, Receptacles & GFCI



A	V/AC	NEMA	Description	Catalog No.	Available Colors
15A	125V	5-15R	Duplex Receptacle	□ TR8200	B, GY, RD, V, W
			Duplex GFCI	□ TRVGFH15	B, GY, LA, RD, V, W
20A	125V	5-20R	Duplex Receptacle	□ TR8300	B, GY, RD, V, W
			Duplex GFCI	□ TRVGFH20	B, GY, LA, RD, V, W

For ordering, include Cat. No. followed by the color code: A (Almond), B (Brown), BK (Black), GY (Gray), LA (Light Almond), RD (Red), V (Ivory), W (White)

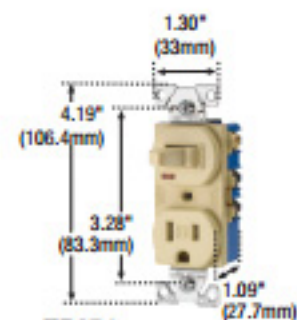
- Hospital Grade

TESTING & CODE COMPLIANCE

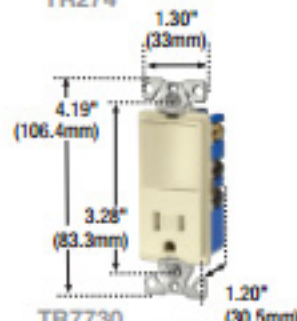
- cULus Listed to UL498, UL943 file nos. E50120 (TRVGF), E15058 (all others), except TR8200 & TR8300: Listed to UL498, file no. E15058.
- cUL Certified to CSA C22.2, no. 42.
- TRVGF meets all UL943 and UL498 requirements.
- TR5262, TR5362, TR8200/8300 UL verified to Fed. Spec. WC-696G.
- NOMANSI Certified.
- Combination devices, cULus File E18704, UL20, UL498, cUL File E18704, CSA 22.2

MATERIAL CHARACTERISTICS

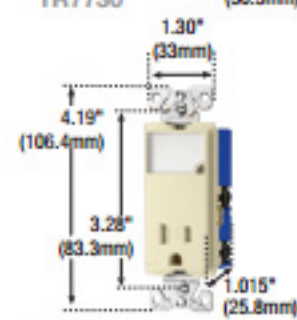
- Environmental: Flammability meets UL94 requirements; TR Combo Devices, TRVGF, TR8200, TR8300, 5262, 5362, V2 rated.
- Temperature Rating: TR Combo Devices: -20°C to 60°C (-4°F to 140°F); TRVGF: -35°C to 66°C (-31°F to 150.8°F); TR8200, TR8300: -40°C to 60°C (-40°F to 140°F); 5262, 5362: -20°C to 70°C (-4°F to 158°F).



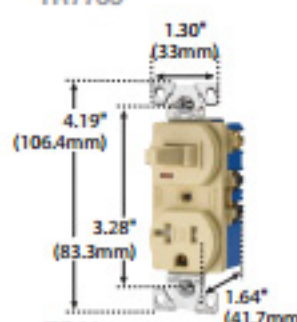
TR274



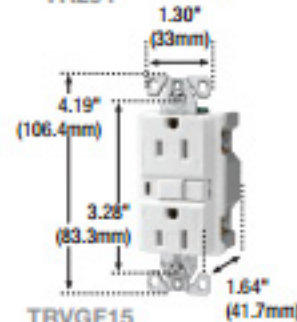
TR7730



TR7735



TR291



TRVGF15

WR & TWR Receptacles

Project Name:	Prepared By:
Project Number:	Date:
Catalog Number:	Type:



Weather Resistant and Tamper & Weather Resistant Receptacles

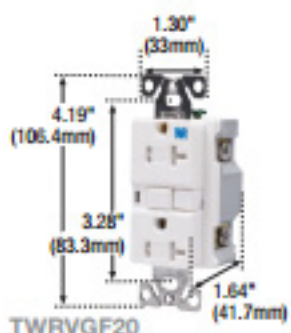
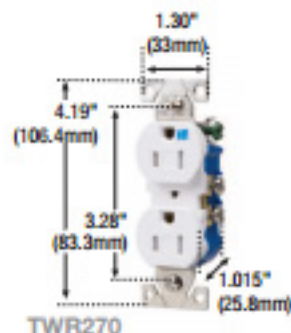
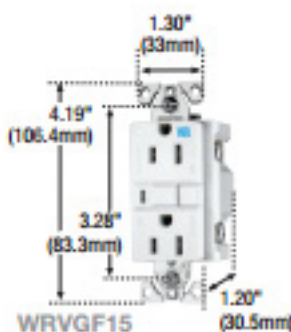
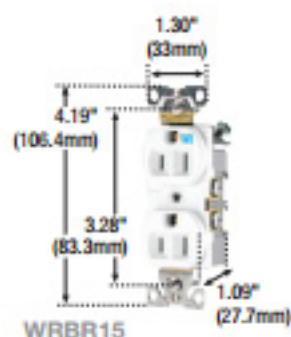
2-Pole, 3-Wire
15A, 125V/AC
20A, 125V/AC



Duplex Receptacles

FEATURES

- Nickel-plated strap & mounting screws, and stainless steel terminal screws for corrosion resistance.
- Provides compliance with 2011 NEC® Article 406.9 that states that all receptacles installed in wet and damp locations must be weather resistant.
- Manufactured with the highest grade of materials; durable impact-resistant thermoplastic face and back body is virtually unbreakable.
- "TR" and "WR" designations provide visual identification.
- Terminal screws are backed out and ready to wire.
- Patented built-in wire stripper for #14 and #12 wire to speed installation.
- Side-wire terminals accept up to #10 solid or stranded wire.
- Push-in terminals accept #14 solid wire (TWR270 only).



WR Commercial Grade, Duplex



A	V/AC	NEMA	Description	Catalog No.	Available Colors
15A	125V	5-15R	Duplex Receptacle, Back & Side Wire	<input type="checkbox"/> WRBR15__	B, GY, V, W
20A	125V	5-20R	Duplex Receptacle, Back & Side Wire	<input type="checkbox"/> WRBR20__	B, GY, V, W

WR Specification Grade GFCI



A	V/AC	NEMA	Description	Catalog No.	Available Colors
15A	125V	5-15R	Duplex GFCI	<input type="checkbox"/> WRVGF15__	B, GY, V, W
20A	125V	5-20R	Duplex GFCI	<input type="checkbox"/> WRVG20__	B, GY, V, W

TWR Residential Grade, Duplex



A	V/AC	NEMA	Description	Catalog No.	Available Colors
15A	125V	5-15R	Duplex Receptacle	<input type="checkbox"/> TWR270__	LA, V, W

TWR Commercial Grade, Duplex



A	V/AC	NEMA	Description	Catalog No.	Available Colors
15A	125V	5-15R	Duplex Receptacle, Back & Side Wire	<input type="checkbox"/> TWRBR15__	B, GY, V, W
20A	125V	5-20R	Duplex Receptacle, Back & Side Wire	<input type="checkbox"/> TWRBR20__	B, GY, V, W

TWR Specification Grade, GFCI



A	V/AC	NEMA	Description	Catalog No.	Available Colors
15A	125V	5-15R	Duplex GFCI	<input type="checkbox"/> TWRVGF15__	B, GY, LA, V, W
20A	125V	5-20R	Duplex GFCI	<input type="checkbox"/> TWRVG20__	B, GY, LA, V, W

For ordering, include Cat. No. followed by the color code: B (Brown), GY (Gray), LA (Light Almond), V (Ivory), W (White)

TESTING & CODE COMPLIANCE

- cULus Listed to UL498.
- cUL Certified to CSA C22.2, no. 42.
- WRVGF & TWRVGF meet all UL943 (GFCI) and UL498 (Receptacles) requirements.
- WRBR and TWRBR UL verified to Fed. Spec. WC-596G.
- NOMANSI Certified.

MATERIAL CHARACTERISTICS

- Environmental: Flammability meets UL94 requirements; TWR270 V2 rated; WRVGF, WRBR, TWRBR, TWRVGF V2 rated.
- Temperature Rating: TWR270: -20°C to 60°C (-4°F to 140°F); WRVGF, TWRVGF: -35°C to 68°C (-31°F to 151°F); WRBR, TWRBR: -20°C to 70°C (-4°F to 158°F).

TR Receptacles

Project Name:	Prepared By:
Project Number:	Date:
Catalog Number:	Type:



Tamper Resistant Receptacles

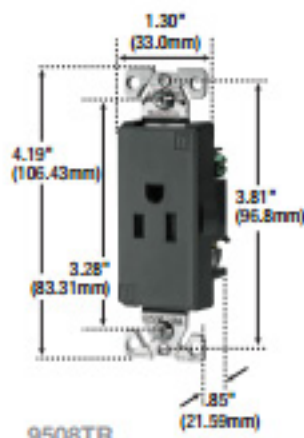
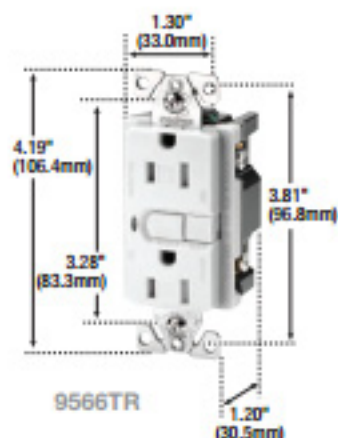
2-Pole, 3-Wire
15A, 125V/AC
20A, 125V/AC



ASPIRE Collection & Recessed Receptacles

FEATURES

- Designed to coordinate with the unique look of the ASPIRE Design System - Available in three distinctive, two-tone color combinations - White Satin, Desert Sand and Silver Granite.
- Features our correct wiring/trip indicator light technology, making certain that every installation is properly wired to provide optimal protection.
- Indicator light provides quick visual reference of a tripped or "end of life" condition.
- Reset button lock-out function protects from miswired line-load connections and GFCI circuitry damage.
- Trip threshold (5ma+/-1ma) and response time (0.025 sec.) meet Class A requirements.
- Ultrasonically welded backbody.
- 20 amp feed-through rating allows full protection of downstream receptacles when wired from load side.
- Ground screw backwiring clamp for fast, secure termination.
- Maximum wiring flexibility is provided with 8 separate backwiring holes that accept up to #10 AWG stranded or solid wire.
- Longer, wider "bridged" strap provides 40% more contact area with wallboard, virtually eliminating floating installations.



ASPIRE Receptacles & GFCI



A	V/AC	NEMA	Description	Catalog No.	Available Colors
15A	125V	5-15R	ASPIRE Duplex Receptacle	□ 9505TR__	AW, DS, SG, WS
			ASPIRE Single Receptacle	□ 9507TR__	AW, DS, SG, WS
			ASPIRE Duplex GFCI	□ 9566TR__	AW, DS, SG, WS
20A	125V	5-20R	ASPIRE Duplex Receptacle	□ 9510TR__	AW, DS, SG, WS
			ASPIRE Single Receptacle	□ 9508TR__	AW, DS, SG, WS
			ASPIRE Duplex GFCI	□ 9569TR__	AW, DS, SG, WS

Residential Grade, Recessed



A	V/AC	NEMA	Description	Catalog No.	Available Colors
15A	125V	5-15R	Recessed Single Receptacle	□ TR775__	W
			Recessed Duplex Receptacle	□ TR780__	W

For ordering, include Cat. No. followed by the color code: AW (Alpine White), DS (Desert Sand), SG (Silver Granite), W (White), WS (White Satin)

NAFTA Compliant

TESTING & CODE COMPLIANCE

- cULus Listed to UL498, file nos. E60120 (9569TR), E15058 (all others); Listed to UL498, file no. E15058.
- cUL Certified to CSA C22.2, no. 42.
- NOMANSI Certified.

MATERIAL CHARACTERISTICS

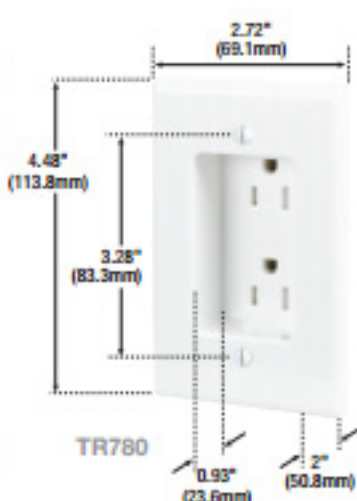
- Environmental: Flammability meets UL94 requirements; 9566TR, 9569TR, 9505TR, 9507TR, 9508TR, 9510TR, TR775, TR780, V2 rated;
- Temperature Rating: 9510TR: -20°C to 60°C (-4°F to 140°F); 9505TR, 9507TR, 9508TR: -20°C to 70°C (-4°F to 158°F); TR775, TR780: -20°C to 70°C (-4°F to 158°F); 9566TR, 9569TR: -35°C to 65°C (-31°F to 150.8°F).

Related Products



For more information about Cooper Wiring Device's Weatherproof covers and boxes, use the QR code above or visit: <http://bit.ly/wthrcvr>

For more information about Cooper Wiring Device's complete ASPIRE Collection, use the QR code above or visit: <http://bit.ly/aspiresystem>





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600 Travis, Ste. 5600
Houston, TX 77002-1001
P: 713-209-8400
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GFCI RECEPTACLE

Model Number: VGF15W-M-L or equal

Rating: 20A 125V NEMA 5-20R

Color: White

Available: Cooper Wiring Devices

Modular Receptacles

Project Name:	Prepared By:
Project Number:	Date:
Catalog Number:	Type:



Ground Fault Circuit Interrupter Receptacles

2-Pole, 3-Wire Grounding
15A 125V/AC
20A 125V/AC



Specification Grade GFCIs

FEATURES

- ArrowLink modular plug and connector incorporate a first make/last break grounding design.
- Wire leads (where applicable) are crimped and resistance welded to plug and connector terminals.
- Audible "click" when mating plug and connector indicates proper assembly.
- Pre-wired plugs provide 100% inspected and consistent torque settings.
- Exclusive screw terminal guards insulate conductive surfaces.
- Tamper Resistant models comply with 2008 NEC® Article 406.11 for all dwelling units.
- ShockSentry™ lock-out function prevents miswired line-load connections and GFCI circuitry damage.

Back Wire & Side Wire

15A, 125V
NEMA 5-15R

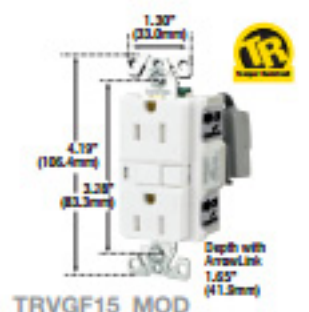


20A, 125V
NEMA 5-20R

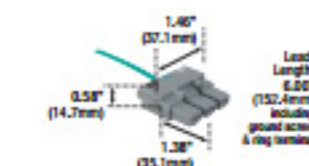


Description	Catalog No. Color Suffix	UL	CSA	Description	Catalog No. Color Suffix	UL	CSA
Duplex GFCI	<input type="checkbox"/> VGF15__MOD A, B, BK, GY, LA, RD, V, W			Duplex GFCI	<input type="checkbox"/> VGF20__MOD A, B, BK, GY, LA, RD, V, W		
Duplex GFCI NAFTA Compliant	<input type="checkbox"/> VGF15F__MOD B, BK, GY, LA, RD, V, W			Duplex GFCI NAFTA Compliant	<input type="checkbox"/> VGF20F__MOD B, BK, GY, LA, RD, V, W		
Tamper Resistant Duplex GFCI	<input type="checkbox"/> TRVGF15__MOD A, B, BK, GY, LA, RD, V, W			Tamper Resistant Duplex GFCI	<input type="checkbox"/> TRVGF20__MOD A, B, BK, GY, LA, RD, V, W		
Tamper Resistant Duplex GFCI NAFTA Compliant	<input type="checkbox"/> TRVGF15F__MOD B, BK, GY, LA, RD, V, W			Tamper Resistant Duplex GFCI NAFTA Compliant	<input type="checkbox"/> TRVGF20F__MOD B, BK, GY, LA, RD, V, W		
Weather Resistant Duplex GFCI	<input type="checkbox"/> WRVGF15__MOD B, GY, V, W			Weather Resistant Duplex GFCI	<input type="checkbox"/> WRVGF20__MOD B, GY, V, W		
Tamper & Weather Resistant Duplex GFCI	<input type="checkbox"/> TWRVGF15__MOD B, GY, LA, V, W			Tamper & Weather Resistant Duplex GFCI	<input type="checkbox"/> TWRVGF20__MOD B, GY, LA, V, W		

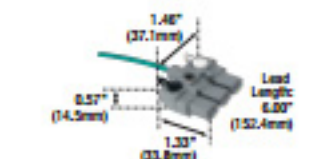
Includes standard size unbreakable wallplate unless otherwise noted
Consult factory customer service representative for additional packaging options



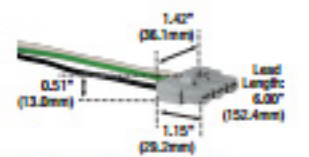
TRVGF15_MOD



Receptacle SPD Push-In Connector



Receptacle SPD Screw Terminal Connector



Ledged Receptacle Connector



Receptacle Plug

ArrowLink Receptacle Connectors

Type	Description	Catalog No.
ArrowLink SPD	Push-In Building Wire Connector	<input type="checkbox"/> MCR300FTPI
	Push-In Building Wire Connector, No Ground Conductor	<input type="checkbox"/> MCR300FTPING
ArrowLink SPD	Screw Terminal Building Wire Connector	<input type="checkbox"/> MCR300FTST
	Screw Terminal Building Wire Connector, No Ground Conductor	<input type="checkbox"/> MCR300FTSTNG
ArrowLink	125V Solid Wire Building Wire Connector	<input type="checkbox"/> MCR125SOL
	125V Stranded Wire Building Wire Connector	<input type="checkbox"/> MCR125STR
	250V Solid Wire Building Wire Connector	<input type="checkbox"/> MCR250SOL
	250V Stranded Wire Building Wire Connector	<input type="checkbox"/> MCR250STR

Patent Pending

Icon Key

Build-To-Spec Customizable Devices

NAFTA Compliant, see Arrow Hart Buyer's Guide pg O-30 for more information

TESTING & CODE COMPLIANCE

- Base Device: cULus Listed to UL 498 and UL 943, file no. E60120; meets all UL 943 (GFCI) and UL 498 (Receptacles) and applicable CSA requirements
- ArrowLink: Plug & connector cULus Listed to UL 2459 file no. E325188
- Combined: cULus Listed wiring assembly, UL file no. E326691

MATERIAL CHARACTERISTICS

- Nylon with PVC terminal guards, except single: adhesive terminal barrier
- Environmental, Base Device: Flammability meets UL 94 requirements; V2 rated; temperature rating: -20°C to 90°C (-4°F to 194°F), except single: -20°C to 80°C (-4°F to 140°F)
- Environmental, ArrowLink: Flammability meets UL 94 requirements; V2 rated; temperature rating: -20°C to 90°C (-4°F to 194°F) max.

COOPER Wiring Devices

Modular Receptacles Specification & Performance Data

Project Name:	Prepared By:
Project Number:	Date:
Catalog Number:	Type:



Specification Grade Ground Fault Circuit Interrupter Receptacles

2-Pole, 3-Wire Grounding
15A, 125V/AC; 20A, 125V/AC
NEMA 5-15, 5-20

Device Type		Specification Grade GFCI 15A & 20A: VGF__MOD and VGF__F__MOD Series ArrowLink: MCR125_, MCR250_, MCR300_Series	Specification Grade Tamper Resistant & Weather Resistant Duplex GFCI 15A & 20A: TRVGF__MOD, TRVGF__F__MOD, WRVGF__MOD, TWRVGF__MOD Series ArrowLink: MCR125_, MCR250_, MCR300_Series	
Wiring Type	Base Device	Back & side wire	Back & side wire	
	ArrowLink	Integral wire leads, crimped & resistance welded	Integral wire leads, crimped & resistance welded	
	ArrowLink SPD	Backwire feed through	Backwire feed through	
Testing & Code Compliance	Base Device	<ul style="list-style-type: none"> cULus Listed to UL 498 and UL 943, file no. E60120 Meets all UL 943 (GFCI), UL 498 (Receptacles) and applicable CSA requirements NOM certified 	<ul style="list-style-type: none"> cULus Listed to UL 498 and UL 943, file no. E60120 Meets all UL 943 (GFCI), UL 498 (Receptacles) and applicable CSA requirements NOM certified 	
	ArrowLink	<ul style="list-style-type: none"> Plug & connector cULus Listed to UL 2459, file no. E325188 	<ul style="list-style-type: none"> Plug & connector cULus Listed to UL 2459, file no. E325188 	
	Combined	<ul style="list-style-type: none"> cULus Listed wiring assembly, UL file no. E326691 	<ul style="list-style-type: none"> cULus Listed wiring assembly, UL file no. E326691 	
Specifications: Environmental	Base Device	Flammability	Meets UL 94 requirements; V2 rated	Meets UL 94 requirements; V2 rated
		Temperature Rating	-35°C to 66°C (-31°F to 150.8°F)	-35°C to 66°C (-31°F to 150.8°F)
	ArrowLink	Flammability	Meets UL 94 requirements; V2 rated	Meets UL 94 requirements; V2 rated
		Temperature Rating	-35°C to 66°C (-31°F to 150.8°F)	-35°C to 66°C (-31°F to 150.8°F)
Specifications: Electrical	Base Device	Dielectric Voltage	Withstands 2000V per UL 498	Voltage: withstands 2000V per UL 498
		Current Interrupting	Yes, at full-rated current	Yes, at full-rated current
		Temperature Rise	Temperature Rise: max. 30°C (86°F) after 100 cycles of overload @ 150% of rated current (DC)	Max. 30°C (86°F) after 100 cycles of overload @ 150% of rated current (DC)
		Trip Time	0.025 seconds (Class A)	0.025 seconds (Class A)
		Frequency	60 Hz; Voltage: 125V; Amperage: 15A/20A 20A Feed Through	60 Hz; Voltage: 125V; Amperage: 15A/20A 20A Feed Through
		Short Circuit Testing	Meets and exceeds 10 kA	Meets and exceeds 10 kA
		Maximum Interrupting Capacity	20 Amps	20 Amps
	ArrowLink	Max. Working Voltage	300V/AC	300V/AC
		Max. Continuous Current	20A	20A
		Overload	52.5A/AC for 10 cycles	52.5A/AC for 10 cycles
		Dielectric Voltage	Withstands 1600V per UL 2459	Withstands 1600V per UL 2459
		Current Interrupting	Limited cycles at full-rated current	Limited cycles at full-rated current
		Temperature Rise	Max. 50°C (122°F) while conducting 35A after 10 cycles of overload @ 52.5A/AC	Max. 50°C (122°F) while conducting 35A after 10 cycles of overload @ 52.5A/AC
Specifications: Mechanical	Base Device Terminal Accommodation	#14 - #10 AWG	#14 - #10 AWG	
	ArrowLink Wire Leads	#12 AWG	#12 AWG	
	ArrowLink SPD Screw Terminals	Accepts #12-#14 stranded and solid wire	Accepts #12-#14 stranded and solid wire	
	ArrowLink SPD Ground	Integral THHN #12 AWG 6" lead with ring terminal and #10 ground screw	Integral THHN #12 AWG 6" lead with ring terminal and #10 ground screw	
	Voltage Ratings	Permanently marked on device	Permanently marked on device	
Specifications: Screw Terminal Guards	ArrowLink Models Only	Material: UL recognized insulating material Dielectric Strength: 2,000V min HWI Rating: 4 min. Relative temperature index, electrical: 80°C (176°F) Flammability: V0 (UL 94)	Material: UL recognized insulating material Dielectric Strength: 2,000V min HWI Rating: 4 min. Relative temperature index, electrical: 80°C (176°F) Flammability: V0 (UL 94)	
Materials:	Base Device	Top Housing	Thermoplastic, nylon	Thermoplastic, nylon; except WR: nylon 6/6
		Bottom Housing	PVC	PVC
		Strap	0.047" thick steel, zinc plated	0.047" thick steel, zinc plated; WR & TWR: nickel-plated
		Line Contacts	0.030" thick brass	0.030" thick brass
		Terminal & Ground Screws	#8-32 steel, brass plated; neutral screw nickel plated, ground screw green	Terminal: Brass/nickel-plated steel; WR & TWR brass/nickel-plated stainless steel; Ground: ground screw green on all models, WR and TWR stainless steel
		Terminal Clamps	0.070" thick steel	Brass-plated steel; WR & TWR nickel-plated steel
	ArrowLink	Housing	Polycarbonate	Polycarbonate
		Contacts	Copper alloy	Copper alloy
		Wire Leads	Solid or stranded THHN #12 AWG	Solid or stranded THHN #12 AWG
		ArrowLink SPD	Housing	Polycarbonate
Contacts	Copper alloy	Copper alloy		

Specifications subject to change without notice.

2-ALMSPSH8-0311

www.cooperwiringdevices.com

COOPER Wiring Devices



COOPER TOGGLE LIGHTED SWITCH

Model: 1301-7W-L or equal

Color: White

Electrical:

Current: 15 A

Voltage: 120V

Available: Cooper Wiring Devices

Products

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[Data and Connectivity](#)

[Electrical Accessories](#)

[GFCI](#)

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Toggle Lighted Switches - 1301-7, 1303-7, 1301-7LT, 1303-7LT

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Longer, wider strap on Toggle Lighted Switches provides 40% more contact area to wall board. Virtually eliminates floating installations. Industrial design cam action mechanism insures quiet switch action. Patented built-in wire stripper for #14 and #12 wire to speed installation. Unbreakable top and bottom housing eliminates call-backs due to job site breakage. Patented built-in wire looper for pre-looping. Three way switches feature additional push-in common termination for feed-through tapping. Push-in terminals accept #14 solid wire only. Side wire terminals accept up to #10 solid or stranded wire. Tri-combo screws accept slotted-, Phillips, and Robertson-head tools for installations in both the U.S. and Canada.

PRODUCT DETAILS

RESOURCES

Catalog Number	1301-7, 1303-7, 1301-7LT, 1303-7LT
Wiring Type	Single Pole, 3-Way
Rating	15A 120V
Product Colors	Colors may vary per product. For ordering, include Cat No. followed by the color code: A (Almond), B (Brown), LA (Light Almond), V (Ivory), W (White).

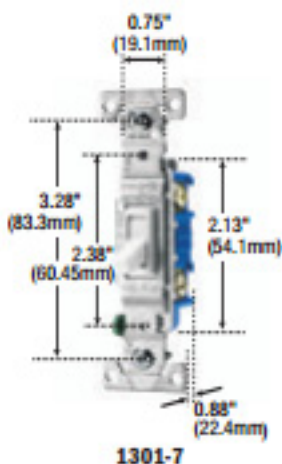


Standard Grade Switches 15A 120V/AC

AC Quiet Switches – Framed Toggle

FEATURES

- Longer, wider strap provides 40% more contact area to wall board. Virtually eliminates floating installations.
- Industrial design cam action mechanism insures quiet switch action.
- Patented built-in wire stripper for #14 and #12 wire to speed installation.
- Unbreakable top and bottom housing eliminates call-backs due to job site breakage.
- Patented built-in wire looper for pre-looping.
- Three way switches feature additional push-in common termination for feed-through tapping.
- Push-in terminals accept #14 solid wire only.
- Side wire terminals accept up to #10 solid or stranded wire.
- Tri-combo screws accept slotted-, Phillips, and Robertson-head tools for installations in both the U.S. and Canada.



Non-Grounding Switch – Side Wire and Push Wire

Rating A	V/AC	Description	Color	Catalog No.	
				Single-Pole	3-Way
15	120	Framed Toggle	Brown	1301B†	1303B†
			Ivory	1301V†	1303V†
			White	1301W†	1303W†

†Not CSA

Grounding Switch – Side Wire and Push Wire

Rating A	V/AC	Description	Color	Catalog No.		
				Single-Pole	3-Way	4-Way
15	120	Framed Toggle	Almond	1301-7A†	1303-7A†	1242-7A†*
			Brown	1301-7B†	1303-7B†	1242-7B†*
			Ivory	1301-7V†	1303-7V†	1242-7V†*
			Light Almond	1301-7LA†	1303-7LA†	1242-7LA†*
			White	1301-7W†	1303-7W†	1242-7W†*
15	120	Less Ears	Brown	1301-73B†	–	–
			Ivory	1301-73V†	–	–
			White	1301-73W†	–	–

†Not CSA

*Side wire only

AC Quiet Switches – Lighted Toggle

FEATURES

- Lighted toggle glows in "off" position.
- Exclusive color matching toggle and dust apron.

Lighted Toggle Grounding Switch – Side Wire and Push Wire

Rating A	V/AC	Description	Color	Catalog No.	
				Single-Pole	3-Way
15	120	Lighted	Almond	1301-7LTA	1303-7LTA
			Ivory	1301-7LTV	1303-7LTV
			Light Almond	1301-7LTLA	1303-7LTLA
			White	1301-7LTW	1303-7LTW

Horsepower Rated for Motor Loads per UL 20

	120V/AC	240V/AC	Max Amps
15A	1/2 HP	2 HP	12A

E-11 Switches

TESTING & CODE COMPLIANCE

- UL 20 Listed, file no. E18704 (1301, 1301-7, 1301-7LT, 1303, 1303-7, 1303-7LT).
- cULus Listed, file no. E18704 (1242-7).
- Meets all CSA requirements, C22.2 111 file no. 10016 (1301-7LT, 1303-7LT).
- NOM Certified.

MATERIAL CHARACTERISTICS

Temperature Rating:
-20°C to 60°C.



**STANDARD SIZE DUPLEX RECEPTACLE WALLPLATES
NYLON**

Model Number: 5132W-SP-L or equal

Color: White

Available: Cooper Wiring Devices

Products

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 Standard Size Duplex Receptacle Wallplates Nylon - 5132, 5150

Standard Size Duplex Receptacle Wallplates Nylon - 5132, 5150

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Standard Size Wallplates - Nylon Duplex Receptacle Rugged construction reduces installation cost due to less plate breakage and resists bowing to provide a smooth, flat installation. Exclusive timesaving Screw-Catch feature holds mounting screws captive and simplifies installation. High gloss finish is soil resistant. Nylon wallplates have a flush-fitting, warp resistant design. Matching mounting screws provided.

PRODUCT DETAILS

RESOURCES

Catalog Number	5132, 5150
Product Colors	Colors may vary per product. For ordering, include Cat No. followed by the color code: A (Almond), BK (Black), B (Brown), GY (Gray), LA (Light Almond), RD (Red), V (Ivory), W (White).

Wallplates

Standard Size
Mid-Size
Oversize
REPEL

	Wallplate Type	Standard Size, Mid-Sized & Oversize Wallplates				REPEL	
	Material Type	Thermoset	Nylon	Stainless Steel	Polycarbonate	REPEL Polycarbonate Mid-Sized Wallplates PJ_AM and PJS_AM Series	REPEL Stainless Steel Standard Size Wallplates 93070_AM, 93090_AM, 93100_AM, 93400_AM Series
	Manufacturing Process	Injection Molded	Injection Molded	Stamped	Injection Molded	Injection Molded	Stamped
	Testing & Code Compliance	UL Listed to UL 514D, file no. E33216	UL Listed to UL 514D, file no. E33216	UL Listed to UL 514D, file no. E92003	UL Listed to UL 514D, file no. E33216	UL Listed to UL 514D, file no. E33216	UL Listed to UL 514D, file no. E92003
		cUL certified to C22.2, no. 42.1, UL file E33216	cUL certified to C22.2, no. 42.1, UL file E33216	CSA certified to C22.2, no. 42.1	cUL, UL file E33216 certified to C22.2, no. 42.1	Agion® Antimicrobial Additive: EPA approved for use as product ingredient PJ_AM only: cUL Listed to CSA C22.2, no 42.1, file no. E33216	Agion® Antimicrobial Additive: EPA approved for use as product ingredient CSA certified to C22.2, no. 42.1
Specifications: Environmental	Flammability	Meets UL 94 requirements; 5V rated	Meets UL 94 requirements; 5V rated	N/A	Meets UL 94 requirements 5VA rated	Meets UL 94 requirements; 5V rated	N/A
	Temperature Rating	-40°C to 90°C (-40°F to 194°F)	-40°C to 70°C (-40°F to 158°F)	-40°C to 70°C (-40°F to 158°F)	-40° to 70° C (-40°F to 158°F)	-40°C to 70°C (-40°F to 158°F)	-40°C to 70°C (-40°F to 158°F)
Materials:	Body	0.080" thick thermoset urea or phenolic	0.060" thick thermoplastic	0.032" thick stainless steel alloy, 18% chromium and 8% nickel for corrosion resistance	0.08" thick thermoplastic polycarbonate	0.071" thick polycarbonate with Agion® Antimicrobial Additive incorporated	0.032" thick 302/304 stainless steel alloy, 18% chromium and 8% nickel for corrosion resistance, DuPont® Alesta® powder coating with Agion® Antimicrobial incorporated
	Inner Wallplate	N/A	N/A	N/A	0.071" thick polycarbonate	PJS_AM only: 0.071" thick polycarbonate	N/A

NOTE: REPEL products do not protect the user against disease causing organisms and ongoing regular cleaning practices should be maintained. Agion is a registered trademark of Agion Technologies, Inc., Wakefield, MA



**CAST WEATHERPROOF COVER DUPLEX RECEPTACLE,
VERTICAL**

Model Number: CA8WV or equal
Dimensions: 4.56" x 2.81"



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Cast Weatherproof Cover Duplex Receptacle Vertical, White

CA8WV

Weatherproof Cover 1 Gang Duplex Receptacle Vertical 1 Self Closing Lid, White

Where to buy

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Representative image shown.

specifications

GENERAL INFO

Color: White
Type: Covers
Special Features: Weatherproof

LISTING AGENCIES/THIRD PARTY INFORMATION

CSA Listing Info: No
CUL Listing No: No
cU Lus: No
cU Rus: No
Federal Spec: No
UL Listing No: No
U N SPS C: 39121305
U R: No

DIMENSIONS

Height U S: 4.56"
Width U S: 2.81"

TECHNICAL INFORMATION

Material: Cast

BUY AMERICAN ACT COMPLIANCE

Country of Origin: INDIA
Buy American Act Status: No



Pass & Seymour

Weatherproof Boxes & Covers Cast Covers One & Two Gang

CA1, CA8, CA26, CA7, CA721, CA725, CA723, CA2, CA82, CA262, CA72

Protect receptacles, power outlets and switches.

This complete line of covers provides both vertical and horizontal solutions. All feature heavy-duty, die-cast zinc construction with a baked-on, electrostatic polyester powder coat finish that provides superior scratch and corrosion resistance. These self-closing designs feature corrosion-resistant stainless steel springs for enhanced durability.

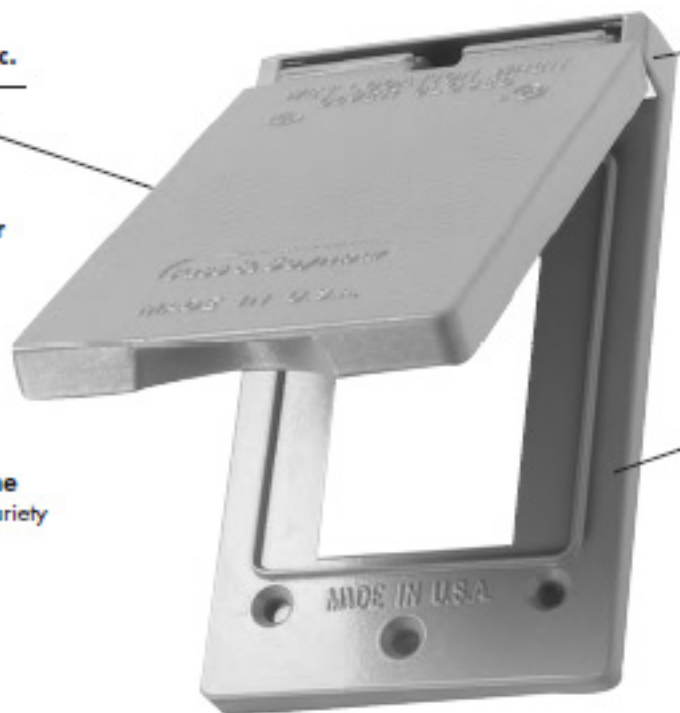


Features & Benefits

Heavy-duty die-cast zinc.

Product assembled after painting for complete corrosion resistance.

Cover available in one and two gang, in a variety of configurations.



Stainless steel springs.

Baked-on, electrostatic polyester powder coat for superior scratch- and corrosion-resistant finish.

No rough edges.

CA26-GV

Field Uses/Vertical Markets

- Industrial
- Health Care
- Education
- Institutional
- Retail
- Office
- Hospitality/Lodging
- Multiple Dwelling

SF2303R1 — Updated January 2004 — For latest specs visit www.legrand.us/passandseymour
















Pass & Seymour

Weatherproof Boxes & Covers

Cast Covers

One & Two Gang

Ordering Information

Catalog Number	Description	Color
One Gang		
 CA1-G	Toggle Vertical – 1 Self-Closing Lid	Gray
 CA8-GH CA8-BRH CA8-WH	Duplex Receptacle Horizontal – 2 Self-Closing Lids	Gray Bronze White
 CA8-GV CA8-BRV CA8-WV	Duplex Receptacle Vertical – 1 Self-Closing Lid	Gray Bronze White
 CA26-GH CA26-BRH CA26-WH	Decorator or GFCI Horizontal – 1 Self-Closing Lid	Gray Bronze White
 CA26-GV CA26-BRV CA26-WV	Decorator or GFCI Vertical – 1 Self-Closing Lid	Gray Bronze White
 CA7-GV CA7-BRV CA7-WV	Single Receptacle Vertical – 1 Self-Closing Lid	Gray Bronze White
 CA721-G	Power Outlet – 1.625 Diameter Vertical – 1 Self-Closing Lid	Gray
 CA725-G	Power Outlet – 1.750 Diameter Vertical – 1 Self-Closing Lid	Gray
 CA723-G	Power Outlet – 2.125 Diameter Vertical – 1 Self-Closing Lid	Gray
Two Gang		
 CA2-G CA2-BR CA2-W	2 Toggles 4 Screw Mounting	Gray Bronze White
 CA82-G CA82-BR CA82-W	2 Duplex Receptacles	Gray Bronze White
 CA262-G	2 Decorator or GFCI 4 Screw Mounting	Gray
 CA72-G	2 Single Receptacles	Gray

For more information on these and other P&S products refer to our Product Guide or visit our web site.

SF2303R1 – Updated January 2004 – For latest specs visit www.legrand.us/passandseymour

Weatherproof Boxes & Covers

Cast Covers

One & Two Gang



Pass & Seymour

Technical Specifications

3rd Party Compliance

cULus Listed.
Complies with 2002 NEC Section 406.8(A) and 406.8(B)(2).

Performance

Environmental Weatherproof

Materials

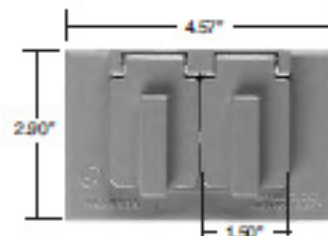
Body	Die-Cast Zinc
Springs	Stainless Steel
Finish	Baked-On, Electrostatic Polyester Powder Coat

Warranty

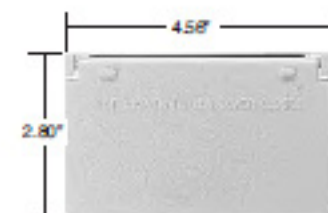
1 Year



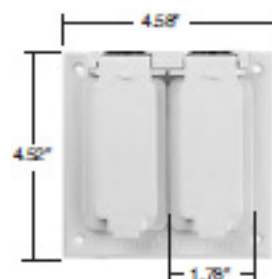
Dimensions for
One Gang Vertical
1 Self-Closing Lid



Dimensions for
One Gang Horizontal
2 Self-Closing Lids



Dimensions for
One Gang Horizontal
1 Self-Closing Lid



Dimensions for
Two Gang Cover

Complementary Devices & Accessories



WEATHERPROOF BOXES & COVERS

- While-In-Use Covers
- Heavy Cast Aluminum Covers
- Boxes



WALL PLATES

- TradeMaster® Thermoplastic Nylon
- Stainless Steel
- Brass
- Aluminum
- Dustproof Stainless Steel Covers



SWITCHES

- Heavy-Duty Toggle
- Heavy-Duty Lighted Toggle
- Heavy-Duty Security
- Heavy-Duty Locking
- Construction Grade Toggle
- Commercial Grade Toggle



STRAIGHT BLADE RECEPTACLES

- Extra Heavy-Duty
- Heavy-Duty
- Construction Grade
- Commercial Grade



GFCIs

- Construction Grade with Auto-Ground
- Construction Grade
- Construction Grade Dead Front

Also available...

- Light Almond Devices
- Decorator Devices
- Hospital Grade Devices
- PlugTail™ Devices
- TVSS & Isolated Ground Devices
- Ground Continuity Monitoring (GCM)
- Straight Blade Plugs & Connectors
- Turnlok® Locking Devices
- IEC 309 Industrial Products
- Flexcor® Wire Mesh Grips
- Configurable Solutions



Legrand/Pass & Seymour
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Fax: 1.860.232.2062
www.legrand.us

Legrand Canada
570 Applewood Crescent
Vaughan, ON, L4K 4B4
Phone: 905.738.9195
Fax: 905.738.9721
www.legrand.ca



LEGRAND RECEPTACLE

Model Number: 0301L or equal

Location: Interior of house

Electical:

Voltage: 125 V

Current: 15 A

Available: Legrand/ Pass & Seymour

features & benefits

- Heavy-duty, brass strap for added strength and ground conductivity.
- .032 inch thick, brass, triple-wipe power contacts for lasting retention.
- Strap tabs wrap around face to prevent strap from separating from face and back body.
- Easily accessed break-off, line-contact connecting tab for fast, easy split-circuit wiring.
- High strength nylon face.
- Internal screw-pressure-plate back and side wired to accept #14 and #10 AWG stranded or solid copper or copper-clad conductors.
- Eight back wire holes.
- Auto-ground clip assures positive ground.



Representative image shown.

specifications

GENERAL INFO

Color: white
Type: Receptacles
Duty: Heavy Duty
Special Features: Back, Side Wire

TECHNICAL INFORMATION

Amps: 15 Amp
Volts: 125V
Volts A C: 125
Capacity: Duplex
Grade Type: Specification

LISTING AGENCIES/THIRD PARTY INFORMATION

CSA Listing Info: C22.2 No. 42
CSA Standard: Yes
Federal Spec: Yes
Fed Spec Number: WC596
UL Listing No: UL498
UL Standard: Yes
UN SPS C: 39121406
UR: No

BUY AMERICAN ACT COMPLIANCE

Country of Origin: MEXICO
Buy American Act Status: Trade Agreement Act Compliant



DIMENSIONS

Depth (U S): .780"
Height U S: 3.281"
Width U S: 1.322"



LEGRAND COVER/OUTLET BOX

Model Number: TP2-W or equal
Location: Interior of house
Available: Legrand/ Pass & Seymour

TP1, TP2, TP8, TP82, TP26, TP262, TP13, TP23, TP7, TP720

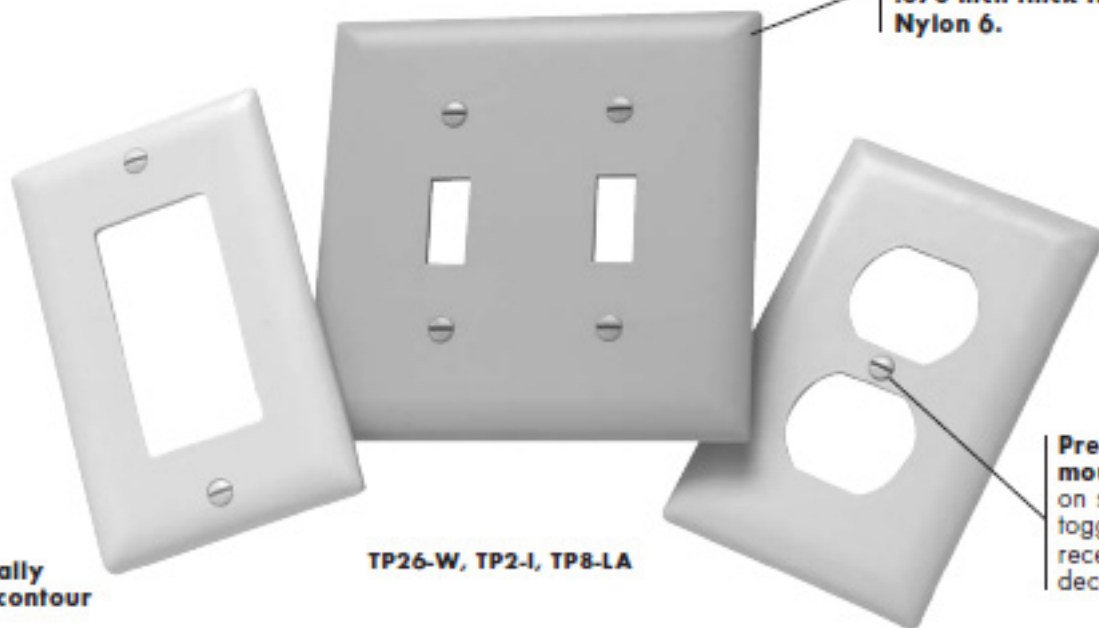
**Maximum durability
in plastic wall plates.**

Self-extinguishing nylon construction makes these TradeMaster[®] wall plates virtually unbreakable. They will not crack if excessive torque is applied to installation screws. They are 3/16" higher and wider than typical plastic wall plates — not enough to be apparent to the eye, but the extra size cuts costs by reducing dry wall rework.

**Features & Benefits**

An extra 3/16" width and height than standard size wall plates for more tolerance in covering ragged sheet rock openings.

Molded of rugged, virtually unbreakable self-extinguishing .070 inch thick thermoplastic Nylon 6.



Pre-installed mounting screws on single gang toggle, duplex receptacle and decorator openings.







Aesthetically pleasing contour design.





TP26-W, TP2-I, TP8-LA

Field Uses/Vertical Markets

- Health Care
- Education
- Institutional
- Retail
- Office
- Hospitality/Lodging
- Multiple Dwelling

Ordering Information

Description	Catalog Number	Color
TradeMaster Toggle Switch Openings		
One Gang 	TP1-I TP1-W TP1 TP1-GRY TP1-BK TP1-RED TP1-LA	Ivory White Brown Gray Black Red Light Almond
Two Gang 	TP2-I TP2-W TP2 TP2-GRY TP2-BK TP2-RED TP2-LA	Ivory White Brown Gray Black Red Light Almond
TradeMaster Duplex Receptacle Openings		
One Gang 	TP8-I TP8-W TP8 TP8-GRY TP8-BK TP8-RED TP8-LA TP8-BL TP8-OR	Ivory White Brown Gray Black Red Light Almond Blue Orange
Two Gang 	TP82-I TP82-W TP82 TP82-GRY TP82-BK TP82-RED TP82-LA TP82-OR	Ivory White Brown Gray Black Red Light Almond Orange
TradeMaster Decorator Openings		
One Gang 	TP26-I TP26-W TP26 TP26-GRY TP26-BK TP26-RED TP26-LA TP26-BL TP26-OR	Ivory White Brown Gray Black Red Light Almond Blue Orange
Two Gang 	TP262-I TP262-W TP262 TP262-GRY TP262-BK TP262-RED TP262-LA TP262-BL TP262-OR	Ivory White Brown Gray Black Red Light Almond Blue Orange

Description	Catalog Number	Color
TradeMaster Blank Plates -- Box Mounted		
One Gang 	TP13-I TP13-W TP13 TP13-GRY TP13-BK TP13-RED TP13-LA	Ivory White Brown Gray Black Red Light Almond
Two Gang 	TP23-I TP23-W TP23 TP23-GRY TP23-BK TP23-LA	Ivory White Brown Gray Black Light Almond
TradeMaster Single Receptacle Openings		
One Gang 	TP7-I TP7-W TP7 TP7-GRY TP7-BK TP7-RED TP7-LA	Ivory White Brown Gray Black Red Light Almond
TradeMaster Power Outlet Receptacle Openings		
One Gang 	TP720-I TP720-W TP720 TP720-GRY TP720-LA	Ivory White Brown Gray Light Almond

For more information on these and other P&S products refer to our Product Guide or visit our web site.

TradeMaster® Thermoplastic Nylon One & Two Gang



Pass & Seymour

Technical Specifications

3rd Party Compliance

UL Listed, Standard UL514, Cover Plates for Flush Mounted Wiring Devices.
CSA Certified.

Performance

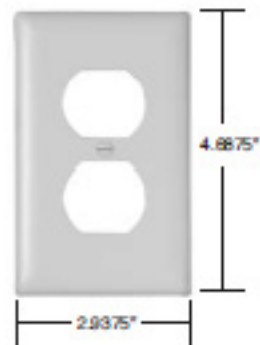
Environmental	Chemical-Resistant
Flammability	UL94 V2

Materials

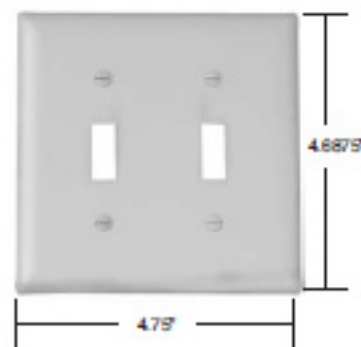
Plate Material	.070" Nylon 6
Plate Finish	Matte
Screws	Steel, Heads Painted to Match Plate Color

Warranty

1 Year



Dimensions for
TradeMaster One Gang



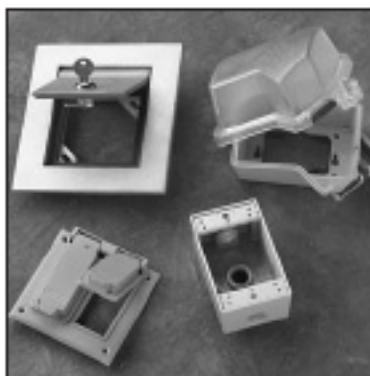
Dimensions for
TradeMaster Two Gang

Complementary Devices & Accessories



WALL PLATES

- Stainless Steel
- Brass
- Aluminum
- Dustproof Stainless Steel Covers



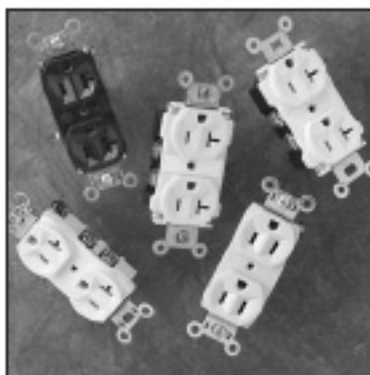
WEATHERPROOF BOXES & COVERS

- While-In-Use Covers
- Heavy Cast Aluminum Covers
- Cast Covers
- Boxes



SWITCHES

- Heavy-Duty Toggle
- Heavy-Duty Lighted Toggle
- Heavy-Duty Security
- Heavy-Duty Locking
- Construction Grade Toggle
- Commercial Grade Toggle



STRAIGHT BLADE RECEPTACLES

- Extra Heavy-Duty
- Heavy-Duty
- Construction Grade
- Commercial Grade



GFCIs

- Construction Grade with Auto-Ground
- Construction Grade
- Construction Grade Dead Front

Also available...

- Light Almond Devices
- Decorator Devices
- Hospital Grade Devices
- PlugTail™ Devices
- TVSS & Isolated Ground Devices
- Ground Continuity Monitoring (GCM)
- Straight Blade Plugs & Connectors
- Turnlok® Locking Devices
- IEC 309 Industrial Products
- Flexcor® Wire Mesh Grips
- Configurable Solutions



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West Hartford, CT 06110
Phone: 1.877.BY.LEGRAND (295.3472)
Fax: 1.860.232.2062
www.legrand.us

Legrand Canada
570 Applewood Crescent
Vaughan, ON, L4K 4B4
Phone: 905.738.9195
Fax: 905.738.9721
www.legrand.ca



LEGRAND SWITCH

Model Number: 660-WG or equal

Location: Interior of house

Electical:

Voltage: 120 V

Current: 15 A

Available: Legrand/ Pass & Seymour



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TradeMaster Grounding Toggle Switch, White

660WG

Smooth, quiet toggle action single pole switch with high-impact resistant construction and grounded terminals. It is a thermoplastic toggle and frame. It has easy-access green hex head ground screw. 15 amps, 120 volts, White.



Representative image shown.

Where to buy >

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features & benefits

- Extra-long strap.
- Side wire #12 and #14 AWG.
- Push wire #14 AWG.
- Tri-drive ground, terminal, and mounting screws.

specifications

GENERAL INFO

Color: White
Product Series: TradeMaster
Type: Toggle

LISTING AGENCIES/THIRD PARTY INFORMATION

CSA Listing Info: No
CUL Listing No: No
cU Lus: Yes
cU Rus: No
Federal Spec: No
UL Listing No: No
U N SPS C: 39121406
U R: No

DIMENSIONS

Depth (U S): 1.090"
Height U S: 4.195"
Width U S: 1.25"

TECHNICAL INFORMATION

Volts A C: 120

BUY AMERICAN ACT COMPLIANCE

Country of Origin: CHINA
Buy American Act Status: No



Q0200TR AC DISCONNECT MOLDED CASE SWITCH

Model Number: Q0200TR

Location: Main house

Dimensions:

Depth: 3.88"

Height: 6.5"

Width: 4.63"

Electrical:

Voltage: 240 V

Current: 60A

Available: Schneider Electric

Price: \$161

QO200TR

AC Disconnect Switch Non Fusible - Molded Case Switch, 60A, NEMA 3R, 2-Pole


 **SQUARE D**

by Schneider Electric

List Price \$161.00 USD

Availability Stock Item: This item is normally stocked in our distribution facility.

Technical Characteristics

Ampere Rating	60A
Application	Residential and light commercial applications
Approvals	UL Listed
Disconnect Type	Non Fusible - Molded Case Switch
Enclosure Type	Metallic - Rain proof and Ice proof (Indoor/Outdoor)
Enclosure Rating	NEMA 3R
For Use With	Air Conditioner
Receptacles	None
Mounting Type	Panel/Surface
Number of Poles	2-Pole
Terminal Type	Screw
Voltage Rating	240VAC
Wiring Configuration	2-Wire
Depth	3.88 Inches
Height	6.50 Inches
Width	4.63 Inches

Notes:

Does not contain overcurrent protection. Suitable for use on systems with up to 10kA available fault current at 240VAC (max) when protected by a fuse or circuit breaker rated 60A or less.

Shipping and Ordering

Category	00044 - Disconnects, Air Conditioner
Discount Schedule	DE2A
GTIN	00785901535966
Package Quantity	1
Weight	3.03 lbs.
Availability Code	Stock Item: This item is normally stocked in our distribution facility.
Returnability	Y
Country of Origin	MX

As standards, specifications, and designs change from time to time, please ask for confirmation of the information given in this document.

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Product Information

Description

Air conditioning disconnects from Schneider Electric are Underwriters Laboratories® (UL®) Listed NEMA Type 3R rainproof. They are designed to meet all current National Electrical Code® (NEC®) requirements for a disconnecting means on residential and commercial air conditioning installations, as well as other single-phase applications, such as swimming pools and pump houses.



QO200TR

Configuration

- NEMA Type 3R rainproof
- 240 Vac two-wire with ground (no neutral)
- Molded case switch versions for applications not requiring overcurrent protection
- Available in metallic and non-metallic enclosures

General Construction

- Factory installed equipment grounding terminals with slot/square drive screws
- Cover padlock provision



QO200TRNM

Molded Case Switch Construction

- Metallic enclosure has removable cover housing (front, top, and side walls) which provides open area for mounting and convenient installation
- Easy access to wiring terminals for conductor installation
- Optional mounting bracket, when used with metallic enclosure, simplifies installation for stucco and lapped siding applications

Enclosures

- Metallic enclosures are galvanized steel enclosures with gray powder coat paint, rated NEMA Type 3R
- Non-metallic enclosures are all NEMA Type 3R

Accessories

Optional mounting bracket PKHB is specifically designed for mounting the QO200TR. This bracket is installed directly to the stud. After the siding goes up, mount the QO200TR air conditioning disconnect to the bracket with screws (not provided).



Mounting Bracket
PKHB

Air Conditioning Disconnects Molded Case Switch

Product Information



QO200TR

Application

Air conditioning disconnects are designed for the following applications:

- Residential and light commercial applications
- 240 Vac maximum
- Suitable for use on systems with up to 10K RMS symmetrical amperes available fault current at 240 Vac
- 60 A maximum
- Horsepower rated


Standards

Air conditioning disconnects are manufactured in accordance with the following standards:

- UL Standard 1429, UL File Number E131815
- NEMA KS-1

Product Information

Air Conditioning Disconnect—Molded Case Switch Rainproof—UL Listed

Service	Ampere Rating	Catalog Number ■		Maximum hp
		Metallic Enclosure	Non-Metallic Enclosure	
2-Wire (Molded Case Switch Included)—240 Vac Maximum				
	60	QO200TR	QO200TRNM	10

■ Does not contain overcurrent protection. Suitable for use on systems with up to 10,000 RMS symmetrical amperes available fault current at 240 Vac max. when protected by a fuse or circuit breaker rated 60 A or less with a 10,000 A short circuit current rating.

Housing Bracket Rainproof—UL Listed

Description	Catalog Number
Bracket used with QO200TR for stucco, aluminum and vinyl siding. Order quantity multiples of 10.	PKHB

Air Conditioning Disconnects Molded Case Switch Product Information

Figure 1:

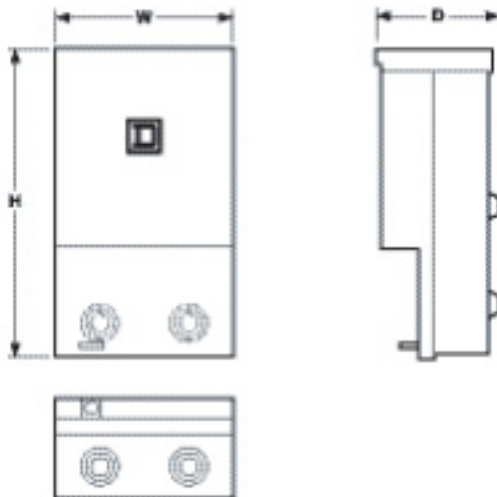


Table 1: Dimensions

Catalog Number	H		W		D		Figure
	IN	mm	IN	mm	IN	mm	
QO200TR	6.50	165	4.63	118	3.88	99	1
QO200TRNM	8.75	222	6.50	165	3.88	99	2
PKHB	5.06	129	4.00	102	0.94	24	3

Figure 2:

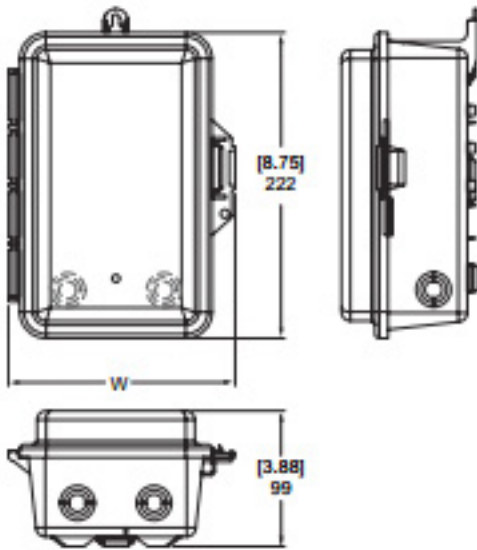
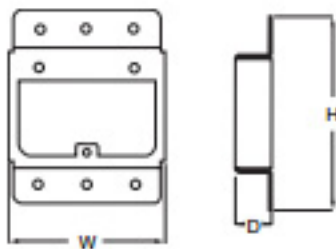


Figure 3:





DOUBLE THROW 200 AMP TRANSFER SWITCH

Model Number: 7205A or equal

Location: Connected with two main trunks from microinverters

Double Pole-Double Throw with 100 amp main contacts, 100 amp aux contacts

Weight: 35 lbs

METER-RITE® GRADE LEVEL DOUBLE THROW SWITCHES

102412

MANUAL, NOT FUSIBLE - QUICK-BREAK/QUICK-MAKE
 METER-RITE® Switches listed below are rated 100% capacity, continuous duty.

CATALOG NUMBER	APPROX WEIGHT (LBS)	DPDT - DOUBLE POLE-DOUBLE THROW TPDT - TRIPLE POLE-DOUBLE THROW
7103 7205A 7406	13 35 48	SINGLE PHASE (240 VAC) UL LISTED DPDT with 100 amp main contacts, 100 amp aux contacts DPDT with 200 amp main contacts, 200 amp aux contacts DPDT with 400 amp main contacts, 400 amp aux contacts
7215 7416	48 48	SINGLE PHASE (240 VAC) WITH "CENTER-OFF" POSITION UL LISTED & SUSE RATED DPDT with 200 amp main contacts, 200 amp aux contacts DPDT with 400 amp main contacts, 400 amp aux contacts
7805 7806	56 56	THREE PHASE (240 VAC) UL LISTED TPDT with 200 amp main contacts, 200 amp aux contacts TPDT with 400 amp main contacts, 400 amp aux contacts
7815 7816	56 56	THREE PHASE (240 VAC) WITH "CENTER-OFF" POSITION UL LISTED & SUSE RATED TPDT with 200 amp main contacts, 200 amp aux contacts TPDT with 400 amp main contacts, 400 amp aux contacts
T-5233-6	184	SINGLE PHASE (600 VAC) NON-UL & NOT-SUSE DPDT with 800 amp main contacts, 600 amp aux contacts
7800-6 7808-6 T-6233-6	56 56 197	THREE PHASE (600 VAC) NON-UL & NOT-SUSE TPDT with 200 amp main contacts, 200 amp aux contacts TPDT with 400 amp main contacts, 400 amp aux contacts TPDT with 800 amp main contacts, 600 amp aux contacts

METER-RITE® Switches are not HP rated and should not be switched under load. SUSE - Suitable for Use as Service Equipment

CATALOG NUMBER	CONDUIT KNOCKOUT SIZES AND HUB TYPE
7103 7205A 7406	(3) 1 to 1-1/4, (1) 1/2 (3) 1-1/2 to 2, (1) 1/2 (2) 2-1/2 to 3, (1) 1-1/2 to 2, (1) 1/2
7215 7416	(3) 1-1/2 to 2, (1) 1/2 (2) 2-1/2 to 3, (1) 1-1/2 to 2, (1) 1/2
7805 7806	(4) 2 to 2-1/2, (1) 1/2 (3) 3 to 3-1/2, (1) 2 to 2-1/2, (1) 1/2
7815 7816	(4) 2 to 2-1/2, (1) 1/2 (3) 3 to 3-1/2, (1) 2 to 2-1/2, (1) 1/2
T-5233-6	NO KNOCKOUTS IN ENCLOSURE
7800-6 7808-6 T-6233-6	(4) 2 to 2-1/2, (1) 1/2 (3) 3 to 3-1/2, (1) 2 to 2-1/2, (1) 1/2 NO KNOCKOUTS IN ENCLOSURE

All knockouts are on bottom of switches. Hubs are top mounted for overhead wiring unless noted above.

Sales Information: 1-800-221-7665



Service & Support: 1-217-563-8333

106 E. State Street • Nokomis, Illinois 62075 www.ronkelectrical.com Phone: 217-563-8333 • Fax: 217-563-8336

METER-RITE® GRADE LEVEL DOUBLE THROW SWITCHES

DIMENSIONS OF NEMA 3R ENCLOSURES

FIGURE 1

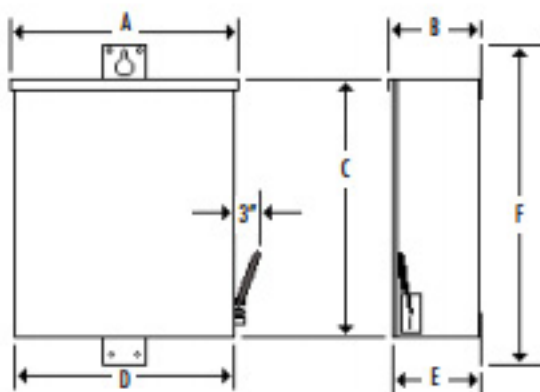
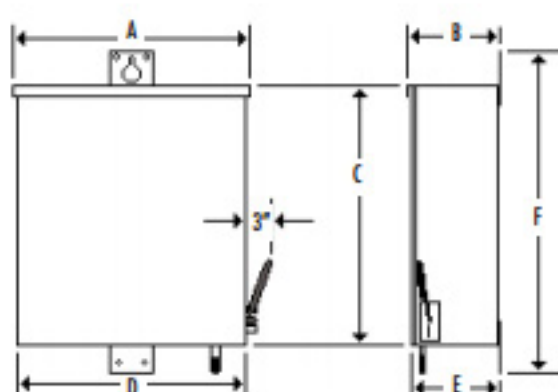


FIGURE 2



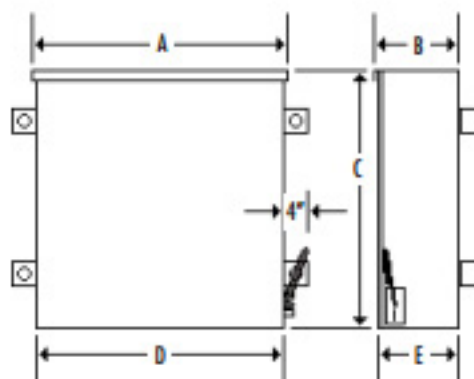
CATALOG NUMBER	WIRE RANGE	FIGURE#	A	B	C	D	E	F
7103	J	1	12	6-1/2	12-7/8	11-3/8	6-1/4	17-5/8
7205A	A	1	16-3/4	8-9/16	24-1/4	15-1/2	8-5/16	29
7215	A	2	19-3/4	8-9/16	26-1/4	18-1/2	8-5/16	31
7406	C	1	19-3/4	8-9/16	26-1/4	18-1/2	8-5/16	31
7416	C	2	19-3/4	8-9/16	26-1/4	18-1/2	8-5/16	31
7805	B	1	25-3/4	8-9/16	26-1/4	24-1/2	8-5/16	31
7800-6	F	1	25-3/4	8-9/16	26-1/4	24-1/2	8-5/16	31
7815	B	2	25-3/4	8-9/16	26-1/4	24-1/2	8-5/16	31
7806	D	1	25-3/4	8-9/16	26-1/4	24-1/2	8-5/16	31
7808-6	H	1	25-3/4	8-9/16	26-1/4	24-1/2	8-5/16	31
7816	D	2	25-3/4	8-9/16	26-1/4	24-1/2	8-5/16	31

WIRE RANGE	LINE/AUXILIARY LUGS	LOAD LUGS	NEUTRAL BAR
A & B	250 MCM - #6 CU-AL (1-HOLE LUG)	250 MCM - #6 CU-AL (4-HOLE LUG)	350 MCM - #6 CU-AL (4-HOLE BAR)
C & D	(2) 250 MCM - 1/0 OR (1) 600 MCM - #4 CU-AL (1-HOLE LUG)	250 MCM - #6 CU-AL (4-HOLE LUG)	350 MCM - #6 CU-AL (6-HOLE BAR)
F	250 MCM - #6 CU-AL (1-HOLE LUG)	250 MCM - #6 CU-AL (1-HOLE LUG)	350 MCM - #6 CU-AL (4-HOLE BAR)
H	(2) 250 MCM - 1/0 OR (1) 600 MCM - #4 CU-AL (1-HOLE LUG)	(2) 250 MCM - 1/0 OR (1) 600 MCM - #4 CU-AL (1-HOLE LUG)	350 MCM - #6 CU-AL (6-HOLE BAR)
J	1/0 - #14 CU-AL (1-HOLE LUG)	1/0 - #14 CU-AL (1-HOLE LUG)	1/0 - #14 CU-AL (3-HOLE LUG)

Other load lug and neutral configurations available. Contact RONK for more information

800 AMP

CATALOG NUMBER #T-5233-6, #T-6233-6



A	B	C	D	E
38	12-1/2	36-1/4	36-1/2	12-1/4
LINE LUGS		LOAD LUGS		
750 MCM - 500 MCM CU-AL (2-HOLE LUG)		600 MCM - #2 CU-AL (3-HOLE LUG)		
AUXILIARY LUGS		NEUTRAL LUG		
350 MCM - #4 CU-AL (2-HOLE LUG)		600 MCM - #2 CU-AL (4-HOLE LUG)		

Sales Information: 1-800-221-7665

RONK
ELECTRICAL INDUSTRIES, INC.

Service & Support: 1-217-563-8333

106 E. State Street • Nokomis, Illinois 62075 www.ronkelectrical.com Phone: 217-563-8333 • Fax: 217-563-8336



EXCLAMATION LIGHT

Location: Living Room, kitchen

Type: LED

Power: 12 V DC

1600 lumens

Available: Yeti Solar





LEGRAND NEW CONSTRUCTION SLIDES

Model Number: 65521

Location: Main House

Spans: 16"-24"

Available: Legrand

New Construction Slides

65521



Slide fan support - same heavy-duty slide as 55501, but with 2.0" deep box , to accommodate up to 1" firewall or soundproofed ceilings, with rotating dual support for 16-24" spans, bulk packed. 25 pack.

features & benefits

- For spans from 16 to 24 inches.
- UL listed for fan and fixture support.
- Peel-off tape for "hands-free" installation.
- Maximum weight rating shown for 16 inch spans.
- Broadest line available, from shallow to deep boxes.
- Pre-assembled with ground screw installed.
- Boxes include top knockouts.

specifications

General Info

Size: Deep

Typical Applications: Heavy Duty

Type: new-work

Listing Agencies/Third Party Information

U N SPS C: 39121308

Dimensions

Depth U S: 2.0"

Volume: 21 cu.in.

Buy American Act Compliance

Country of Origin: CHINA
Buy American Act Status: No



DIVISION 28 ELECTRICAL SAFETY AND SECURITY



ROMEX SIMPULL NMD90 THREE WIRE CONDUCTOR

Model: CU-NMD90
Size (AWG): 12
Insulation Thickness: 0.004"
Available: SIMpull

Romex® SIMpull® NMD90

Nonmetallic Sheathed Cable.
300 Volts. Copper Conductors.



APPLICATIONS

Southwire's Romex® SIMpull® NMD90 cables may be used for both exposed work in dry locations or concealed work in dry or damp locations. The maximum allowable conductor temperature is 90°C. The minimum recommended installation temperature is minus 25° C for two-conductor cables, and minus 10°C for three-conductor cables (with suitable handling procedures). Material should be properly stored above 0°C for 24 hours prior to installation. The maximum voltage rating for all intended applications is 300 volts. Consult the Canadian Electrical Code ¹ for further information related to applications.

SPECIFICATIONS

Southwire's Romex® SIMpull® NMD90 cables meet or exceed the requirements of

- ASTM
- CSA C22.2 No. 48, LL90458
- Canadian Electrical Code
- FT1

CONSTRUCTION

Southwire's Romex® SIMpull® NMD90 cables are available as two- or three-conductor cables, with bare grounding conductor. The construction is manufactured using annealed (soft) copper conductors - compressed stranding for the stranded conductors; a 90°C rated thermoplastic polyvinyl chloride (PVC) insulation and a nylon jacket for the individual conductors; and a PVC jacket surrounding the overall construction. The cable jacket is color coded for quick size identification; White - 14 AWG, Yellow - 12 AWG, Orange - 10 AWG, and White - 8 AWG and 6 AWG. For two-conductor cable, one conductor has white insulation and the second conductor has black insulation. For the three-conductor cable, one conductor has white insulation, one conductor has black insulation, and the third conductor has red insulation. A blue overall jacket is available with two-conductor cable size 14 AWG. A red overall jacket is available with two-conductor cables - sizes AWG 14, AWG 12, AWG 10, and AWG 8: phase conductors will be red and black.

¹ 2008 Canadian Electrical Code

CU-NMD90

Conductor					Ground Wire		Approx. Jacket Thickness		Approx. Cable Dimensions		Approx. Weight		Allowable Ampacity+ (Amps) 30°C Ambient		
Size (AWG)	Number	No. of Strands	Insulation Thickness		Size (AWG)	No. of Strands	mm	in.	mm	in.	kg/km	lbs/ 1000 ft.	60°C	75°C	90°C
			mm	in.											
TWO CONDUCTOR															
14	2	1	0.10	0.004	14	1	00	00	9.86 x 4.83	0.388 x 0.192	101	68	15	15	15
14	2	1	0.10	0.004	14	1	00	00	9.86 x 4.83	0.388 x 0.192	101	68	15	15	15
12	2	1	0.10	0.004	14	1	00	00	10.71 x 5.30	0.422 x 0.209	129	87	20	20	20
10	2	1	0.10	0.004	12	1	00	00	12.21 x 5.84	0.481 x 0.230	182	122	30	30	30
8	2	1	0.13	0.005	10	1	00	00	16.15 x 7.92	0.636 x 0.312	311	209	40	45	45
6	2	7	0.15	0.006	8	7	00	00	20.12 x 9.40	0.792 x 0.370	469	315	55	65	65
6	2	7	0.15	0.006	8	7	00	00	20.12 x 9.40	0.792 x 0.370	469	315	55	65	65
4	2	7	0.15	0.006	8	7	00	00	19.66	0.774	673	452	70	85	85
2	2	7	0.15	0.006	6	7	00	00	23.62	0.930	1040	699	100	115	120
THREE CONDUCTOR															
14	3	1	0.10	0.004	14	1	0.76	0.030	8.77	0.345	129	87	15	15	15
12	3	1	0.10	0.004	14	1	0.76	0.030	9.69	0.381	170	114	20	20	20
10	3	1	0.10	0.004	12	1	0.76	0.030	10.85	0.427	243	163	30	30	30
8	3	7	0.13	0.005	10	1	1.14	0.045	14.47	0.570	410	275	40	45	45
6	3	7	0.15	0.006	8	7	1.14	0.045	17.65	0.695	629	423	55	65	65
4	3	7	0.15	0.006	8	7	1.52	0.060	19.66	0.774	673	452	70	85	85
3	3	7	0.15	0.006	6	7	2.03	0.080	22.05	0.868	887	596	80	100	105
3	3	7	0.15	0.006	6	7	2.03	0.080	23.48	0.925	1192	801	80	100	105
2	3	7	0.15	0.060	6	7	2.03	0.080	25.20	0.992	1415	951	100	115	120

+Allowable ampacities are for general use as specified by the Canadian Electrical Code, 2008, Table 2.



ENERGEX NM-B COPPER INSULATED CABLE

Model: ENERGEX NM-B

Size: 12 AWG

Electrical:

600 V

Available: Nexans

ENERGEX® NM-B Copper

PVC/Nylon Insulated Cable, Copper Conductors, 600 Volts, 90°C Dry Rated - LEAD FREE

Description

Application

Nexans non-metallic sheathed ENERGEX® NM-B cable is used in normally dry installations in residential wiring, as branch circuits for outlets, lighting and other residential loads. Its applications are outlined in NEC 2008 and NEC 2011 Article 334. NM-B is rated at 600 volts and although it is rated at a conductor temperature of 90°C dry, its ampacity is limited to 60°C according to the NEC 2008 and NEC 2011. It may be fished through masonry or tile walls, where not exposed or subject to excessive moisture or dampness.

Nexans NM-B cables are LEAD FREE and RoHS compliant.

Construction

Conductor:

Solid 14 to 10 AWG annealed soft bare copper per ASTM B3.
Stranded 8 AWG and larger annealed soft bare copper per ASTM B3 and B8.

Insulation:

Color coded polyvinyl chloride (PVC) compound with a nylon covering meeting the required thickness of Type THHN. Conductor insulation is rated 90°C.

Ground:

Soft, bare copper solid per ASTM B3 and stranded per ASTM B3 and B8

Sheath:

30 mil color coded PVC sheath rated 90°C is applied over the completed assembly:

White 14 AWG
Yellow 12 AWG
Orange 10 AWG
Black 8 to 2 AWG

Specifications

- Nexans ENERGEX® NM-B meets or exceeds all applicable ASTM specifications.
- UL 83: Thermoplastic Insulated Wires and Cables
- UL 719: Non-Metallic Cables
- Federal Specification A-A-59544 and requirements of the NEC.
- Voltage rating - 600 volts.

Surface Print Legend (example)

NEXANS-C ENERGEX 2C-14 AWG TYPE NM-B 600V W/GRD (UL) LEAD FREE
MM/DD/YY/ MADE IN U.S.A.



Standards

National UL 719; UL 83

ENERGEX® NM-B Copper

Characteristics

Construction characteristics	
Conductor material	Copper
Lead free	Yes
Electrical characteristics	
Maximum operating voltage	600 V
Usage characteristics	
Maximum operating temperature	90 °C

ENERGEX® NM-B Copper

ENERGEX® NM-B Copper

Conductor Size AWG	# of Conductors	PVC Insulation Thickness		Ground Wire Size AWG	Nylon Thickness		Nominal Cable Dimensions		Approximate Net Cable Weight		Ampacity (Amps)
		mils	mm		inch	mm	mils	mm	lbs/kft	kg/km	
Two Conductor											
14 (1)	2	15	0.38	14 (1)	4	0.10	0.16 x 0.36	4.0 x 9.1	57	85	15
12 (1)	2	15	0.38	12 (1)	4	0.10	0.17 x 0.40	4.3 x 10.2	82	122	20
10 (1)	2	20	0.51	10 (1)	4	0.10	0.21 x 0.49	5.3 x 12.4	124	185	30
8 (7)	2	30	0.76	10 (1)	5	0.13	0.27 x .059	6.9 x 15.0	186	277	40
6 (7)	2	30	0.76	10 (1)	5	0.13	0.32 x 0.68	8.1 x 17.3	255	379	55
Three Conductor											
14 (1)	3	15	0.38	14 (1)	4	0.10	0.31	7.9	74	110	15
12 (1)	3	15	0.38	12 (1)	4	0.10	0.34	8.6	107	159	20
10 (1)	3	20	0.51	10 (1)	4	0.10	0.43	10.9	163	243	30
8 (7)	3	30	0.76	10 (1)	5	0.13	0.56	14.2	254	378	40
6 (7)	3	30	0.76	10 (1)	5	0.13	0.63	16.0	357	531	55
4 (7)	3	40	1.02	8 (7)	6	0.15	0.85	21.6	593	882	70
2 (7)	3	40	1.02	6 (7)	6	0.15	0.98	24.9	856	1274	95
Four Conductor											
14 (1)	2/2 ¹	15	0.38	14 (1)	4	0.10	0.35	8.9	91	135	15
14 (1)	4 ²	15	0.38	14 (1)	4	0.10	0.35	8.9	91	135	15
12 (1)	2/2 ¹	15	0.38	12 (1)	4	0.10	0.38	9.7	132	196	20
12 (1)	4 ²	15	0.38	12 (1)	4	0.10	0.38	9.7	132	196	20

Notes:

- Where stated, "nominal" and "approximate" values are provided for information purposes only and are subject to standard manufacturing tolerances.
- Ampacities are in accordance with NEC 2008 and NEC 2011 Article 310.15 and 334.80, which are based on NEC 2008 Table 310.16 or NEC 2011 Table 310.15(B)(16) for conductors in a raceway or direct buried at 30°C ambient temperature and 60°C rated conductors.
- For correction factors for different ambient temperatures and ampacities at different conductor temperature ratings see NEC 2008 Table 310.16 or NEC 2011 Table 310.15(B)(16).
- NEC 2008 and NEC 2011 Article 240.4(D) requires that overcurrent protection not exceed 15 amperes for 14 AWG, 20 amperes for 12 AWG, and 30 amperes for 10 AWG copper conductors after any correction factors for ambient temperature and number of conductors have been applied. Exceptions to this may be covered in NEC 2008 and NEC 2011 Article 240.4(E) through (G).

¹ Insulation color code for 2 / 2 conductor cable is Black, White, Red, and White with Red stripe. Cable ampacity is based on the White and White with Red Stripe conductors being connected as the neutrals for the system.

² Insulation color code for 4 conductor cable is Black, White, Red and Blue. Cable ampacity is based on the 4th conductor being connected as the neutral conductor of a balanced 3 phase system.

Selling information

Product Features

- Slick proprietary sheathing material designed for ease of installation
- Color coded sheaths designed for quick cable identification
- LEAD FREE and RoHS compliant

ENERGEX® NM-B Copper

- 14 AWG 2C and 12 AWG 2C available with two neutral conductors

Packaging

- 14, 12 & 10 AWG; 2, 3 and 4 conductor - 250 ft coil and 1000 ft reel
- 8 AWG and larger 2 and 3 conductor - 125 ft coil, 500 and 1000 ft reel



KIDDE CARBON MONOXIDE ALARM

Model: KN-COB-IC or equal

Electrical:

120 V AC plug in with battery back up

Color: White

Loudness: 85 dB alarm

Available: Home Depot

Price: \$27.87



AC Wire-In Carbon Monoxide Alarm With Battery Back-Up – Interconnectable

Part Number 900-0120

Model KN-COB-IC

Test/Reset

Tests CO alarm circuit operation and allows you to immediately silence the alarm

Green Power LED

Red Alarm LED

Amber, Initiation Alarm LED

Adjustable Mounting Bracket

Allows for fast installation and perfect alignment

Alerts user to replace CO alarm after 7 years of operation



Description

The Kidde 900-0120 is an AC wire-in carbon monoxide alarm that warns you and your family of dangerous carbon monoxide levels. It includes multiple contractor friendly features to ensure easy installation and minimal troubleshooting. This alarm interconnects with up to 24 Kidde devices (of which 18 can be initiation) including smoke alarms, CO alarms and heat alarms on one wiring network. The 900-0120 includes a 9V battery backup along with a 5-year limited warranty.

Consumer Benefits

The Kidde 900-0120 is an essential device to help warn you and your family of dangerous carbon monoxide levels in your home. This unit is interconnectable to other Kidde devices such as smoke alarms and heat detectors on one wiring network, making your home a safer place for your family. The 9V battery backup provides continuous monitoring of carbon monoxide levels even during a power failure. The 900-0120 includes a smart interconnect system. This system enables the unit to alarm in a carbon monoxide pattern and sound a different pattern when interconnected to a Kidde smoke alarm that is in alarm mode.

Contractor-Friendly Features

- **Battery Pull Tab** – Eliminates battery installation time and keeps battery fresh.
- **Adjustable Mounting Bracket** – Allows for fast installation and perfect alignment.
- **Quick Connect** – Installs quickly with snap-on harness.
- **Sealed Cover** – Reduces nuisance alarms. Sealed to protect sensor from contaminants prior to installation.
- **Tamper Resist Locking Feature** – To deter battery and alarm theft.
- **Alkaline Battery Backup** – for continuous protection in case of power failure.



Architectural and Engineering Specifications

The carbon monoxide alarm shall be Kidde Unit Number KN-COB-IC (part number 900-0120) or approved equal. It shall be powered by 120VAC, 60Hz source with a 9V battery backup. The temperature operating range shall be between 40°F and 100°F (4°C and 38°C) and the humidity operating range shall be 5% - 95% relative humidity.

The unit's CO sensor shall be of a fuel cell design and shall meet the sensitivity requirements of Underwriters Laboratories UL2034 Single and Multiple Station Carbon Monoxide Alarms.

The alarm can be installed on the surface of any wall or ceiling following the UL/NFPA/Manufacturer's recommended placement guidelines. The alarm can be installed on any standard single gang electrical box, up to a 4" octagon junction box. The electrical connection (to the alarm) shall be made with a plug-in connector. The unit shall provide optional tamper resistance that deters removal of the unit from the wall or ceiling. No additional pieces shall be required to activate this feature.

A maximum of 24 Kidde devices can be interconnected in a multiple station arrangement. The interconnect system must not exceed the NFPA (National Fire Protection Association) limit of 18 initiating devices, of which 12 can be smoke alarms. With 18 initiating devices (smoke, heat, CO, etc), interconnected, it is still possible to interconnect 6 strobe lights and or relay modules.

The alarm shall include a test button that will electronically simulate the presence of CO and cause the unit to alarm. This sequence tests the unit's electronics and horn to ensure proper operation.

In accordance with UL 2034 with requirements, the CO sensor will not alarm to levels of CO below 30 ppm and will alarm in the following time range when exposed to the corresponding levels of CO.

70 ppm CO Concentration	60 – 240 minutes
150 ppm CO Concentration	10 – 50 minutes
400 ppm CO Concentration	4 – 15 minutes

The alarm shall utilize a piezoelectric horn that is rated at 85 decibels at 10 feet. When the unit detects carbon monoxide, the alarm pattern will be four (4) short beeps - followed by five (5) seconds of silence - followed by four (4) short beeps. The unit shall incorporate "Intelligent Interconnect" feature that allows it to respond to a smoke incident when interconnected with smoke alarms. During a smoke incident, the horn will sound in the required, repetitive manner for a smoke alarm – three (3) beeps, a pause, three (3) beeps, a pause.

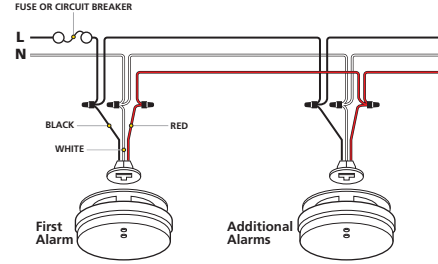
The unit shall incorporate 3 LED's. A green LED will be steady on when AC power is present and will flash every 7 seconds when in the battery only mode. A red LED will flash in unison with the sounder pattern for both a smoke or CO incident, it will flash once per 30 seconds if the alarm needs service, or be steady on if the alarm is in error mode. The amber LED will illuminate if that unit is the originating alarm in a CO incident.

The unit shall also indicate a low battery warning by issuing a brief alarm chirp and the red LED will flash approximately every 15 seconds.

The unit shall be listed to UL 2034. It has a 7-year life and it shall also include a 5-year manufacturer's limited warranty.

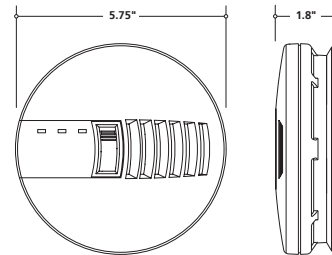
Installation of Carbon Monoxide Alarm

The CO alarm should be installed to comply with all local codes having jurisdiction in your area, Article 760 of the National Electric Code, and NFPA 72. Make certain all alarms are wired to a single, continuous (non-switched) power line, which is not protected by a ground fault interrupter. A maximum of 1000 ft. of wire can be used in the interconnect system. Use standard UL Listed household wire (18 gauge or larger as required by local codes).



Technical Specifications

Part Number:	900-0120
Model:	KN-COB-IC
UPC:	0-47871-00120-0
Power Source:	120VAC, 60HZ, 9V battery back-up
Sensor:	Electrochemical
Audio Alarm:	85dB at 10ft
Temperature Range:	40°F (4°C) to 100°F (38°C)
Humidity Range:	5%-95% relative humidity (RH)
Size:	5.75" diameter x 1.8" depth
Weight:	1lb
Interconnects:	Up to 24 Kidde devices
Warranty:	5 year limited



Ordering Information

Gift Box UPC: 0-47871-00120-0

Part Number	1 of 5	Pack Quantity	Dimensions (w x d x h inches)	Weight	Case/Skid	Layers/Skid	Skid Weight
900-0120**	N/A	Individual	6 x 2 x 6	1lb	N/A	N/A	N/A
21006406	200 47871 00120 4	Master Pack (6 units)	6.5 x 13 x 6.5	6.5lbs	126	5	820lbs

**Not for sale by individual unit



1016 Corporate Park Drive
Mebane NC 27302
1-800-880-6788 www.Kidde.com

Distributed by:

As a courtesy to our customers, Energizer has prepared copyrighted Product Safety Datasheets to provide information on the different Eveready/Energizer battery systems. As defined in OSHA Hazard Communication Standard, Section 1910.1200 (c), Eveready batteries are manufactured "articles", which do not result in exposure to a hazardous chemical under normal conditions of use. For this reason, Material Safety Datasheets are not required. The information and recommendations set forth herein are made in good faith, for information only, and are believed to be accurate as of the date of preparation. However, ENERGIZER BATTERY MANUFACTURING, INC., MAKES NO WARRANTY, EITHER EXPRESS OR IMPLIED, WITH RESPECT TO THIS INFORMATION AND DISCLAIMS ALL LIABILITY FROM REFERENCE ON IT.

PRODUCT SAFETY DATA SHEET**PRODUCT NAME:** Eveready Battery**Type No.:****Volts:****TRADE NAMES:** CLASSIC; SUPER HEAVY DUTY; INDUSTRIAL; HERCULES**Approximate Weight:****CHEMICAL SYSTEM:** Carbon Zinc**Designed for Recharge:** No**SECTION 1 - MANUFACTURER INFORMATION**Energizer Battery Manufacturing, Inc.
25225 Detroit Rd.
Westlake, OH 44145

Telephone Number for Information:

800-383-7323 (USA / CANADA)

Date Prepared: January, 2010

SECTION 2 - HAZARDS IDENTIFICATION

Under normal conditions of use, the battery is hermetically sealed.

Ingestion: Swallowing a battery can be harmful. Contents of an open battery can cause serious chemical burns of mouth, esophagus, and gastrointestinal tract.

Inhalation: Contents of an open battery can cause respiratory irritation.

Skin Contact: Contents of an open battery can cause skin irritation and/or chemical burns.

Eye Contact: Contents of an open battery can cause severe irritation and chemical burns.

SECTION 3 - INGREDIENTS

IMPORTANT NOTE: The battery should not be opened or burned. Exposure to the ingredients contained within or their combustion products could be harmful.

MATERIAL OR INGREDIENT	PEL (OSHA)	TLV (ACGIH)	%/wt.
Acetylene Black (CAS# 1333-86-4)	3.5 mg/m ³ TWA (as carbon black)	3.5 mg/m ³ TWA (as carbon black)	3-7
Ammonium Chloride (CAS# 12125-02-9)	None established	10 mg/m ³ TWA (fume) 20 mg/m ³ STEL (fume)	0-10
Manganese Dioxide (CAS# 1313-13-9)	5 mg/m ³ CEILING (as Mn)	0.2 mg/m ³ TWA (as Mn)	15-31
Zinc (CAS# 7440-66-6)	15 mg/m ³ TWA PNOR* (total dust) 5 mg/m ³ TWA PNOR* (respirable fraction)	10 mg/m ³ TWA PNOC** (inhalable particulate) 3 mg/m ³ TWA PNOC** (respirable particulate)	7-42
Zinc Chloride (CAS# 7646-85-7)	1 mg/m ³ TWA (fume)	1 mg/m ³ TWA (fume) 2 mg/m ³ STEL (fume)	2-10

Non-Hazardous Components			
Steel (Iron CAS # 7439-89-6)	None established	None established	23-28
Water, Paper, Plastic and Other	Non established	Non established	Balance

* PNOR: Particulates not otherwise regulated

**PNOC: Particulates not otherwise classified

SECTION 4 – FIRST AID MEASURES

Ingestion: Do not induce vomiting or give food or drink. Seek medical attention immediately. CALL NATIONAL BATTERY INGESTION HOTLINE for advice and follow-up (202-625-3333) collect day or night.

Inhalation: Provide fresh air and seek medical attention.

Skin Contact: Remove contaminated clothing and wash skin with soap and water. If a chemical burn occurs or if irritation persists, seek medical attention.

Eye Contact: Immediately flush eyes thoroughly with water for at least 15 minutes, lifting upper and lower lids, until no evidence of the chemical remains. Seek medical attention.

SECTION 5 - FIRE FIGHTING MEASURES

In case of fire, it is permissible to use any class of extinguishing medium on these batteries or their packing material. Cool exterior of batteries if exposed to fire to prevent rupture.

Fire fighters should wear self-contained breathing apparatus.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

To cleanup leaking batteries:

Ventilation Requirements: Room ventilation may be required in areas where there are open or leaking batteries.

Eye Protection: Wear safety glasses with side shields if handling an open or leaking battery.

Gloves: Use neoprene or natural rubber gloves if handling an open or leaking battery.

Battery materials should be collected in a leak-proof container.

SECTION 7 - HANDLING AND STORAGE

Storage: Store in a cool, well ventilated area. Elevated temperatures can result in shortened battery life.

Mechanical Containment: If potting or sealing the battery in an airtight or watertight container is required, consult your Energizer Battery Manufacturing, Inc. representative for precautionary suggestions. Batteries normally evolve hydrogen which, when combined with oxygen from the air, can produce a combustible or explosive mixture unless vented. If such a mixture is present, short circuits, high temperature, or static sparks can cause an ignition.

Do not obstruct safety release vents on batteries. Encapsulation (potting) of batteries will not allow cell venting and can cause high pressure rupture.

Handling: Accidental short circuit for a few seconds will not seriously affect the battery. Prolonged short circuit will cause the battery to lose energy, and can cause the safety release vent to open. Sources of short circuits include jumbled batteries in bulk containers, metal jewelry, metal covered tables or metal belts used for assembly of batteries into devices.

If soldering or welding to the battery is required, consult your Energizer Battery Manufacturing, Inc. representative for proper precautions to prevent seal damage or short circuit.

Charging: This battery is manufactured in a charged state. It is not designed for recharging. Recharging can cause battery leakage or, in some cases, high pressure rupture. Inadvertent charging can occur if a battery is installed backwards.

Labeling: If the Eveready Battery label or package warnings are not visible, it is important to provide a package and/or device label stating:

WARNING: do not install backwards, charge, put in fire, or mix with other battery types. May explode or leak causing injury.
Replace all batteries at the same time.

Where accidental ingestion of small batteries is possible, the label should include:

Keep away from small children. If swallowed, promptly see doctor; have doctor phone (202) 625-3333 collect.

SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

Ventilation Requirements: Not necessary under normal conditions.

Respiratory Protection: Not necessary under normal conditions.

Eye Protection: Not necessary under normal conditions.

Gloves: Not necessary under normal conditions.

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point @ 760 mm Hg (°C)	Not applicable for an Article
Vapor Pressure (mm Hg @ 25°C)	Not applicable for an Article
Vapor Density (Air = 1)	Not applicable for an Article
Density (g/cm ³)	2.0 – 3.0
Percent Volatile by Volume (%)	Not applicable for an Article
Evaporation Rate (Butyl Acetate = 1)	Not applicable for an Article
Physical State	Solid
Solubility in Water (% by weight)	Not applicable for an Article
pH	Not applicable for an Article
Appearance and Odor	Solid object / no odor

SECTION 10 – STABILITY AND REACTIVITY

Carbon zinc batteries do not meet any of the criteria established in 40 CFR 261.2 for reactivity.

SECTION 11 – TOXICOLOGICAL INFORMATION

Carbon zinc batteries are not hazardous waste. Under normal conditions of use, carbon zinc batteries are non-toxic.

SECTION 12 – ECOLOGICAL INFORMATION

Issues such as ecotoxicity, persistence and bioaccumulation are not applicable for articles.

SECTION 13 – DISPOSAL CONSIDERATIONS

Dispose of in accordance with all applicable federal, state and local regulations. Appropriate disposal technologies include incineration and land filling.

SECTION 14 – TRANSPORT INFORMATION

In general, all batteries in all forms of transportation (ground, air, or ocean) must be packaged in a safe and responsible manner. Regulatory concerns from all agencies for safe packaging require that batteries be packaged in a manner that prevents short circuits and be contained in "strong outer packaging" that prevents spillage of contents. All original packaging for Energizer or Eveready carbon zinc batteries has been designed to be compliant with these regulatory concerns.

Carbon zinc batteries (sometimes referred to as "Dry cell" batteries) are not listed as dangerous goods under the IATA Dangerous Goods Regulations, ICAO Technical Instructions and the U.S. hazardous materials regulations (49 CFR). These batteries are not subject to the dangerous goods regulations provided they meet the requirements contained in the following special provisions.

Regulatory Body	Special Provisions
ADR	295 - 304, 598
IMDG	UN 3028 Provisions 295 - 304
UN	UN 3028 Provisions 295 - 304
US DOT	49 CFR 172.102 Provision 130
IATA	A123
ICAO	UN 3028 Provisions 295 - 304

All Energizer or Eveready carbon zinc batteries are packed in such a way to prevent short circuits or the generation dangerous quantities of heat and meet the special provisions listed above. In addition, the IATA Dangerous Goods Regulations and ICAO Technical Instructions require the words "not restricted" and the Special Provision number A123 be provided on the air waybill, when an air waybill is issued.

SECTION 15 - REGULATORY INFORMATION

Batteries marketed by Energizer Battery Manufacturing, Inc. are not classified as dangerous goods by the US Department of Transportation or the major international regulatory bodies and are therefore not regulated.

SARA/TITLE III - As an article, this battery and its contents are not subject to the requirements of the Emergency Planning and Community Right-To-Know Act.

SECTION 16 - OTHER INFORMATION

None.



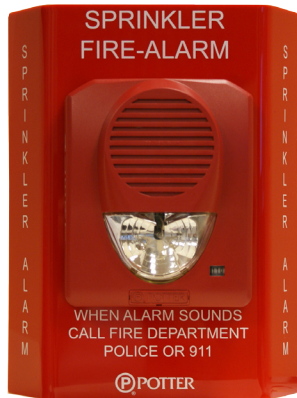
**SPRINKLER ALARM STROBE/ HORN/ SIGN COMBINATION
SASH-24**

Model: 1000755

Location: Exterior North wall of house

Voltage 12/24 VDC

Dimensions: 10 3/4" x 9" x 4 1/2"



UL Listed Strobe Horn

Dimensions: 10-3/4" h x 9" w x 4-1/2" d

Voltages Available: SASH-24 (12/24 VDC)
SASH-120 (120 VAC)

Environment: Indoor or Outdoor use
Weatherproof backbox is included with both models

Termination: Separate terminals for horn and strobe

Finish: Red with white lettering

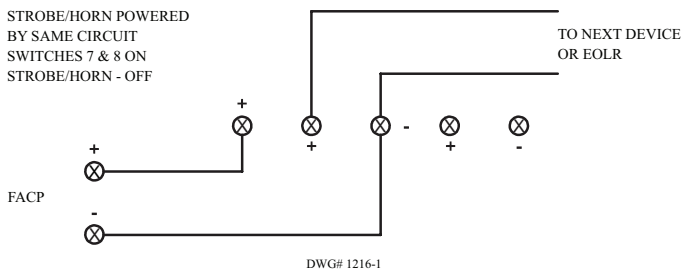
Stock number: 1000755 SASH-24
Stock number: 1000760 SASH-120

The SASH series is a multitone sstrobe/horn combination designed for use as an audio visual indication for automatic sprinkler systems. It can be installed in conjunction with or in place of water motor gongs.

Wiring Information

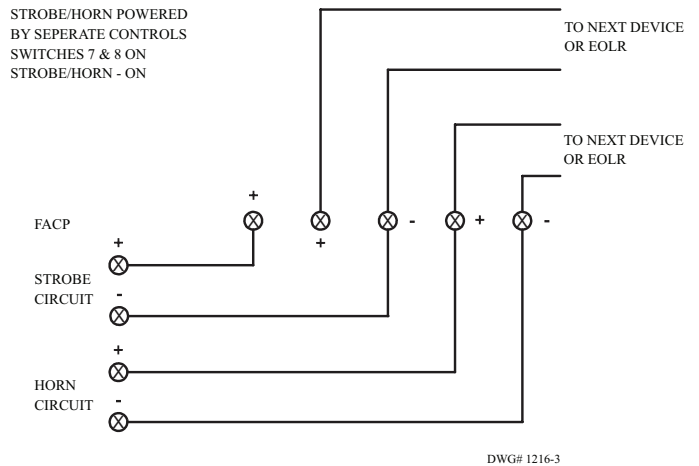
SASH-24

STROBE/HORN POWERED BY SAME CIRCUIT
SWITCHES 7 & 8 ON
STROBE/HORN - OFF

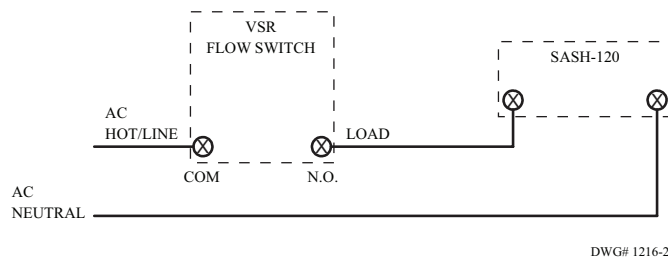


SASH-24

STROBE/HORN POWERED BY SEPERATE CONTROLS
SWITCHES 7 & 8 ON
STROBE/HORN - ON



SASH-120





KIDDE SMOKE ALARM AND CARBON MONOXIDE ALARM

Model: KN-COSM-IB

Electrical: 120 VAC

Color: white

CO Sensor: Electrochemical

Size: 5.75" in diameter x 1.7" depth

Available: Home Depot



AC Wire-in Combination Carbon Monoxide & Smoke Alarm

- 120VAC Direct Wire with Battery Backup
- Alarm/Voice message warning system
- Permanent independent carbon monoxide and smoke alarm sensors

Part Number 21006377 (Previously 900-0114)

Model KN-COSM-IB

Voice Warning

Warns of hazard by announcing "Fire, Fire" or "Warning, Carbon Monoxide".

Peak Level Memory

Alerts user when the unit has detected CO concentrations of 100ppm or higher.

Smart Hush™

Silences the unit during nuisance alarm situations. (Smoke must be present before hush is activated)

Two LED's

- Red – Alarm mode.
- Green – Indicates that AC power is present.

Test/Reset Button Functions

- Tests the units electronics and resets the unit during CO alarm.
- Activates Hush Feature and Peak Level Memory.

Adjustable Mounting Bracket

Allows for easy installation and alignment.

Alerts user to replace CO alarm after 7 years of operation



Description

The Kidde 2106377 Combination Carbon Monoxide & Smoke Alarm provides two important safety devices in a single unit. This alarm includes a voice warning system that announces "Fire, Carbon Monoxide, Low Battery or Smart Hush™ Activation". The voice alarm eliminates any confusion and clearly warns you and your family of a smoke or carbon monoxide danger, or if your battery is in need of replacement. This technically advanced combination alarm includes 9V battery backup providing protection even during a power outage when many incidences occur. The 2106377 is an easy to install alarm that is suitable for all living areas. It has a 7-year life and a 5-year limited warranty.

Alarm Warnings

Fire: The red LED will flash and be accompanied by three long alarm beeps followed by a verbal warning message "FIRE! FIRE!". The alarm will repeat pattern until smoke is eliminated.

Carbon Monoxide: Four short alarm beeps followed by a verbal warning "WARNING! CARBON MONOXIDE!" This continues until the unit is reset or the CO is eliminated.

Low Battery: One chirp followed by warning "LOW BATTERY". The red LED light will flash. This pattern will continue every minute for the first hour. After the first hour the red LED light will flash once every minute accompanied by the chirp sound. The "LOW BATTERY" warning will only sound once every fifteen minutes.

Voice Hush Indication: "HUSH ACTIVATED" and "HUSH CANCELLED" voice announcement

Peak Level Memory: If the alarm had detected a CO level of 100ppm or higher when the Test/Reset button is pressed, the unit will announce "CO PREVIOUSLY DETECTED" to warn of the CO incident.

**Based on accuracy claims of major manufacturers*

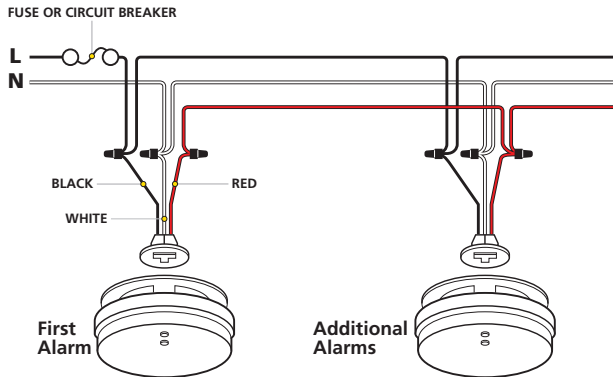
Features and Benefits

- **Smart Interconnect™** – Interconnects up to 24 Kidde devices (of which 18 can be initiating).
- **Battery Backup (9V battery included)** – Provides protection during power outages.
- **Battery Lockout System** – Minimized risk of mounting unit without installation of battery.
- **Alarm Tamper Resist** – Helps deter from tampering and theft.
- **Adjustable Mounting Bracket** – Makes installation fast and easy.
- **Peak Level Memory** – Announces "CO previously detected" if alarm had detected a CO level of 100ppm or higher since it was last reset.
- **Smart Hush™ Feature** – Silences nuisance alarms for approximately 10 minutes. (Smoke must be present before Smart Hush™ is activated)
- **Ionization Sensor Technology** – Ideal for detecting fast flaming and other types of fires.
- **Test Button Functions**
 - Tests the unit for proper operation
 - Resets the Carbon Monoxide alarm
 - Peak Level memory
- **Green LED**
 - Illuminates to indicate the unit is receiving AC power. Flashes every 5 seconds to indicate battery only mode. Flashes once per second (until reset) to indicate that the alarm sensed a smoke or CO hazard. Flashes every 2 seconds while the alarm is in HUSH® mode.
- **Red LED**
 - When a dangerous level of smoke or carbon monoxide is detected the red LED will flash. If the unit malfunctions, the red LED will flash and the unit will chirp every 30 seconds.



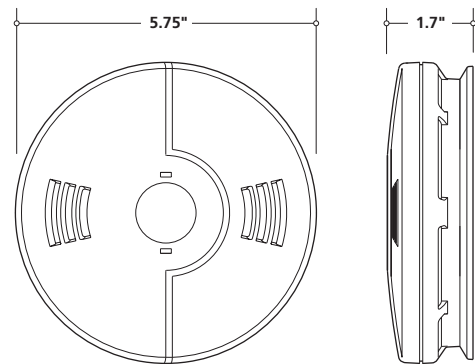
Installation of Smoke Alarm

The combination alarm should be installed to comply with all local codes having jurisdiction in your area, Article 760 of the National Electric Code, and NFPA 72. Make certain all alarms are wired to a single, continuous (non-switched) power line, which is not protected by a ground fault interrupter. A maximum of 1000 ft. of wire can be used in the interconnect system. Use standard UL listed household wire (18 gauge or larger as required by local codes).



Technical Specifications

Part Number:	21006377
Model:	KN-COSM-IB
Power Source:	120VAC, 60Hz 25mA max per alarm 9V battery backup
Smoke Sensor:	Ionization
CO Sensor:	Electrochemical
Audio Alarm:	85dB at 10ft
Temperature Range:	40°F (4.4°C) to 100°F (37.8°C)
Humidity Range:	5%-95% relative humidity
Size:	5.75" in diameter x 1.7" depth
Weight:	1lb
Wiring:	Quick connect plug with 8" pigtails
Interconnects:	Up to 24 Kidde devices (of which 18 can be initiating)
Warranty:	5 year limited

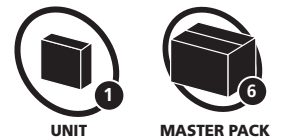


Ordering Information

UPC: 0-47871-00114-9

Part Number	I 2 of 5	Pack Quantity	Dimensions (w x d x h inches)	Weight	Case/Skid	Layers/Skid	Skid Weight
900-0114**	N/A	Individual	5.8 x 2 x 6.2	1lb	N/A	N/A	N/A
900-0114-02	200 47871 00114 3	Master Pack (6 units)	7 x 13 x 7	7.65lbs	100	5	765lbs

**Not for sale by individual unit



1016 Corporate Park Drive
Mebane NC 27302
1-800-880-6788 www.Kidde.com

Distributed by:

DIVISION 32 EXTERIOR IMPROVEMENTS



SCOTTS 1 CU. FT. PREMIUM GARDEN SOIL

Model Number: 72251750
Available: Home Depot



Scotts 1 cu. ft. Premium Garden Soil

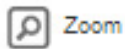
Model # 72251750 Store SKU # 190987

★★★★★ (1)

[Write a Review](#)

[Read All Q&A](#)

\$3.97 /EA-Each



Zoom



More Views



Store Only



Buy Online, Pick Up In Store Today

[Check Store Inventory](#)



PRODUCT DESCRIPTION

Scotts 1 cu. ft. Premium Garden Soil is good for planting flowers, vegetables, trees and shrubs in the ground. It is enhanced with plant food to help your garden flourish. It contains compost, sphagnum peat moss, ammonium phosphate, ammonium nitrate, calcium phosphate and potassium sulphate. It has a 0.08-0.05-0.05 fertilizer analysis.

- Use to plant flowers, vegetables, trees and shrubs in the ground
- Enhanced with plant food to help your garden flourish
- Contains compost, sphagnum peat moss, ammonium phosphate, ammonium nitrate, calcium phosphate and potassium sulphate for optimal growing conditions
- 0.08-0.05-0.05 fertilizer analysis
- MFG Brand Name : Scotts
- MFG Model # : 72251750
- MFG Part # : 72251750

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SPECIFICATIONS

Bag Capacity/Dry Volume (cu. ft.)	1 ft ³	Fertilizer Enriched	Yes
Manufacturer Warranty	Scotts No-Quibble Guarantee: If for any reason you, the consumer, are not satisfied after using this product, you are entitled to get your money back. Simply send us evidence of purchase and we will mail you a refund check promptly.	Moisture Control	No
Mulch and Soil Council Certified	Yes	Organic	No
Package Quantity	1	Product Type	Soil
Soil Type	Garden		

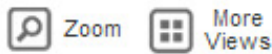


PAVESTONE 0.5 CU. FT. ALL PURPOSE DECORATIVE STONE

Model: 469552

Location: Bottom of planting beds

Available: Home Depot



Pavestone 0.5 cu. ft. All-Purpose Decorative Stone

Model # 469552 Store SKU # 469552

★★★★★ (1) [Write a Review](#)

[View Local Store Pricing](#)

Available for In-Store Pick Up

This item cannot be shipped to the following state(s): AK,HI

- Store Only
- Buy Online, Pick Up In Store Today
- [Check Store Inventory](#)
- [+](#)

[Product Description](#) | [Specifications](#) | [Customer Reviews](#) | [More Info](#) | [Shipping Options](#)

PRODUCT DESCRIPTION

Vigoro 0.5 cu. ft. All-Purpose Decorative Stone can be used in almost any area of your yard as both a decorative and functional ground cover. It is extremely durable and resists losing its color or being scattered by wind and rain. This rock can help keep soil moist and in place. It generally does not attract termites or ants.

- Crushed decorative stone mulch for landscaping around trees, shrubs, decks, driveways and other areas
- Helps retain moisture and reduce erosion
- Resists discoloration and being carried away by wind or rain
- Extremely durable ground cover provides beauty that lasts
- Does not attract termites or ants in normal use
- Note: Product may vary by store.
- MFG Brand Name : Pavestone
- MFG Model # : 469552
- MFG Part # : 469552

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SPECIFICATIONS

Assembled Depth (in.)	4 in	Assembled Height (in.)	18 in
Assembled Width (in.)	15 in	Bag Capacity/Dry Volume (cu. ft.)	.5 ft ³
Bag Weight (lb.)	48	Color	Grey
Color Family	Grays	Coverage Area (sq. ft.)	1 ft ²
Manufacturer Warranty	No	Product Type	Soil/Mulch/SoilAmendment Accessory



VIGORO 0.5 CU. FT. PEA PEBBLES

Model: 440773

Location: Planting Beds

Available: Home Depot



Vigoro 0.5 cu. ft. Pea Pebbles

Model # 440773 Store SKU # 440773

★★★★☆ (5) [Write a Review](#)

[View Local Store Pricing](#)

Available for In-Store Pick Up

Store Only

Buy Online, Pick Up In Store Today
[Check Store Inventory](#)



[Product Description](#) | [Specifications](#) | [Customer Reviews](#) | [More Info](#) | [Shipping Options](#)

PRODUCT DESCRIPTION

The Vigoro 0.5 cu. ft. Pea Pebbles are a functional and decorative landscape addition. The pebbles help limit weeds and protect the soil from temperature extremes and also lend a natural look to your garden. The pebbles may also be used at front entrances to provide a professional look and are ideal for use with drainage projects and under decks.

- Perfect for use under decks and for drainage projects
- Neutral-colored decorative stones limit weeds and protect the soil from harsh temperatures while providing a natural look to your garden
- Use at front entrances for a professional look
- Offers permanent coverage
- Stones are 3/8 - 1/2 in.
- 0.5 cu. ft. covers approximately 6 sq. ft.
- Note: Product may vary by store.
- MFG Brand Name : Vigoro
- MFG Model # : 440773
- MFG Part # : 440773

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SPECIFICATIONS

Assembled Depth (in.)	48 in	Assembled Height (in.)	36 in
Assembled Width (in.)	40 in	Bag Capacity/Dry Volume (cu. ft.)	.5 ft ³
Bag Weight (lb.)	45	Color	multicolored
Color Family	Browns / Tans	Coverage Area (sq. ft.)	6 ft ²
Manufacturer Warranty	30 days	Product Type	Landscape Rock

[Return To Top](#)



SCOTT'S EARTHGROW BROWN MULCH

Location: Planter Boxes
Available: Home Depot


[Zoom](#)
[More Views](#)

Scotts Earthgro 2 cu. ft. Brown Mulch

Model # 647185 Store SKU # 647185

★★★★☆ (23) [Write a Review](#) [Read All Q&A](#)

[View Local Store Pricing](#)

Available for In-Store Pick Up

- Store Only
- Buy Online, Pick Up In Store Today
- [Check Store Inventory](#)
- [+](#)

PRODUCT DESCRIPTION

This Scotts Earthgro 2 cu. ft. Brown Mulch features shredded pine to beautify your landscape areas. The 100% wood composition helps conserve soil moisture and moderate temperature, and the mulch blocks growth and light access to help discourage weeds when applied at a depth of 3 in. or greater. Color Advantage helps maintain color for up to 12 months.

- Shredded mulch beautifies landscape areas
- Blocked growth and light access helps to discourage weeds when applied at a depth of 3 in. or greater
- 100% wood composition helps conserve soil moisture and moderate temperature
- Color Advantage helps maintain color for up to 12 months
- MFG Brand Name : Scotts
- MFG Model # : 647185
- MFG Part # : 647185

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SPECIFICATIONS

Assembled Depth (in.)	0 in	Assembled Height (in.)	0 in
Assembled Width (in.)	0 in	Bag Capacity/Dry Volume (cu. ft.)	2 ft ³
Color	Brown	Color Family	Browns / Tans
Coverage Area at 3 In. (sq. ft.)	16	Manufacturer Warranty	Scotts No-Quibble Guarantee: If for any reason you, the consumer, are not satisfied after using this product, you are entitled to get your money back. Simply send us evidence of purchase and we will mail you a refund check promptly.
Material	Wood	Mulch Type	Shredded
Mulch and Soil Council Certified	Yes	Package Quantity	1
Percentage of Product Made From Wood (%)	100	Product Type	Mulch

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FEATHER REED GRASS

Location: Landscape
Available: Planting Depot





BLUE FESCUE GRASS

Location: Landscape
Available: Planting Depot





SALVIA

Location: Landscape
Available: Planting Depot





ALYSSUM

Location: Landscape
Available: Planting Depot





MIGHTY OAK RED LETTUCE

Location: Landscape
Available: Planting Depot





MIGHTY OAK RED LETTUCE

Location: Landscape
Available: Planting Depot





SAGE

Location: Landscape
Available: Planting Depot





THYME

Location: Landscape
Available: Planting Depot





CHIVES

Location: Landscape
Available: Planting Depot





OREGANO

Location: Landscape
Available: Planting Depot





LAVENDER

Location: Landscape
Available: Planting Depot





BLACK SEEDED SIMPSON LETTUCE

Location: Landscape
Available: Planting Depot





DESERT MALLOW

Location: Landscape
Available: Planting Depot





DIVISION 41 MATERIAL PROCESSING & HANDLING EQUIPMENT



70 TON CRANE WITH OPERATOR

Available: Crainco Inc.



KOMATSU FG40T FORKLIFT TRUCK

Model Number: FG40T
Available: Clairemont Equipment



INGERSOLL RAND 3 HP STATIONARY COMPRESSOR

Model Number: SS3L3

Dimensions:

Height: 23"



Depth: 20"

Width: 23"

Finish: Cast Iron

Available: Any national chain store such as Home Depot or Lowes

Price: \$748.33

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Ingersoll Rand 3 HP Stationary Compressor

Model # SS3L3 Internet # 202889695

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DIVISION 46 WATER & WASTE-
WATER EQUIPMENT



DIVISION 48 ELECTRICAL POWER GENERATION



SOLOPOWER SOLOPANEL SP1

Model Number: SP1

Location: Main House

Dimensions:

Length: 86.51"

Width: 15.67"

Thickness: 0.1"

Weight: 4.6 lbs

Power ranges: 95 W

SoloPanel® Model SP1

Our SoloPanel SP1 is an innovative photovoltaic module based upon Copper, Indium, Gallium, Selenium ("CIGS") semiconductor material electro-deposited on a flexible stainless steel substrate and encapsulated in a state-of-the-art moisture barrier laminate. It is designed for a wide range of applications.

LOW INSTALLED SYSTEM COST

The flexible, lightweight form factor of the SP1 enables rapid and easy installation as well as low cost system integration with a wide variety of mounting solutions. The SP1 module is optimized for residential and standing seam metal roof integration.

HIGH ENERGY PERFORMANCE

SoloPower® is the market leader in high efficiency flexible modules. Modules are designed for superior performance under all light conditions, including low sun angle, providing excellent energy yield throughout the year.

PROVEN DURABILITY

SoloPower® modules are built to meet or exceed UL 1703, IEC 61646 & IEC 61730 standards. Cells and modules are continually subjected to rigorous environmental and accelerated life cycle testing beyond industry standards.



IMAGINE INTEGRATION

SoloPower, Inc. is a US based manufacturer of high-efficiency thin-film photovoltaic modules based on Copper Indium Gallium di Selenide (CIGS). The unique manufacturing process utilizes a low cost, proprietary electro-deposition tool set. The company is headquartered in San Jose, California.



KEY FEATURES

- + Sixty (60) series connected, high efficiency, CIGS solar cells optimize panel performance
- + Low weight, non-penetrating mounting solutions take advantage of the lightweight module characteristics
- + Superior low-sun angle and low light performance provide excellent energy yield
- + Low profile bypass diodes allow for maximum performance under shade conditions
- + Weather resistant front sheet, sealed junction box and protective back sheet provide a long life, reliable and durable package
- + Modules are built to meet and/or exceed UL standard 1703, IEC 61646 & IEC 61730 standards
- + Manufactured in a highly automated state-of-the-art facility
- + 5-year limited warranty against defective materials and workmanship
- + 25-year warranty on power output
- + Designed and manufactured in USA
- + For a complete listing of SoloPower products visit: www.solopower.com

APPLICATIONS

Segments: Commercial, Industrial, and Residential Rooftops

ELECTRICAL CHARACTERISTICS (STC)¹

SoloPower SP1		75	80	85	90	95
Rated Power (P _{max}) ²	W	75	80	85	90	95
Voltage at P _{max} (V _{mp})	V	21.8	22.7	23.3	24.7	26.2
Current at P _{max} (I _{mp})	A	3.4	3.5	3.6	3.6	3.6
Short-circuit current (I _{sc})	A	4.3	4.3	4.4	4.3	4.2
Open-circuit Voltage (V _{oc})	V	30.6	31.8	32.4	33.6	34.8
Efficiency ³	%	9.9	10.5	11.2	11.9	12.5

1. STC standard test conditions: 1000W/m² intensity, Air Mass 1.5, 25°C cell temperature. The power tolerance is -3% / +5% Wp, at STC. The electrical characteristics are within ± 10% unless otherwise specified.
2. Stabilized Power.
3. Aperture Efficiency.

SoloPower SP1					
Temp. Co-efficient of I _{sc}	%/°C	-0.01	Pmp	-0.4	%/°C
Temp. Co-efficient of V _{oc}	%/°C	-0.3			
Max. Series Fuse Rating	A	7			
Maximum DC Voltage					
US	VDC	600			
EU	VDC	1,000			
NOCT	°C	47			

PHYSICAL CHARACTERISTICS

SoloPower SP1		
Length		86.1 in / 2.189 m
Width		15.7 in / 0.399 m
Thickness		0.1 in / 2.0 mm
Weight		4.6 lbs / 2.1 kg
Roof Load From Module		0.49 lbs/ft ² / 2.4 kg/m ²

QUALIFICATIONS

Certified to Standards: UL 1703, IEC 61646, & IEC 61730.



WARRANTY

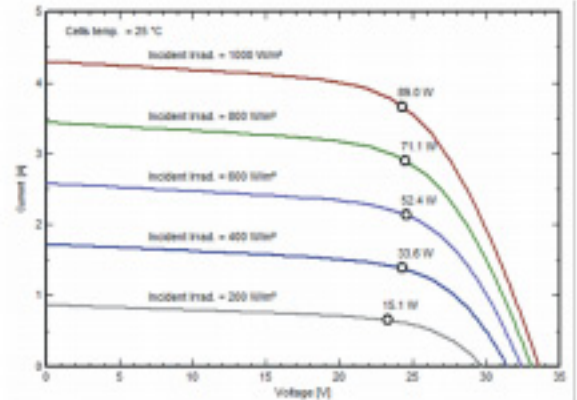
Limited Warranty

Materials and workmanship: 5 years. Power output: 25 years (90% of nominal rated power for years 1 to 10, 80% of nominal rated power for years 11 to 25). Designed and manufactured in the US.

Contact sales@solopower.com for complete terms of the limited warranty.

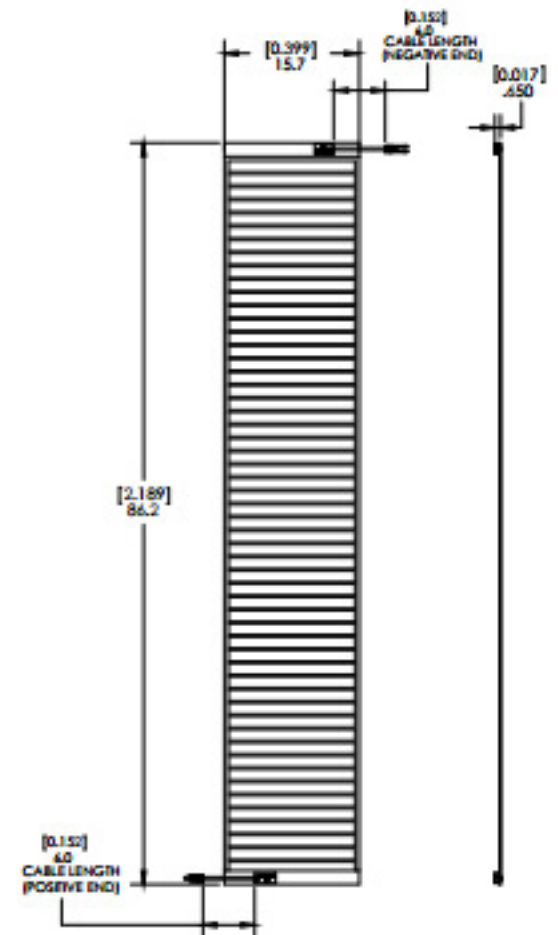
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IV CURVES



Current (A) vs. Voltage (V) at various Irradiance levels

MECHANICAL DRAWING





SOLECTRIA INVERTER

Model Number: PVI-6500

Location: Near meter disconnect box on north side of house

Dimensions:

Width: 28.8 in

Height: 17.3 in

Depth: 8.2 in

Weight: 88.9 lbs

Output Data:

AC power: 6500 W each

Max Operating Input Current: 35 A

Voltage: 240 VAC

Peak Efficiency: 96.3%

Quantity: 1

STRING INVERTERS

PVI 3000
PVI 3000S
PVI 4000
PVI 4000S
PVI 5000
PVI 5000S
PVI 5300
PVI 6500
PVI 7500

FEATURES

- 96% CEC efficiency
- Wide input operating voltage window
- 9 Power Ratings
- 208 VAC, 240 VAC or 277 VAC
- Fully-integrated design
- Detachable wiring box
- Standard 10 year warranty
- RS485 communications
- LCD

OPTIONS

- Integrated panel assembly to 15 kW
- Web-based monitoring



STRING INVERTERS

At 96% CEC efficiency, the Solectria Renewables string inverter series, ranging from 3.0 kW to 7.5 kW, is the most efficient transformer isolated string inverter on the market. The PVI 3000-PVI 7500 series of inverters consist of nine power ratings to optimally match your grid-tied PV system, and boasts fully-integrated DC and AC disconnects, an LCD, and a 3, 4, or 5 fused string inputs all contained within a detachable wiring box. This feature allows for a clean, simple, and safe installation with easy serviceability. The integrated panel assembly option allows for this inverter series to be pre-wired and mounted on an industrial grade aluminum panel with kWh meter and optional AC visible-blade disconnect or circuit breakers on a two-inverter panel assembly.



SPECIFICATIONS		PVI 3000 PVI 3000S	PVI 4000 PVI 4000S	PVI 5000 PVI 5000S	PVI 5300	PVI 6500	PVI 7500	
DC Input								
Absolute Maximum Input Voltage		600 VDC						
MPPT Input Voltage Range		200-550 VDC				230-500 VDC		
Maximum Operating Input Current		16 A	21 A	25 A	25 A	35 A	35 A	
AC Output								
Nominal Output Voltage		208 or 240 VAC				208, 240 or 277 VAC		
AC Voltage Range (Standard)		-12%/+10%						
Continuous Output Power	208 VAC	2700 W	3400 W	4300 W	4600 W	6500 W	7500 W	
	208 VAC (S type)	2800 W	3500 W	4400 W		--		
	240 VAC	2900 W	3900W	4900 W	5300 W	6500 W	7500 W	
	240 VAC (S type)	3000 W	4000 W	5000 W		--		
	277 VAC		--			6500 W	7500 W	
Continuous Output Current	208 VAC	13 A	16.3 A	20.7 A	22.1 A	31.3 A	36.1 A	
	208 VAC (S type)	13.5 A	16.8 A	21.1 A		--		
	240 VAC	13 A	16.3 A	20.7 A	22.1 A	27.1 A	31.3 A	
	240 VAC (S type)	13.5 A	16.8 A	21.1 A		--		
	277 VAC		--			23.5 A	27.1 A	
Maximum Backfeed Current		0 A						
Nominal Output Frequency		60 Hz						
Output Frequency Range		59.3-60.5 Hz						
Power Factor		Unity, >0.99						
Total Harmonic Distortion (THD)		<3%						
Efficiency								
Peak Efficiency	208 VAC	96.4%	96.5%	96.4%	96.2%	96.0%	96.2%	
	240 VAC	96.7%	96.7%	96.7%	96.4%	96.3%	96.5%	
	277 VAC		--			96.7%	96.7%	
CEC Efficiency	208 VAC	95.5%	95.5%	96.0%	95.5%		95.5%	
	240 VAC	96.0%	96.0%	96.0%	96.0%		96.0%	
	277 VAC		--				96.0%	
Tare Loss		0.5 W						
Integrated String Combiner								
Fused String Inputs		3	4	4	4	5	5	
Temperature								
Ambient Temperature Range (full power)		-13°F to +131°F (-25°C to +55°C)					-13°F to +122°F (-25°C to +50°C)	
Storage Temperature Range		-13°F to +131°F (-25°C to +55°C)				-13°F to +149°F (-25°C to +65°C)		
Relative Humidity (non-condensing)		5-95%						
Monitoring Options								
Web-based Monitoring (Inverter Direct)		SolrenView						
Revenue Grade Monitoring		External						
Third Party Compatibility		RS485						
Testing & Certifications								
Safety Listings & Certifications		UL 1741/IEEE 1547, IEEE 1547.1, CSA C22.2#107.1, FCC part 15 B						
Testing Agency		ETL						
Warranty								
Standard		10 year						
Enclosure								
AC/DC Disconnects		Standard, fully-integrated (Internal)						
Dimensions (H x W x D)		28.8 in x 17.9 in x 6.9 in (732 mm x 454 mm x 175 mm)		28.8 in x 17.9 in x 7 in (732 mm x 454 mm x 187 mm)		28.8 in x 17.3 in x 8.2 in (732 mm x 438 mm x 208 mm)		
Weight		48.8 lbs (22.2 kg)		59.8 lbs (27.2 kg)		88.9 lbs (40.4 kg)		
Enclosure Rating		NEMA 3R						
Enclosure Finish		Painted aluminum						



SOLAR BOS

Model Number: CST-08-15-N3
Location: Exterior North wall
Features: ETL listed to UL-1741
Configuration: 6 string combiner
Max Fuse Size (Amps) : 30
Steel Enclosure Dimensions: 16" x 12" x 6"
Weight: 30 lbs



310 Stealth Court, Livermore, CA 94551
925.456.7744 | www.solarbos.com

Source Circuit Combiners

SolarBOS Source Circuit Combiners are ETL listed to UL-1741 for 600 Volt and 1000 Volt DC photovoltaic systems. They are designed to minimize installation costs by giving the system designer the utmost flexibility.



SolarBOS Source Circuit Combiner
CST-08-15-N3



PRODUCT FEATURES:

- ETL listed to UL-1741
- 90C output terminals
- NEMA-3R, 4 & 4X rated enclosure options
- Steel or fiberglass enclosures
- Rated for 600 or 1000 VDC and continuous duty
- Touch-safe fuse holders
- Cover doors with poured-in-place seamless gaskets
- High-quality negative input terminal blocks
- Configured for both positive and negative grounded arrays
- Clean design for ample wiring room

Highly Configurable

SolarBOS combiners can be specified with 4 to 36 input circuits, single or dual 90C output terminals, and NEMA-3R, 4 or 4X steel or fiberglass enclosures. All combiner enclosures offer complete gasketed seals for better protection from the elements as well as plenty of wiring room for ease of installation.

Made in California

SolarBOS products are designed and manufactured with the system integrator in mind, using the highest quality components to ensure long-term field reliability. All products are assembled in our UL certified facility in Livermore, California, and we guarantee customer satisfaction.

BALANCE OF SYSTEM PRODUCTS FOR THE SOLAR INDUSTRY

Configure your BOS
Solutions Online:
www.solarbos.com



310 Stealth Court, Livermore, CA 94551
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Combiner Specifications

SolarBOS Source Circuit Combiners offer many configuration options, including single or dual output terminals, number of input circuits, fuse ampacity, and enclosure type.

A common top level part number is a CS-12-15-N3. This "reads" as a 12-circuit, single output combiner box with 15-amp fuses and NEMA-3R enclosure. SolarBOS offers Single and Dual output terminals (CS and CD), anywhere from 4 to 36 input circuits, 2 to 30-amp fuses, and NEMA-3R, 4, and 4X enclosures as standard options.

Please refer to the following table for dimensions and shipping weights.

Number of Input Circuits	4 to 12	14 to 18	20 to 24	26 to 36
Input Conductor Size Range (AWG)	#16 to 4	#16 to 4	#16 to 4	#16 to 4
Max Fuse Size (Amps)	30	30	30	30
Max Rated Current (ADC Continuous)	310	400	400	400
Number of Output Conductors	1	1 or 2	1 or 2	1 or 2
Output Conductor Size Range (AWG)	#6 to 350 kcmil *	#6 to 350 kcmil *	#6 to 350 kcmil *	#6 to 350 kcmil *
Steel Enclosure Dimensions (inches)	16x12x6	20x20x6	20x20x6	24x24x6
Approx. Weight (Powder Coated or Stainless Steel)	30 lbs	36 lbs	45 lbs	60 lbs
Fiberglass Enclosure Dimensions (inches)	18x16x8	18x16x8	24x20x8	24x24x8
Approx. Weight (Fiberglass)	18 lbs	22 lbs	29 lbs	45 lbs
Enclosure NEMA Ratings	3R / 4 / 4X	3R / 4 / 4X	3R / 4 / 4X	3R / 4 / 4X

* Other output terminals and configurations are available up to 600 kcmil. Please ask for details.

SolarBOS Part Numbers

A few example part numbers are explained below:

CS-12-15-N3: Combiner, 12 circuit, single output terminals, with 15-amp fuses and NEMA-3/3R enclosure

CD-24-10-4XF: Combiner, 24 circuit, dual output terminals, with 10-amp fuses and NEMA-4X fiberglass enclosure

CS-08-15-N4: Combiner, 8 circuit, single output terminals, with 15-amp fuses and NEMA-4 enclosure

Configure your BOS Solutions Online: www.solarbos.com



3M DUAL LOCK RECLOSABLE FASTENER

Model: SJ3870

Location: Fastener for solar panels to roof

Type: 250

Thickness: 0.240"

Available:



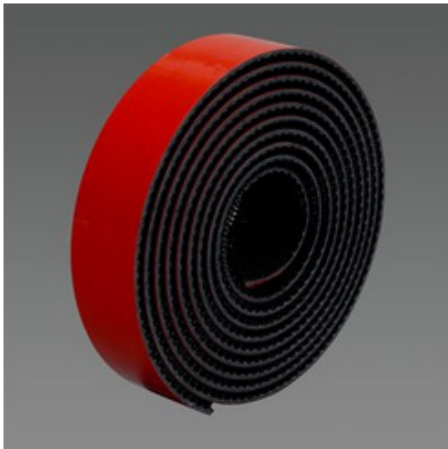
Industrial Adhesives Home

- Structural Adhesives
- Non-Structural Adhesives
- Bonding Tapes
- Fasteners**
- Custom/Die Cuts

United States > All 3M Products > Market Segments > Manufacturing and Industry > Industrial Adhesives > Fasteners > Fasteners & Gripping Material > 3M Dual Lock™ Reclosable Fasteners > 3M™ Dual Lock™ Reclosable Fastener SJ3870 250 Black, 1/2 in x 45 yd 0.22 in (5.6 mm), 4 per case Bulk

3M™ Dual Lock™ Reclosable Fastener SJ3870 250 Black, 1/2 in x 45 yd 0.22 in (5.6 mm), 4 per case Bulk

PC# 00051111187913 3M Product Number SJ3870 3M ID 70006651080



[View All Images](#)

A modified acrylic adhesive on the back of a black polypropylene reclosable fastener. 250 stems per square inch. 0.24 inch engaged thickness. Closure life 1,000.

- Black fastener with mushroom shaped stems backed with a modified acrylic pressure sensitive adhesive.
- Type 250 stem density polyolefin fastener which mates to Type 170, 250 or 400.
- Designed to bond to many plastics and powder coated paints and medium to low surface energy materials with little or no surface preparation.
- General Industrial, Transportation, Speciality Vehicle, Medical, Military, Packaging, Point of Purchase Displays, Exhibits, Electronics, Construction, Furniture, Maintenance Repair and Operations (MRO)
- Attach Doors, Flexible Solar Panels, Headliners, Access Panels, Signs and Display Components.

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★ ★ ★ ★ ★ 0.0 (No reviews)

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For indoor/outdoor use. Medium temperature performance, temperature resistance 180 F. For use with many plastics (polycarbonate, ABS), powder coated paints and medium to low surface energy materials.

Specifications

Adhesive Type	Modified Acrylic Adhesive
Brand	Dual Lock
Closure Life	1000
Color	Black
Engaged Thickness	0.24 Inch
Flame Retardant	No
Indoor/Outdoor	Both
Industry - Use	Construction, Electronics, Furniture, General Industrial, Medical, Military & Government, MRO, Packaging, Retail, Specialty Vehicle, Transportation
Length	45 Linear Yard
Length (metric)	41.14 Linear Metre
Liner Thickness	5 Milli-inch (mil)
Liner Type	Red Polyethylene
Low Profile	No
Maximum Operating Temperature (Fahrenheit)	180 Degree Fahrenheit
Product Form	Roll
Stem Density	250
Units per Case	4
Width	0.50 Inch
Width (metric)	12.70 Millimetre



Dual Lock™ Reclosable Fasteners

SJ3872 (Type 170)

SJ3870 (Type 250)

SJ3871 (Type 400)

Dual Lock Reclosable Fastener with high strength modified acrylic adhesive

Product Information

June, 2010

Product Description

3M™ Dual Lock™ Reclosable Fasteners consist of a continuous polyolefin film backing with mushroom shaped stems protruding up from the backing. When pressed together these mushroom shaped stems interlock to provide you with a strong reliable attachment. There are three different stem densities (170, 250 and 400) offered with these fasteners, referring to the approximate number of stems per square inch.

Dual Lock reclosable fasteners can be mated in the following combinations of increasing closure strength: type 170 to type 250, type 250 to type 250, type 170 to type 400 and type 250 to type 400. Dual Lock reclosable fasteners can combine with 3M™ Scotchmate™ Reclosable Fastener Loop to form a limited use closure.

3M™ Dual Lock™ Reclosable Fasteners SJ3870, SJ3871, and SJ3872 have a high strength modified acrylic adhesive which will bond to a variety of high surface and medium surface energy plastics, metals, powder coat surfaces, and more with little or no surface preparation.

Product Construction

Note: The following technical information and data should be considered representative or typical only and should not be used for specification purposes.

Product Number	3M™ Dual Lock™ Reclosable Fastener		
	SJ3872	SJ3870	SJ3871
Type: Approx. Stems/in ² (Stems/cm ²)	170 (26)	250 (39)	400 (62)
Material of Construction			
Stem/Heads	Black Polypropylene		
Backing	Black Polypropylene		
Adhesive	Black 3M™ Modified Acrylic Foam Adhesive		
Thickness without liner			
Unmated ± 10%	0.145 inch (3.7 mm)		
Engaged	0.240 inch (6.1 mm)		
Liner	5.0 mil (0.13 mm) thick red silicone treated polyolefin		
Weight grams/in ² without liner	0.85	0.89	0.98
Closure Cycle Life	1,000		
Number of opening and closings before losing 50% of original tensile strength			
Shelf Life	24 months from date of manufacture when stored at 72°F (22°C) with 50% RH.		

3M™ Dual Lock™ Reclosable Fasteners

SJ3872 (Type 170) • SJ3870 (Type 250) • SJ3871 (Type 400)

System Performance

Note: The following technical information and data is intended as a guideline to assist customers for further evaluation. This technical information is not product release specifications or standards.

3M™ Dual Lock™ Reclosable Fastener Combination:	SJ3872 / SJ3870 Type 170 / 250	SJ3872 / SJ3871 Type 170 / 400	SJ3870 / SJ3870 Type 250 / 250	SJ3870 / SJ3871 Type 250 / 400
INITIAL TENSILE (Rigid to Rigid Substrates)		Pounds_f/sq inch (Newtons/cm²)		
Dynamic Tensile Engagement Force	13 (9)	21 (14.5)	22 (15)	31 (22)
Dynamic Tensile Disengagement Force	27 (19)	43 (30)	43 (30)	60 (42)
Static Tensile Holding Power	Holds minimum 1000 grams/in ² for indicated time and temperature			
72°F (22°C)	10,000 minutes	10,000 minutes	10,000 minutes	10,000 minutes
100°F (38°C)/100% RH	10,000 minutes	10,000 minutes	10,000 minutes	10,000 minutes
180°F (82°C)	10,000 minutes	10,000 minutes	10,000 minutes	10,000 minutes
INITIAL SHEAR (Rigid to Rigid Substrates)		Pounds_f/sq inch (Newtons/cm²)		
Dynamic Shear (1" x 1" overlap)	14 (9.8)	21 (14.5)	22 (15)	59 (41.3)
Static Shear Holding Power	Holds minimum 750 grams/in ² for indicated time and temperature			
72°F (22°C)	10,000 minutes	10,000 minutes	10,000 minutes	10,000 minutes
100°F (38°C)/100% RH	10,000 minutes	10,000 minutes	10,000 minutes	10,000 minutes
180°F (82°C)	10,000 minutes	10,000 minutes	10,000 minutes	10,000 minutes
PEEL AND CLEAVAGE		Pounds/inch width		
Cleavage Strength (Rigid to Rigid) - 2.25" long	12	24	24	35
Peel Strength ("T" Peel, Flexible to Flexible)	0.5	1.0	1.0	1.5
Peel Strength (90° Peel, Flexible to Rigid)	1.5	3.0	3.0	3.5

Typical Adhesive Performance

90 degree peel adhesion runs at 12 inches per minute

4.5 lb rolled twice

Pounds per inch width	Stainless Steel	Polycarbonate	ABS
Initial (15 minutes)	20	15	10
72 hour dwell at 72°F (22°C)	25	25	25
72 hour dwell at 158°F (70°C)	30	20	25

Typical values not specifications.

Note: Unless stated differently, the typical system performance and product properties were obtained using specific test methods under controlled laboratory conditions of 72°F ± 5°F and 50% ± 10% relative humidity. The user is responsible for evaluating 3M™ Dual Lock™ Reclosable Fasteners under expected use conditions to ensure suitable performance for the intended application.

3M™ Dual Lock™ Reclosable Fasteners

SJ3872 (Type 170) • SJ3870 (Type 250) • SJ3871 (Type 400)

Design Considerations

The following information is intended to assist the designer considering the use of 3M™ Dual Lock™ Reclosable Fasteners with pressure sensitive adhesive. Product performance depends upon a number of factors, including the Dual Lock reclosable fastener selected, the conditions in which the Dual Lock reclosable fastener is applied and the time and environment in which it is expected to perform. Because many of these factors are uniquely within the user's knowledge and control, it is required that the user evaluate 3M products to determine whether it is fit for a particular purpose and suitable for the users substrates, method of application and desired end use.

It is suggested that 4 square inches of Dual Lock reclosable fastener per 1 pound of static load be used as a starting point when determining how much Dual Lock reclosable fastener to use on any particular application. The amounts may be adjusted up or down depending on the needs of the specific applications

Surface Preparation

The amount and type of surface preparation required will depend upon the surfaces to which 3M™ Dual Lock™ Reclosable Fasteners SJ3870, SJ3871 and SJ3872 are attached and expected product use exposure conditions. This modified acrylic has been found to adhere with little or no surface preparation to a wide variety of substrates. Because product performance will depend on actual conditions within any specific application, it is essential that the user evaluate the 3M product to determine whether it is fit for a particular material purpose and suitable for the user's method of application.

Resistance to Chemicals: The polyolefin backing stems and mushroom top should resist attack by most common solvents and alkaline solutions. The adhesive on Dual Lock reclosable fasteners SJ3870, SJ3871 and SJ3872 may be affected by some common laboratory solvents and transportation fluids (gasoline, motor oil, etc.). Tests should be conducted by the user to evaluate the solvents and exposure time expected for the actual application.

Resistance to Environmental Exposure: Temperatures between -20°F (-29°C) and 180°F (82°C) should have minimal affect on closure strength. To maintain performance when exposed for extended periods to sunlight or ultraviolet radiation these products should be placed between two opaque or UV resistant surfaces. Specific testing under the expected environmental conditions is recommended.

Resistance to Water or Humidity: Closure strength should not be affected by prolonged exposure to water or humidity. Once bonded to the substrate, the adhesive has high resistance to moisture under typical use conditions. Exposure to elevated heat and chlorine or bromine may compromise the adhesive performance to the Dual Lock reclosable fasteners.

Washing and Dry Cleaning: The adhesive present on these Dual Lock reclosable fastener products typically make them unsuitable to washing or dry cleaning processes. The adhesive may soften during the cleaning process, potentially leaving adhesive residues on other material. The mushroom topped stems may also be easily entangled with loop or fabric present, potentially damaging these materials when they are separated.

3M™ Dual Lock™ Reclosable Fasteners

SJ3872 (Type 170) • SJ3870 (Type 250) • SJ3871 (Type 400)

Product Use

Many factors beyond 3M's control and uniquely within user's knowledge and control can affect the use and performance of a 3M product in a particular application. Given the variety of factors that can affect the use and performance of a 3M product, user is solely responsible for evaluating the 3M product and determining whether it is fit for a particular purpose and suitable for user's method of application.

Warranty, Limited Remedy, and Disclaimer

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Limitation of Liability

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ISO 9001:2000 • ISO/TS 16949:2002

This Industrial Adhesives and Tapes Division product was manufactured under a 3M quality system registered to ISO 9001:2000 and ISO/TS 16949:2002 standards.



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ADCO HELIO BOND TAPE

Model: PVA-600BT

Dimensions: 3" x 0.035" x 120'

Shear Strength: 5 psi

Peel Strength: 10 psi @ 70 degree F

Purpose: PV Module Attachment Tape

HelioBond® PVA 600BT

Description

HelioBond® PVA 600BT is a high performance elastomeric (butyl) adhesive tape designed to provide very high tack, excellent adhesion. "Best in Class" water and moisture resistance, in a "peel and stick" bonding solution for the integration of flexible thin film PV modules and membrane roofing systems. **HelioBond® PVA 600BT** is designed to bond to most commercially available PV flexible thin film module back sheets and to commonly subscribed installation slip sheets. **HelioBond® PVA 600BT** can be applied with commercially available laminators, using industry accepted lamination techniques.

Typical Aged Adhesive Strength	
Peel Strength	10 pli @ 70° F / 5 pli @ 190° F
Shear Strength	5 psi @ 190° F

Physical Properties		
	Typical Values	Test Method
Color	Black	Visual
Brittleness Temperature	-50° F	ASTM D746
Elongation (tape)	>1000%	ASTM D412
Specific Gravity	0.97	ASTM D71
Application Properties		
Service Temperature	-40° F - 250° F (-40° C - 121° C)	ASTM D3359
Application Temperature	40° F - 120° F (4° C - 49° C)	ASTM C603
Minimum Shelf Life	1 Year	ASTM D1337

Values are typical performance properties and characteristics based on laboratory testing. This is intended as a guide for comparison purposes and does not constitute a specification or specification range.

Features	Benefits
Proven performance in the field	20+ years in the field with exemplary performance
Integrated single roofing and PV module "peel and stick" bonding solution	Supply chain simplicity using material for complete integration of roof material to sub structure and PV module to roofing material
"peel and stick" installation concept	Provides for lower labor costs, faster installation times
ADCO experience with established installation procedures	Eliminates the second guessing and provides step by step inspection, installation and maintenance guidelines
"Best in Class" environmentally resistant adhesive	Impervious to water, humidity, sunshine, snow, hail, UV
Environmentally safe installation	No primers needed, no VOC's, simple safe installation method not using torches or solvents
Simple and easy release liner removal	Installations are a simple and quick under rooftop conditions
Excellent tack and adhesion under outside conditions	Quick stick with proven long term adhesion performance

CAUTION: All statements and technical information in this document are based on tests or data that ADCO believes is reliable. However, ADCO does not warrant or guarantee the accuracy or completeness of this information. The user has sole knowledge and control of factors that can affect the performance of ADCO's products in the user's intended application. It is the user's responsibility to conduct tests to determine the compatibility of ADCO's product with the design, structure, and materials of the user's end product and the suitability of ADCO's product for the user's method of application and intended use. The user assumes all risk and liability arising out of such use.

Application Instructions

The **HelioBond® PVA 600BT** is an extruded tape with installation friendly quick release liner. It comes in various dimensional profiles with a 0.030" thickness and a 20.0" maximum width. It can be easily laminated to either roofing membrane materials or flexible thin film PV modules using commercially available lamination equipment, using industry accepted lamination techniques. Standard lamination conditions are to apply to clean, dry substrates at temperatures above 40° F (4° C) for best results. Apply pressure to bond interface (15psi) with roller or platen. Contact your ADCO technical representative for specific instructions, dependent upon application specifics.

Basic Use

HelioBond® PVA 600BT is used for bonding flexible Thin Film PV modules to roof membranes. **HelioBond® PVA 600BT** can also be used to bond roofing membranes (TPO, EPDM, and other non-polar materials) to roofing substrates, such as metal, or modified bitumen.

Precautions and Limitations

Talc, dust oil, ice, snow, or wet conditions inhibit good adhesion. Clean and dry surfaces are a necessity. Check with your ADCO representative for a list of approved PV modules, back sheets, and slip sheets, roofing membranes and other substrates prior to using the **HelioBond® PVA 600BT** for any application.

Clean Up

Remove excess material and clean residue with aliphatic solvent or isopropyl alcohol.

Packaging

HelioBond® PVA 600BT is supplied in extruded tape and die-cut patch form in various dimensional profiles with 0.030" minimum thickness and 20.0" maximum width. Contact your local ADCO Products, Inc. representative for additional custom availability requirements.

Storage and Shelf Life

When stored at or below 75° F (24° C), **ADCO's HelioBond® PVA 600BT** has a minimum shelf life of 1 year.

Shipping Limitations

None

Health & Safety

Users must follow individual product data sheet and Material Safety Data Sheet (M.S.D.S.) for health and safety precautions. Always use protective eyewear.

Availability/Cost

Availability and cost may be obtained from your ADCO representative by calling 800-248-4010.

HelioBond® PVA 600BT R7 12-07-11

WARRANTY: ADCO warrants its products to conform to ADCO's specifications at the time of sale when tested according to ADCO standards. If a product is proven to be defective when tested according to ADCO standards, ADCO will, at its option, refund the purchase price or replace or repair the defective product. THIS LIMITED WARRANTY IS THE BUYERS SOLE AND EXCLUSIVE REMEDY AGAINST ADCO AND IS IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. In no event shall ADCO be liable for any special, incidental, consequential, or punitive damages arising out of any claims whether based on negligence, contract, warranty, strict liability or otherwise.



WIRE MANAGEMENT SYSTEM

Model Number: WM18-PVC

Location: On the roof

Cover Dimensions: 3.44 x 1.78 x 18.5"

Tray Dimensions 2.9" x 1.78" x 18.5"

Wing Dimensions: 4.03" x 2.33" x 18.5"

Tensile Strength: 6200 psi

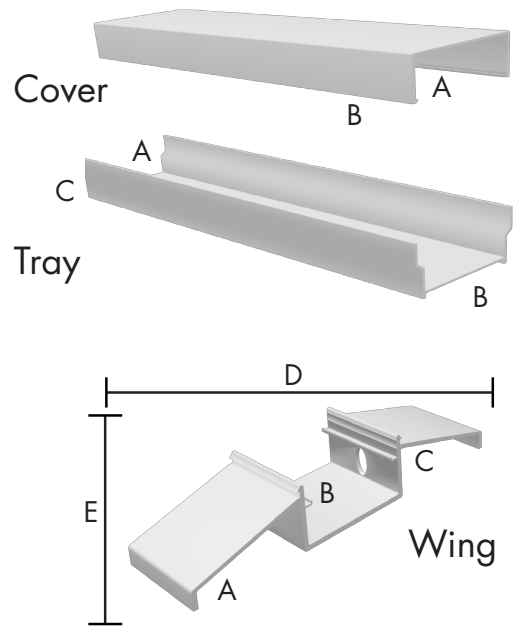
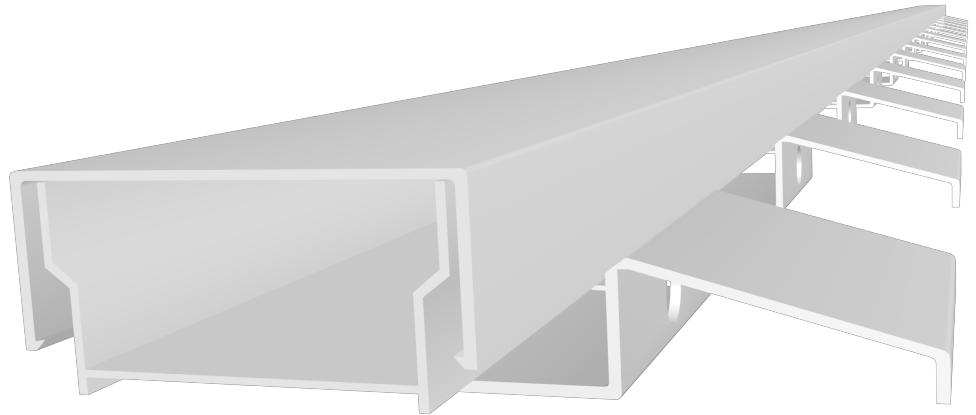
WM18-PVC

MODEL NUMBER

Building integrated PVC system with built in UV protection designed to manage wires in AGT thin-film photovoltaic laminate installations. Protects wires and organizes the roof. Delivered as three components. The base and cover slide together, the wings protect the wire leads from each PV laminate strip. Delivered in 18 foot 6 inch lengths with sets of 15 wings.

FEATURES

- Lightweight
- Easy to assemble
- Durable
- Adheres firmly



Cover	Outside Dimension	In.	Millimeter
A	Width	3.44	87.37
B	Height	1.78	45.21

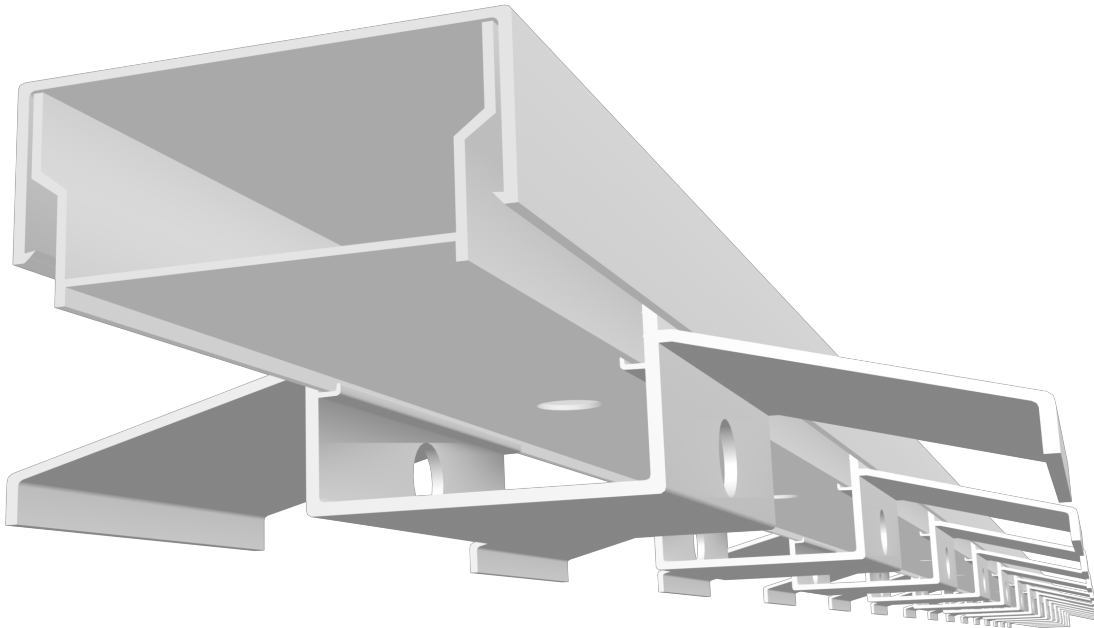
Tray	Inside Dimension	In.	Millimeter
A	Width	2.90	73.66
B	Width	2.50	63.50
C	Height	1.78	45.21

Wing	Inside Dimension	In.	Millimeter
A	Width	4.03	102.36
B	Width	2.80	71.12
C	Width	4.15	105.41
D	Width	11.11	282.19
E	Height	2.33	59.18

WM18-PVC

PHYSICAL PROPERTIES

Tensile strength (psi)	d-638	6200.00
Flexular strength (psi)	d-790	10,500.00
Flexular modulus (psi)	d-790	380,000.00
Noched izod impact 1/8"	d-256	8.00
Specific gravity	d-792	1.43
Heat deflection @ 264 psi	d-648	167.00
Recommended melt temp.	360°	182°



COMPONENTS	wt or % VOLI	ACGIH TL V	OSHA
Acrylic polymers established	<15%	none	none
Calcium carbonate	<10%	10mg\m ³	15mg\m ³
Titanium dioxide	<10%	10mg\m ³	10mg\m ³
Organo tin complex	<5%	0.1 mg\m ³	0.1 mg\m ³
Vinyl chloride	<0.00%	5ppm	1ppm

WM18-PVC



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