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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
Delta T-90 House
Norwich University

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
<table>
<thead>
<tr>
<th>RULE</th>
<th>RULE DESCRIPTION</th>
<th>LOCATION DESCRIPTION</th>
<th>LOCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rule 4-2</td>
<td>Construction Equipment</td>
<td>Drawing(s) showing the assembly and disassembly sequences and the movement of heavy machinery on the competition site</td>
<td>O-101, O-102, O-602</td>
</tr>
<tr>
<td>Rule 4-2</td>
<td>Construction Equipment</td>
<td>Specifications for heavy machinery</td>
<td>41 22 00, 41 62 23</td>
</tr>
<tr>
<td>Rule 4-3</td>
<td>Ground Penetration</td>
<td>Drawing(s) showing the locations and depths of all ground penetrations on the competition site</td>
<td>C-101</td>
</tr>
<tr>
<td>Rule 4-4</td>
<td>Impact within the Solar Envelope</td>
<td>Drawing(s) showing the location, contact area, and bearing pressure of every component resting directly within the solar envelope</td>
<td>A-101, C-101, S-102, S-103, S-505, S-506</td>
</tr>
<tr>
<td>Rule 4-5</td>
<td>Generators</td>
<td>Specifications for generators (including sound rating)</td>
<td>H-101, F-102, P-102, P-101, P-103, P-501, P-603</td>
</tr>
<tr>
<td>Rule 4-6</td>
<td>Spill Containment</td>
<td>Drawing(s) showing the locations of all equipment, containers, and pipes that will contain liquids at any point during the event</td>
<td>22 11 23, 22 11 16, 21 13 13, 01 51 13, 41 65 16</td>
</tr>
<tr>
<td>Rule 4-6</td>
<td>Spill Containment</td>
<td>Specifications for all equipment, containers, and pipes that will contain fluids at any point during the event</td>
<td>22 11 23, 22 11 16, 21 13 13, 01 51 13, 41 65 16</td>
</tr>
<tr>
<td>Rule 4-6</td>
<td>Spill Containment</td>
<td>Calculations showing that the structural design remains compliant even if 18 in. (45.7 cm) of vertical elevation change exists</td>
<td>A-311, L-104</td>
</tr>
<tr>
<td>Rule 4-7</td>
<td>Lot Conditions</td>
<td>Drawing(s) showing shimming methods and materials to be used if 18 in. (45.7 cm) of vertical elevation change exists on the lot</td>
<td>S-102, S-103, A-311</td>
</tr>
<tr>
<td>Rule 4-7</td>
<td>Lot Conditions</td>
<td>Drawing(s) showing the location of all house and site components relative to the solar envelope</td>
<td>A-101, G-201, G-202, L-101</td>
</tr>
<tr>
<td>Rule 5-2</td>
<td>Solar Envelope Dimensions</td>
<td>List of solar envelope exemption requests accompanied by justifications and drawing references</td>
<td>N/A</td>
</tr>
<tr>
<td>Rule 5-2</td>
<td>Solar Envelope Dimensions</td>
<td>List of solar envelope exemption requests accompanied by justifications and drawing references</td>
<td>N/A</td>
</tr>
<tr>
<td>Rule 6-1</td>
<td>Structural Design Approval</td>
<td>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</td>
<td>S-001 through S-506, A-311, C-101 PM Appendix A</td>
</tr>
<tr>
<td>Rule 6-2</td>
<td>Finished Square Footage</td>
<td>Drawing(s) showing all information needed by the rules officials to measure the finished square footage electronically</td>
<td>A-111, A-112, G-101</td>
</tr>
<tr>
<td>Rule 6-2</td>
<td>Finished Square Footage</td>
<td>Drawing(s) showing all movable components that may increase the finished square footage if operated during contest week</td>
<td>N/A</td>
</tr>
<tr>
<td>Rule 6-3</td>
<td>Entrance and Exit Routes</td>
<td>Drawing(s) showing the accessible public tour route</td>
<td>G-103</td>
</tr>
<tr>
<td>Rule 7-1</td>
<td>Placement</td>
<td>Drawing(s) showing the location of all vegetation and, if applicable, the movement of vegetation designed as part of an integrated mobile system</td>
<td>L-101 L-401</td>
</tr>
<tr>
<td>Rule 7-2</td>
<td>Watering Restrictions</td>
<td>Drawing(s) showing the layout and operation of greywater irrigation systems</td>
<td>N/A</td>
</tr>
<tr>
<td>Rule 8-1</td>
<td>PV Technology Limitations</td>
<td>Specifications for photovoltaic components</td>
<td>48 14 00</td>
</tr>
<tr>
<td>Rule 8-3</td>
<td>Batteries</td>
<td>Drawing(s) showing the location(s) and quantity of all primary and secondary batteries and stand-alone, PV-powered devices</td>
<td>N/A</td>
</tr>
<tr>
<td>Rule 8-3</td>
<td>Batteries</td>
<td>Specifications for all primary and secondary batteries and stand-alone, PV-powered devices</td>
<td>N/A</td>
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<tr>
<td>Rule 8-4</td>
<td>Desiccant Systems</td>
<td>Drawing(s) describing the operation of the desiccant system</td>
<td>N/A</td>
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<tr>
<td>Rule 8-4</td>
<td>Desiccant Systems</td>
<td>Specifications for desiccant system components</td>
<td>N/A</td>
</tr>
<tr>
<td>Rule 8-5</td>
<td>Village Grid</td>
<td>Completed interconnection application form</td>
<td>PM 19</td>
</tr>
<tr>
<td>Rule 8-5</td>
<td>Village Grid</td>
<td>Drawing(s) showing the locations of the photovoltaic, inverter(s), terminal box, meter housing, service equipment, and grounding means</td>
<td>E-001 – E-604 C-103, A-212</td>
</tr>
<tr>
<td>Rule 8-5</td>
<td>Village Grid</td>
<td>Specifications for the photovoltaic, inverter(s), terminal box, meter housing, service equipment, and grounding means</td>
<td>26 05 26 26 05 33 48 14 00 E-601, E-603</td>
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<tr>
<td>Rule 8-5</td>
<td>Village Grid</td>
<td>One-line electrical diagram</td>
<td>E-602</td>
</tr>
<tr>
<td>Rule 8-5</td>
<td>Village Grid</td>
<td>Calculation of service/feeder net computed load per NEC 220</td>
<td>PM 15</td>
</tr>
<tr>
<td>Rule 8-5</td>
<td>Village Grid</td>
<td>Site plan showing the house, decks, ramps, tour paths, and terminal box</td>
<td>A-101, G-102 L-101, E-101</td>
</tr>
<tr>
<td>Rule 8-5</td>
<td>Village Grid</td>
<td>Elevation(s) showing the meter housing, main utility disconnect, and other service equipment</td>
<td>A-212</td>
</tr>
<tr>
<td>Rule 9-1</td>
<td>Container Locations</td>
<td>Drawing(s) showing the location of all liquid containers relative to the finished square footage</td>
<td>P-101, O-109, H-101</td>
</tr>
<tr>
<td>Rule 9-1</td>
<td>Container Locations</td>
<td>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</td>
<td>A-501</td>
</tr>
<tr>
<td>Rule 9-2</td>
<td>Team-Provided Liquids</td>
<td>Quantity, specifications, and delivery date(s) of all team-provided liquids for irrigation, thermal mass, hydronic system pressure testing, and thermodynamic system operation</td>
<td>N/A</td>
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<tr>
<td>Rule 9-3</td>
<td>Greywater Reuse</td>
<td>Drawing(s) showing the layout and operation of greywater reuse systems</td>
<td>N/A</td>
</tr>
<tr>
<td>Rule 9-4</td>
<td>Rainwater Collection</td>
<td>Drawing(s) showing the layout and operation of rainwater collection systems</td>
<td>N/A</td>
</tr>
<tr>
<td>Rule 9-6</td>
<td>Thermal Mass</td>
<td>Drawing(s) showing the locations of liquid-based thermal mass systems</td>
<td>N/A</td>
</tr>
<tr>
<td>Rule 9-6</td>
<td>Thermal Mass</td>
<td>Specifications for components of liquid-based thermal mass systems</td>
<td>N/A</td>
</tr>
<tr>
<td>Rule 9-7</td>
<td>Greywater Heat Recovery</td>
<td>Drawing(s) showing the layout and operation of greywater heat recovery systems</td>
<td>N/A</td>
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<tr>
<td>Rule 9-8</td>
<td>Water Delivery</td>
<td>Drawing(s) showing the complete sequence of water delivery and distribution events</td>
<td>P-102, P-603, O-109</td>
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<tr>
<td>Rule 9-8</td>
<td>Water Delivery</td>
<td>Specifications for the containers to which water will be delivered</td>
<td>46 00 00</td>
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<tr>
<td>Rule 9-9</td>
<td>Water Removal</td>
<td>Drawing(s) showing the complete sequence of water consolidation and removal events</td>
<td>O-109</td>
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<tr>
<td>Rule 9-9</td>
<td>Water Removal</td>
<td>Specifications for the containers from which water will be removed</td>
<td>46 00 00</td>
</tr>
<tr>
<td>Rule 11-4</td>
<td>Public Exhibit</td>
<td>Interior and exterior plans showing entire accessible tour route</td>
<td>G-102, G-103</td>
</tr>
</tbody>
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## NEC220 Calculations

<table>
<thead>
<tr>
<th>Appliance</th>
<th>Total Connected Load</th>
</tr>
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<tbody>
<tr>
<td>General Lighting *</td>
<td>2925</td>
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<tr>
<td>Small Appliances</td>
<td>3000</td>
</tr>
<tr>
<td>Laundry</td>
<td>1380</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>7305</strong></td>
</tr>
<tr>
<td>3000 VA at 100%</td>
<td>3000</td>
</tr>
<tr>
<td>7305 - 3000 = 4305 VA at 35%</td>
<td>1507</td>
</tr>
<tr>
<td><strong>Net Load</strong></td>
<td><strong>4507</strong></td>
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<tr>
<td>Range</td>
<td>8000</td>
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<tr>
<td>Heat Pump</td>
<td>1750</td>
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<tr>
<td>Range Hood</td>
<td>250</td>
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<tr>
<td>Dishwasher</td>
<td>1200</td>
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<tr>
<td>Refrigerator</td>
<td>1800</td>
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<td>Water Heater</td>
<td>19200</td>
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<td>HRV Lunos (3)</td>
<td>9</td>
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<tr>
<td>Fire pump</td>
<td>2300</td>
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<tr>
<td>Effluent</td>
<td>876</td>
</tr>
<tr>
<td>Water pump</td>
<td>1296</td>
</tr>
<tr>
<td><strong>Net Calculated Load (VA)</strong></td>
<td><strong>41188</strong></td>
</tr>
<tr>
<td><strong>Net Calculated Netural Load (VA)</strong></td>
<td><strong>38788</strong></td>
</tr>
<tr>
<td><strong>Neutral Ampacity (A)</strong></td>
<td><strong>162</strong></td>
</tr>
<tr>
<td><strong>Service/Feeder Ampacity (A)</strong></td>
<td><strong>172</strong></td>
</tr>
</tbody>
</table>

### Optional Calculation per NEC 220.82(A)

<table>
<thead>
<tr>
<th>Appliance</th>
<th>Total Connected Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Lighting *</td>
<td>2925</td>
</tr>
<tr>
<td>Small Appliances</td>
<td>3000</td>
</tr>
<tr>
<td>Laundry</td>
<td>1380</td>
</tr>
<tr>
<td>Range</td>
<td>9600</td>
</tr>
<tr>
<td>Heat Pump</td>
<td>1750</td>
</tr>
<tr>
<td>Dishwasher</td>
<td>1200</td>
</tr>
<tr>
<td>Refrigerator</td>
<td>1800</td>
</tr>
<tr>
<td>Water Heater</td>
<td>19200</td>
</tr>
<tr>
<td>HRV Lunos (3)</td>
<td>9</td>
</tr>
<tr>
<td>Fire pump</td>
<td>2300</td>
</tr>
<tr>
<td>Water pump</td>
<td>1296</td>
</tr>
<tr>
<td><strong>Net Calculated Load (VA)</strong></td>
<td><strong>44460</strong></td>
</tr>
<tr>
<td><strong>Calculated Load for Service Size (VA)</strong></td>
<td><strong>23784</strong></td>
</tr>
<tr>
<td><strong>Service/Feeder Ampacity (A)</strong></td>
<td><strong>99</strong></td>
</tr>
</tbody>
</table>
## Detailed Water Budget

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

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

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

**INVERTERS**

<table>
<thead>
<tr>
<th>Inverter Manufacturer</th>
<th>Model Number</th>
<th>Voltage</th>
<th>Rating (kVA or KW)</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solectria</td>
<td>PVI-6500</td>
<td>600VDC max</td>
<td>6 kW</td>
<td>1</td>
</tr>
</tbody>
</table>

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)

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

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

\[ \Delta T90 = \frac{\text{change in temperature}}{70^\circ \text{F interior to } -20^\circ \text{F exterior}} \]

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 earthly 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 lives 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 Framer Series Floor Joists, dense pack cellulose, 1/2” PT plywood under floor

C. Roof Assembly: 5/8” gypsum wall board, 2 x 12 Framer Series Rafters, dense pack cellulose, 3/4” plywood sheathing, 4” RoxulToprock, 1/4” Densedeck underlayment, 1/8” roof membrane

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

<table>
<thead>
<tr>
<th>Appliance Package</th>
<th>Assumed Hour Usage Daily</th>
<th>kW</th>
<th>kW/hr/day</th>
<th>kW/hr/YR</th>
<th>Price per year (CA)</th>
<th>Price per year (VT)</th>
<th>$/GJ (CA)</th>
<th>$/GJ (VT)</th>
<th>days per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>washer/dryer combo</td>
<td>0.43</td>
<td>1.18</td>
<td>0.59</td>
<td>296.29</td>
<td>29.11</td>
<td>29.53</td>
<td>0.1301</td>
<td>0.1324</td>
<td>365</td>
</tr>
<tr>
<td>Ev. Stove/oven</td>
<td>1.02</td>
<td>2.60</td>
<td>2.00</td>
<td>194.00</td>
<td>123.46</td>
<td>125.63</td>
<td>0.1301</td>
<td>0.1324</td>
<td>365</td>
</tr>
<tr>
<td>refrigerator/stores</td>
<td>0.90</td>
<td>0.70</td>
<td>0.15</td>
<td>127.75</td>
<td>16.62</td>
<td>16.91</td>
<td>0.1301</td>
<td>0.1324</td>
<td>365</td>
</tr>
<tr>
<td>Dishwasher</td>
<td>0.90</td>
<td>0.70</td>
<td>0.15</td>
<td>127.75</td>
<td>16.62</td>
<td>16.91</td>
<td>0.1301</td>
<td>0.1324</td>
<td>365</td>
</tr>
</tbody>
</table>

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.
### Internal Heat Gains

<table>
<thead>
<tr>
<th>Calculation</th>
<th>Persons</th>
<th>2.1</th>
<th>P</th>
<th>Annual Heat Demand Heating Period</th>
<th>10-61</th>
<th>100 BTU/hr/yr</th>
<th>868</th>
<th>1000</th>
<th>Internal Heat Source (BTU/hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dishwashing</td>
<td>1</td>
<td>L</td>
<td>1.0</td>
<td>1.00</td>
<td>1.00</td>
<td>65</td>
<td>0.30</td>
<td>0.30</td>
<td>9.74</td>
</tr>
<tr>
<td>Clothes Washing</td>
<td>1</td>
<td>L</td>
<td>0.5</td>
<td>1.00</td>
<td>0.60</td>
<td>57</td>
<td>0.30</td>
<td>0.30</td>
<td>9.74</td>
</tr>
<tr>
<td>Clothes Drying with Condensation Dryer</td>
<td>1</td>
<td>L</td>
<td>2.6</td>
<td>1.00</td>
<td>57</td>
<td>215</td>
<td>0.30</td>
<td>0.78</td>
<td>9.74</td>
</tr>
<tr>
<td>Energy Consumed by Evaporation</td>
<td>0</td>
<td>L</td>
<td>-</td>
<td>1.00</td>
<td>57</td>
<td>0</td>
<td>0.00</td>
<td>0.00</td>
<td>9.74</td>
</tr>
<tr>
<td>Refrigeration</td>
<td>0</td>
<td>L</td>
<td>0.4</td>
<td>1.00</td>
<td>91</td>
<td>0</td>
<td>0.00</td>
<td>0.00</td>
<td>9.74</td>
</tr>
<tr>
<td>Electric Recharge</td>
<td>0</td>
<td>L</td>
<td>0.9</td>
<td>1.00</td>
<td>91</td>
<td>0</td>
<td>0.00</td>
<td>0.00</td>
<td>9.74</td>
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<tr>
<td>Combustion</td>
<td>3</td>
<td>L</td>
<td>1.0</td>
<td>1.00</td>
<td>91</td>
<td>1245</td>
<td>0.00</td>
<td>0.00</td>
<td>9.74</td>
</tr>
<tr>
<td>Cooking</td>
<td>3</td>
<td>M</td>
<td>0.4</td>
<td>1.00</td>
<td>91</td>
<td>107</td>
<td>0.00</td>
<td>0.00</td>
<td>9.74</td>
</tr>
<tr>
<td>Lighting</td>
<td>2</td>
<td>L</td>
<td>0.9</td>
<td>1.00</td>
<td>91</td>
<td>0</td>
<td>0.00</td>
<td>0.00</td>
<td>9.74</td>
</tr>
<tr>
<td>Consumer Electronics</td>
<td>1</td>
<td>M</td>
<td>100</td>
<td>1.00</td>
<td>91</td>
<td>0</td>
<td>0.00</td>
<td>0.00</td>
<td>9.74</td>
</tr>
<tr>
<td>Household Appliances/Other</td>
<td>3</td>
<td>M</td>
<td>50</td>
<td>1.00</td>
<td>91</td>
<td>350</td>
<td>0.00</td>
<td>0.00</td>
<td>9.74</td>
</tr>
<tr>
<td>Auxiliary Appliances (if Any, Electricity)</td>
<td>1</td>
<td>L</td>
<td>50</td>
<td>1.00</td>
<td>91</td>
<td>17</td>
<td>0.00</td>
<td>0.00</td>
<td>9.74</td>
</tr>
<tr>
<td>Penrate</td>
<td>2</td>
<td>L</td>
<td>80</td>
<td>1.00</td>
<td>8.76</td>
<td>301.9</td>
<td>0.55</td>
<td>0.55</td>
<td>9.76</td>
</tr>
<tr>
<td>Hot Water</td>
<td>2</td>
<td>L</td>
<td>5</td>
<td>1.00</td>
<td>8.76</td>
<td>5.06</td>
<td>1.30</td>
<td>1.30</td>
<td>9.76</td>
</tr>
<tr>
<td>Kindling</td>
<td>2</td>
<td>L</td>
<td>5</td>
<td>1.00</td>
<td>8.76</td>
<td>5.06</td>
<td>1.30</td>
<td>1.30</td>
<td>9.76</td>
</tr>
<tr>
<td>Total Heat Available From Internal Sources</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>213</td>
<td>213</td>
<td>9.74</td>
</tr>
</tbody>
</table>

**Specific Demand**

- **BTU/hr**: 1,064
- **kBtu/yr**: 5.21
### 6.0 Annual Predicted Electricity Usage

#### Passive House Planning

<table>
<thead>
<tr>
<th>PRIMARY ENERGY VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Building</strong></td>
</tr>
<tr>
<td><strong>Location</strong></td>
</tr>
<tr>
<td><strong>Treated Floor Area</strong></td>
</tr>
<tr>
<td><strong>Space Heat Demand</strong></td>
</tr>
<tr>
<td><strong>Useful/ Cooling Demand</strong></td>
</tr>
<tr>
<td><strong>Electricity Demand - Auxiliary Electricity</strong></td>
</tr>
<tr>
<td><strong>Total Electricity Demand (without Heat Pump)</strong></td>
</tr>
</tbody>
</table>

#### Heat Pump

<table>
<thead>
<tr>
<th>Component</th>
<th>Electric Demand (Without Heat Pump)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Covered Fraction of Space Heat Demand</strong></td>
<td>0.98</td>
</tr>
<tr>
<td><strong>Covered Fraction of DHW Demand</strong></td>
<td>0.97</td>
</tr>
<tr>
<td><strong>Energy Efficiency Ratio of Heat Pump</strong></td>
<td>3.1</td>
</tr>
<tr>
<td><strong>Total System Performance Ratio of Heat Generator</strong></td>
<td>3.1</td>
</tr>
<tr>
<td><strong>Electricity Demand Heat Pump</strong></td>
<td>2.7 kW (Btu/h)</td>
</tr>
<tr>
<td><strong>Non-Electric Demand - DHW Wash/Dish</strong></td>
<td>2.7 kW (Btu/h)</td>
</tr>
<tr>
<td><strong>Total Electricity Demand Heat Pump</strong></td>
<td>2.7 kW (Btu/h)</td>
</tr>
</tbody>
</table>

#### Other

<table>
<thead>
<tr>
<th>Component</th>
<th>Electric Demand (Without Heat Pump)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Covered Fraction of Space Heat Demand</strong></td>
<td>0.98</td>
</tr>
<tr>
<td><strong>Covered Fraction of DHW Demand</strong></td>
<td>0.97</td>
</tr>
<tr>
<td><strong>Energy Efficiency Ratio of Heat Pump</strong></td>
<td>3.1</td>
</tr>
<tr>
<td><strong>Total System Performance Ratio of Heat Generator</strong></td>
<td>3.1</td>
</tr>
<tr>
<td><strong>Electricity Demand Heat Pump</strong></td>
<td>2.7 kW (Btu/h)</td>
</tr>
<tr>
<td><strong>Non-Electric Demand - DHW Wash/Dish</strong></td>
<td>2.7 kW (Btu/h)</td>
</tr>
<tr>
<td><strong>Total Electricity Demand Heat Pump</strong></td>
<td>2.7 kW (Btu/h)</td>
</tr>
</tbody>
</table>

#### District Heat

| **Electricity Demand** | 2.7 kW (Btu/h) |
| **Non-Electric Demand - DHW Wash/Dish** | 2.7 kW (Btu/h) |
| **Total Electric Demand - District Heat** | 2.7 kW (Btu/h) |

#### Other

| **Electricity Demand** | 2.7 kW (Btu/h) |
| **Non-Electric Demand - Other** | 2.7 kW (Btu/h) |
| **Total Electric Demand - Other** | 2.7 kW (Btu/h) |

#### Heating, Cooling, DHW, Auxiliary and Invasive Electricity

| **Electricity Demand** | 2.7 kW (Btu/h) |
| **Energy Efficiency Ratio of Heat Pump** | 3.1 |
| **Total Electric Demand - District Heat** | 2.7 kW (Btu/h) |

#### Total Primary Energy Use Intensity

| **Electricity Demand** | 59.1 kW (Btu/h) |
| **Total Emissions, CO₂-Equivalent** | 8.1 lb/yr (kg) |

#### Primary Energy Requirement

| **Electricity Demand** | 36.9 kW (Btu/h) |
| **Total Emissions, CO₂-Equivalent** | 8.1 lb/yr (kg) |

#### Specific PE Demand - Mechanical System

| **Electricity Demand** | 32.1 kW (Btu/h) |
| **Total Emissions, CO₂-Equivalent** | 5.2 lb/yr (kg) |

#### Solar Electricity

| **Electricity Demand** | 5.2 kW (Btu/h) |
| **Total Emissions, CO₂-Equivalent** | 5.2 lb/yr (kg) |
## Passive House Verification

**Building:** Norwich University_1991_RUGAM READY 2013  
**Location and Climate:** Northfield, Vermont  
**Street Address:** 138 Ramsey Dr.  
**City, State, Zip:** Northfield, Vermont 05663  
**Country:** United States of America  
**Building Type:** Single Family Affordable Residence

<table>
<thead>
<tr>
<th>Building Type</th>
<th>Heat Type</th>
<th>Building Type</th>
<th>Heat Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Family Affordable Residence</td>
<td>Resubmitted</td>
<td>Single Family Affordable Residence</td>
<td>Resubmitted</td>
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</table>

### Energy Demands with Reference to the Treated Floor Area

<table>
<thead>
<tr>
<th>Energy Demand</th>
<th>Aperture (A)</th>
<th>Monthly Method</th>
<th>PHC Certificate</th>
<th>Verification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific Space Heat Demand</td>
<td>10.67 kBTU/yr</td>
<td>4.76 kBTU/yr</td>
<td>No</td>
<td>Annual Method</td>
</tr>
<tr>
<td>Pressure Test Result</td>
<td>0.30 ACH&lt;sub&gt;50&lt;/sub&gt;</td>
<td>60 ACH&lt;sub&gt;50&lt;/sub&gt;</td>
<td>Yes</td>
<td>Specific Space Heat Demand, Annual Method</td>
</tr>
<tr>
<td>Specific Primary Energy Demand</td>
<td>50.1 kBTU/yr</td>
<td>38.0 kBTU/yr</td>
<td>No</td>
<td>Specific Space Heat Demand, Monthly Method</td>
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<tr>
<td>Specific Primary Energy Demand (with Heating, Cooling, and Ventilation Devices)</td>
<td>32.1 kBTU/yr</td>
<td>38.0 kBTU/yr</td>
<td>No</td>
<td>Specific Space Heat Demand, Monthly Method</td>
</tr>
<tr>
<td>Specific Primary Energy Demand</td>
<td>38.0 kBTU/yr</td>
<td>38.0 kBTU/yr</td>
<td>Yes</td>
<td>Specific Space Heat Demand, Monthly Method</td>
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<tr>
<td>Energy Conservation by Solar Electricity</td>
<td>6.68 kWh/m²</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heating Load</td>
<td>0.09 kBTU/yr</td>
<td>4.76 kBTU/yr</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Cooling Load</td>
<td>2.07 kWh/m²</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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: [Date]  
Agreed: [Name]  
Authorized: [Name]  
Reviewed: [Name]
### Passive House Planning

#### Calculating Summer Shading Factors

**Summary**

<table>
<thead>
<tr>
<th>Orientation</th>
<th>Glazing Area</th>
<th>Summer Shading Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>North</td>
<td>7.1</td>
<td>0%</td>
</tr>
<tr>
<td>East</td>
<td>22.6</td>
<td>0%</td>
</tr>
<tr>
<td>South</td>
<td>77.7</td>
<td>0%</td>
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<tr>
<td>West</td>
<td>43.4</td>
<td>0%</td>
</tr>
<tr>
<td>Horizontal</td>
<td>0.0</td>
<td>100%</td>
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</table>

Results from the Summer worksheet:

- Frequency of overheating ($h_{over}$) = 0.5%

#### Input Field

<table>
<thead>
<tr>
<th>Description</th>
<th>Qty</th>
<th>Window Unit Label</th>
<th>Deviation from North</th>
<th>Angle of Inclination from the Horizontal</th>
<th>Orientation</th>
<th>Glazing Width</th>
<th>Glazing Height</th>
<th>Glazing Area</th>
<th>Height of the Shading Object</th>
<th>Horiz. Distance</th>
<th>Rev. Depth</th>
<th>Distance from Upper Glazing Edge to Overhang</th>
<th>Overhang Depth</th>
<th>Additional Shading Reduction Factor (Summer)</th>
<th>Total Summer Shading Reduction Factor</th>
<th>Horizontal Shading Reduction Factor</th>
<th>Vertical Shading Reduction Factor</th>
<th>Summer Shading Reduction Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>S. Wall 1 - NWI_03</td>
<td>1</td>
<td>Window 5_1016</td>
<td>180</td>
<td>90</td>
<td>South</td>
<td>111</td>
<td>51</td>
<td>56</td>
<td>5</td>
<td>5</td>
<td>2</td>
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<td>100%</td>
<td>0%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>0%</td>
</tr>
<tr>
<td>W. Wall 1 - NWI_04</td>
<td>1</td>
<td>Window 1_1016</td>
<td>270</td>
<td>90</td>
<td>West</td>
<td>30</td>
<td>42</td>
<td>55</td>
<td>5</td>
<td>5</td>
<td>2</td>
<td>2</td>
<td>100%</td>
<td>0%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>0%</td>
</tr>
<tr>
<td>S. Wall 1 - NWI_03</td>
<td>1</td>
<td>Window 3_1016</td>
<td>270</td>
<td>90</td>
<td>West</td>
<td>27</td>
<td>15</td>
<td>14</td>
<td>5</td>
<td>5</td>
<td>2</td>
<td>2</td>
<td>100%</td>
<td>0%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>0%</td>
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</tbody>
</table>
### Passive House Planning

#### Heat Distribution and DHW System

- **Basic Heat Distribution**
  - Length of Insulated Pipes
  - Length of Non-Insulated Pipes
  - Temperature of Water in Supply and Return Pipes
  - Design Temperature
  - Heat Loss Coefficient of Pipes
  - Heat Loss Calculation of Pipes
  - Heat Loss Calculation of Insulation

- **DHW Distribution and Storage**
  - Length of Insulated Pipes
  - Length of Non-Insulated Pipes
  - Temperature of Water in Supply and Return Pipes
  - Design Temperature
  - Heat Loss Coefficient of Pipes
  - Heat Loss Calculation of Pipes
  - Heat Loss Calculation of Insulation

- **Secondary Calculation of Heating and Cooling**
  - Heat Losses at DHW
  - Heat Losses with DHW
  - Heat Losses from Storage

- **Secondary Calculation of DHW System**
  - Heat Losses from DHW Storing
  - Heat Losses from DHW System
  - Heat Losses from DHW Storage

### Additional Information

- **Project Manual**
  - August 22, 2013
  - U.S. Department of Energy

---

#### Table: Passive House Planning

<table>
<thead>
<tr>
<th>Window Area Orientation</th>
<th>Global Radiation (Cardinal Points)</th>
<th>Shading</th>
<th>Dirt</th>
<th>Non-Perpendicular Incident Radiation</th>
<th>Transmission Losses</th>
<th>Heat Gains Solar Radiation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>kBTU/yr</td>
<td>0.75</td>
<td>0.95</td>
<td>0.85</td>
<td>0.76</td>
<td>0.85</td>
</tr>
<tr>
<td>North</td>
<td>41</td>
<td>0.76</td>
<td>0.95</td>
<td>0.85</td>
<td>360</td>
<td>66</td>
</tr>
<tr>
<td>East</td>
<td>99</td>
<td>0.72</td>
<td>0.95</td>
<td>0.85</td>
<td>1182</td>
<td>482</td>
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<tr>
<td>South</td>
<td>180</td>
<td>0.96</td>
<td>0.95</td>
<td>0.85</td>
<td>1975</td>
<td>4277</td>
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<tr>
<td>West</td>
<td>98</td>
<td>0.82</td>
<td>0.95</td>
<td>0.85</td>
<td>1568</td>
<td>1230</td>
</tr>
<tr>
<td>Horizontal</td>
<td>154</td>
<td>0.75</td>
<td>0.95</td>
<td>0.85</td>
<td>0</td>
<td>0</td>
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</table>
Passive House Planning

SPECIFIC SPACE HEATING LOAD

Delta T-90 House
Norwich University

Transmission Heat Losses \( P_t \)

<table>
<thead>
<tr>
<th>Building Element</th>
<th>Temperature Zone</th>
<th>( \Delta T_{in} )</th>
<th>( R_{Value} )</th>
<th>Factor Areas</th>
<th>( \Delta T_{diff} )</th>
<th>( P_{net} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exterior Wall - Ambient</td>
<td>A</td>
<td>1276</td>
<td>4.64</td>
<td>1.00</td>
<td>69 or 66</td>
<td>( \rightarrow 1903 ) or ( \rightarrow 1814 )</td>
</tr>
<tr>
<td>Exterior Wall - Ground</td>
<td>B</td>
<td></td>
<td></td>
<td>1.00</td>
<td>69 or 66</td>
<td>( \rightarrow 690 )</td>
</tr>
<tr>
<td>Roof/Façade - Ambient</td>
<td>A</td>
<td>975</td>
<td>55.2</td>
<td>1.00</td>
<td>69 or 66</td>
<td>( \rightarrow 1222 ) or ( \rightarrow 1164 )</td>
</tr>
<tr>
<td>Ground 1</td>
<td>B</td>
<td>975</td>
<td>38.3</td>
<td>1.00</td>
<td>69 or 66</td>
<td>( \rightarrow 690 )</td>
</tr>
<tr>
<td>Ground 2</td>
<td>C</td>
<td>1.00</td>
<td>28 or 28</td>
<td>( \rightarrow 686 )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ground 3</td>
<td>D</td>
<td>1.00</td>
<td>28 or 28</td>
<td>( \rightarrow 686 )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>X</td>
<td></td>
<td>1.00</td>
<td>69 or 66</td>
<td>( \rightarrow 690 )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y</td>
<td></td>
<td>1.00</td>
<td>69 or 66</td>
<td>( \rightarrow 690 )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Z</td>
<td></td>
<td>1.00</td>
<td>69 or 66</td>
<td>( \rightarrow 690 )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WIndows</td>
<td>A</td>
<td>194</td>
<td>5.0</td>
<td>1.00</td>
<td>69 or 66</td>
<td>( \rightarrow 2678 ) or ( \rightarrow 2555 )</td>
</tr>
<tr>
<td>Exterior Door</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Ventilation System:

<table>
<thead>
<tr>
<th>Effective Air Volume, ( V_e )</th>
<th>Clear Room-Height, ( h )</th>
</tr>
</thead>
<tbody>
<tr>
<td>790</td>
<td>8.2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>( P_{net} )</th>
<th>( \Delta T_{diff} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>682</td>
<td>0.120</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>( P_{total} )</th>
<th>( P_{net} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>7442</td>
<td>7133</td>
</tr>
</tbody>
</table>

Total Heating Load \( P_L \)

\[
P_L = P_{total} = 7442 \text{ or } 7133
\]

Solar Heat Gain, \( P_s \)

\[
P_s = \text{Total} = 2350 \text{ or } 1042
\]

Internal Heat Gains \( P_i \)

\[
P_i = 5600 \text{ BTU/h}
\]

Heat Gains \( P_h \)

\[
P_h = P_1 + P_2 = 2750 \text{ or } 1443
\]

Heating Load \( P_h \)

\[
P_h = P_1 - P_2
\]

Specific Heating Load \( P_{sha} / A_{wall} \)

\[
\frac{P_h}{A_{wall}} = 7.2 \text{ BTU/h/ft}^2
\]

For Comparison: Heating Load Transportable by Supply Air. \( P_{supply} \)

\[
P_{supply} = \frac{2449 \text{ BTU/hr}}{3.1 \text{ BTU/h/ft}^2} = \text{No}
\]

Supply Air Heating Efficiency (No)
Passive House Planning

SPECIFIC ANNUAL HEAT DEMAND

Climatic Region: PHPP Burlington Data
Building Type: Single Family Affordable Residence
Location: Norwich, University
Building: Norwich University_990 SOLAR DECEMBER 2013

<table>
<thead>
<tr>
<th>Building Element</th>
<th>Temperature Zone</th>
<th>Area</th>
<th>R-Value</th>
<th>Temp Factor f</th>
<th>FT</th>
<th>Heating Degree</th>
<th>Oct</th>
<th>Heat Loss G (kW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exterior Wall - Ambient</td>
<td>A</td>
<td>1476</td>
<td>46.4</td>
<td>1.00</td>
<td>72.37</td>
<td>→</td>
<td>4777</td>
<td></td>
</tr>
<tr>
<td>Exterior Wall - Ground</td>
<td>B</td>
<td>975</td>
<td>55.2</td>
<td>1.00</td>
<td>72.37</td>
<td>→</td>
<td>3047</td>
<td></td>
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<tr>
<td>Ground 1</td>
<td>B</td>
<td>875</td>
<td>38.9</td>
<td>0.59</td>
<td>72.37</td>
<td>→</td>
<td>2583</td>
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<tr>
<td>Ground 2</td>
<td>B</td>
<td>0.59</td>
<td>→</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Ground 3</td>
<td>B</td>
<td>0.59</td>
<td>→</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Window</td>
<td>A</td>
<td>194</td>
<td>5.0</td>
<td>1.00</td>
<td>72.37</td>
<td>→</td>
<td>6721</td>
<td></td>
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<tr>
<td>Exterior Door</td>
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<td>1.00</td>
<td>→</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exterior Window</td>
<td>A</td>
<td>1.00</td>
<td>→</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exterior Wall (length/m)</td>
<td>P</td>
<td>0.59</td>
<td>→</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ground Wall (length/m)</td>
<td>P</td>
<td>0.59</td>
<td>→</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total: 17148 kW

Transmission Heat Losses Q_T

Effective Air Volume V_e = 4882 m^3
Clear Heat Loss (kW) = V_e * f = 4882 kW

Total Heat Losses Q_T = 17148 kW

Available Solar Heat Gains Q_S

Internal Heat Gains Q_I

0.024 kW * 205 h = 4.75 kW

Annual Heat Demand Q_H

Q_H = Q_T - Q_S - Q_I = 10.08 kW

Limiting Value = 4.75 kW

Requirement met? No
Passive House Planning

SPECIFIC ANNUAL HEAT DEMAND
MONTHLY METHOD

<table>
<thead>
<tr>
<th>Month</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
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</thead>
<tbody>
<tr>
<td>Heat Load</td>
<td>1234</td>
<td>1234</td>
<td>1234</td>
<td>1234</td>
<td>1234</td>
<td>1234</td>
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<td>Temperature</td>
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<td>Hourly Heat Load</td>
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<td>1234</td>
<td>1234</td>
<td>1234</td>
<td>1234</td>
<td>1234</td>
</tr>
</tbody>
</table>

| Total Heat Load | 1234 |
| Internal Heat Load | 1234 |
| Sol. Heat Gain | 1234 |
| Heat Exchanger | 1234 |
| Heat Transfer | 1234 |
| Annual Heat Demand | 1234 |

Graph: Heat Load by Month

<table>
<thead>
<tr>
<th>Month</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
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<td>1234</td>
</tr>
<tr>
<td>Temperature</td>
<td>1234</td>
<td>1234</td>
<td>1234</td>
<td>1234</td>
<td>1234</td>
<td>1234</td>
<td>1234</td>
<td>1234</td>
<td>1234</td>
<td>1234</td>
<td>1234</td>
<td>1234</td>
</tr>
<tr>
<td>Hourly Heat Load</td>
<td>1234</td>
<td>1234</td>
<td>1234</td>
<td>1234</td>
<td>1234</td>
<td>1234</td>
<td>1234</td>
<td>1234</td>
<td>1234</td>
<td>1234</td>
<td>1234</td>
<td>1234</td>
</tr>
</tbody>
</table>

| Total Heat Load | 1234 |
| Internal Heat Load | 1234 |
| Sol. Heat Gain | 1234 |
| Heat Exchanger | 1234 |
| Heat Transfer | 1234 |
| Annual Heat Demand | 1234 |

Graph: Heat Load by Month
## Passive House Planning
### ELECTRICITY DEMAND

<table>
<thead>
<tr>
<th>Description</th>
<th>Unit of Measure</th>
<th>Power Factor</th>
<th>Energy Factor</th>
<th>Energy Coefficient</th>
<th>Phase</th>
<th>Primary Energy Source</th>
<th>Primary Energy Demand (kWh/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dishwasher</td>
<td>1</td>
<td>1</td>
<td>3.0</td>
<td>0.66</td>
<td>0.5</td>
<td>68</td>
<td>1584</td>
</tr>
<tr>
<td>Clothes Washer</td>
<td>1</td>
<td>1</td>
<td>0.8</td>
<td>0.65</td>
<td>0.5</td>
<td>53</td>
<td>220</td>
</tr>
<tr>
<td>Clothes Drier</td>
<td>1</td>
<td>1</td>
<td>1.0</td>
<td>0.65</td>
<td>0.5</td>
<td>300</td>
<td>76</td>
</tr>
<tr>
<td>Refrigerator</td>
<td>1</td>
<td>1</td>
<td>0.8</td>
<td>0.65</td>
<td>0.5</td>
<td>400</td>
<td>989</td>
</tr>
<tr>
<td>Cooker</td>
<td>1</td>
<td>1</td>
<td>1.0</td>
<td>0.65</td>
<td>0.5</td>
<td>20</td>
<td>305</td>
</tr>
<tr>
<td>Lighting</td>
<td>1</td>
<td>1</td>
<td>0.8</td>
<td>0.65</td>
<td>0.5</td>
<td>20</td>
<td>595</td>
</tr>
<tr>
<td>Consumer Equipment</td>
<td>1</td>
<td>1</td>
<td>0.8</td>
<td>0.65</td>
<td>0.5</td>
<td>40</td>
<td>156</td>
</tr>
<tr>
<td>Total Aux. Electricity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>211</td>
<td>283</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>623</td>
<td>989</td>
</tr>
</tbody>
</table>

**Total:** 3686 kWh/yr

### Specific Demand

- **Recommended Maximum Value:** 3686 kWh/yr
## Passive House Planning

### PRIMARY ENERGY VALUE

| Building Type: Single Family Affordable Residence | Location: Norwich University

<table>
<thead>
<tr>
<th></th>
<th>Final Energy</th>
<th>Primary Energy</th>
<th>Emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>kWh/(t yr)</td>
<td>kWh/(t yr)</td>
<td>CO₂ equivalent</td>
</tr>
<tr>
<td><strong>Electricity Demand (without Heat Pump)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Covered Fraction of Space Heat Demand</td>
<td>100%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Covered Fraction of DHW Demand</td>
<td>0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct Electric Heating</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>DHW Production, Direct Electric (without Wash&amp;Dish)</td>
<td>1.6</td>
<td>4.3</td>
<td>2.36</td>
</tr>
<tr>
<td>Electric Postheating DHW Wash&amp;Dish</td>
<td>0.1</td>
<td>0.4</td>
<td>0.22</td>
</tr>
<tr>
<td>Electricity Demand Household Appliances</td>
<td>1.7</td>
<td>4.5</td>
<td>2.50</td>
</tr>
<tr>
<td>Electricity Demand - Auxiliary Electricity</td>
<td>0.8</td>
<td>2.0</td>
<td>1.13</td>
</tr>
<tr>
<td>Total Electricity Demand (without Heat Pump)</td>
<td>4.1</td>
<td>11.0</td>
<td>5.31</td>
</tr>
</tbody>
</table>

| **Heat Pump** | | | |
| --- | --- | --- |
| Covered Fraction of Space Heat Demand | 100% | | |
| Covered Fraction of DHW Demand | 0% | | |
| Energy Carrier - Supplementary Heating | | | |
| Annual Coefficient of Performance - Heat Pump | 3.20 | | |
| Total System Performance Ratio of Heat Generator | 0.95 | | |
| Electricity Demand Heat Pump (without DHW Wash&Dish) | 1.1 | 2.9 | 1.42 |
| Non-Electric Demand, DHW Wash&Dish | 0.0 | 0.0 | 0.0 |
| Total Electricity Demand Heat Pump | 1.1 | 2.9 | 1.42 |

| **Compact Heat Pump Unit** | | | |
| --- | --- | --- |
| Covered Fraction of Space Heat Demand | 100% | | |
| Covered Fraction of DHW Demand | 0% | | |
| Energy Carrier - Supplementary Heating | | | |
| CDP Heat Pump Heating | | | |
| CDP Heat Pump DHW | | | |
| Performance Ratio of Heat Generator (Verification) | | | |
| Performance Ratio of Heat Generator (Plumbing) | | | |
| Electricity Demand Heat Pump (without DHW Wash&Dish) | 0.0 | 0.0 | 0.0 |
| Non-Electric Demand, DHW Wash&Dish | 0.0 | 0.0 | 0.0 |
| Total Compact Unit | 0.0 | 0.0 | 0.0 |

| **Boiler** | | | |
| --- | --- | --- |
| Covered Fraction of Space Heat Demand | 100% | | |
| Covered Fraction of DHW Demand | 1.1 | 0.55 | |
| Boiler Type | | | |
| Utilization Factor Heat Generator | | | |
| Annual Energy Demand (without DHW Wash&Dish) | 0.0 | 0.0 | 0.0 |
| Non-Electric Demand, DHW Wash&Dish | 0.0 | 0.0 | 0.0 |
| Total Heating DHW/Gas/Wood | 0.0 | 0.0 | 0.0 |

| **District Heat** | | | |
| --- | --- | --- |
| Covered Fraction of Space Heat Demand | 100% | | |
| Covered Fraction of DHW Demand | 0.7 | -0.15 | |
| Heat Source | | | |
| Utilization Factor Heat Generator | | | |
| Heat Demand District Heat (without DHW Wash&Dish) | 0.0 | 0.0 | 0.0 |
| Non-Electric Demand, DHW Wash&Dish | 0.0 | 0.0 | 0.0 |
| Total District Heat | 0.0 | 0.0 | 0.0 |

| **Other** | | | |
| --- | --- | --- |
| Covered Fraction of Space Heat Demand | 100% | | |
| Covered Fraction of DHW Demand | 0% | | |
| Heat Source | | | |
| Utilization Factor Heat Generator | 1.0 | | |
| Annual Energy Demand, Space Heating | 0.0 | 0.0 | 0.0 |
| Annual Energy Demand, DHW (without DHW Wash&Dish) | 0.0 | 0.0 | 0.0 |
| Non-Electric Demand, DHW Wash&Dish | 0.0 | 0.0 | 0.0 |
| Non-Electric Demand Cooking/Drying (Gas) | 0.0 | 0.0 | 0.0 |
| Total - Other | 0.0 | 0.0 | 0.0 |
Marketing the Delta T-90 House
Initial Statistical Research

Housing Lifestyle of Vermonters (%)

- Married-couple families: 49.8%
- People living alone: 27.6%
- Other nonfamily households: 9.8%
- Other families: 13.0%

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 Types of Housing Units in Vermont in 2011

- Single-unit structures: 70.1%
- In multi-unit structures: 23.0%
- Mobile homes: 6.9%

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.

Monthly Housing Costs as a Percentage of Household Income in 2011

<table>
<thead>
<tr>
<th>Income Range</th>
<th>Percentage</th>
<th>Housing Cost Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than $20,000</td>
<td>15.1%</td>
<td>+1.0%</td>
</tr>
<tr>
<td>Less than $20,000</td>
<td>0.6%</td>
<td>+0.2%</td>
</tr>
<tr>
<td>20 to 29 percent</td>
<td>1.5%</td>
<td>+0.3%</td>
</tr>
<tr>
<td>30 percent or more</td>
<td>13.1%</td>
<td>+0.9%</td>
</tr>
<tr>
<td>$20,000 to $34,999</td>
<td>19.9%</td>
<td>+1.0%</td>
</tr>
<tr>
<td>Less than $20,000</td>
<td>1.5%</td>
<td>+0.3%</td>
</tr>
<tr>
<td>20 to 29 percent</td>
<td>3.7%</td>
<td>+0.6%</td>
</tr>
<tr>
<td>30 percent or more</td>
<td>13.7%</td>
<td>+0.8%</td>
</tr>
<tr>
<td>$35,000 to $49,999</td>
<td>14.5%</td>
<td>+0.9%</td>
</tr>
<tr>
<td>Less than $20,000</td>
<td>3.0%</td>
<td>+0.5%</td>
</tr>
<tr>
<td>20 to 29 percent</td>
<td>4.5%</td>
<td>+0.6%</td>
</tr>
<tr>
<td>30 percent or more</td>
<td>5.9%</td>
<td>+0.6%</td>
</tr>
<tr>
<td>$50,000 to $74,999</td>
<td>19.5%</td>
<td>+1.1%</td>
</tr>
<tr>
<td>Less than $20,000</td>
<td>2.0%</td>
<td>+0.7%</td>
</tr>
<tr>
<td>20 to 29 percent</td>
<td>6.3%</td>
<td>+0.5%</td>
</tr>
<tr>
<td>30 percent or more</td>
<td>5.1%</td>
<td>+0.6%</td>
</tr>
<tr>
<td>$75,000 or more</td>
<td>32.5%</td>
<td>+1.0%</td>
</tr>
<tr>
<td>Less than $20,000</td>
<td>23.9%</td>
<td>+0.9%</td>
</tr>
<tr>
<td>20 to 29 percent</td>
<td>9.7%</td>
<td>+0.8%</td>
</tr>
<tr>
<td>30 percent or more</td>
<td>2.4%</td>
<td>+0.5%</td>
</tr>
<tr>
<td>Zero or negative income</td>
<td>0.6%</td>
<td>+0.1%</td>
</tr>
<tr>
<td>No cash rent</td>
<td>2.9%</td>
<td>+0.3%</td>
</tr>
</tbody>
</table>

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:
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:
- 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

SOLAR PANELS

- Maintenance
  - Solar panels must be weatherproofed against the elements and installed properly to insure projected lifetime
  - A periodic cleaning of debris, weather, dust, and pollution is required for maximum efficiency.
  - 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 INITIAL 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.

<table>
<thead>
<tr>
<th></th>
<th>Mobile home (new)</th>
<th>Delta90 House</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upfront costs</td>
<td>$40,000</td>
<td>$145,000</td>
<td>$85,000</td>
</tr>
<tr>
<td>Utilities (per year)</td>
<td>$5,592</td>
<td>0</td>
<td>$5,592</td>
</tr>
</tbody>
</table>

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. *
  - 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.
  - *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.

<table>
<thead>
<tr>
<th>Vermont Design Characteristics</th>
<th>Solar Decathlon Design Characteristics</th>
<th>Key Unique Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar Panels/Renewable Resources</td>
<td>Solar Panels</td>
<td>Only one wet wall</td>
</tr>
<tr>
<td>Ultra high-performance to lower housing costs</td>
<td>Ultra High-Performance 1,000 Square Feet = Maximum allowed for competition</td>
<td>NO mechanical room</td>
</tr>
<tr>
<td>14&quot; Thickness of Wall Section</td>
<td>Strong day lighting design</td>
<td>Affordability for Vermont residents</td>
</tr>
<tr>
<td>Two bedrooms for family</td>
<td>No dependency on fuel</td>
<td></td>
</tr>
<tr>
<td>No dependency on fuel</td>
<td>No dependency on fuel</td>
<td></td>
</tr>
</tbody>
</table>
## SITE SPECIFIC COSTS FOR LOCAL VERMONT BUILDING SITES

### SITE #1: Barre, Vermont

<table>
<thead>
<tr>
<th>53 Brooklyn Street, Barre, VT</th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Cost for House and Placement</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost</td>
<td>Quantity</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>Property</td>
<td>4,900</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Foundation</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete Piers</td>
<td></td>
</tr>
<tr>
<td>320</td>
<td>12</td>
</tr>
<tr>
<td>Replace rusted water and sewage pipes</td>
<td></td>
</tr>
<tr>
<td>3,000</td>
<td>1</td>
</tr>
<tr>
<td>Electricity ($ per ft² of line)</td>
<td></td>
</tr>
<tr>
<td>11.6</td>
<td>20</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Site Work</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Asphalt Driveway ($ per ft²)</td>
<td></td>
</tr>
<tr>
<td>1.32</td>
<td>600</td>
</tr>
<tr>
<td>Transportation to site</td>
<td></td>
</tr>
<tr>
<td>1200</td>
<td>1200</td>
</tr>
</tbody>
</table>

**TOTAL FOR SITEWORK** 13964

### SITE #1: Northfield, Vermont

<table>
<thead>
<tr>
<th>44 Hallstrom Road, Northfield, VT, 05663</th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Categories of cost</th>
<th>Breakdown</th>
<th>Cost</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foundation Cost</td>
<td>Land</td>
<td>$37,000.00</td>
<td>Century 21 Jack Realtors</td>
</tr>
<tr>
<td></td>
<td>Land tax</td>
<td>$436.00</td>
<td>Century 21 Jack Realtors</td>
</tr>
<tr>
<td></td>
<td>Well</td>
<td>$4,140.00</td>
<td>Well drilling Company</td>
</tr>
<tr>
<td></td>
<td>Septic tank</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td></td>
<td>Electric</td>
<td>$371.20</td>
<td>Hardwick Electric</td>
</tr>
</tbody>
</table>

**TOTAL** $41,947.20

<table>
<thead>
<tr>
<th>Site work Costs</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>12 Concrete Piers</td>
<td>$3,840.00</td>
</tr>
<tr>
<td>Earth stripping and stockpiling of land</td>
<td>$3020.00</td>
</tr>
<tr>
<td>Asphalt driveway</td>
<td>$11077.50</td>
</tr>
<tr>
<td>Transportation to site</td>
<td>$666.00</td>
</tr>
</tbody>
</table>

**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

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Delta T-90 House</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location of Permanent Site</td>
<td>Vermont</td>
</tr>
<tr>
<td>Housing Type</td>
<td>Single family residence</td>
</tr>
<tr>
<td># of Occupants</td>
<td>3</td>
</tr>
<tr>
<td>Client Demographic</td>
<td>Two parents, one child</td>
</tr>
<tr>
<td>Client Annual Income</td>
<td>$41,000</td>
</tr>
<tr>
<td># of Bedrooms</td>
<td>2</td>
</tr>
</tbody>
</table>

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

<table>
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<tr>
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<th>Brief Description</th>
<th>Detailed Description</th>
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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

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
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 ½" 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
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: Framer’s Series by Weyerhaeuser
   2. Location: In line floor framing and roof framing
   3. Dimensions: 1 ¾” x 11 ¼” x 14’
B. Sill Plates and Top Plates
   1. Model: Framer Series by Weyerhaeuser
   2. Location: Above and below the wall studs
   3. Dimensions: 1 ¾” x 11 ¼” x 14’
C. 2x4 Wall Studs
   1. Model: Framer Series M-12 by Weyerhaeuser
   2. Location: Walls throughout house
   3. Dimensions: 1 ¾” x 3 ½” x 10’
D. 2 x 6 Wall Studs
   1. Model: Framer Series M-12 by Weyerhaeuser
   2. Location: Partition wall between kitchen and bathroom
   3. Dimensions: 1 ¾” x 5 ½” x 10’

2.4 ACCESSORIES
A. Bostitch-HQG-Hurriquake- 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 ½” 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 ½” 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 ½” 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: Framert'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

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 ½” 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 ¼” x 2 ½”
   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
   East Montpelier, VT 05651
   (802)-223-4131

   or

   707 Stone Cutters Way
   Montpelier, VT 05602
   (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

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”
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 ¼” x 2 ½”
   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:

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.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, 4 inches 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

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

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 TM 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
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=0.484, Ug=0.106, VT=70.3
   - Others available

5. System: Eforfe

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


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8  WS1-01

Model number: WS 1-01

Location: Master bedroom and entry door

END OF SECTION 08 06 10
### SECTION 08 06 50: WINDOW SCHEDULE

<table>
<thead>
<tr>
<th></th>
<th>Window</th>
<th>System: EFORTE</th>
<th>Fittings: MACO</th>
<th>Frame: INOUTIC passive house window profile</th>
<th>Color (inside/outside): White/White</th>
<th>Filler: 1: CG4x16Hb4F4x16HbCG4, Triple glazed unit with 2 low-emissivity 1.0 glass, U_g = 0.000</th>
<th>Sash: 1: Tilt &amp; turn</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>WN1-01</td>
<td>Dimension: 914 x 1270</td>
<td>Area: 1.2 m²</td>
<td>Price, USD: 463.57</td>
<td>Quantity, Qnt: 1</td>
<td>Total: 463.57</td>
<td></td>
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<tr>
<td>2</td>
<td>WE1-03</td>
<td>Dimension: 2400 x 686</td>
<td>Area: 1.7 m²</td>
<td>Price, USD: 621.35</td>
<td>Quantity, Qnt: 1</td>
<td>Total: 621.35</td>
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<tr>
<td>3</td>
<td>WS1-03</td>
<td>Dimension: 2972 x 2007</td>
<td>Area: 6.0 m²</td>
<td>Price, USD: 1650.60</td>
<td>Quantity, Qnt: 1</td>
<td>Total: 1650.60</td>
<td></td>
</tr>
<tr>
<td>Window</td>
<td>System: EFORTE</td>
<td>Fittings: MACO</td>
<td>Frame: INOUTIC passive house window profile</td>
<td>Color (inside/outside): White/White</td>
<td>Filter: 1: CG4x16HxF4x16HxCG4, Triple glazed unit with 2 low-emissivity 1.0 glass, Ug = 0.088</td>
<td>Sash: 1: Tilt &amp; turn</td>
<td></td>
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</tr>
<tr>
<td>4 WW1-01</td>
<td>Dimension: 914 x 1270</td>
<td>Area: 1.2 m²</td>
<td>Price, USD: 463.57</td>
<td>Quantity, Qnt: 1</td>
<td>Total: 463.57</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 WW1-02</td>
<td>Dimension: 1829 x 1270</td>
<td>Area: 2.3 m²</td>
<td>Price, USD: 731.89</td>
<td>Quantity, Qnt: 1</td>
<td>Total: 731.89</td>
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<td></td>
</tr>
<tr>
<td>6 WE1-01</td>
<td>Dimension: 914 x 1270</td>
<td>Area: 1.2 m²</td>
<td>Price, USD: 641.79</td>
<td>Quantity, Qnt: 1</td>
<td>Total: 641.79</td>
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</tbody>
</table>
### Window

**System:** EFORTE  
**Filling:** MACO  
**Frame:** INOTIC passive house window profile  
**Color (inside/outside):** White/White  
**Filler:**  
1. CG4x16/HbF4x16HbCG4, Triple glazed unit with 2 low-emissivity 1.0 glass,  
   **Ug:** 0.099  
**Sash:** 1: Till  
**Accessories:**  
- Connect profile KP14/KP14, white - 2.21 m

<table>
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<tr>
<th>Dimension</th>
<th>Area</th>
<th>Price, USD</th>
<th>Quantity, Qnt</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1715 x 457</td>
<td>0.8 m²</td>
<td>589.88</td>
<td>1</td>
<td>589.88</td>
</tr>
</tbody>
</table>

### Door

**System:** PRESTIGE FRONT DOORS IN  
**Color (inside/outside):** White/White  
**Filler:**  
1. GrunSt4+16H+Grund4+14H+GrundSt4, Triple glazed unit with 1 tempered glass and 2 tempered-low-emissivity  
   **Ug:** 0.106  
**Sash:** 1: Doorstep: ALUMINUM  
**Lock:** 3-point key-operated lock with latch  
**Handle:** Door handle 35/2200, white  
**Accessories:**  
- Lock cylinder 50/50 - 1.00 unit

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Area</th>
<th>Price, USD</th>
<th>Quantity, Qnt</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1041 x 2354</td>
<td>2.5 m²</td>
<td>1908.28</td>
<td>2</td>
<td>3816.57</td>
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</tbody>
</table>

### Total

- **Total unique positions:** 8  
- **Total units:** 9  
- **Area:** 19.09 m²  
- **Screens:** 88.65 ft²

<table>
<thead>
<tr>
<th>Sub Total</th>
</tr>
</thead>
</table>
| 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 SUBMITTALS

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 ¾”, 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 ¼”

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
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- Uw=0.1287 Btu/(h.ft2.F),R=7.7

   Frame - Uf=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.


   4. Structural Performance: No failure or permanent deflection as defined in the test method ASTM E 330.

   5. Acoustic performance: Triple glazing- up to Ug=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. GC4x16HxF4x16HxCF4,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. GC4x16HxF4x16HxCF4,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: GC4x16HxF4x16HxC4,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: GC4x16HxF4x16HxC4,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

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: Ug=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 Rw: 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

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

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: ACRYCLR0 .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 ¾\" x 3 ½\" x 10\'
   3. Available: Allen Lumber

D. 2\" x 4\" x 8\' SPF Stud
   1. Location: Water tank shading device
   2. Dimensions: 1 ¾\" x 3 ½\" x 8\'
   3. Available: Allen Lumber

E. 2\" x 4\" x 10\' SPF Stud
   1. Location: Water tank shading device
   2. Dimensions: 1 ¾\" x 3 ½\" 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 ½" 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
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
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
   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

C. Stainless Steel Machine Screw 1/4"-20
1. Location: Solar Shade
2. Dimensions: 1 ½"
3. Quantity: 225

D. Horizontal Rough Sawn Cedar
1. Location: Exterior walls
2. Dimensions (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

PART 2 – PRODUCTS

2.1 MANUFACTURER
A. Homecrest
   P.O. Box 420
   Jasper, IN 47547
B. Allied Trade Group, Inc.
   11410 N.E. 122nd Way, 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
4. 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.
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
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
B. 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"

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

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. 122nd War, Suite 200
   Kirkland, WA 98034
   Phone: 425-814-2515
F. Aubuchon Hardware
   95 Aubuchon Drive
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

F. Vermont Natural Coatings Floor Finish
1. Location: Throughout house
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 system 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°C]

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]
   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 GPM
   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 oversixed 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
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.
SECTION 22 12 19: FACILITIES 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

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.
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 Eltron Tempra 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 Nirtogen-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.
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

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: 71041112-0 or 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

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 Luftungstechnik 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"
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. Bionaire 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 electrical wiring
   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'
B. Galvan Rod Clamp
   1. Ground Electrical System
   2. Galvan 5/8" Copper Alloy Ground Rod Clamp
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

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.


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

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

C. Arc Fault Breaker
1. Eaton BR115AF or equal

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)

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)

   1. Products: Legrand Pass and Seymour or equal
   2. 1301-7W-L or equal
   3. Tamper Resistant, in compliance with NEC 406.12

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 coved, 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
   4. 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
   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

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

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

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

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

B. Pebbles
   1. Type: Vigoro 0.5 cubic feet Pea Pebbles
   2. Location: Planting Beds

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

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

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,

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

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
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

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 416516: 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: EU6500iS 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-Phase
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

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 no 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

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
3. Dimensions:
   - Width: 28.8 in
   - Height: 17.3 in
   - Depth: 8.2 in
4. Weight: 88.9 lbs
5. Output Data:
   - AC power: 6500 W each
   - Max Operating Input Current: 35A
   - Voltage: 240 VAC
6. Peak Efficiency: 96.3%
7. 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 psi summary @ 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
### Solopower SP1 Panel Specifications

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<th>Metric</th>
<th>Units</th>
<th>85</th>
<th>90</th>
<th>95</th>
<th>Final Design</th>
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<td>Rated Power (P_{max})</td>
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<td>24.7</td>
<td>26.2</td>
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<tr>
<td>Voltage at P_{max} (V_{mp})</td>
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<td>3.6</td>
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<tr>
<td>Current at P_{max} (I_{mp})</td>
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<td>Short-circuit current (I_{sc})</td>
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<td>33.6</td>
<td>34.8</td>
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<tr>
<td>Open-circuit voltage (V_{oc})</td>
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<td>11.2</td>
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<td>Efficiency</td>
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<td>Temp. Coefficient of I_{sc}</td>
<td>%/deg. C</td>
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<td>-0.36</td>
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<td>Temp. Coefficient of V_{oc}</td>
<td>%/deg. C</td>
<td>7</td>
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<td>Max. Series Fuse Rating</td>
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<td>Temp. Coefficient of P_{mp}</td>
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<td>Maximum DC Voltage</td>
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<td>Standard test conditions</td>
<td>deg C</td>
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</table>

**Environmental Constraints**

- Minimum Outdoor Temperature deg F: -30
- Minimum Outdoor Temperature deg C: -34

Total number of PV panels count

**Values in orange boxes are calculated values in the spreadsheet**
### Design Calculations

<table>
<thead>
<tr>
<th></th>
<th>85</th>
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<th>Final Design</th>
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<tr>
<td>Maximum panel voltage at min. temp.</td>
<td>39.3</td>
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<td>Maximum number of panels in a string</td>
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<td>Maximum short-circuit current (note 3)</td>
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<td>Max (NEC) PV Source current</td>
<td>33.59</td>
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<tr>
<td>Output of 6 equal length strings</td>
<td>7140</td>
<td>7020</td>
<td>7410</td>
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<td># of panels in each string</td>
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<td>String V_{oc} @ 25 deg C</td>
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<td>Maximum string voltage</td>
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Notes:

1. NEC 690.7(D) - provide protection for unqualified persons. May be an enclosure that premits 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.
<table>
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<tr>
<th>Panel</th>
<th>String</th>
<th>Module ID</th>
<th>Power rating, Watts</th>
<th>Quantity installed, Watts</th>
<th>Unit price per Watt</th>
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</table>
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.

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.

<table>
<thead>
<tr>
<th>Occupancy or Use</th>
<th>Live Loading</th>
<th>Uniform (psf)</th>
<th>Concentrated (pounds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interior floor, decks, ramps:</td>
<td>50 psf</td>
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<td></td>
</tr>
<tr>
<td>Exterior floor, decks, ramps used for tour staging and egress purposes:</td>
<td>100psf</td>
<td>2000(1)</td>
<td></td>
</tr>
<tr>
<td>Roof</td>
<td>20psf</td>
<td>250(1)</td>
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</tr>
<tr>
<td>Railings:</td>
<td></td>
<td>200(2)</td>
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</tbody>
</table>

(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.
Wind Loading

Building Frame

ASCE7-10, Section 27.6 on wind loads is used to calculate the design forces. The design base shear is found using the static force procedure with the following factors:
- Basic Wind Speed: 115 mph (Solar Decathlon 2013 requires 85mph), 3-second gust
- Category II Building
- Wind Exposure: C

Seismic Parameters

The 2012 IRC Section on earthquake loads will be used to calculate the design forces. Seismic:
- IRC Seismic Design Category (SDC) D2 See IRC Section R301.2.2

Design Considerations:

Stability
1. Dead Load = 2.0 x overturning [Competition - 85mph]
2. Dead Load = 2.0 x sliding [Competition - 85mph]

Lateral Deflection Limits
1. Design (amplified) story drift due to seismic loads shall not exceed 0.007 x story height.
2. Design story drift due to wind shall not exceed 0.002 x story height.

Floor Deflections Limits
1. The live load deflection of wood floor framing supporting tile or stone finishes shall not exceed 1/600 times the span length.
2. The live load deflection of wood floor framing supporting standard wood floor finishes shall not exceed 1/480 times the span length.
3. The live load deflection of steel beams and girders shall not exceed 1/360 times the span length.
4. Roof deflection under snow or wind loads shall not exceed 1/360 times the span length.
5. The live load deflection of floor spandrels supporting exterior wall elements shall not exceed 0.3”

Vibrations
Where human comfort is the criteria for limiting pedestrian induced motion, floor-framing vibration due to footfall vibrations will be verified. Where running machinery causes vibrations, the machinery shall be isolated by damping devices. Engineered wood joists will be designed so that the assembly receives at least 45 TJ-Pro Rating Points or equivalent perception/acceptance criteria.

Non-Structural Components
Provisions for the support of non-structural components are as follows:
Seismic provisions of the 2009 IBC require minimum detailing requirements for non-load bearing walls, supports for mechanical/electrical/plumbing equipment, etc.
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
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.
Total gypsum board weight = 5,000 lb

Plywood sheeting 5/8" (Subfloor) weighs 1.77 lb/ft²
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.

From Table 27.6-1, Wind Loads on Walls
Exposure C, V=115mph, h=15ft, for L/B≤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 \( p_h = p_o = 26.5\text{psf} \)

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=115mph, h=15ft, Flat < 2:12 roof.

The roof wind pressures are as follows: Zone 3 \( p_{roof} = -25.9\text{psf} \), Zone 4 \( p_{roof} = -23.1\text{psf} \), Zone 5 \( p_{roof} = -18.9\text{psf} \) (negative means uplift)

The roof wind pressures for a wind velocity of 85mph are Zone 3 \( p_{roof85} = -14.1\text{psf} \), Zone 4 \( p_{roof85} = -12.6\text{psf} \), Zone 5 \( p_{roof85} = -10.3\text{psf} \)

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.
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
3000lb (windward wall) + 3800lb (leeward wall) = 6800 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*54,000lb = 10,800 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_SD ≤ 1.17

Irvine California, Orange County Great Park, Irvine, CA, 92618, 33.67 N, -117.73 W
Design Spectral Response Acceleration Parameter: S_SD = 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

Seismic Response Coefficient \( C_s = \frac{S_SD}{R \cdot I_e} \)
\( C_s = 0.153 \)

For dead weight \( W = 54,000 \text{ lb} \) (measured)

Seismic Base Shear \( V = C_s \cdot W = 0.153(54,000 \text{ lb}) = 8,300 \text{ lb} \)

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
**Roof Joists**  
Framer Series Grade M-12

Allowable Stresses:

\[ F_b := 1600 \text{ psi} \quad F_v := 175 \text{ psi} \quad E := 1600000 \text{ psi} \]

Member Properties  
\[ d := 11.25 \text{ in} \quad b := 1.5 \text{ in} \]

\[ S_x := \frac{b \cdot d^2}{6} \quad I_x := \frac{b \cdot d^3}{12} \quad A := b \cdot d \quad A := 16.9 \text{ in}^2 \]

<table>
<thead>
<tr>
<th>joist spacing</th>
<th>dead load</th>
<th>roof live load</th>
<th>snow load</th>
</tr>
</thead>
<tbody>
<tr>
<td>L := 13.9 ft</td>
<td>S := 2 ft</td>
<td>w_{dl} := 15 \text{ psf}</td>
<td>w_{lr} := 20 \text{ psf}</td>
</tr>
</tbody>
</table>

Loads on Joists (per foot of joist)

\[ w_{dl} = w_{dl} S \quad w_{dl} = 30 \text{ plf} \quad w_{lr} = w_{lr} S \quad w_{lr} = 40 \text{ plf} \quad w_{sl} = w_{sl} S \quad W_{dl} = 140 \text{ plf} \]

\[ W_{service} := \max(W_{dl}, W_{dl} + \max(W_{lr}, W_{sl})) \quad W_{service} = 170 \text{ plf} \]

**Analysis:**

\[ M_{\text{max}} := \left( W_{\text{service}} \right) \frac{L^2}{8} \quad M_{\text{max}} = 4.1 \text{-kip ft} \quad V_{\text{max}} := \left( W_{\text{service}} \right) \frac{L}{2} \quad V_{\text{max}} = 1.2 \text{-kip} \]

\[ f_0 := \frac{M_{\text{max}}}{S_x} \quad f_0 = 1557 \text{ psi} < F_b = 1600 \text{ psi} \quad f_v := \frac{3}{2} \frac{V_{\text{max}}}{A} \quad f_v = 105 \text{ psi} < F_v = 175 \text{ psi} \]

**Deflections:**

\[ \Delta_{sl} := 5 \frac{w_{sl} L^4}{384 \cdot E \cdot I_x} \quad \Delta_{sl} = 0.413 \text{ in} < \Delta_{sl, \text{allowable}} := \frac{L}{360} \quad \Delta_{sl, \text{allowable}} = 0.46 \text{ in} \]

\[ \Delta_{\text{Total}} := 5 \frac{(w_{dl} + w_{sl}) L^4}{384 \cdot E \cdot I_x} \quad \Delta_{\text{Total}} = 0.50 \text{ in} < \Delta_{\text{Total, allowable}} := \frac{L}{240} \quad \Delta_{\text{Total, allowable}} = 0.70 \text{ in} \]

[Diagram of roof joint detail]
Design Maps Summary Report

User-Specified Input

Report Title: Norwich University Solar Decathlon Project
Sun March 31, 2013 23:14:13 UTC

(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

\[ S_S = 1.493 \text{ g} \quad S_{MS} = 1.493 \text{ g} \quad S_{DS} = 0.995 \text{ g} \]
\[ S_1 = 0.554 \text{ g} \quad S_{M1} = 0.831 \text{ g} \quad S_{D1} = 0.554 \text{ g} \]

For information on how the SS and S1 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.

MCE\textsubscript{R} Response Spectrum

Design Response Spectrum
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) $S_s = 1.493 \, g$

From Figure 1613.3.1(2) $S_1 = 0.554 \, g$

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

<table>
<thead>
<tr>
<th>Site Class</th>
<th>$\bar{v}_s$</th>
<th>$\bar{N}$ or $\bar{N}_{ch}$</th>
<th>$\bar{s}_u$</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Hard Rock</td>
<td>&gt;5,000 ft/s</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>B. Rock</td>
<td>2,500 to 5,000 ft/s</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>C. Very dense soil and soft rock</td>
<td>1,200 to 2,500 ft/s</td>
<td>&gt;50</td>
<td>&gt;2,000 psf</td>
</tr>
<tr>
<td>D. Stiff Soil</td>
<td>600 to 1,200 ft/s</td>
<td>15 to 50</td>
<td>1,000 to 2,000 psf</td>
</tr>
<tr>
<td>E. Soft clay soil</td>
<td>&lt;600 ft/s</td>
<td>&lt;15</td>
<td>&lt;1,000 psf</td>
</tr>
</tbody>
</table>

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 $s_u < 500$ psf

F. Soils requiring site response analysis in accordance with Section 21.1

See Section 20.3.1

For SI: $1 \text{ ft/s} = 0.3048 \text{ m/s}$ $1 \text{ lb/ft}^2 = 0.0479 \text{ kN/m}^2$
Section 1613.3.3 — Site coefficients and adjusted maximum considered earthquake spectral response acceleration parameters

### TABLE 1613.3.3(1)
VALUES OF SITE COEFFICIENT $F_a$

<table>
<thead>
<tr>
<th>Site Class</th>
<th>Mapped Spectral Response Acceleration at Short Period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$S_s \leq 0.25$</td>
</tr>
<tr>
<td>A</td>
<td>0.8</td>
</tr>
<tr>
<td>B</td>
<td>1.0</td>
</tr>
<tr>
<td>C</td>
<td>1.2</td>
</tr>
<tr>
<td>D</td>
<td>1.6</td>
</tr>
<tr>
<td>E</td>
<td>2.5</td>
</tr>
<tr>
<td>F</td>
<td>See Section 11.4.7 of ASCE 7</td>
</tr>
</tbody>
</table>

Note: Use straight–line interpolation for intermediate values of $S_s$

**For Site Class = D and $S_s = 1.493 \text{g}$, $F_a = 1.000$**

### TABLE 1613.3.3(2)
VALUES OF SITE COEFFICIENT $F_v$

<table>
<thead>
<tr>
<th>Site Class</th>
<th>Mapped Spectral Response Acceleration at 1–s Period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$S_1 \leq 0.10$</td>
</tr>
<tr>
<td>A</td>
<td>0.8</td>
</tr>
<tr>
<td>B</td>
<td>1.0</td>
</tr>
<tr>
<td>C</td>
<td>1.7</td>
</tr>
<tr>
<td>D</td>
<td>2.4</td>
</tr>
<tr>
<td>E</td>
<td>3.5</td>
</tr>
<tr>
<td>F</td>
<td>See Section 11.4.7 of ASCE 7</td>
</tr>
</tbody>
</table>

Note: Use straight–line interpolation for intermediate values of $S_1$

**For Site Class = D and $S_1 = 0.554 \text{g}$, $F_v = 1.500$**
### Equation (16-37):
\[ S_{NS} = F_a S_s = 1.000 \times 1.493 = 1.493 \, g \]

### Equation (16-38):
\[ S_{M1} = F_v S_1 = 1.500 \times 0.554 = 0.831 \, g \]

Section 1613.3.4 — Design spectral response acceleration parameters

### Equation (16-39):
\[ S_{DS} = \frac{2}{3} S_{NS} = \frac{2}{3} \times 1.493 = 0.995 \, g \]

### Equation (16-40):
\[ S_{DL} = \frac{2}{3} S_{M1} = \frac{2}{3} \times 0.831 = 0.554 \, g \]

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

<table>
<thead>
<tr>
<th>VALUE OF $S_{ds}$</th>
<th>I or II</th>
<th>III</th>
<th>IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>$S_{ds} &lt; 0.167g$</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>$0.167g \leq S_{ds} &lt; 0.33g$</td>
<td>B</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>$0.33g \leq S_{ds} &lt; 0.50g$</td>
<td>C</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>$0.50g \leq S_{ds}$</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
</tbody>
</table>

For Risk Category = I and $S_{ds} = 0.995g$, Seismic Design Category = D

### TABLE 1613.3.5(2)
SEISMIC DESIGN CATEGORY BASED ON 1-SECOND PERIOD RESPONSE ACCELERATION

<table>
<thead>
<tr>
<th>VALUE OF $S_{d1}$</th>
<th>I or II</th>
<th>III</th>
<th>IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>$S_{d1} &lt; 0.067g$</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>$0.067g \leq S_{d1} &lt; 0.133g$</td>
<td>B</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>$0.133g \leq S_{d1} &lt; 0.20g$</td>
<td>C</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>$0.20g \leq S_{d1}$</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
</tbody>
</table>

For Risk Category = I and $S_{d1} = 0.554g$, 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 = “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
2. *Figure 1613.3.1(2)*: 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
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<th>Feature</th>
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<tr>
<td>Weight</td>
<td>260 Lbs. (117.94 kilograms)</td>
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<tr>
<td>Dimensions</td>
<td>33.5L x 26.4W x 27.5H</td>
</tr>
<tr>
<td></td>
<td>(85.09 x 67.06 x 69.85 cm)</td>
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<tr>
<td>Consumer Warranty</td>
<td>3 Years</td>
</tr>
<tr>
<td>Commercial Warranty</td>
<td>3 Years</td>
</tr>
</tbody>
</table>
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
Ultra-Containment Trays®

Versatile Secondary Containment For Small Containers And Packages

- Low profile, 16.5 gallon sump is perfect for spill containment of 5-gallon pails, batteries, safety cans, dry cleaning waste drums and leaky machine parts.
- 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®**

<table>
<thead>
<tr>
<th>Ultra-Containment Tray without Grating</th>
<th>Ultra-Containment Tray with Grating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part# 2351: Yellow</td>
<td>Part# 2352: Yellow</td>
</tr>
<tr>
<td>Part# 2328: Black</td>
<td>Part# 2350: Black</td>
</tr>
<tr>
<td>Dimensions: 54” x 20 3/4” x 3 1/2” (1,372 mm x 755 mm x 89 mm)</td>
<td>Dimensions: 54” x 20 3/4” x 3 1/2” (1,372 mm x 755 mm x 89 mm)</td>
</tr>
<tr>
<td>Weight: 17 lbs. (7.5 kg)</td>
<td>Weight: 34 lbs. (15 kg)</td>
</tr>
<tr>
<td>Spill Containment Capacity: 16.5gal (62 L)</td>
<td>Spill Containment Capacity: 14 gal (63 L)</td>
</tr>
</tbody>
</table>

Options: Grating Part #3420

See this product in our e-catalog

Compliance: 40 CFR 264.175

Chemical Compatibility

Other products you may be interested in:
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
Grip-Rite 30 lb 16D 3.5-in Hot Dipped Galvanized Smooth Box Nails

Item #: 186039 | Model #: 16RGBX6K

Be the first to write a review!

$45.43

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 | Subtotal: $45.43

Customers Also Viewed

Add to Cart

Grip-Rite 30 lb 16D 3.5-in Hot Dipped Galvanized Smooth Box Nails

Subtotal: $45.43

Grip-Rite 5 lb 6D

Related Items

$45.43

Not Yet Rated
3" 16D NAIL HOT DIPPED GALVANIZED SMOOTH

Model Number: 10HGBX5
Location: Foundation
Dimensions:
  Length: 3"
Available: Lowes
Price: $17.97
### Grip-Rite 5 lb 10D 3-in Hot Dipped Galvanized Smooth Box Nails

**Item #: 69932 | Model #: 10H06X5**

Be the first to write a review!

**$17.97**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
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<tbody>
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<td>Material</td>
<td>Steel</td>
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<td>Finish</td>
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<td>Pound(s)</td>
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<tr>
<td>Package Quantity</td>
<td>6.0</td>
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</tbody>
</table>

**Customers Also Viewed**

- **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**
  - Not Yet Rated
  - $6.57
- **Grip-Rite 500-Count Galvanized/Uncoated Lumber**
  - $13.93
- **Top Choice 2 x 4 x 6 #2 Prime Treated Lumber**
  - $3.57
- **1/2 x 4 x 8 Pine Sheathing Plywood**
  - $31.97
- **Grip-Rite 5-Lbs. 3-1/2-in Hot Dipped**
  - $3.57

**Related Items**

- **Top Choice 2 x 4 x 8 #2 Prime Treated Lumber**
  - $3.57

**Subtotal:** $17.97

**Qty:** 1

**Add to Cart** +

**Save Item** 1

**Set a Reminder** 1

**Go to Your Account**

---

**FREE 1 to 3-Day Shipping**

on qualifying orders $49 or more.
THE HILLMAN GROUP 4” TORQUE SCREWS

Model Number: 47376  
Location: Deck  
Dimensions:  
  Thickness: #10  
  Length: 4”  
Available: Lowes  
Price: $79.47
The Hillman Group 5 lbs #10 x 4-in Flat-Head Galvanized Dual Torque-Drive Deck Screws

Description | Specifications | Reviews | Community Q&A
---|---|---|---
Screw Thickness | #10 | | 
Thread Style | Coarse | | 
Screw Length (Inches) | 4 | | 
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 | | 

$79.47

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- Team Lowe's Racing

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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
GRK Fasteners 8 x 2-1/2 in. Finish Trim Head Screw (420-Pack)

Model # 115730  Store SKU # 523456

* * * * *  | Write The First Review

$28.52 / each

Store Only

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Check Store Inventory

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 jams and moulding. Special features include W-cut threads and Zip Tips to help prevent wood splitting. The screws are Climatex 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-cut threads help prevent wood splitting
- MFG Model #: 115730
- MFG Part #: 115730

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assembled Depth (in.)</td>
<td>0.164 In.</td>
</tr>
<tr>
<td>Assembled Height (in.)</td>
<td>2.5 In.</td>
</tr>
<tr>
<td>Assembled Width (in.)</td>
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<tr>
<td>Color Family</td>
<td>Metallics</td>
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<td>Manufacturer Warranty</td>
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</tr>
<tr>
<td>Package Quantity</td>
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<tr>
<td>Product Depth (in.)</td>
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<tr>
<td>Product Height (in.)</td>
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<tr>
<td>Product Weight (lb.)</td>
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<tr>
<td>Product Width (in.)</td>
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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
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
GRK Fasteners 5/16 x 6 in. RSS Screws 10-Count Blister-Pak

Model #: 113233  Store SKU #: 323415

$11.54 / package

This item cannot be shipped to the following state(s): AK, GU, HI, PR, VI.

Store Only
Buy Online, Pick Up In Store Today

PRODUCT OVERVIEW

GRK’s RSS screw is made out of Climatic 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-tapping
- W-cut thread design
- May be used as a lag screw alternative
- MFG Model #: 113233
- MFG Part #: 113233

SPECIFICATIONS

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<thead>
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<tr>
<td>Fastener Type</td>
<td>Specialty</td>
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<tr>
<td>Manufacturer Warranty</td>
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<td>Package Quantity</td>
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<td>Product Height (in.)</td>
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<td>Product Weight (lb.)</td>
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<tr>
<td>Product Width (in.)</td>
<td>4.5 in</td>
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</table>
A36 STEEL ROD

Model: 518
Location: Foundation Anchor
Size:
  Length: 48"
  Diameter: 1"
Material: A36 Steel
Available:
HR Steel Round Bar

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.

<table>
<thead>
<tr>
<th>Stock Number</th>
<th>Product Type</th>
<th>Item Size &amp; Description (Inches)</th>
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<td>R114</td>
<td>HR CQ Steel Round</td>
<td>1/4 inch Dia. Round Bar</td>
<td>1</td>
<td>Get Price</td>
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<td>R1516</td>
<td>HR CQ Steel Round</td>
<td>5/16 inch Dia. Round Bar</td>
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<td>R138</td>
<td>HR CQ Steel Round</td>
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<td>R158</td>
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<tr>
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<tr>
<td>R178</td>
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<tr>
<td>R11</td>
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<td>1 inch Dia. Round Bar</td>
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<tr>
<td>R1114</td>
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<td>1-1/4 inch Dia. Round Bar</td>
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<td>R1134</td>
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<td>R12</td>
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<td>2 inch Dia. Round Bar</td>
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<td>R1212</td>
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<td>2-1/2 inch Dia. Round Bar</td>
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<tr>
<td>R13</td>
<td>Hot Rolled A-36 Steel Round</td>
<td>3 inch Dia. Round Bar</td>
<td>1</td>
<td>Get Price</td>
</tr>
</tbody>
</table>
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**

- FM Global
- Miami-Dade County
- 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**

Material: SAE C1022, heat treated
Coating: Tru-Kote™ Epoxy E-Coat
Manufacturing Location: Bryan, OH USA
LEED® Eligible Recycled Content: 20%

**PRODUCT SELECTION**

<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>DP-1625</td>
<td>1-5/8”</td>
<td>1-5/8” (Full)</td>
<td>1000/Bucket</td>
<td>11.8 lbs.</td>
<td>80,000</td>
</tr>
<tr>
<td>DP-2250</td>
<td>2-1/4”</td>
<td>2-1/4” (Full)</td>
<td>1000/Bucket</td>
<td>16.2 lbs.</td>
<td>80,000</td>
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<tr>
<td>DP-2875</td>
<td>2-7/8”</td>
<td>2-7/8” (Full)</td>
<td>1000/Bucket</td>
<td>19.7 lbs.</td>
<td>80,000</td>
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<tr>
<td>DP-3250</td>
<td>3-1/4”</td>
<td>2-7/8”</td>
<td>1000/Bucket</td>
<td>21.5 lbs.</td>
<td>80,000</td>
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<tr>
<td>DP-3750</td>
<td>3-3/4”</td>
<td>2-7/8”</td>
<td>1000/Bucket</td>
<td>24.6 lbs.</td>
<td>80,000</td>
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<tr>
<td>DP-4500</td>
<td>4-1/2”</td>
<td>3-7/8”</td>
<td>1000/Bucket</td>
<td>28.8 lbs.</td>
<td>60,000</td>
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<tr>
<td>DP-5000</td>
<td>5”</td>
<td>3-7/8”</td>
<td>1000/Bucket</td>
<td>31.5 lbs.</td>
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<tr>
<td>DP-6000</td>
<td>6”</td>
<td>3-7/8”</td>
<td>1000/Bucket</td>
<td>37.1 lbs.</td>
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<tr>
<td>DP-7000</td>
<td>7”</td>
<td>3-7/8”</td>
<td>500/Bucket</td>
<td>20.9 lbs.</td>
<td>40,000</td>
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<tr>
<td>DP-8000</td>
<td>8”</td>
<td>3-7/8”</td>
<td>500/Bucket</td>
<td>23.9 lbs.</td>
<td>40,000</td>
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</table>
#12 DP Roofing Fasteners

**Performance Data**

<table>
<thead>
<tr>
<th>Property</th>
<th>Standard</th>
<th>Average Ultimate Value</th>
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</thead>
<tbody>
<tr>
<td>Tensile Strength:</td>
<td>ASTM F606-10</td>
<td>2500 lb.</td>
</tr>
<tr>
<td>Shear Strength:</td>
<td>NASM 1312-20</td>
<td>1900 lb. (thread zone)</td>
</tr>
<tr>
<td>Corrosion Resistance:</td>
<td>FM 4470, DIN 50018</td>
<td>&lt; 15% Red Rust after 30 cycles</td>
</tr>
</tbody>
</table>

**Average Ultimate Pullout Values in Corrugated Steel Deck Substrates**

<table>
<thead>
<tr>
<th>Thickness</th>
<th>24 ga.</th>
<th>22 ga.</th>
<th>20 ga.</th>
<th>18 ga.</th>
<th>16 ga.</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Yield Strength</td>
<td>36.5 ksi</td>
<td>33.0 ksi</td>
<td>102.0 ksi</td>
<td>33.0 ksi</td>
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<tr>
<td>Pullout (lbf.)</td>
<td>230</td>
<td>285</td>
<td>410</td>
<td>465</td>
<td>355</td>
</tr>
</tbody>
</table>

**Average Ultimate Pullout Values in Wood Substrates**

<table>
<thead>
<tr>
<th>Thickness</th>
<th>APA Rated OSB</th>
<th>APA Rated Plywood</th>
<th>SPF #2</th>
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<tbody>
<tr>
<td>7/16”</td>
<td>265</td>
<td>265</td>
<td>265</td>
</tr>
<tr>
<td>15/32”</td>
<td>300</td>
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<tr>
<td>19/32”</td>
<td>325</td>
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<tr>
<td>23/32”</td>
<td>440</td>
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<td>440</td>
</tr>
<tr>
<td>15/32”</td>
<td>365</td>
<td>365</td>
<td>365</td>
</tr>
<tr>
<td>19/32”</td>
<td>475</td>
<td>475</td>
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</tr>
<tr>
<td>23/32”</td>
<td>720</td>
<td>720</td>
<td>720</td>
</tr>
</tbody>
</table>

* 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 ¾”, 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.
TRUFAST HEAVY DUTY DRILL POINT FASTENERS

Model Number: HD-HV8000
Location: TPO Roofing with metal plates
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.

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

<table>
<thead>
<tr>
<th>Length (in.)</th>
<th>SIPTP Part #</th>
<th>SIPLD Part #</th>
<th>Pkg. Qty.</th>
</tr>
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<tbody>
<tr>
<td>2</td>
<td>SIPTP-2000</td>
<td>SIPLD-3000</td>
<td>500/Pail</td>
</tr>
<tr>
<td>2-1/2</td>
<td>SIPTP-2500</td>
<td>SIPLD-3500</td>
<td>500/Pail</td>
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<tr>
<td>3</td>
<td>SIPTP-3000</td>
<td>SIPLD-4000</td>
<td>500/Pail</td>
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<td>3-1/2</td>
<td>SIPTP-3500</td>
<td>SIPLD-4500</td>
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<td>SIPTP-7500</td>
<td>SIPLD-8500</td>
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<td>8</td>
<td>SIPTP-8000</td>
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<td>500/Pail</td>
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<td>8-1/2</td>
<td>SIPTP-8500</td>
<td>SIPLD-9500</td>
<td>500/Pail</td>
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<td>9</td>
<td>SIPTP-9000</td>
<td>SIPLD-10000</td>
<td>250/Pack</td>
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<td>10</td>
<td>SIPTP-10000</td>
<td>SIPLD-10500</td>
<td>250/Pack</td>
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<td>11</td>
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<td>SIPLD-14000</td>
<td>250/Pack</td>
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</tbody>
</table>

NOTE: Two T-30 Driver Bits included in each package.

## FASTENER DIMENSIONS

### SIPTP THREAD POINT

- Ø0.625 Head Dia.
- 2.750' Thread Length
- Ø0.190 Nominal Shank Dia.
- Ø0.255 Thread O.D.

### SIPLD LIGHT DUTY DRILL POINT

- Ø0.625 Head Dia.
- 2.750' Thread Length
- Ø0.190 Nominal Shank Dia.
- Ø0.255 Thread O.D.

### SIPLD HEAVY DUTY DRILL POINT

- Ø0.625 Head Dia.
- 3.875' Thread Length
- Ø0.212 Nominal Shank Dia.
- Ø0.245 Thread O.D.

## PERFORMANCE DATA

<table>
<thead>
<tr>
<th>Fastener</th>
<th>Tensile Strength</th>
<th>Shear Strength</th>
<th>Head Pull-Thru Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIPTP</td>
<td>3380 lb.f.</td>
<td>2900 lb.f.</td>
<td>545 lb.f. 630 lb.f.</td>
</tr>
<tr>
<td>SIPLD</td>
<td>3380 lb.f.</td>
<td>2900 lb.f.</td>
<td>545 lb.f. 630 lb.f.</td>
</tr>
<tr>
<td>SIPHD</td>
<td>6000 lb.f.</td>
<td>3400 lb.f.</td>
<td>545 lb.f. 630 lb.f.</td>
</tr>
</tbody>
</table>

**Withdrawal Values in Wood**

 Specific Gravity: 0.67 0.55 0.50 0.46 0.43 0.36 0.31

**SIPTP & SIPLD:** 1439 1173 1067 981 917 768 661

*Values are in lb.f. of thread penetration

**Withdrawal Values in Steel**

Type B Corrugated: 22 ga 20 ga 18 ga

SIPLD: 510 lb.f 645 lb.f 920 lb.f Structural Steel: 16 ga 13 ga 12 ga 3/16" 1/4"

SIPLD: 770 lb.f 1130 lb.f 1990 lb.f 3100 lb.f 4500 lb.f

## Lateral Load Resistance

<table>
<thead>
<tr>
<th>Fastener</th>
<th>Main Member</th>
<th>Side Member</th>
<th>Load (lb.f.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIPTP</td>
<td>SPF 2x4</td>
<td>SIP Panel</td>
<td>943</td>
</tr>
<tr>
<td>SIPLD</td>
<td>22 ga. Corrugated Steel</td>
<td>Nail Base</td>
<td>411</td>
</tr>
<tr>
<td>SIPLD</td>
<td>7/16&quot; OSB</td>
<td>Nail Base</td>
<td>112</td>
</tr>
<tr>
<td>SIPLD</td>
<td>1/8&quot; Structural Steel</td>
<td>SIP Panel</td>
<td>929</td>
</tr>
</tbody>
</table>

**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.

NOTE: Two T-30 Driver Bits included in each package.

**TRUFAST, LLC**
02105 Williams County Road 12-C
Bryan, OH 43506
Phone: 419-636-6715 or 800-443-9602
Fax: 419-636-1784
Email: sales@trufast.com
www.trufast.com
HANDRAIL

Model Number: HR120W
Location: Ramp
Size:
  Length: 10”
  Diameter: 1 1/2”
Available: Railing Dynamic, Inc.
HR120W

120" Vinyl Clad Aluminum Handrail - White

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
180 DEGREE LOOP

Model: HRHLW
Location: Ramp
Available: Railing Dynamic, Inc.
HRHLW
180° Return Loop - White

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
90 DEGREE CORNER

Model: HRCNW
Location: Ramp
Available: Railing Dynamic, Inc.
HRCNW
90° Degree Corner - White

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
STRAIGHT RETURN

Model: HRSRW
Location: Ramp
Available: Railing Dynamic, Inc.
HRSRW
Straight Wall Return - White

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 Range cover: 1

MORE DETAILS
Straight Wall Return - White
ADJUSTABLE JOINERS

Model: HRAJW
Location: Ramp
Available: Railing Dynamic, Inc.
HAND RAIL

Endurance®

HRAJ
Handrail Adjustable Joiner

TO PURCHASE THIS PRODUCT
LOCATE OUR DEALERS

FEATURES
- Product Type: Secondary Hand Rail
- Warranty Type: Lifetime - Limited
- Material: Cast Aluminum

WHAT'S INCLUDED
- Aluminum adjustable joiner (2 pcs): 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

Mounting Bracket - White

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
6061-T6 Aluminum Structural Angle 4" x 4" x 72" - (.375"")

Availability: In stock

Price: $78.68

Qty: 1  Add to Cart

OR-

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

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SKU</td>
<td>300005947.1</td>
</tr>
<tr>
<td>Alloy</td>
<td>N/A</td>
</tr>
<tr>
<td>Temper</td>
<td>N/A</td>
</tr>
<tr>
<td>Shape</td>
<td>Structural Angle</td>
</tr>
<tr>
<td>Leg Length (1)</td>
<td>4 inches</td>
</tr>
<tr>
<td>Leg Length (2)</td>
<td>4 inches</td>
</tr>
<tr>
<td>Thickness</td>
<td>3/8 inch</td>
</tr>
<tr>
<td>Length</td>
<td>72 inches</td>
</tr>
<tr>
<td>Package Quantity</td>
<td>1 piece</td>
</tr>
</tbody>
</table>
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

**Design Properties (100% Load Duration)**

<table>
<thead>
<tr>
<th>Depth</th>
<th>TJI®</th>
<th>Joist Weight (lbs/ft)</th>
<th>Maximum Resisting Moment (In-lb/ft)</th>
<th>Maximum Vertical Shear (lbs)</th>
<th>9/16” End Reaction (lbs)</th>
<th>3/4” End Reaction (lbs)</th>
<th>3/4” Intermediate Reaction (lbs)</th>
<th>5/16” Intermediate Reaction (lbs)</th>
<th>No Web Stiffeners</th>
<th>With Web Stiffeners</th>
</tr>
</thead>
<tbody>
<tr>
<td>9”</td>
<td>110</td>
<td>2.3</td>
<td>2,500</td>
<td>157</td>
<td>1,920</td>
<td>1,720</td>
<td>1,935</td>
<td>N/A</td>
<td>2,350</td>
<td>N/A</td>
</tr>
<tr>
<td>9½”</td>
<td>110</td>
<td>2.5</td>
<td>3,000</td>
<td>166</td>
<td>2,330</td>
<td>2,145</td>
<td>2,295</td>
<td>N/A</td>
<td>2,565</td>
<td>N/A</td>
</tr>
<tr>
<td>11½”</td>
<td>110</td>
<td>2.5</td>
<td>3,200</td>
<td>267</td>
<td>2,560</td>
<td>2,315</td>
<td>2,350</td>
<td>2,705</td>
<td>2,350</td>
<td>N/A</td>
</tr>
<tr>
<td>11¼”</td>
<td>120</td>
<td>2.8</td>
<td>3,755</td>
<td>315</td>
<td>3,550</td>
<td>2,145</td>
<td>2,295</td>
<td>N/A</td>
<td>2,565</td>
<td>N/A</td>
</tr>
<tr>
<td>14”</td>
<td>120</td>
<td>3.0</td>
<td>4,250</td>
<td>347</td>
<td>3,840</td>
<td>2,410</td>
<td>2,765</td>
<td>3,150</td>
<td>2,740</td>
<td>N/A</td>
</tr>
<tr>
<td>15”</td>
<td>120</td>
<td>3.6</td>
<td>5,700</td>
<td>429</td>
<td>4,550</td>
<td>2,810</td>
<td>3,350</td>
<td>3,000</td>
<td>3,350</td>
<td>N/A</td>
</tr>
<tr>
<td>16”</td>
<td>120</td>
<td>4.0</td>
<td>9,500</td>
<td>636</td>
<td>5,810</td>
<td>3,060</td>
<td>3,730</td>
<td>3,350</td>
<td>3,450</td>
<td>N/A</td>
</tr>
</tbody>
</table>

(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 nailing information.

### General Notes

- Design reaction includes all loads on the joint. 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
  \[
  \Delta = \frac{22.5 \cdot W}{E} + \frac{2.57 \cdot w^2}{d \cdot x \cdot 10^4}
  \]

  For TJI® 560 Joists
  \[
  \Delta = \frac{22.5 \cdot W}{E} + \frac{2.29 \cdot w^2}{d \cdot x \cdot 10^4}
  \]

  \(w\) = uniform load in pounds per linear foot
  \(l\) = span in feet
  \(d\) = cut-to-cut depth of the joist in inches
  \(E\) = value from table above
SILL PLATES AND TOP PLATES

Model: Framer 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)

<table>
<thead>
<tr>
<th></th>
<th>1.3E Beam Orientation</th>
<th>1.3E Plank Orientation</th>
<th>1.5E Beam Orientation</th>
<th>1.5E Plank Orientation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modulus of elasticity $E$</td>
<td>$1.3 \times 10^4$ psi</td>
<td>$1.3 \times 10^4$ psi</td>
<td>$1.5 \times 10^4$ psi</td>
<td>$1.5 \times 10^4$ psi</td>
</tr>
<tr>
<td>Adjusted modulus of elasticity $E_{a}$</td>
<td>$660,750$ psi</td>
<td>$660,750$ psi</td>
<td>$762,400$ psi</td>
<td>$762,400$ psi</td>
</tr>
<tr>
<td>Flexural stress $f_{f}$</td>
<td>$1,700$ psi$^{(2)}$</td>
<td>$1,900$ psi$^{(2)}$</td>
<td>$2,250$ psi$^{(2)}$</td>
<td>$2,525$ psi$^{(2)}$</td>
</tr>
<tr>
<td>Compression perpendicular to grain $f_{c}$</td>
<td>$680$ psi$^{(4)}$</td>
<td>$625$ psi$^{(4)}$</td>
<td>$775$ psi$^{(4)}$</td>
<td>$625$ psi$^{(4)}$</td>
</tr>
<tr>
<td>Compression parallel to grain $f_{c}$</td>
<td>$1,400$ psi</td>
<td>$1,400$ psi</td>
<td>$1,950$ psi</td>
<td>$1,950$ psi</td>
</tr>
<tr>
<td>Horizontal shear parallel to grain $f_{h}$</td>
<td>$400$ psi</td>
<td>$150$ psi</td>
<td>$400$ psi</td>
<td>$150$ psi</td>
</tr>
</tbody>
</table>

(1) Reference modulus of elasticity for beam stability and column stability calculations, per NDS® 2005.
(2) For 12" depth. For other depths, multiply by $[\frac{d}{12}]^{1.3}$
(3) Value shown is for thickness up to 3/4".
(4) $f_{c}$ 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. Field 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.wy.com/infor.

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.

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 #87-1005).

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

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Printed in the USA.
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’
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

<table>
<thead>
<tr>
<th>Nominal Size</th>
<th>Lengths</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>2x6</td>
<td>12’ to 16’, in 2’ increments</td>
<td>M-12</td>
</tr>
<tr>
<td>2x6</td>
<td>8’, 9’, 10’</td>
<td>M-9</td>
</tr>
<tr>
<td>2x6</td>
<td>12’ to 20’, in 2’ increments</td>
<td>M-12</td>
</tr>
<tr>
<td>2x8, 2x10, 2x12</td>
<td>8’ to 20’, in 2’ increments</td>
<td>M-12</td>
</tr>
</tbody>
</table>

Allowable Design Stresses (100% Load Duration)

<table>
<thead>
<tr>
<th></th>
<th>M-9 Grade</th>
<th>M-12 Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modulus of elasticity</td>
<td>$1.4 \times 10^6$ psi</td>
<td>$1.6 \times 10^6$ psi</td>
</tr>
<tr>
<td>Flexural stress</td>
<td>$1,400$ psi</td>
<td>$1,600$ psi</td>
</tr>
<tr>
<td>Tension stress</td>
<td>$800$ psi</td>
<td>$850$ psi</td>
</tr>
<tr>
<td>Compression perpendicular to grain</td>
<td>$565$ psi</td>
<td>$565$ psi</td>
</tr>
<tr>
<td>Compression parallel to grain</td>
<td>$1,600$ psi</td>
<td>$1,675$ psi</td>
</tr>
<tr>
<td>Horizontal shear parallel to grain</td>
<td>$175$ psi</td>
<td>$175$ psi</td>
</tr>
</tbody>
</table>

- Design values based on Table 4C, 2005 IRC 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)

<table>
<thead>
<tr>
<th>Stud Size</th>
<th>Laterally supported stud height</th>
<th>Supporting roof and ceiling only</th>
<th>Supporting one floor, roof, and ceiling</th>
<th>Supporting two floors, roof and ceiling</th>
<th>Supporting one floor only</th>
<th>Laterally unsupported stud height</th>
<th>Non-Bearing Walls</th>
<th>Maximum spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>2x4</td>
<td>10’</td>
<td>$24’$ a.c.</td>
<td>$16’$ a.c.</td>
<td>$24’$ a.c.</td>
<td>$24’$ a.c.</td>
<td>$14’$</td>
<td>$24’$ a.c.</td>
<td>$24’$ a.c.</td>
</tr>
<tr>
<td>2x6</td>
<td>10’</td>
<td>$24’$ a.c.</td>
<td>$16’$ a.c.</td>
<td>$24’$ a.c.</td>
<td>$24’$ a.c.</td>
<td>$20’$</td>
<td>$24’$ a.c.</td>
<td>$24’$ a.c.</td>
</tr>
</tbody>
</table>

* Listed heights are distances between points of lateral support placed perpendicular to the plane of the wall.

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.

SUSTAINABLE FORESTRY INITIATIVE

Certified Sourcing
www.sfiprogram.org
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 of 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)\(^1\)

<table>
<thead>
<tr>
<th>Property</th>
<th>M-12 Framer Series</th>
<th>#2 Douglas fir(^2)</th>
<th>#2 Southern pine(^2)</th>
<th>M-9 Framer Series</th>
<th>#1 / #2 SPF(^3)</th>
<th>#2 Hem-Fir(^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modulus of elasticity, (E)</td>
<td>1,600,000</td>
<td>1,600,000</td>
<td>1,600,000</td>
<td>1,400,000</td>
<td>1,400,000</td>
<td>1,300,000</td>
</tr>
<tr>
<td>Flexural stress, (F_{b})</td>
<td>1,600</td>
<td>1,350 / 900</td>
<td>1,500 / 975</td>
<td>1,400</td>
<td>1,312 / 875</td>
<td>1,275 / 850</td>
</tr>
<tr>
<td>Tension stress, (F_{t})</td>
<td>850</td>
<td>862 / 575</td>
<td>825 / 550</td>
<td>800</td>
<td>675 / 450</td>
<td>787 / 525</td>
</tr>
<tr>
<td>Compression perp. to grain, (F_{c})</td>
<td>565</td>
<td>625</td>
<td>565</td>
<td>565</td>
<td>425</td>
<td>405</td>
</tr>
<tr>
<td>Compression parallel to grain, (F_{c})</td>
<td>1,675</td>
<td>1,552 / 1,350</td>
<td>1,650 / 1,450</td>
<td>1,600</td>
<td>1,322 / 1,150</td>
<td>1,495 / 1,300</td>
</tr>
<tr>
<td>Horizontal shear parallel to grain, (F_{h})</td>
<td>175</td>
<td>180</td>
<td>175</td>
<td>175</td>
<td>135</td>
<td>150</td>
</tr>
</tbody>
</table>

\(^{1}\) 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

<table>
<thead>
<tr>
<th>Size</th>
<th>Species and Grade</th>
<th>12'' o.c.</th>
<th>16'' o.c.</th>
<th>19.2'' o.c.</th>
<th>24'' o.c.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2x8</td>
<td>M-12 Framer Series</td>
<td>14''-2''</td>
<td>12''-9''</td>
<td>12''-1''</td>
<td>11''-3''</td>
</tr>
<tr>
<td></td>
<td>#2 Douglas fir(^1)</td>
<td>14''-2''</td>
<td>12''-9''</td>
<td>12''-1''</td>
<td>11''-3''</td>
</tr>
<tr>
<td></td>
<td>#2 Southern pine(^2)</td>
<td>14''-2''</td>
<td>12''-9''</td>
<td>12''-1''</td>
<td>11''-3''</td>
</tr>
<tr>
<td></td>
<td>#1 / #2 SPF(^3)</td>
<td>13''-6''</td>
<td>12''-3''</td>
<td>11''-6''</td>
<td>10''-3''</td>
</tr>
<tr>
<td></td>
<td>#2 Hem-Fir(^2)</td>
<td>13''-2''</td>
<td>12''-6''</td>
<td>11''-3''</td>
<td>10''-3''</td>
</tr>
<tr>
<td>2x10</td>
<td>M-12 Framer Series</td>
<td>18''-0''</td>
<td>16''-5''</td>
<td>15''-5''</td>
<td>14''-4''</td>
</tr>
<tr>
<td></td>
<td>#2 Douglas fir(^1)</td>
<td>18''-0''</td>
<td>16''-5''</td>
<td>15''-5''</td>
<td>14''-4''</td>
</tr>
<tr>
<td></td>
<td>#2 Southern pine(^2)</td>
<td>18''-0''</td>
<td>16''-5''</td>
<td>15''-5''</td>
<td>14''-4''</td>
</tr>
<tr>
<td></td>
<td>#1 / #2 SPF(^3)</td>
<td>17''-3''</td>
<td>15''-5''</td>
<td>14''-1''</td>
<td>12''-7''</td>
</tr>
<tr>
<td></td>
<td>#2 Hem-Fir(^2)</td>
<td>16''-10''</td>
<td>15''-2''</td>
<td>13''-10''</td>
<td>12''-5''</td>
</tr>
<tr>
<td>2x12</td>
<td>M-12 Framer Series</td>
<td>21''-11''</td>
<td>19''-11''</td>
<td>18''-9''</td>
<td>17''-5''</td>
</tr>
<tr>
<td></td>
<td>#2 Douglas fir(^1)</td>
<td>20''-11''</td>
<td>18''-11''</td>
<td>16''-6''</td>
<td>14''-9''</td>
</tr>
<tr>
<td></td>
<td>#2 Southern pine(^2)</td>
<td>21''-9''</td>
<td>18''-10''</td>
<td>17''-2''</td>
<td>15''-5''</td>
</tr>
<tr>
<td></td>
<td>#1 / #2 SPF(^3)</td>
<td>20''-7''</td>
<td>17''-10''</td>
<td>16''-3''</td>
<td>14''-7''</td>
</tr>
<tr>
<td></td>
<td>#2 Hem-Fir(^2)</td>
<td>20''-4''</td>
<td>17''-7''</td>
<td>16''-1''</td>
<td>14''-4''</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Species and Grade</th>
<th>M-12 Framer Series</th>
<th>#2 Douglas fir(^1)</th>
<th>#2 Southern pine(^2)</th>
<th>M-9 Framer Series</th>
<th>#2 Hem-Fir(^2)</th>
<th>#1 / #2 SPF</th>
</tr>
</thead>
</table>

\(^{1}\) 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 Framer 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.iLevel.com.

Table 1: Allowable Design Stresses – 100% Load Duration (psi)

<table>
<thead>
<tr>
<th>Property</th>
<th>M-29 Premium Joist</th>
<th>#1 Southern pine</th>
<th>M-12 Framer Series</th>
<th>#2 Douglas fir</th>
<th>M-9 Framer Series</th>
<th>#1 / #2 SPF</th>
<th>#2 Hem-Fir</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modulus of elasticity, E</td>
<td>1,700,000</td>
<td>1,700,000</td>
<td>1,600,000</td>
<td>1,600,000</td>
<td>1,600,000</td>
<td>1,600,000</td>
<td>1,400,000</td>
</tr>
<tr>
<td>Flexural stress, ( F_b )</td>
<td>1,550</td>
<td>1,850 / 1,250</td>
<td>1,600</td>
<td>1,350 / 900</td>
<td>1,500 / 975</td>
<td>1,400</td>
<td>1,312 / 875</td>
</tr>
<tr>
<td>Tension stress, ( F_t )</td>
<td>850</td>
<td>1,050 / 675</td>
<td>850</td>
<td>862 / 575</td>
<td>825 / 550</td>
<td>800</td>
<td>675 / 450</td>
</tr>
<tr>
<td>Compression perp. to grain, ( F_{cr} )</td>
<td>565</td>
<td>565</td>
<td>565</td>
<td>625</td>
<td>565</td>
<td>565</td>
<td>425</td>
</tr>
<tr>
<td>Compression parallel to grain, ( F_{cpl} )</td>
<td>1,650</td>
<td>1,850 / 1,600</td>
<td>1,675</td>
<td>1,552 / 1,350</td>
<td>1,650 / 1,450</td>
<td>1,600</td>
<td>1,322 / 1,150</td>
</tr>
<tr>
<td>Horizontal shear parallel to grain, ( F_{s} )</td>
<td>175</td>
<td>175</td>
<td>175</td>
<td>180</td>
<td>175</td>
<td>175</td>
<td>135</td>
</tr>
</tbody>
</table>

1. M-29 Premium Joist and M-12 Framer 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

<table>
<thead>
<tr>
<th>Size</th>
<th>Species and Grade</th>
<th>12” o.c.</th>
<th>16” o.c.</th>
<th>19.2” o.c.</th>
<th>24” o.c.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2x8</td>
<td>M-29 Premium Joist</td>
<td>14-’5”</td>
<td>13-’1”</td>
<td>12-’4”</td>
<td>11-’5”</td>
</tr>
<tr>
<td></td>
<td>#1 Southern pine</td>
<td>14-’5”</td>
<td>13-’1”</td>
<td>12-’4”</td>
<td>11-’5”</td>
</tr>
<tr>
<td></td>
<td>M-12 Framer Series</td>
<td>14-’2”</td>
<td>12-’10”</td>
<td>11-’8”</td>
<td>10-’5”</td>
</tr>
<tr>
<td></td>
<td>#2 Douglas fir</td>
<td>14-’2”</td>
<td>12-’9”</td>
<td>11-’8”</td>
<td>10-’5”</td>
</tr>
<tr>
<td></td>
<td>#2 Southern pine</td>
<td>14-’2”</td>
<td>12-’10”</td>
<td>11-’1”</td>
<td>10-’3”</td>
</tr>
<tr>
<td></td>
<td>#1 / #2 SPF</td>
<td>13-’8”</td>
<td>12-’3”</td>
<td>11-’3”</td>
<td>10-’3”</td>
</tr>
<tr>
<td></td>
<td>#2 Hem-Fir</td>
<td>13-’2”</td>
<td>12-’0”</td>
<td>11-’3”</td>
<td>10-’2”</td>
</tr>
<tr>
<td>2x10</td>
<td>M-29 Premium Joist</td>
<td>18-’5”</td>
<td>16-’9”</td>
<td>15-’9”</td>
<td>14-’7”</td>
</tr>
<tr>
<td></td>
<td>#1 Southern pine</td>
<td>18-’5”</td>
<td>16-’9”</td>
<td>15-’9”</td>
<td>14-’7”</td>
</tr>
<tr>
<td></td>
<td>M-12 Framer Series</td>
<td>18-’0”</td>
<td>16-’5”</td>
<td>15-’5”</td>
<td>14-’4”</td>
</tr>
<tr>
<td></td>
<td>#2 Douglas fir</td>
<td>18-’0”</td>
<td>16-’5”</td>
<td>15-’5”</td>
<td>14-’2”</td>
</tr>
<tr>
<td></td>
<td>#2 Southern pine</td>
<td>18-’0”</td>
<td>16-’1”</td>
<td>15-’8”</td>
<td>14-’3”</td>
</tr>
<tr>
<td></td>
<td>#1 / #2 SPF</td>
<td>17-’3”</td>
<td>15-’4”</td>
<td>14-’3”</td>
<td>12-’7”</td>
</tr>
<tr>
<td></td>
<td>#2 Hem-Fir</td>
<td>16-’10”</td>
<td>15-’2”</td>
<td>13-’10”</td>
<td>12-’5”</td>
</tr>
<tr>
<td>2x12</td>
<td>M-29 Premium Joist</td>
<td>22-’5”</td>
<td>20-’4”</td>
<td>19-’2”</td>
<td>17-’9”</td>
</tr>
<tr>
<td></td>
<td>#1 Southern pine</td>
<td>22-’5”</td>
<td>20-’4”</td>
<td>19-’2”</td>
<td>17-’5”</td>
</tr>
<tr>
<td></td>
<td>M-12 Framer Series</td>
<td>21-’11”</td>
<td>19-’11”</td>
<td>18-’9”</td>
<td>17-’5”</td>
</tr>
<tr>
<td></td>
<td>#2 Douglas fir</td>
<td>20-’11”</td>
<td>18-’1”</td>
<td>16-’6”</td>
<td>14-’9”</td>
</tr>
<tr>
<td></td>
<td>#2 Southern pine</td>
<td>21-’9”</td>
<td>18-’10”</td>
<td>17-’2”</td>
<td>15-’5”</td>
</tr>
<tr>
<td></td>
<td>#1 / #2 SPF</td>
<td>20-’7”</td>
<td>17-’10”</td>
<td>16-’3”</td>
<td>14-’7”</td>
</tr>
<tr>
<td></td>
<td>#2 Hem-Fir</td>
<td>20-’4”</td>
<td>17-’7”</td>
<td>16-’1”</td>
<td>14-’4”</td>
</tr>
</tbody>
</table>

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'
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

<table>
<thead>
<tr>
<th>Nominal Size</th>
<th>Lengths</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>2x4</td>
<td>8', 9', 10', 16', 20'</td>
<td>M-9</td>
</tr>
<tr>
<td>2x6</td>
<td>12' to 16', in 2' increments</td>
<td>M-12</td>
</tr>
<tr>
<td>2x8</td>
<td>8', 9', 10'</td>
<td>M-9</td>
</tr>
<tr>
<td>2x10, 2x12</td>
<td>12' to 20', in 2' increments</td>
<td>M-12</td>
</tr>
<tr>
<td>2x8, 2x10, 2x12</td>
<td>8' to 20', in 2' increments</td>
<td>M-12</td>
</tr>
</tbody>
</table>

### Allowable Design Stresses (100% Load Duration)

<table>
<thead>
<tr>
<th></th>
<th>M-9 Grade</th>
<th>M-12 Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modulus of elasticity</td>
<td>1.4 x 10^6 psi</td>
<td>1.6 x 10^6 psi</td>
</tr>
<tr>
<td>Flexural stress</td>
<td>1,400 psi</td>
<td>1,600 psi</td>
</tr>
<tr>
<td>Tension stress</td>
<td>800 psi</td>
<td>850 psi</td>
</tr>
<tr>
<td>Compression perpendicular to grain</td>
<td>565 psi</td>
<td>565 psi</td>
</tr>
<tr>
<td>Compression parallel to grain</td>
<td>1,600 psi</td>
<td>1,675 psi</td>
</tr>
<tr>
<td>Horizontal shear parallel to grain</td>
<td>175 psi</td>
<td>175 psi</td>
</tr>
</tbody>
</table>

- 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

<table>
<thead>
<tr>
<th>Stud Size</th>
<th>Laterally supported stud height</th>
<th>Supporting roof and ceiling only</th>
<th>Supporting one floor, roof, and ceiling</th>
<th>Supporting two floors, roof, and ceiling</th>
<th>Supporting one floor only</th>
<th>Laterally unsupported stud height</th>
<th>Maximum spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>2x4</td>
<td>10'</td>
<td>24' a.c.</td>
<td>16' a.c.</td>
<td></td>
<td>24' a.c.</td>
<td>14'</td>
<td>24' a.c.</td>
</tr>
<tr>
<td>2x6</td>
<td>10'</td>
<td>24' a.c.</td>
<td>24' a.c.</td>
<td>24' a.c.</td>
<td>24' a.c.</td>
<td>20'</td>
<td>24' a.c.</td>
</tr>
</tbody>
</table>

- Listed heights are distances between points of lateral support placed perpendicular to the plane of the wall.

---

**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.

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**SUSTAINABLE FORESTRY INITIATIVE**

Certified Sourcing
www.sfiprogram.org
**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 of 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)\(^{(1)}\)**

<table>
<thead>
<tr>
<th>Property</th>
<th>M-12 Framer Series</th>
<th>#2 Douglas Fir(^{(2)})</th>
<th>#2 Southern Pine(^{(2)})</th>
<th>M-9 Framer Series</th>
<th>#1 / #2 SPF(^{(2)})</th>
<th>#2 Hem-Fir(^{(2)})</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modulus of elasticity, E</td>
<td>1,600,000</td>
<td>1,600,000</td>
<td>1,600,000</td>
<td>1,400,000</td>
<td>1,400,000</td>
<td>1,300,000</td>
</tr>
<tr>
<td>Flexural stress, F(_b)</td>
<td>1,600</td>
<td>1350 / 900</td>
<td>1500 / 975</td>
<td>1,400</td>
<td>1312 / 875</td>
<td>1275 / 850</td>
</tr>
<tr>
<td>Tension stress, F(_t)</td>
<td>850</td>
<td>862 / 575</td>
<td>825 / 550</td>
<td>800</td>
<td>675 / 450</td>
<td>787 / 525</td>
</tr>
<tr>
<td>Compression perpendicular to grain, F(_{cp})</td>
<td>565</td>
<td>625</td>
<td>565</td>
<td>565</td>
<td>425</td>
<td>405</td>
</tr>
<tr>
<td>Compression parallel to grain, F(_c)</td>
<td>1,675</td>
<td>1552 / 1350</td>
<td>1650 / 1450</td>
<td>1,600</td>
<td>1322 / 1150</td>
<td>1495 / 1300</td>
</tr>
<tr>
<td>Horizontal shear parallel to grain, F(_h)</td>
<td>175</td>
<td>180</td>
<td>175</td>
<td>175</td>
<td>135</td>
<td>150</td>
</tr>
</tbody>
</table>

\(^{(1)}\) 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**

<table>
<thead>
<tr>
<th>Size</th>
<th>Species and Grade</th>
<th>12(^{\circ}) o.c.</th>
<th>16(^{\circ}) o.c.</th>
<th>19.2(^{\circ}) o.c.</th>
<th>24(^{\circ}) o.c.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2x8</td>
<td>M-12 Framer Series</td>
<td>14(^{\circ}) - 15(^{\circ})</td>
<td>14(^{\circ}) - 15(^{\circ})</td>
<td>13(^{\circ}) - 15(^{\circ})</td>
<td>13(^{\circ}) - 15(^{\circ})</td>
</tr>
<tr>
<td></td>
<td>#2 Douglas fir</td>
<td>14(^{\circ}) - 15(^{\circ})</td>
<td>14(^{\circ}) - 15(^{\circ})</td>
<td>13(^{\circ}) - 15(^{\circ})</td>
<td>13(^{\circ}) - 15(^{\circ})</td>
</tr>
<tr>
<td></td>
<td>#2 Southern pine</td>
<td>14(^{\circ}) - 15(^{\circ})</td>
<td>14(^{\circ}) - 15(^{\circ})</td>
<td>13(^{\circ}) - 15(^{\circ})</td>
<td>13(^{\circ}) - 15(^{\circ})</td>
</tr>
<tr>
<td></td>
<td>#1 / #2 SPF</td>
<td>13(^{\circ}) - 15(^{\circ})</td>
<td>13(^{\circ}) - 15(^{\circ})</td>
<td>13(^{\circ}) - 15(^{\circ})</td>
<td>13(^{\circ}) - 15(^{\circ})</td>
</tr>
<tr>
<td></td>
<td>#2 Hem-Fir</td>
<td>13(^{\circ}) - 15(^{\circ})</td>
<td>13(^{\circ}) - 15(^{\circ})</td>
<td>13(^{\circ}) - 15(^{\circ})</td>
<td>13(^{\circ}) - 15(^{\circ})</td>
</tr>
<tr>
<td>2x10</td>
<td>M-12 Framer Series</td>
<td>18(^{\circ}) - 19(^{\circ})</td>
<td>18(^{\circ}) - 19(^{\circ})</td>
<td>17(^{\circ}) - 19(^{\circ})</td>
<td>17(^{\circ}) - 19(^{\circ})</td>
</tr>
<tr>
<td></td>
<td>#2 Douglas fir</td>
<td>18(^{\circ}) - 19(^{\circ})</td>
<td>18(^{\circ}) - 19(^{\circ})</td>
<td>17(^{\circ}) - 19(^{\circ})</td>
<td>17(^{\circ}) - 19(^{\circ})</td>
</tr>
<tr>
<td></td>
<td>#2 Southern pine</td>
<td>18(^{\circ}) - 19(^{\circ})</td>
<td>18(^{\circ}) - 19(^{\circ})</td>
<td>17(^{\circ}) - 19(^{\circ})</td>
<td>17(^{\circ}) - 19(^{\circ})</td>
</tr>
<tr>
<td></td>
<td>#1 / #2 SPF</td>
<td>17(^{\circ}) - 19(^{\circ})</td>
<td>17(^{\circ}) - 19(^{\circ})</td>
<td>17(^{\circ}) - 19(^{\circ})</td>
<td>17(^{\circ}) - 19(^{\circ})</td>
</tr>
<tr>
<td></td>
<td>#2 Hem-Fir</td>
<td>17(^{\circ}) - 19(^{\circ})</td>
<td>17(^{\circ}) - 19(^{\circ})</td>
<td>17(^{\circ}) - 19(^{\circ})</td>
<td>17(^{\circ}) - 19(^{\circ})</td>
</tr>
<tr>
<td>2x12</td>
<td>M-12 Framer Series</td>
<td>21(^{\circ}) - 23(^{\circ})</td>
<td>21(^{\circ}) - 23(^{\circ})</td>
<td>20(^{\circ}) - 23(^{\circ})</td>
<td>20(^{\circ}) - 23(^{\circ})</td>
</tr>
<tr>
<td></td>
<td>#2 Douglas fir</td>
<td>20(^{\circ}) - 22(^{\circ})</td>
<td>20(^{\circ}) - 22(^{\circ})</td>
<td>19(^{\circ}) - 22(^{\circ})</td>
<td>19(^{\circ}) - 22(^{\circ})</td>
</tr>
<tr>
<td></td>
<td>#2 Southern pine</td>
<td>21(^{\circ}) - 23(^{\circ})</td>
<td>21(^{\circ}) - 23(^{\circ})</td>
<td>20(^{\circ}) - 23(^{\circ})</td>
<td>20(^{\circ}) - 23(^{\circ})</td>
</tr>
<tr>
<td></td>
<td>#1 / #2 SPF</td>
<td>20(^{\circ}) - 22(^{\circ})</td>
<td>20(^{\circ}) - 22(^{\circ})</td>
<td>19(^{\circ}) - 22(^{\circ})</td>
<td>19(^{\circ}) - 22(^{\circ})</td>
</tr>
<tr>
<td></td>
<td>#2 Hem-Fir</td>
<td>20(^{\circ}) - 22(^{\circ})</td>
<td>20(^{\circ}) - 22(^{\circ})</td>
<td>19(^{\circ}) - 22(^{\circ})</td>
<td>19(^{\circ}) - 22(^{\circ})</td>
</tr>
</tbody>
</table>

- 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**

<table>
<thead>
<tr>
<th>Species and Grade</th>
<th>M-12 Framer Series</th>
<th>#2 Douglas fir(^{(1)})</th>
<th>#2 Southern Pine</th>
<th>M-9 Framer Series</th>
<th>#2 Hem-Fir</th>
<th>#1 / #2 SPF</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-12 Framer Series</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#2 Douglas fir</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#2 Southern pine</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M-9 Framer Series</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#2 Hem-Fir</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^{(1)}\) 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
RH-SBDR113-HQG - HurriQuake® -- 5,000 Qty. 2-1/2" x .113 HQ Ring Shank 21° Plastic Collated Galvanized Sheathing Nail

Features and Benefits:
- Up to 2× 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 resistance
- 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 overtube

Product Details:
- Fastener Length: 2-1/2"
- Fastener Shank Diameter: .113
- Finish: Galvanized
- Flare Bostitch Tools: F2AL, HERR-H, HERR-H-2MCN
- Point Style: Diamond
- Quantity Per Carton: 5,000
- Shank Type: HQ Ring
FRAMING NAILS

Model: S16D131-FH
Location: Walls throughout house
Dimensions: 3 1/2” x .131”
S160131-FH - 2,000 Qty 3-1/2" x .131 Smooth Shank 28° Wire Collated Full Round Head Stick Framing Nails

Features and Benefits

Product Details

- Fastener Length: 3-1/2"
- Fastener Shank Diameter: .131
- Finish: Coated
- Fit Bostitch Tools: N75WW, N8CSB, N6ES, N8WWB, N100S, F28WW
- Point Style: Diamond
- Quantity Per Item Pack: 2,000
- Shank Type: Smooth

Warranty
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
SW90403-4 - 2,000 Pack 3/4" Leg 1-3/8" Wide Crown Stick Packaging Staple

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, D60B, D60ADS, FB4
- 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

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 SJQ AND DJ SERIES
## ALLOWABLE LOADS (POUNDS) \(^5\)

<table>
<thead>
<tr>
<th>MODEL</th>
<th>DIMENSIONS (INCHES)</th>
<th>STEEL GAGE NO.</th>
<th>NAIL SCHEDULE(^1)</th>
<th>ALLOWABLE LOADS — SYP(^2) (LBS)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>H</td>
<td>W</td>
<td>B</td>
<td>Joist</td>
</tr>
<tr>
<td>SJQ24</td>
<td>3-1/6</td>
<td>1-1/2</td>
<td>1-1/2</td>
<td>2</td>
</tr>
<tr>
<td>SJQ26</td>
<td>4-1/4</td>
<td>1-1/2</td>
<td>1-1/2</td>
<td>4</td>
</tr>
<tr>
<td>SJQ28</td>
<td>7</td>
<td>1-1/2</td>
<td>1-1/2</td>
<td>6</td>
</tr>
<tr>
<td>SJQ210</td>
<td>7-1/4</td>
<td>1-1/2</td>
<td>1-1/2</td>
<td>6</td>
</tr>
<tr>
<td>DJ46</td>
<td>5-1/2</td>
<td>3-1/6</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>DJ48</td>
<td>7-1/4</td>
<td>3-1/6</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>DJ410</td>
<td>8-1/2</td>
<td>3-1/6</td>
<td>2</td>
<td>8</td>
</tr>
</tbody>
</table>

For SI: 1 inch = 25.4 mm, 1 lbf = 4.5 N.

\(^1\)Nails are 10d by 1-1/2 inch joist hanger nails complying with Section 3.8.3.

\(^2\)Allowable 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.

\(^3\)Allowable uplift loads have been adjusted by a load duration factor \(C_{du}\) of 1.6 (160%), corresponding to the typical duration of wind and earthquake loads. No further increases in allowable loads are permitted.

\(^4\)Allowable 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.

\(^5\)Tabulated loads are without a 33% steel stress increase. Application of steel stress increase is not permitted.

---

![FIGURE 1—SJQ AND DJ SERIES](image-url)
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

<table>
<thead>
<tr>
<th>MODEL</th>
<th>DIMENSIONS (INCHES)</th>
<th>STEEL GAGE NO.</th>
<th>NAIL SCHEDULE</th>
<th>ALLOWABLE LOADS - SYP² (LBS)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>H</td>
<td>W</td>
<td>B</td>
<td>Joist</td>
</tr>
<tr>
<td>SJQ24</td>
<td>3-¹/₈</td>
<td>1⁻⁷/₁₆</td>
<td>1⁻¹/₂</td>
<td>20</td>
</tr>
<tr>
<td>SJQ26</td>
<td>4⁻¹/₈</td>
<td>1⁻⁷/₁₆</td>
<td>1⁻¹/₂</td>
<td>20</td>
</tr>
<tr>
<td>SJQ28</td>
<td>7</td>
<td>1⁻⁷/₈</td>
<td>1⁻¹/₂</td>
<td>20</td>
</tr>
<tr>
<td>SJQ210</td>
<td>7⁻²/₈</td>
<td>1⁻⁷/₁₆</td>
<td>1⁻¹/₂</td>
<td>20</td>
</tr>
<tr>
<td>DJ46</td>
<td>5⁻¹/₂</td>
<td>3⁻¹/₄</td>
<td>2</td>
<td>18</td>
</tr>
<tr>
<td>DJ48</td>
<td>7⁻³/₄</td>
<td>3⁻¹/₄</td>
<td>2</td>
<td>18</td>
</tr>
<tr>
<td>DJ410</td>
<td>8⁻¹/₂</td>
<td>3⁻¹/₄</td>
<td>2</td>
<td>18</td>
</tr>
</tbody>
</table>

For SI: 1 inch = 25.4 mm, 1 lbf = 4.5 N.

Nails are 10d by 1⁻¹/₂ inch joist hanger nails complying with Section 3.8.3.

Allowable 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.

Allowable uplift loads have been adjusted by a load duration factor Cₚ, of 1.6 (160%), corresponding to the typical duration of wind and earthquake loads. No further increases in allowable loads are permitted.

For SI: 1 inch = 25.4 mm, 1 lbf = 4.5 N.

Nails are 10d by 1⁻¹/₂ inch joist hanger nails complying with Section 3.8.3.

Allowable 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.

Allowable uplift loads have been adjusted by a load duration factor Cₚ, of 1.6 (160%), corresponding to the typical duration of wind and earthquake loads. No further increases in allowable loads are permitted.

Allowable gravity (bearing) loads have been adjusted by load duration factors, Cₚ, 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.

Tabulated 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
PT-MC13115-1M - 1,000-Qty. 1-1/2" x .131 35° STRAPSHOT™ Paper Collated Metal Connector Nails

Features and Benefits
- Full Round Head - Identified
- Bond yield = 100,000 PSI
- For Metal Connector Applications

Product Details
- Fastener Length: 1-1/2"
- Fastener Shank Diameter: .131
- Finish: Bright, Heat Treated
- File Bostitch Tools: F258T, STRAPSHOT™ MCN-100, STRAPSHOT™ MCN-250
- File Comparator Tools: Paslode 5250/650 PP, Hitachi NR 65AK
- Point Style: Diamond
- Quantity Per Carton: 1,000
- Shank Type: Smooth
1 1/8" OSB [ORIENTED STRAND BOARD]: SUB FLOOR

Model Number: EDGE
Location: subfloor throughout
Dimensions:
  Length: 4’
  Width: 8’
Available: Weyerhauser
Material Safety Data Sheet

Weyerhaeuser OSB Sheathing

Weyerhaeuser Company
PO Box 9777
Federal Way, WA 98063-9777
http://www.weyerhaeuser.com/Sustainability/Planet/Products/MSDS

1. Product Identification

<table>
<thead>
<tr>
<th>Product</th>
<th>Weyerhaeuser OSB Sheathing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synonyms: Oriented Strand Board, OSB</td>
<td></td>
</tr>
</tbody>
</table>

2. Hazardous Ingredients/Identity Information

<table>
<thead>
<tr>
<th>Name</th>
<th>CAS#</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wood (wood dust, softwood and hardwood)</td>
<td>None</td>
</tr>
<tr>
<td>Resin Solids: Polymeric phenol-formaldehyde a</td>
<td>9003-35-4</td>
</tr>
<tr>
<td>Polymeric Diphenylmethane Diisocyanate c</td>
<td>9016-87-9</td>
</tr>
<tr>
<td>Paraffin wax</td>
<td>8002-74-2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Agency</th>
<th>Percent</th>
<th>Exposure Limits</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>OSHA</td>
<td>84-89</td>
<td>PEL-TWA 15 mg/m³ (see footnote a below)</td>
<td>Total dust (PNOR)</td>
</tr>
<tr>
<td>OSHA</td>
<td></td>
<td>PEL-TWA 5 mg/m³ (see footnote a below)</td>
<td>Respirable dust fraction (PNOR)</td>
</tr>
<tr>
<td>ACGIH</td>
<td></td>
<td>TLV-TWA 1 mg/m³</td>
<td>Inhalable fraction</td>
</tr>
<tr>
<td>OSHA</td>
<td>1-14</td>
<td>PEL-TWA 0.75 ppm PEL-STE L 2 ppm</td>
<td>Free gaseous formaldehyde</td>
</tr>
<tr>
<td>ACGIH</td>
<td></td>
<td>TLV-Ceiling 0.3 ppm</td>
<td></td>
</tr>
<tr>
<td>OSHA</td>
<td>0-14</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>ACGIH</td>
<td></td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>OSHA</td>
<td>0-2</td>
<td>PEL-TWA 2 mg/m³ TLV-TWA 2 mg/m³</td>
<td>Paraffin wax fume</td>
</tr>
<tr>
<td>ACGIH</td>
<td></td>
<td>TLV-TWA 2 mg/m³</td>
<td>Paraffin wax fume</td>
</tr>
</tbody>
</table>

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.

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:
☐ 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, lymphaic and hematopoetic 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.

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boiling Point (@ 760 mm Hg)</td>
<td>NAP</td>
</tr>
<tr>
<td>Evaporation Rate (Butyl Acetate = 1)</td>
<td>NAP</td>
</tr>
<tr>
<td>Freezing Point</td>
<td>NAP</td>
</tr>
<tr>
<td>Melting Point</td>
<td>NAP</td>
</tr>
<tr>
<td>Molecular Formula</td>
<td>NAP</td>
</tr>
<tr>
<td>Molecular Weight</td>
<td>NAP</td>
</tr>
<tr>
<td>Oil-water Distribution Coefficient</td>
<td>NAP</td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>NAV</td>
</tr>
</tbody>
</table>
9. Physical/Chemical Properties (cont'd.)

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>NAP</td>
</tr>
<tr>
<td>Solubility in Water (% by weight:)</td>
<td>&lt;0.1</td>
</tr>
<tr>
<td>Specific Gravity (H₂O = 1):</td>
<td>Variable; depends on wood species and moisture</td>
</tr>
<tr>
<td>Vapor Density (air = 1; 1 atm):</td>
<td>NAP</td>
</tr>
<tr>
<td>Vapor Pressure (mm Hg):</td>
<td>NAP</td>
</tr>
<tr>
<td>Viscosity:</td>
<td>NAP</td>
</tr>
<tr>
<td>% Volatile by Volume [@ 70°F (21°C)]:</td>
<td>0</td>
</tr>
</tbody>
</table>

10. Stability and Reactivity

- Stability: [ ] Unstable  [x] 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  [x] 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 T₅₀ of 17 mg/m³ for 30 minutes produced eye and pulmonary results; human inhalation T₅₀ of 300 µg/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

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.

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.

Edge Gold™ floor panel benefits include:
- 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

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.

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:
- 9/16", 9/32", 9/16", and 11/4"

Edge Gold™ floor panels:
- 9/6", 9/32", 9/16", and 11/4"

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 (IRC).

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)

<table>
<thead>
<tr>
<th>Span rating</th>
<th>20° e.c.</th>
<th>24° e.c.</th>
<th>32° e.c.</th>
<th>48° e.c.</th>
</tr>
</thead>
<tbody>
<tr>
<td>20° e.c.</td>
<td>24° e.c.</td>
<td>32° e.c.</td>
<td>48° e.c.</td>
<td>20° e.c.</td>
</tr>
<tr>
<td>Strength axis</td>
<td>Primary</td>
<td>Secondary</td>
<td>Primary</td>
<td>Secondary</td>
</tr>
<tr>
<td>Moment capacity (lb-in./ft of width)</td>
<td>575</td>
<td>250</td>
<td>770</td>
<td>385</td>
</tr>
<tr>
<td>Shear (lb/ft of depth)</td>
<td>87,000</td>
<td>87,000</td>
<td>93,000</td>
<td>93,000</td>
</tr>
<tr>
<td>Axial tension capacity (lb/ft of width)</td>
<td>2,900</td>
<td>2,100</td>
<td>3,350</td>
<td>2,550</td>
</tr>
<tr>
<td>Axial compression capacity (lb/ft of width x 10^3)</td>
<td>4,200</td>
<td>4,000</td>
<td>5,000</td>
<td>4,300</td>
</tr>
</tbody>
</table>
| (1) The primary strength axis is the long direction of the panel unless otherwise noted.

### General Notes
- Table is based on information from the International Building Code (IRC).
- Values 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

<table>
<thead>
<tr>
<th>2-Span to 1-Span</th>
<th>3-Span to 1-Span</th>
<th>2-Span to 1-Span</th>
<th>3-Span to 1-Span</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deflection</td>
<td>0.42</td>
<td>0.53</td>
<td>0.64</td>
</tr>
<tr>
<td>Moment</td>
<td>1.00</td>
<td>0.90</td>
<td>1.00</td>
</tr>
<tr>
<td>Shear</td>
<td>1.25</td>
<td>1.20</td>
<td>1.25</td>
</tr>
</tbody>
</table>

- 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)

(Appplies to strength capacities)

<table>
<thead>
<tr>
<th>Duration</th>
<th>Capacity Factor C_d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permanent load (over 10 years)</td>
<td>0.90</td>
</tr>
<tr>
<td>Occupancy live load</td>
<td>1.00</td>
</tr>
<tr>
<td>2 months, as for snow</td>
<td>1.15</td>
</tr>
<tr>
<td>7 days, as for fire</td>
<td>1.25</td>
</tr>
<tr>
<td>Wind or earthquake</td>
<td>1.60</td>
</tr>
<tr>
<td>Impact</td>
<td>2.00</td>
</tr>
</tbody>
</table>

**Moisture Condition**
- **Dry**: 0.50
- **OSB**: 0.90

- When a permanent or constant load will stress a panel to 1/4 or more of its design strength capacity, adjust the deflection calculation by applying the creep adjustment factor \( C_c = 0.50 \) to the panel stiffness (EI) found above.
SECTION PROPERTIES AND LOAD/SPAN TABLE

Panel Section Properties

<table>
<thead>
<tr>
<th>r/s²</th>
<th>4/s²</th>
<th>8/s²</th>
<th>12/s²</th>
<th>16/s²</th>
<th>20/s²</th>
<th>24/s²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2.0</td>
<td>2.1</td>
<td>2.4</td>
<td>2.5</td>
<td>2.9</td>
<td>3.3</td>
</tr>
<tr>
<td>Area (in²/ft²) A</td>
<td>7.125</td>
<td>7.500</td>
<td>8.625</td>
<td>9.000</td>
<td>10.500</td>
<td>12.000</td>
</tr>
<tr>
<td>Moment of inertia (in.⁴/ft²) I</td>
<td>0.209</td>
<td>0.244</td>
<td>0.371</td>
<td>0.422</td>
<td>0.670</td>
<td>1.000</td>
</tr>
<tr>
<td>Section modulus (in.⁴/ft³) S</td>
<td>0.705</td>
<td>0.781</td>
<td>1.033</td>
<td>1.125</td>
<td>1.531</td>
<td>2.000</td>
</tr>
<tr>
<td>Statical moment (in.⁴/ft³) Q</td>
<td>0.529</td>
<td>0.586</td>
<td>0.775</td>
<td>0.844</td>
<td>1.148</td>
<td>1.500</td>
</tr>
<tr>
<td>Shear constant (in.⁴/ft³) t/s =</td>
<td>4.750</td>
<td>5.000</td>
<td>5.750</td>
<td>6.000</td>
<td>7.000</td>
<td>8.000</td>
</tr>
</tbody>
</table>

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 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)

<table>
<thead>
<tr>
<th>Span Rating</th>
<th>Nominal Thickness</th>
<th>Load Calculation Based on Percent of Rated Design Span</th>
<th>Span Normal Orientation, Strength Axis Perpendicular to Supports</th>
<th>Span Strength Axis Parallel to Supports</th>
</tr>
</thead>
<tbody>
<tr>
<td>20&quot; o.a.</td>
<td>4/8&quot;, 3/4&quot;</td>
<td>Deflection 914 344 188 91 45 36 32 23 15</td>
<td>12&quot; 16&quot; 19.2&quot; 24&quot; 30&quot; 32&quot; 36&quot; 40&quot; 48&quot; 60&quot;</td>
<td>12&quot; 16&quot; 24&quot; 201 118 42</td>
</tr>
<tr>
<td>24&quot; o.a.</td>
<td>4/8&quot;, 3/4&quot;</td>
<td>Strength 390 270 188 120 77 68 43 35 24</td>
<td>12&quot; 16&quot; 19.2&quot; 24&quot; 30&quot; 32&quot; 36&quot; 40&quot; 48&quot; 60&quot;</td>
<td>12&quot; 16&quot; 24&quot; 201 118 42</td>
</tr>
<tr>
<td>32&quot; o.a.</td>
<td>4/8&quot;, 3/4&quot;</td>
<td>Deflection 1,065 491 269 130 64 52 46 33 21 10</td>
<td>12&quot; 16&quot; 19.2&quot; 24&quot; 30&quot; 32&quot; 36&quot; 40&quot; 48&quot; 60&quot;</td>
<td>12&quot; 16&quot; 24&quot; 201 118 42</td>
</tr>
<tr>
<td>48&quot; o.a.</td>
<td>4/8&quot;, 3/4&quot;</td>
<td>Strength 476 345 250 160 102 50 57 46 32 20</td>
<td>12&quot; 16&quot; 19.2&quot; 24&quot; 30&quot; 32&quot; 36&quot; 40&quot; 48&quot; 60&quot;</td>
<td>12&quot; 16&quot; 24&quot; 201 118 42</td>
</tr>
</tbody>
</table>

(1) Deflection calculation based on L/360 deflection limit. The allowable load for other deflection limits can be computed as follows:
- for L/140 limit, multiply by 1.5
- for L/180 limit, multiply by 2.0
- for L/480 limit, divide by 1.5

(2) Strength calculation based on the minimum of bending or shear.

(3) Values may be increased for Structural grade 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 grade 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 (AFC-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 joint 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’-diphenylmethanediame) 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 24 mg/L
- 96 hr LC50 Bluegill 0.10 mg/L
- 5 min EC50 Photobacterium phosphoreum 9 mg/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 has 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:

- Moment Capacity: \( M = \frac{95FS}{L} \)
- Shear Capacity: \( V = \frac{24FS}{L} \)
- Deflection: \( \delta = \frac{L^2}{EIL_R} \)

**Two-Span Equations**

Uniform load equations based on:

- Moment Capacity: \( M = \frac{95FS}{L} \)
- Shear Capacity: \( V = \frac{19.2FS}{L} \)
- Deflection: \( \delta = \frac{L^2(21.6E)}{2L^2} \)

**Three-Span Equations**

Uniform load equations based on:

- Moment Capacity: \( M = \frac{120FS}{L} \)
- Shear Capacity: \( V = \frac{20FS}{L} \)
- Deflection: \( \delta = \frac{L^2(1743E)}{3L^2} \)

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:

- \( \Delta \) ...... deflection (in.)
- \( EI \) ...... design bending stiffness capacity (lb-in.·ft/ft)
- \( FS \) ...... design moment capacity (lb-ft/ft)
- \( SW \) ...... support width factor:
  - 0.25 for 2x nominal lumber
  - 0.625 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)
- \( W \) ...... 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 4x8” 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) = \( FS \) = 770 lb-in./ft of width
- Shear capacity (in-the-plane) = \( V \) = 250 lb/ft of width
- Stiffness = \( EI \) = 300,000 lb-in.·in./ft of width

1 Calculate Allowable Uniform Load Based on Moment Capacity

\( W_m = \frac{120FS}{16} \)

Calculate appropriate span for moment (center-to-center), \( L_m = 16” \)

Using: \( FS = 770 \) lb-in./ft and \( L_m = 16” \)

\( W_m = 770/16 = 48 \) psf

2 Calculate Allowable Uniform Load Based on Shear Capacity

\( W_v = \frac{20FS}{16} \)

Calculate appropriate span for shear (clear span), \( L_v = 16”-1.5” = 14.5” \)

Using: \( FS = 250 \) lb and \( L_v = 14.5” \)

\( W_v = 20 \times 250/14.5 \)

\( W_v = 345 \) psf

3 Calculate Allowable Uniform Load Based on Deflection

\( W_D = \frac{L^2(1743E)}{3L^2} \)

SW = 0.25 (from above)

Calculate appropriate span for deflection (clear span + SW),

\( L_D = 14.5” + 0.25” = 14.75” \)

Using: \( L_D = 16” \), \( R = 360 \), and \( EI = 300,000 \) lb-in.·in./ft

\( W_D = 16 \times 1743 \times 14.75 \times 300,000 \)

\( W_D = 491 \) psf

4 Compare Calculated Allowable Uniform Loads

Calculated allowable uniform loads based on strength:

\( W_m = 48 \) psf

\( W_v = 345 \) psf

\( W_D = 491 \) 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.

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.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
BOSTITCH WELDED WIRE COIL NAILS

Model Number: MGK 25BPBF
Location: Floor System Fasteners
Dimensions:
  Thickness: .113"
  Length: 2 1/2"
Available: Nail Gun Depot
LVL [LAMINATED VENEER LUMBER] RIM JOIST AND CENTRAL BEAM

Location: Central Foundation
Dimensions:
  Thickness: 1 3/4"
  Width: 11 1/4"
  Length: 14’
Available: Weyerhauser
LATERAL DETAILS AND SPECIFICATIONS

2x4 or 2x6 stud wall at 16" on-center maximum

Plate nail
Floor panel nail
Rim board to TJ® joist
1/4" TimberStrand® LSL or 1/4" TJ® rim board (see nailing schedule below)
Toe nailing
Rim board to TJ® joist
Sheathing may be attached as shown in A3.4
Web stiffener required on both sides at A3.4W ONLY

When panel thickness exceeds 1/4", use sheathing tongue at rim board

TJ® joist spanning in either direction
TJ® joist to plate

2x4 or 2x6 stud wall at 16" on-center maximum

Plate nail
Floor panel nail
Rim board to TJ® joist
1/4" TimberStrand® LSL or 1/4" TJ® rim board
Attatch panel per nailing schedule (R50)
Toe nailing
Rim board to TJ® joist
12" minimum
Install proper blocking to support all panel edges

TJ® joist spanning in either direction
TJ® joist to plate

Exterior Deck Attachment

Structural exterior sheathing
Flashings
1/4" TimberStrand® LSL or 1/4" TJ® rim board
Treated 2x_ ledger

Maintain 2" distance (minimum) from edge of ledger to fastener. See fastener table on page 4.

LA
Allowable load per Lag Screw Capacities table on page 4
DESIGN PROPERTIES AND MATERIAL WEIGHTS

Allowable Design Stresses (100% Load Duration)

<table>
<thead>
<tr>
<th>Property</th>
<th>1&quot; TimberStrand® LSL Rim Board</th>
<th>1/4&quot; TimberStrand® LSL Rim Board</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modulus of elasticity E</td>
<td>1.3 x 10^6 psi</td>
<td>660,750 psi</td>
</tr>
<tr>
<td>Adjusted modulus of elasticity Em</td>
<td>1.77 x 10^6 psi</td>
<td></td>
</tr>
<tr>
<td>Shear modulus of elasticity G</td>
<td>81,250 psi</td>
<td></td>
</tr>
<tr>
<td>Punch stress Fp</td>
<td>1,700 psi</td>
<td></td>
</tr>
<tr>
<td>Compression perpendicular to grain Fc</td>
<td>886 psi</td>
<td></td>
</tr>
<tr>
<td>Compression parallel to grain</td>
<td>1,430 psi</td>
<td></td>
</tr>
<tr>
<td>Vertical load capacity</td>
<td>4,250 psi</td>
<td>4,039 psi</td>
</tr>
</tbody>
</table>

Approximate Weights of Rim Board

<table>
<thead>
<tr>
<th>Depth</th>
<th>1&quot; TimberStrand® LSL Rim Board</th>
<th>1/4&quot; TimberStrand® LSL Rim Board</th>
<th>1&quot; TimberStrand® LSL Rim Board</th>
<th>1/4&quot; TimberStrand® LSL Rim Board</th>
</tr>
</thead>
<tbody>
<tr>
<td>9/8&quot;</td>
<td>3.5</td>
<td>2.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11/8&quot;</td>
<td>4.3</td>
<td>3.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13/8&quot;</td>
<td>5.1</td>
<td>4.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15/8&quot;</td>
<td>5.8</td>
<td>4.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17/8&quot;</td>
<td>6.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20&quot;</td>
<td>7.3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TimberStrand® LSL and 1/8" rim board are intended for dry and roof applications.

NAILING RECOMMENDATIONS

- Endless cantilevered 12D nails:
  - Attach to each post with two 12D (0.138" x 3") nails, one each at top and bottom flange.
- Offers high vertical load transfer capacity, replaces 12D rim joists and blocking panels.
  - Vertical load transfer at bearing: 4,250 psi 4,039 psi

Leg Screw Capacities

<table>
<thead>
<tr>
<th>Fastener Size</th>
<th>1&quot; TimberStrand® LSL Rim Board</th>
<th>1/4&quot; TimberStrand® LSL Rim Board</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 1/4&quot; lag bolt</td>
<td>400</td>
<td>N.A.</td>
</tr>
<tr>
<td>1 1/2&quot; lag bolt</td>
<td>375</td>
<td>500</td>
</tr>
</tbody>
</table>

Notes:
(1) Allowable load determined in accordance with ACI 224.
(2) Durability-resistant fasteners required for full service applications.
### Table 2—Allowable Loads for the U Series Joint Hangers

<table>
<thead>
<tr>
<th>MODEL No.</th>
<th>DIMENSIONS (Inches)</th>
<th>FASTENERS* (Quantity-Type)</th>
<th>ALLOWABLE LOADS** (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>W x H x B</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fastener</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U24</td>
<td>1 1/2 x 3 1/2 x 2</td>
<td>4</td>
<td>2,100 x 1 1/2</td>
</tr>
<tr>
<td>U20</td>
<td>1 1/2 x 4 5/8 x 2</td>
<td>6</td>
<td>4,100 x 1 1/2</td>
</tr>
<tr>
<td>U210</td>
<td>1 1/2 x 7 1/2 x 2</td>
<td>10</td>
<td>6,100 x 1 1/2</td>
</tr>
<tr>
<td>U214</td>
<td>1 1/2 x 10 2</td>
<td>12</td>
<td>8,100 x 1 1/2</td>
</tr>
<tr>
<td>U24</td>
<td>2 1/2 x 3 1/2 x 2</td>
<td>4</td>
<td>2,100 x 1 1/2</td>
</tr>
<tr>
<td>U96</td>
<td>2 1/2 x 6 5/8 x 2</td>
<td>6</td>
<td>4,100 x 1 1/2</td>
</tr>
<tr>
<td>U200</td>
<td>2 1/2 x 8 7/8 x 2</td>
<td>10</td>
<td>6,100 x 1 1/2</td>
</tr>
<tr>
<td>U210</td>
<td>2 1/2 x 10 3/4 x 2</td>
<td>12</td>
<td>8,100 x 1 1/2</td>
</tr>
<tr>
<td>G23</td>
<td>3 1/2 x 3 1/2 x 2</td>
<td>4</td>
<td>2,100 x 1 1/2</td>
</tr>
<tr>
<td>U25-2</td>
<td>3 1/2 x 5 3/4 x 2</td>
<td>6</td>
<td>4,100 x 1 1/2</td>
</tr>
<tr>
<td>U210-2</td>
<td>3 1/2 x 7 1/2 x 2</td>
<td>10</td>
<td>6,100 x 1 1/2</td>
</tr>
<tr>
<td>U24</td>
<td>4 1/2 x 3 1/2 x 2</td>
<td>4</td>
<td>2,100 x 1 1/2</td>
</tr>
<tr>
<td>U99</td>
<td>4 1/2 x 6 5/8 x 2</td>
<td>6</td>
<td>4,100 x 1 1/2</td>
</tr>
<tr>
<td>U210</td>
<td>4 1/2 x 8 7/8 x 2</td>
<td>10</td>
<td>6,100 x 1 1/2</td>
</tr>
<tr>
<td>U24</td>
<td>5 1/2 x 10 3/4 x 2</td>
<td>12</td>
<td>8,100 x 1 1/2</td>
</tr>
<tr>
<td>U96</td>
<td>5 1/2 x 12 1/2 x 2</td>
<td>14</td>
<td>10,100 x 1 1/2</td>
</tr>
<tr>
<td>U200</td>
<td>5 1/2 x 14 1/2 x 2</td>
<td>16</td>
<td>12,100 x 1 1/2</td>
</tr>
<tr>
<td>U210</td>
<td>6 1/2 x 10 3/4 x 2</td>
<td>12</td>
<td>8,100 x 1 1/2</td>
</tr>
<tr>
<td>U24</td>
<td>6 1/2 x 12 1/2 x 2</td>
<td>14</td>
<td>10,100 x 1 1/2</td>
</tr>
<tr>
<td>U96</td>
<td>6 1/2 x 14 1/2 x 2</td>
<td>16</td>
<td>12,100 x 1 1/2</td>
</tr>
</tbody>
</table>

**For 1 inch = 25.4 mm, 1 lb = 4.45 kg.**

*Refer to Figure 2 (this page) for definitions of hanger nomenclature (W, H, B).

**Tabled allowable loads must be selected based on duration of load as permitted by the applicable building code.

U Series Hangers provide lateral resistance, which is defined as a moment of not less than 75 pounds (334 N) times the depth of the joint at which the lateral movement of the top or bottom of the joint with respect to the vertical position of the joint is 0.125 inch (3.2 mm). The height, H, of the joint hanger must be at least 93 percent of the height of the joint unless additional lateral resistance is provided, as designed by others.

The quantity of 10d or 16d common nails specified in the “Header” column under “Fasteners” is required to achieve the tabulated allowable loads shown in the “Allowable Load” columns.

*Allowable uplift loads are for hangers installed with either 10d or 16d 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 occur.**

---

For U Series Hanger:

**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
SUSTAINABLE FORESTRY INITIATIVE
Certified Sourcing
www.cfi-program.org
1FL00018

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

<table>
<thead>
<tr>
<th>Nominal Size</th>
<th>Lengths</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>2x4</td>
<td>8’, 9’, 10’, 18’, 20’</td>
<td>M-9</td>
</tr>
<tr>
<td>2x4</td>
<td>12” to 16&quot;, in 2” increments</td>
<td>M-12</td>
</tr>
<tr>
<td>2x6, 2x8, 2x10, 2x12</td>
<td>8” to 20&quot;, in 2” increments</td>
<td>M-12</td>
</tr>
</tbody>
</table>

Allowable Design Stresses (100% Load Duration)

<table>
<thead>
<tr>
<th></th>
<th>M-9 Grade</th>
<th>M-12 Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modulus of elasticity</td>
<td>( E = 1.4 \times 10^6 \text{ psi} )</td>
<td>( 1.6 \times 10^6 \text{ psi} )</td>
</tr>
<tr>
<td>Flexural stress</td>
<td>( f_b = 1,400 \text{ psi} )</td>
<td>( 1,600 \text{ psi} )</td>
</tr>
<tr>
<td>Tension stress</td>
<td>( f_t = 800 \text{ psi} )</td>
<td>( 850 \text{ psi} )</td>
</tr>
<tr>
<td>Compression perpendicular to grain</td>
<td>( f_{c1} = 565 \text{ psi} )</td>
<td>( 565 \text{ psi} )</td>
</tr>
<tr>
<td>Compression parallel to grain</td>
<td>( f_{c12} = 1,600 \text{ psi} )</td>
<td>( 1,675 \text{ psi} )</td>
</tr>
<tr>
<td>Horizontal shear parallel to grain</td>
<td>( f_s = 175 \text{ psi} )</td>
<td>( 175 \text{ psi} )</td>
</tr>
</tbody>
</table>

- 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)

<table>
<thead>
<tr>
<th>Stud Size</th>
<th>Laterally unsupported stud height</th>
<th>Supporting roof and ceiling only</th>
<th>Supporting one floor, root, and ceiling</th>
<th>Supporting two floors, roof, and ceiling</th>
<th>Supporting one floor only</th>
<th>Laterally unsupported stud height</th>
<th>Maximum spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>2x4</td>
<td>10’</td>
<td>24” o.c.</td>
<td>16’ o.c.</td>
<td>–</td>
<td>24” o.c.</td>
<td>14’</td>
<td>24” o.c.</td>
</tr>
<tr>
<td>2x6</td>
<td>10’</td>
<td>24” o.c.</td>
<td>24” o.c.</td>
<td>16’ o.c.</td>
<td>24” o.c.</td>
<td>20’</td>
<td>24” o.c.</td>
</tr>
</tbody>
</table>

- Listed heights are distances between points of lateral support placed perpendicular to the plane of the wall.
### Maximum Floor Spans (1)

<table>
<thead>
<tr>
<th>Nominal Size</th>
<th>Width</th>
<th>Depth</th>
<th>12&quot; o.c.</th>
<th>16&quot; o.c.</th>
<th>19.2&quot; o.c.</th>
<th>24&quot; o.c.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2x8</td>
<td>1½&quot;</td>
<td>7½&quot;</td>
<td>14-2</td>
<td>12-10</td>
<td>12-4</td>
<td>11-3</td>
</tr>
<tr>
<td>2x10</td>
<td>1½&quot;</td>
<td>9½&quot;</td>
<td>18-0</td>
<td>16-5</td>
<td>15-5</td>
<td>14-4</td>
</tr>
<tr>
<td>2x12</td>
<td>1½&quot;</td>
<td>11½&quot;</td>
<td>21-11</td>
<td>19-11</td>
<td>18-5</td>
<td>17-5</td>
</tr>
</tbody>
</table>

(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)

<table>
<thead>
<tr>
<th>Nominal Size</th>
<th>Width</th>
<th>Depth</th>
<th>12&quot; o.c.</th>
<th>16&quot; o.c.</th>
<th>19.2&quot; o.c.</th>
<th>24&quot; o.c.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2x8</td>
<td>1½&quot;</td>
<td>7½&quot;</td>
<td>20-5</td>
<td>18-6</td>
<td>17-5</td>
<td>16-2</td>
</tr>
<tr>
<td>2x10</td>
<td>1½&quot;</td>
<td>9½&quot;</td>
<td>26-0</td>
<td>23-8</td>
<td>22-3</td>
<td>20-8</td>
</tr>
<tr>
<td>2x12</td>
<td>1½&quot;</td>
<td>11½&quot;</td>
<td>31-8</td>
<td>28-9</td>
<td>27-1</td>
<td>25-1</td>
</tr>
</tbody>
</table>

(1) Maximum available length is 20'.
(2) Based on 115% duration of load (snow areas).

### Maximum Ceiling Spans (1)

<table>
<thead>
<tr>
<th>Nominal Size</th>
<th>Width</th>
<th>Depth</th>
<th>12&quot; o.c.</th>
<th>16&quot; o.c.</th>
<th>19.2&quot; o.c.</th>
<th>24&quot; o.c.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2x8</td>
<td>1½&quot;</td>
<td>7½&quot;</td>
<td>20-5</td>
<td>18-6</td>
<td>17-5</td>
<td>16-2</td>
</tr>
<tr>
<td>2x10</td>
<td>1½&quot;</td>
<td>9½&quot;</td>
<td>26-0</td>
<td>23-8</td>
<td>22-3</td>
<td>20-8</td>
</tr>
<tr>
<td>2x12</td>
<td>1½&quot;</td>
<td>11½&quot;</td>
<td>31-8</td>
<td>28-9</td>
<td>27-1</td>
<td>25-1</td>
</tr>
</tbody>
</table>

(1) Maximum available length is 20'.
(2) Based on 100% duration of load.

### Joist, Beam, or Header Allowable Loads (PLF)

<table>
<thead>
<tr>
<th>Clear Span (1)</th>
<th>1½&quot; Width</th>
<th>3&quot; Width (2-ply)</th>
<th>4½&quot; Width (3-ply)</th>
<th>6&quot; Width (4-ply)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4'</td>
<td>799</td>
<td>1,180</td>
<td>1,556</td>
<td>1,933</td>
</tr>
<tr>
<td>Total Load</td>
<td>799</td>
<td>1,180</td>
<td>1,556</td>
<td>1,933</td>
</tr>
<tr>
<td>Live Load</td>
<td>799</td>
<td>1,180</td>
<td>1,556</td>
<td>1,933</td>
</tr>
<tr>
<td>Min. End Bearing (in.)</td>
<td>3.0</td>
<td>3.0</td>
<td>3.0</td>
<td>3.0</td>
</tr>
<tr>
<td>6'</td>
<td>372</td>
<td>591</td>
<td>849</td>
<td>1,183</td>
</tr>
<tr>
<td>Total Load</td>
<td>372</td>
<td>591</td>
<td>849</td>
<td>1,183</td>
</tr>
<tr>
<td>Live Load</td>
<td>372</td>
<td>591</td>
<td>849</td>
<td>1,183</td>
</tr>
<tr>
<td>Min. End Bearing (in.)</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>8'</td>
<td>211</td>
<td>340</td>
<td>496</td>
<td>643</td>
</tr>
<tr>
<td>Total Load</td>
<td>211</td>
<td>340</td>
<td>496</td>
<td>643</td>
</tr>
<tr>
<td>Live Load</td>
<td>211</td>
<td>340</td>
<td>496</td>
<td>643</td>
</tr>
<tr>
<td>Min. End Bearing (in.)</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>10'</td>
<td>135</td>
<td>219</td>
<td>322</td>
<td>423</td>
</tr>
<tr>
<td>Total Load</td>
<td>135</td>
<td>219</td>
<td>322</td>
<td>423</td>
</tr>
<tr>
<td>Live Load</td>
<td>135</td>
<td>219</td>
<td>322</td>
<td>423</td>
</tr>
<tr>
<td>Min. End Bearing (in.)</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>12'</td>
<td>93</td>
<td>152</td>
<td>224</td>
<td>305</td>
</tr>
<tr>
<td>Total Load</td>
<td>93</td>
<td>152</td>
<td>224</td>
<td>305</td>
</tr>
<tr>
<td>Live Load</td>
<td>93</td>
<td>152</td>
<td>224</td>
<td>305</td>
</tr>
<tr>
<td>Min. End Bearing (in.)</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>14'</td>
<td>58</td>
<td>111</td>
<td>165</td>
<td>233</td>
</tr>
<tr>
<td>Total Load</td>
<td>58</td>
<td>111</td>
<td>165</td>
<td>233</td>
</tr>
<tr>
<td>Live Load</td>
<td>58</td>
<td>111</td>
<td>165</td>
<td>233</td>
</tr>
<tr>
<td>Min. End Bearing (in.)</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>16'</td>
<td>38</td>
<td>81</td>
<td>126</td>
<td>172</td>
</tr>
<tr>
<td>Total Load</td>
<td>38</td>
<td>81</td>
<td>126</td>
<td>172</td>
</tr>
<tr>
<td>Live Load</td>
<td>38</td>
<td>81</td>
<td>126</td>
<td>172</td>
</tr>
<tr>
<td>Min. End Bearing (in.)</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>18'</td>
<td>26</td>
<td>56</td>
<td>99</td>
<td>132</td>
</tr>
<tr>
<td>Total Load</td>
<td>26</td>
<td>56</td>
<td>99</td>
<td>132</td>
</tr>
<tr>
<td>Live Load</td>
<td>26</td>
<td>56</td>
<td>99</td>
<td>132</td>
</tr>
<tr>
<td>Min. End Bearing (in.)</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
</tr>
</tbody>
</table>

(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.
**Maximum Notch and Hole Sizes**

<table>
<thead>
<tr>
<th>Joist, Beam, or Header Nominal Size</th>
<th>A: Maximum Notch Length not to exceed d/3</th>
<th>B: Maximum Notch Depth not to exceed d/6</th>
<th>C: Maximum End Notch Depth not to exceed d/4</th>
<th>D: Maximum Hole Diameter not to exceed d/3</th>
<th>E: Minimum Bearing Length</th>
<th>Wood or Steel</th>
<th>Masonry</th>
</tr>
</thead>
<tbody>
<tr>
<td>2x8</td>
<td>23⁄8&quot;</td>
<td>13⁄16&quot;</td>
<td>13⁄16&quot;</td>
<td>13⁄16&quot;</td>
<td>1½&quot;</td>
<td>3&quot;</td>
<td></td>
</tr>
<tr>
<td>2x10</td>
<td>31⁄16&quot;</td>
<td>1½&quot;</td>
<td>23⁄8&quot;</td>
<td>31⁄16&quot;</td>
<td>1½&quot;</td>
<td>3&quot;</td>
<td></td>
</tr>
<tr>
<td>2x12</td>
<td>31⁄4&quot;</td>
<td>1½&quot;</td>
<td>23⁄8&quot;</td>
<td>31⁄4&quot;</td>
<td>1½&quot;</td>
<td>3&quot;</td>
<td></td>
</tr>
</tbody>
</table>

**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:
  - 21⁄4" diameter for 2x4 walls
  - 3¼" diameter for 2x6 or wider walls
- Holes may be drilled anywhere along the length of the stud or column but must be at least ¼" from the edge.
- Notches may be cut anywhere except the middle ⅔ of the length of the stud or column.

**Maximum notch in bearing walls:**
- ¼" in 2x4 studs
- 1½" in 2x6 or wider studs

**For Wall Framing**

**For Joists, Beams, and Headers**

**Safety**
- Use care when handling lumber to prevent injuries. Always wear gloves and eye protection when handling building materials.
- Do not use lumber as ramps, planks, etc. Use only as directed in this guide.
- After sheathing, do not overload joists with construction material in excess of design loads.

**Storage and Handling**

**In Warehouse**
- Store bundles on a hard and level surface in a covered shed and protect from weather. Avoid contact with water or extended exposure to direct sunlight.
- Do not store lumber in direct contact with the ground. All bundles come with corner protection under the strap, and with 2x6 dunnage to keep product off the ground when breaking bundles.
- To avoid physical damage to lumber, use care when handling bundles or individual components, especially when handling with forklifts or cranes.

**At Job Site**
- Keep lumber wrapped and covered during transit from lumberyard to the job site.
- Do not open bundles until ready to install.
- To ensure that materials retain a low moisture content after the bundle is broken, rewrap the unused portion and make sure all four sides and the top are covered.
- Keep lumber off of the ground and covered at the job site.

**Contact Us**

1.888.453.8358 • woodbywy.com/contact
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
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 x 8 in. x 16 ft.
- Best warranty available on treated wood
- Note: Product may vary by store
- MFG Model Name: WeatherShield
- MFG Part #: 255677
- MFG Brand Name: WeatherShield

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual product thickness (in.)</td>
<td>2</td>
</tr>
<tr>
<td>Actual product width (in.)</td>
<td>8.0</td>
</tr>
<tr>
<td>Aluminum compatible</td>
<td>Yes</td>
</tr>
<tr>
<td>Assembled Height (in.)</td>
<td>1.625</td>
</tr>
<tr>
<td>Assembled Depth (in.)</td>
<td>192</td>
</tr>
<tr>
<td>Assembled Width (in.)</td>
<td>7.625</td>
</tr>
<tr>
<td>Contact Type Allowed</td>
<td>Above Ground</td>
</tr>
<tr>
<td>Chemical retention (lb./cu. ft.)</td>
<td>.05</td>
</tr>
<tr>
<td>Fastener recommendation</td>
<td>Nails and other hardware should be hot-dipped zinc-coated or equally well protected material.</td>
</tr>
<tr>
<td>Item Package Type</td>
<td>No Package</td>
</tr>
<tr>
<td>Lumber quality</td>
<td>Premium</td>
</tr>
<tr>
<td>Manufacturer Warranty</td>
<td>Warranty information available at <a href="http://www.wolmanizedwood.com">www.wolmanizedwood.com</a></td>
</tr>
<tr>
<td>Nominal Length (in.)</td>
<td>192</td>
</tr>
<tr>
<td>Nominal Width (in.)</td>
<td>8</td>
</tr>
<tr>
<td>Nominal Product Height (in.)</td>
<td>2</td>
</tr>
<tr>
<td>Nominal Product Length (ft.)</td>
<td>16</td>
</tr>
<tr>
<td>Nominal product width (in.)</td>
<td>8.0</td>
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<tr>
<td>Portion of product made from wood (%)</td>
<td>100.0</td>
</tr>
<tr>
<td>Product Length (ft.)</td>
<td>16.0</td>
</tr>
<tr>
<td>Secondary Specific Wood Species</td>
<td>Southern Yellow Longleaf Pine (US) (Pinus palustris)</td>
</tr>
<tr>
<td>Type of Pressure Treatment</td>
<td>CA - Copper Azole</td>
</tr>
<tr>
<td>Texture</td>
<td>Smooth</td>
</tr>
<tr>
<td>Water Resistant</td>
<td>No</td>
</tr>
</tbody>
</table>

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: Weyerhauser
<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual product thickness (in.)</td>
<td>5.5</td>
</tr>
<tr>
<td>Aluminum compatible</td>
<td>Yes</td>
</tr>
<tr>
<td>Assembled Height (in.)</td>
<td>42 in</td>
</tr>
<tr>
<td>Assembled Width (in.)</td>
<td>96 in</td>
</tr>
<tr>
<td>Chemical retention (lb./cu. ft.)</td>
<td>.16</td>
</tr>
<tr>
<td>Contact Type Allowed</td>
<td>Ground Contact</td>
</tr>
<tr>
<td>Fastener recommendation</td>
<td>Hot Dipped Galvanized or Stainless Steel</td>
</tr>
<tr>
<td>Item Package Type</td>
<td>No Package</td>
</tr>
<tr>
<td>Lumber quality</td>
<td>Premium</td>
</tr>
<tr>
<td>Manufacturer Warranty</td>
<td>Lifetime Limited Warranty Against Rot, Decay, and Termites</td>
</tr>
<tr>
<td>Nominal Length (in.)</td>
<td>96 in</td>
</tr>
<tr>
<td>Nominal Product Height (in.)</td>
<td>6</td>
</tr>
<tr>
<td>Nominal Product Length (ft.)</td>
<td>8</td>
</tr>
<tr>
<td>Nominal Width (in.)</td>
<td>6</td>
</tr>
<tr>
<td>Nominal Product Width (in.)</td>
<td>6</td>
</tr>
<tr>
<td>Portion of product made from wood (%)</td>
<td>100</td>
</tr>
<tr>
<td>Primary Specific Wood Species</td>
<td>Southern Yellow Loblolly Pine (US) (Pinus taeda)</td>
</tr>
<tr>
<td>Secondary Specific Wood Species</td>
<td>Southern Yellow Longleaf Pine (US) (Pinus palustris)</td>
</tr>
<tr>
<td>Texture</td>
<td>Smooth</td>
</tr>
<tr>
<td>Type of Pressure Treatment</td>
<td>MCA - Micronized Copper Azole</td>
</tr>
</tbody>
</table>
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
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

<table>
<thead>
<tr>
<th>Thickness and Width</th>
<th>Nominal (inches)</th>
<th>Nominal (mm)</th>
<th>Rough (inches)</th>
<th>Rough (mm)</th>
<th>Dressed (inches)</th>
<th>Dressed (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5</td>
<td>127</td>
<td>4 3⁄4</td>
<td>121</td>
<td>4 1⁄2</td>
<td>114</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>152</td>
<td>5 3⁄4</td>
<td>146</td>
<td>5 1⁄2</td>
<td>140</td>
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<td></td>
<td>8</td>
<td>203</td>
<td>7 3⁄4</td>
<td>197</td>
<td>7 1⁄2</td>
<td>191</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>254</td>
<td>9 3⁄4</td>
<td>248</td>
<td>9 1⁄2</td>
<td>241</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>305</td>
<td>11 3⁄4</td>
<td>298</td>
<td>11 1⁄2</td>
<td>292</td>
</tr>
<tr>
<td></td>
<td>Over 12</td>
<td>Over 305</td>
<td>¾ off</td>
<td>6mm off</td>
<td>½ off</td>
<td>13mm off</td>
</tr>
</tbody>
</table>

**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, either 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
| SPECs | Slow growth inland Douglas Fir and Larch yield fine-grained, smooth faces  
|       | All Group 1, Struc 1 Species |
| FACES | “A” grade veneer  
|       | Quality wood plugs or putty repairs, minimal use of polyurethane paste  
|       | 15 plug average assures the highest face quality  
|       | Fully sanded face |
| BACKS, CENTERS & CORES | 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 | Thickness Ply count  
3/4” 7 Ply  
5/8” 5 or 7 Ply  
1/2” 5 Ply  
3/8” 4 Ply  
1/4” 3 Ply  
|       | Standard size 4’ x 8’  
|       | Panel thickness to 1 1/2”  
|       | Solid long length to 102”  
|       | Scarfed panels to 18’  
|       | 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

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.

<table>
<thead>
<tr>
<th>Stock Number</th>
<th>Product Type</th>
<th>Item Size &amp; Description (Inches)</th>
<th>Qty</th>
<th>Select / Price</th>
</tr>
</thead>
</table>
12 GAUGE STRAP

Location: Foundation
Dimensions:
  Length: 6”
  Widht: 12”
Connected with 5/8” Lag bolts into 6 x6
Simpson Strong-Tie 27 in. 12-Gauge Strap

Model #MST27  Internet #100374971  Store SKU #462713

Write The First Review  |  Ask a Question

$5.98 /EA-Each

This item cannot be shipped to the following state(s): AK, GU, HI, PR, VI

Ships FREE with $45.00 Order

Buy Online, Pick Up In Store Today
Check Store Inventory +
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.

Load Tables: See code report listings below

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Total L</th>
<th>Tension Tie</th>
<th>Fasteners</th>
<th>Allowable Tension Loads</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSTD4</td>
<td>18</td>
<td>HTT4</td>
<td>16 - 16d Sinker</td>
<td>12 - 16d Sinker</td>
</tr>
<tr>
<td>MSTD5</td>
<td>27</td>
<td>HTT5</td>
<td>24 - 16d Sinker</td>
<td>18 - 16d Sinker</td>
</tr>
</tbody>
</table>

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
The Hillman Group 5 lbs #8 x 2-1/2-in Flat-Head Galvanized Dual Torque-Drive Deck Screws

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$66.67

Specifications

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screw Thickness</td>
<td>#8</td>
</tr>
<tr>
<td>Thread Style</td>
<td>Coarse</td>
</tr>
<tr>
<td>Screw Length (Inches)</td>
<td>2.5</td>
</tr>
<tr>
<td>Head Type</td>
<td>Flat</td>
</tr>
<tr>
<td>Drive</td>
<td>Dual torque</td>
</tr>
<tr>
<td>Point Type</td>
<td>Standard</td>
</tr>
<tr>
<td>Use Location</td>
<td>Exterior</td>
</tr>
<tr>
<td>Materials Fastened</td>
<td>Wood to wood</td>
</tr>
<tr>
<td>Finish</td>
<td>Galvanized/Uncoated</td>
</tr>
<tr>
<td>Color/Finish Family</td>
<td>Gray/Silver</td>
</tr>
<tr>
<td>Material</td>
<td>Steel</td>
</tr>
<tr>
<td>Package Unit of Measurement</td>
<td>Pound(s)</td>
</tr>
<tr>
<td>Package Quantity</td>
<td>50</td>
</tr>
</tbody>
</table>

Add to Cart
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: Weyerhauser
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.
<table>
<thead>
<tr>
<th>Model No.</th>
<th>Fasteners</th>
<th>Allowable Loads</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>DF/SP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Uplift (160)</td>
</tr>
<tr>
<td>LU24</td>
<td>4-SD9112</td>
<td>2-SD9112</td>
</tr>
<tr>
<td>LU26</td>
<td>6-SD9112</td>
<td>4-SD9112</td>
</tr>
<tr>
<td>LUC26Z</td>
<td>6-SD9112</td>
<td>4-SD9112</td>
</tr>
<tr>
<td>LUC26Z</td>
<td>6-SD10112</td>
<td>4-SD10112</td>
</tr>
<tr>
<td>LU28</td>
<td>8-SD9112</td>
<td>6-SD9112</td>
</tr>
<tr>
<td>LU210</td>
<td>10-SD9112</td>
<td>6-SD9112</td>
</tr>
<tr>
<td>LUC210Z</td>
<td>10-SD9112</td>
<td>6-SD9112</td>
</tr>
<tr>
<td>LUC210Z</td>
<td>10-SD10112</td>
<td>6-SD10112</td>
</tr>
</tbody>
</table>

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.
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 holdown 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.

**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 IBC-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 (RC02.2.2.3)

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 DTT2-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 holdown on double studs in a shearwall application. The DTT2Z-SDS2.5 is also suitable in deck applications where double 2x members are used for deck joists or blocking.

**Load Table:**

<table>
<thead>
<tr>
<th>Model No.</th>
<th>G</th>
<th>Anchor Diameter</th>
<th>Fasteners</th>
<th>Minimum Wood Member Thickness</th>
<th>Allowable Tension Load</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>DF/SP</td>
</tr>
<tr>
<td>DTT2Z/DTT2SS</td>
<td>1/4</td>
<td>1/4</td>
<td>8-SDS 1/4 x 1-1/2&quot;</td>
<td>1-1/8</td>
<td>1825</td>
</tr>
<tr>
<td>DTT2Z-SDS2.5</td>
<td>1/4</td>
<td>1/4</td>
<td>8-SDS 1/4 x 2-1/2&quot;</td>
<td>3</td>
<td>2000</td>
</tr>
</tbody>
</table>

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
Project Pak 10-Count 1/2-In-13 x 6-In Zinc-Plated Carriage Bolts

Item #: 85424 | Model #: 492067

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Description | Specifications | Reviews | Community Q&A
--- | --- | --- | ---
Fastener Callout Size | 1/2-13 x 6" | Material | Steel
Bolt Diameter | 1/2" | Fastener Color/Finish | Zinc Plated
Fastener Length (Inches) | 6.0 | Finish | Zinc-plated
Bolt Thread Pitch | 13 | Fastener Head Style | Round
Bolt Shank Size (Inches) | 0.5 | Color/Finish Family | Gray/Silver
Thread Style | Coarse | Fastener Materials | Steel
Bolt Type | Carriage | Package Unit of Measurement | Count
Length (Inches) | 6.0 | Package Quantity | 10.0
Fastener Thread Type | Coarse
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'-11½" (1.216 m) x 7'-11½" (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, −½" (+0, −1.6 mm)
- Straightness Tolerance: ±¼" (±1.6 mm)
- Squareness Tolerance: ±¼" (±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

<table>
<thead>
<tr>
<th>Location</th>
<th>APA Mill Number</th>
<th>Zip Code</th>
<th>Harvest Radius</th>
</tr>
</thead>
<tbody>
<tr>
<td>Camden, TX</td>
<td>515</td>
<td>75934</td>
<td>90 miles</td>
</tr>
<tr>
<td>Corrigan, TX</td>
<td>516</td>
<td>75939</td>
<td>90 miles</td>
</tr>
<tr>
<td>Dudley, NC</td>
<td>348</td>
<td>28333</td>
<td>80 miles</td>
</tr>
<tr>
<td>Emporia, VA</td>
<td>230</td>
<td>23847</td>
<td>40 miles</td>
</tr>
<tr>
<td>Gurdon, AR</td>
<td>517</td>
<td>71743</td>
<td>60 miles</td>
</tr>
<tr>
<td>Madison, GA</td>
<td>404</td>
<td>30660</td>
<td>100 miles</td>
</tr>
<tr>
<td>Prosperity, SC</td>
<td>329</td>
<td>29127</td>
<td>80 miles</td>
</tr>
<tr>
<td>Taylorsville, MS</td>
<td>282</td>
<td>39168</td>
<td>50 miles</td>
</tr>
<tr>
<td>Warm Springs, GA</td>
<td>324</td>
<td>31830</td>
<td>450 miles</td>
</tr>
</tbody>
</table>
1/2” PRESSURE TREATED PLYWOOD

Location: Underfloor of Floor System
Dimensions:
- Thickness: 1/2”
- Width: 8’
- Length: 4’
Material Safety Data Sheet

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

<table>
<thead>
<tr>
<th>Product</th>
<th>Manufacturing Location(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plywood</td>
<td>USA: Zwolle, LA; Emerson, AR.</td>
</tr>
<tr>
<td></td>
<td>Canada: None</td>
</tr>
</tbody>
</table>

2. Hazardous Ingredients/Identity Information

<table>
<thead>
<tr>
<th>Name</th>
<th>CAS#</th>
<th>Percent</th>
<th>Agency</th>
<th>Exposure Limits</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wood (wood dust, softwood or hardwood)</td>
<td>None</td>
<td>84-99</td>
<td>OSHA</td>
<td>PEL-TWA 15 mg/m³ (see footnote A below)</td>
<td>Total dust</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>OSHA</td>
<td>PEL-TWA 5 mg/m³ (see footnote A below)</td>
<td>Respirable dust fraction</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ACGIH</td>
<td>TLV-TWA 1 mg/m³</td>
<td></td>
</tr>
<tr>
<td>Phenol-formaldehyde resin solids</td>
<td>9003-35-4</td>
<td>1-14</td>
<td>OSHA</td>
<td>PEL-TWA 0.75 ppm</td>
<td>Free gaseous formaldehyde</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>OSHA</td>
<td>PEL-STEL 2 ppm</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ACGIH</td>
<td>TLV-Ceiling 0.3 ppm</td>
<td></td>
</tr>
</tbody>
</table>

---

Footnotes:

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: ☑ 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 TCI of 17 mg/m³ for 30 minutes produced eye and pulmonary results; human inhalation TCI 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 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](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:**

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACGIH</td>
<td>American Conference of Governmental Industrial Hygienists</td>
</tr>
<tr>
<td>AICS</td>
<td>Australian Inventory of Chemical Substances</td>
</tr>
<tr>
<td>C</td>
<td>Ceiling Limit</td>
</tr>
<tr>
<td>CAS#</td>
<td>Chemical Abstracts System Number</td>
</tr>
<tr>
<td>DOT</td>
<td>U. S. Department of Transportation</td>
</tr>
<tr>
<td>DSL</td>
<td>Domestic Substance List</td>
</tr>
<tr>
<td>EC50</td>
<td>Effective concentration that inhibits the endpoint to 50% of control population</td>
</tr>
<tr>
<td>EINECS</td>
<td>European Inventory of Existing Commercial Chemical Substances or European List of Notified Chemical Substances</td>
</tr>
<tr>
<td>ENCS</td>
<td>Japanese Existing and New Chemical Substances List</td>
</tr>
<tr>
<td>EPA</td>
<td>U. S. Environmental Protection Agency</td>
</tr>
<tr>
<td>HMIS</td>
<td>Hazardous Materials Identification System</td>
</tr>
<tr>
<td>IARC</td>
<td>International Agency for Research on Cancer</td>
</tr>
<tr>
<td>IATA</td>
<td>International Air Transport Association</td>
</tr>
<tr>
<td>IMDG</td>
<td>International Maritime Dangerous Goods</td>
</tr>
<tr>
<td>KECL</td>
<td>South Korean Existing Chemicals List</td>
</tr>
<tr>
<td>LC50</td>
<td>Concentration in air resulting in death to 50% of experimental animals</td>
</tr>
<tr>
<td>LC50e</td>
<td>Lowest concentration in air resulting in death</td>
</tr>
<tr>
<td>LD50</td>
<td>Administered dose resulting in death to 50% of experimental animals</td>
</tr>
<tr>
<td>LDLo</td>
<td>Lowest dose resulting in death</td>
</tr>
<tr>
<td>LEL</td>
<td>Lower Explosive Limit</td>
</tr>
<tr>
<td>LFL</td>
<td>Lower Flammable Limit</td>
</tr>
<tr>
<td>MSHA</td>
<td>Mine Safety and Health Administration</td>
</tr>
<tr>
<td>NAP</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>NAV</td>
<td>Not Available</td>
</tr>
<tr>
<td>NFPA</td>
<td>National Fire Protection Association</td>
</tr>
<tr>
<td>NIOSH</td>
<td>National Institute for Occupational Safety and Health</td>
</tr>
<tr>
<td>NPRI</td>
<td>Canadian National Pollution Release Inventory</td>
</tr>
<tr>
<td>NTP</td>
<td>National Toxicology Program</td>
</tr>
</tbody>
</table>
16. Additional Information (cont’d.)

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OSHA</td>
<td>Occupational Safety and Health Administration</td>
</tr>
<tr>
<td>PEL</td>
<td>Permissible Exposure Limit</td>
</tr>
<tr>
<td>RCRA</td>
<td>Resource Conservation and Recovery Act</td>
</tr>
<tr>
<td>STEL</td>
<td>Short-Term Exposure Limit (15 minutes)</td>
</tr>
<tr>
<td>STP</td>
<td>Standard Temperature and Pressure</td>
</tr>
<tr>
<td>TCLo</td>
<td>Lowest concentration in air resulting in a toxic effect</td>
</tr>
<tr>
<td>TDG</td>
<td>Canadian Transportation of Dangerous Goods</td>
</tr>
<tr>
<td>TDLo</td>
<td>Lowest dose resulting in a toxic effect</td>
</tr>
<tr>
<td>TLV</td>
<td>Threshold Limit Value</td>
</tr>
<tr>
<td>TSCCA</td>
<td>Toxic Substance Control Act</td>
</tr>
<tr>
<td>TWA</td>
<td>Time-Weighted Average (8 hours)</td>
</tr>
<tr>
<td>UFL</td>
<td>Upper Flammable Limit</td>
</tr>
<tr>
<td>WHMIS</td>
<td>Workplace Hazardous Materials Information System</td>
</tr>
</tbody>
</table>
3/4” MEDIUM DENSITY FIBERBOARD

Location: Skylight Frame Return
Dimensions:
  Length: 96”
  Width: 48”
3/4 x 48 x 96 Premium MDF

Product is sold in individual pieces; please review the product specifications for details.

### Specifications

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Thickness in Inches</td>
<td>3/4</td>
</tr>
<tr>
<td>Nominal Length (Inches)</td>
<td>96.0</td>
</tr>
<tr>
<td>Nominal Width (Inches)</td>
<td>48.0</td>
</tr>
<tr>
<td>Actual Thickness (Inches)</td>
<td>0.75</td>
</tr>
<tr>
<td>Actual Length (Inches)</td>
<td>97.0</td>
</tr>
<tr>
<td>Actual Width (Inches)</td>
<td>49.0</td>
</tr>
<tr>
<td>Grade</td>
<td>Premium</td>
</tr>
<tr>
<td>CARB Compliant</td>
<td>Yes</td>
</tr>
<tr>
<td>No Added Formaldehyde (NAF)</td>
<td>No</td>
</tr>
</tbody>
</table>

Subtotal: $34.12

<table>
<thead>
<tr>
<th>Qty.</th>
<th>1</th>
</tr>
</thead>
</table>

Add to Cart

**Related Items**

- 2 x 4 x 96 Kiln-Dried Whitewood Stud
  - Price: $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
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 (150m²) |

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

<table>
<thead>
<tr>
<th>Layer</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cover fleece</td>
<td>2 layer polypropylene microfibre</td>
</tr>
<tr>
<td>Membrane</td>
<td>monolithic TEE film</td>
</tr>
<tr>
<td>non-woven fabric</td>
<td>polypropylene microfibre</td>
</tr>
</tbody>
</table>
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
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

<table>
<thead>
<tr>
<th>Technical Details</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>vapour diffusion resistance coefficient</td>
<td>37.500</td>
</tr>
<tr>
<td>water vapour transmission resistance: sd</td>
<td>0,25m to &gt;20m</td>
</tr>
<tr>
<td>permeance</td>
<td>13,20 to 0,17 US perms</td>
</tr>
<tr>
<td>mvtr</td>
<td>1,25MN/g to 100MN/g</td>
</tr>
<tr>
<td>thickness</td>
<td>0,2mm</td>
</tr>
<tr>
<td>surface weight</td>
<td>125g/m²</td>
</tr>
<tr>
<td>breaking load: MD</td>
<td>320N/5cm</td>
</tr>
<tr>
<td>breaking load: XD</td>
<td>280N/5cm</td>
</tr>
<tr>
<td>fire rating</td>
<td>B2</td>
</tr>
<tr>
<td>membrane</td>
<td>polyethylene copolymer</td>
</tr>
<tr>
<td>non-woven fabric:</td>
<td>polypropylene</td>
</tr>
<tr>
<td>reinforcement</td>
<td>polypropylene</td>
</tr>
<tr>
<td>temperature resistance:</td>
<td>-40°C to +80°C</td>
</tr>
<tr>
<td>colour</td>
<td>white</td>
</tr>
<tr>
<td>roll width</td>
<td>1,50m</td>
</tr>
<tr>
<td>roll lengt</td>
<td>20m or 50m</td>
</tr>
<tr>
<td>roll area</td>
<td>30m² or 75m²</td>
</tr>
<tr>
<td>roll weight</td>
<td></td>
</tr>
</tbody>
</table>

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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
Directions for Installing Dense Pack Cellulose behind Insulweb Netting

Equipment and Material Requirements

- Hanes Insulweb netting in 8 foot (SB105-8x2375) or 9 foot (SB105-9x275) widths x 375 feet long
- Air compressor with a minimum of two air lines
- Pneumatic staple gun, Spotnails model BS8016AF, (SB8016AF) or equivalent with ½ in. crown by 5/16 in. long staples (S90005)
- 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
- Aluminum insulation roller (Wall Roller)
- 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.
- 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), linob 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, then inset (lip stitch) staple ¾ 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).
7. 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

1. 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.

2. 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.

3. 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.

<table>
<thead>
<tr>
<th>Framing Size</th>
<th>R-Value</th>
<th>Cavity Depth (Inches)</th>
<th>Coverage per Bag (Net SqFt)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 x 4</td>
<td>13</td>
<td>3.5</td>
<td>24.6</td>
</tr>
<tr>
<td>2 x 6</td>
<td>20</td>
<td>5.5</td>
<td>15.2</td>
</tr>
<tr>
<td>2 x 8</td>
<td>27</td>
<td>7.5</td>
<td>10.9</td>
</tr>
<tr>
<td>2 x 10</td>
<td>35</td>
<td>9.5</td>
<td>8.3</td>
</tr>
<tr>
<td>2 x 12</td>
<td>42</td>
<td>11.5</td>
<td>6.7</td>
</tr>
<tr>
<td>2 x 14</td>
<td>49</td>
<td>13.5</td>
<td>5.6</td>
</tr>
<tr>
<td>2 x 16</td>
<td>57</td>
<td>15.5</td>
<td>4.7</td>
</tr>
</tbody>
</table>

4. 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.

5. 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.

6. Cross bracing can create two separate cavities. Blow each cavity with separate entry holes.

7. 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
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
- 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**

<table>
<thead>
<tr>
<th>R-Value @75°F</th>
<th>Initial Installed Thickness (in.)</th>
<th>Minimum Settled Thickness (in.)</th>
<th>Bags Per 1000 sq.ft. No joists</th>
<th>Net Coverage sq.ft./Bag No joists</th>
<th>Minimum Weight lb/sq.ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>4.3</td>
<td>3.8</td>
<td>11.7</td>
<td>85.8</td>
<td>0.29</td>
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<tr>
<td>19</td>
<td>5.9</td>
<td>5.3</td>
<td>19.8</td>
<td>50.5</td>
<td>0.50</td>
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<tr>
<td>22</td>
<td>6.8</td>
<td>6.1</td>
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<td>41.6</td>
<td>0.60</td>
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<td>30</td>
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<td>8.1</td>
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<td>38</td>
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<td>10.2</td>
<td>46.8</td>
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<td>1.17</td>
</tr>
<tr>
<td>49</td>
<td>14.5</td>
<td>13.1</td>
<td>62.6</td>
<td>16.0</td>
<td>1.56</td>
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<tr>
<td>60</td>
<td>17.7</td>
<td>16.0</td>
<td>78.4</td>
<td>12.8</td>
<td>1.96</td>
</tr>
<tr>
<td><strong>Net Coverage - Sidewalls - 25 lbs. - Settled Density 3.1 lbs/cu.ft.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>2 x 4</td>
<td>3.5</td>
<td>38.2</td>
<td>27.8</td>
<td>0.90</td>
</tr>
<tr>
<td>20</td>
<td>2 x 6</td>
<td>5.5</td>
<td>56.9</td>
<td>17.6</td>
<td>1.42</td>
</tr>
</tbody>
</table>

**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-I-515E; 16CFR 1209
Meets ASTM C739 Class 1/A Building Material
Cel-Pak® Cellulose Insulation

CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Cel-Pak®
Chemical Formula: \((C_1\text{H}_1\text{O}_3\cdot\text{H}_3\text{BO}_3)\)
Chemical Name/Synonyms: Cellulose Insulation
Chemical Family: Cellulose Treated With Inorganics Salts
CAS Registry Number: Not Established
TSCA Inventory Number: Not Listed

MANUFACTURER: National Fiber
50 Depot Street
Belchertown, MA 01007
413-283-8747
EMERGENCY PHONE NUMBER: 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 (\(\text{H}_3\text{BO}_3\)), 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: Irrigation 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.
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-E-515F: 16 CFR 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 Temperatures: 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/m³ total dust and 5 mg/m³ respirable dust
- ACGIH: TLV** 2 mg/m³
- Cal OSHA: PEL* 10 mg/m³

*PEL="Permissible Exposure Limit"
**TLV="Threshold Limit Value"

PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Gray, odorless fiber Specific Gravity: 0.7 compressed Vapor Pressure: Negligible @ 20°C Solubility in Water: Fiber is not soluble; Chemical additive is soluble at the rate of 4.7% @ 20°C. Boiling Point: Not Applicable Melting Point: Not Applicable Flash Point: Not Applicable 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
Insulweb 10' x 375'

SKU: NW-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
**Insulweb**

**#90100**

**Typical Physical Properties**

<table>
<thead>
<tr>
<th>Property</th>
<th>Unit of Measure</th>
<th>Typical Value 100% Polypropylene</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color</td>
<td></td>
<td>White</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>osy</td>
<td>1.25</td>
<td>ASTM D5261</td>
</tr>
<tr>
<td>Thickness</td>
<td>mils</td>
<td>12</td>
<td>ASTM D5199</td>
</tr>
<tr>
<td>Elongation</td>
<td>%</td>
<td>30.9</td>
<td>ASTM D5035</td>
</tr>
<tr>
<td></td>
<td></td>
<td>60.5</td>
<td></td>
</tr>
<tr>
<td>Tensile Strength</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strip</td>
<td>lbs</td>
<td>28.1</td>
<td>ASTM D5035</td>
</tr>
<tr>
<td>Wide Width</td>
<td>lbs</td>
<td>115.7</td>
<td>ASTM D4595</td>
</tr>
<tr>
<td>Grab</td>
<td>lbs</td>
<td>52.6</td>
<td>ASTM D4832</td>
</tr>
<tr>
<td>Trap Tear Strength</td>
<td>lbs</td>
<td>23.6</td>
<td>ASTM D4533</td>
</tr>
<tr>
<td>Puncture Strength</td>
<td>lbs</td>
<td>14.75</td>
<td>ASTM D4833</td>
</tr>
<tr>
<td>Apparent Opening Size</td>
<td>mm</td>
<td>.768</td>
<td>ASTM D4751</td>
</tr>
<tr>
<td>Flow Rate @ 2&quot; Head</td>
<td>gals/min/ft^2</td>
<td>319</td>
<td>ASTM D4491</td>
</tr>
<tr>
<td>Air Permeability</td>
<td>cfm</td>
<td>692</td>
<td>ASTM D737-961</td>
</tr>
<tr>
<td>Light Penetration</td>
<td>%</td>
<td>76.8</td>
<td>ASTM D6567</td>
</tr>
<tr>
<td>UV Resistance</td>
<td>%</td>
<td>91</td>
<td>ASTM D4355</td>
</tr>
<tr>
<td>(Strength after 500 hrs)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specific Gravity</td>
<td></td>
<td>.91</td>
<td></td>
</tr>
<tr>
<td>Melting Point</td>
<td>°C</td>
<td>165</td>
<td></td>
</tr>
</tbody>
</table>

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.
Material Safety Data Sheet

Section 1 - Chemical Product and Company Identification

Product: Insulweb
Chemical Family: Thermoplastic Polyolefin

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.

HMIS Ratings*
Health: 0  Fire: 1  Reactivity: 0  Personal Protection: A
*See Section 16

Section 3 - Composition

<table>
<thead>
<tr>
<th>CAS #</th>
<th>Component</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>9003-07-0</td>
<td>Polypropylene</td>
<td>100%</td>
</tr>
</tbody>
</table>

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.
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)
Auto Ignition: >357°C (675°F)
Lower Explosive Limit (%): Not Applicable
Method Used: Not Applicable
Flammability Classification: 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.
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

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS</th>
<th>Exposure Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polypropylene</td>
<td>9003-07-0</td>
<td>ACGIH: None Available</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OSHA: None Available</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Property</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>White Fabric</td>
</tr>
<tr>
<td>Physical State</td>
<td>Solid</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>NIL</td>
</tr>
<tr>
<td>Boiling Point</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Solubility (H₂O)</td>
<td>Negligible</td>
</tr>
<tr>
<td>Vapor Density</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Packing Density</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Odor</td>
<td>Essentially Odorless</td>
</tr>
<tr>
<td>pH</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Melting Point</td>
<td>&gt;140° C</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>0.88-0.99</td>
</tr>
<tr>
<td>Percent Volatiles</td>
<td>NIL</td>
</tr>
</tbody>
</table>

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.
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

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS</th>
<th>LD50/LC50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polypropylene</td>
<td>9003-07-0</td>
<td>Rat:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>LD50: Route: Intraperitoneal; Dose: &gt;110mg/kg;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Toxic Effects: lacrimation; Sense organs and</td>
</tr>
<tr>
<td></td>
<td></td>
<td>special senses-ptosis; Behavioral-convulsions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>or effect on seizure threshold; Reference:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yakuri to Chiryo.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pharmacology and Therapeutics 14:1109, 1986</td>
</tr>
<tr>
<td></td>
<td></td>
<td>LD50; Route: Intravenous; Dose: &gt;99mg/kg;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Toxic Effects: Behavioral-tremor; Lungs,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Thorax, or Respiratory-cyanosis; Nutritional</td>
</tr>
<tr>
<td></td>
<td></td>
<td>and Gross Metabolic-body temperature decrease;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reference: Yakuri to Chiryo.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pharmacology and Therapeutics 14:1109, 1986.</td>
</tr>
</tbody>
</table>

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.
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 21 CFR 177.1520 of the FDA food contact regulations.

Component Analysis-Federal

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS #</th>
<th>SARA 302 (40 CFR 355 App. A)</th>
<th>SARA 313 (40 CFR 372.65)</th>
<th>CERCLA (40 CFR 302.4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polypropylene</td>
<td>9003-07-0</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

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:

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS</th>
<th>CA</th>
<th>FL</th>
<th>MA</th>
<th>MN</th>
<th>NJ</th>
<th>PA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polypropylene</td>
<td>9003-07-0</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

Component Analysis-WHMIS IDL
No components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List.

Additional Regulatory Information
Component Analysis-Inventory

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS</th>
<th>TSCA</th>
<th>DSL</th>
<th>EINECS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polypropylene</td>
<td>9003-07-0</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes (6-402)</td>
</tr>
</tbody>
</table>
Section 16 - Other Information

Other Information
Material for this MSDS was taken from MSDS's for raw materials

PERSONAL PROTECTION EQUIPMENT (PPE)

<table>
<thead>
<tr>
<th>Personal Protection Equipment Code</th>
<th>Personal Protection Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>safety glasses</td>
</tr>
<tr>
<td>B</td>
<td>safety glasses and gloves</td>
</tr>
<tr>
<td>C</td>
<td>safety glasses, gloves and an apron</td>
</tr>
<tr>
<td>D</td>
<td>face shield, gloves and an apron</td>
</tr>
</tbody>
</table>

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM (HMIS) / NATIONAL FIRE PROTECTION AGENCY (NFPA)

<table>
<thead>
<tr>
<th>Hazard Scale for HMIS / NFPA</th>
<th>HMIS / NFPA Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Minimal</td>
</tr>
<tr>
<td>1</td>
<td>Slight</td>
</tr>
<tr>
<td>2</td>
<td>Moderate</td>
</tr>
<tr>
<td>3</td>
<td>Serious</td>
</tr>
<tr>
<td>4</td>
<td>Severe</td>
</tr>
<tr>
<td>*</td>
<td>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)</td>
</tr>
</tbody>
</table>

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

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES
The information in this document is believed to be correct as of the date issued.
HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY USE, OR ANY OTHER WARRANTY IS EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THIS INFORMATION, THE RESULTS TO BE OBTAINED FROM USE OF THIS INFORMATION OR THE PRODUCT, THE SAFETY OF THIS PRODUCT, OR THE HAZARDS RELATED TO ITS USE.
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:**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Specification/Approval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Specification for Mineral Fiber Roof Insulation Boards</td>
<td>Complies</td>
</tr>
<tr>
<td>Approval Standard for Single-Ply, Polymer-Modified Bitumen</td>
<td>Complies</td>
</tr>
<tr>
<td>Sheet, Built-Up Roof (BUR) and Liquid Applied Roof Assemblies</td>
<td></td>
</tr>
<tr>
<td>for use in Class 1 and Noncombustible Roof Deck Construction</td>
<td></td>
</tr>
<tr>
<td>NCC – (Noncombustible Core) Rated Roof Insulation</td>
<td>Complies</td>
</tr>
</tbody>
</table>

**Fire Performance:**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Method of Fire Test for Determining the Heat Release</td>
<td>1</td>
</tr>
<tr>
<td>Rate of Roofing Assemblies with Combustible Above-Deck</td>
<td></td>
</tr>
<tr>
<td>Roofing Components</td>
<td>Non-Combustible</td>
</tr>
<tr>
<td>Non-Combustibility in Building Materials</td>
<td>Class A</td>
</tr>
<tr>
<td>Fire Tests of Roof Coverings</td>
<td>Construction C7, C18, C28, C38</td>
</tr>
<tr>
<td>Fire Spread Under Roof Deck Assemblies</td>
<td>Flame Spread = 0</td>
</tr>
<tr>
<td>Surface Burning Characteristics</td>
<td>Smoke Developed = 0</td>
</tr>
<tr>
<td>Standard Test Methods for Fire Tests of Roof Coverings</td>
<td>Flame Spread = 0</td>
</tr>
<tr>
<td>See UL Roofing and Materials Directory for Assembly Details</td>
<td>Smoke Developed = 5</td>
</tr>
</tbody>
</table>
| Fire Tests of Building Construction and Materials                           | See UL Fire Resistance Directory at the following link for assembly details: [

**Dimensional Stability:**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear Shrinkage 24 Hrs. @ 1200°F (650°C)</td>
<td>0.71 %</td>
</tr>
<tr>
<td>Linear change 7 days @ 40°F (~40°C) ambient RH</td>
<td>0.1 %</td>
</tr>
<tr>
<td>Linear change 7 days @ 200°F (93°C) ambient RH</td>
<td>0.1 %</td>
</tr>
<tr>
<td>Linear change 7 days @ 158°F (70°C) 97% RH</td>
<td>0.0 %</td>
</tr>
</tbody>
</table>

**Hail Performance:**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Standard for Susceptibility to Hail Damage</td>
<td>1 = SH (Severe Hail)</td>
</tr>
<tr>
<td>Impact Resistance by Impacting with Freezer Ice Balls</td>
<td>4</td>
</tr>
<tr>
<td>Impact Resistance of Prepared Roof Covering Materials</td>
<td>4</td>
</tr>
</tbody>
</table>

**Moisture Resistance:**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Vapor Sorption</td>
<td>0.15%</td>
</tr>
<tr>
<td>Water Vapor Transmission, Desiccant Method</td>
<td>2330 ng/Pa.s.m² (41 Perm)</td>
</tr>
<tr>
<td>Water Absorption</td>
<td>&lt;1.0%</td>
</tr>
</tbody>
</table>

**Thermal Resistance:**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Temperature</td>
<td>R-value/inch</td>
</tr>
<tr>
<td>25°F (~4°C)</td>
<td>4.3 hr.ft².F/Btu</td>
</tr>
<tr>
<td>40°F (4°C)</td>
<td>4.2 hr.ft².F/Btu</td>
</tr>
<tr>
<td>75°F (24°C)</td>
<td>3.8 hr.ft².F/Btu</td>
</tr>
<tr>
<td>110°F (43°C)</td>
<td>3.6 hr.ft².F/Btu</td>
</tr>
<tr>
<td>RSI value/25.4 mm</td>
<td>0.74 m²K/W</td>
</tr>
<tr>
<td>0.72 m²K/W</td>
<td></td>
</tr>
<tr>
<td>0.68 m²K/W</td>
<td></td>
</tr>
<tr>
<td>0.64 m²K/W</td>
<td></td>
</tr>
</tbody>
</table>

*MASTER FORMAT 1995 EDITION **MASTER FORMAT 2004 EDITION*
Corrosive Resistance:
ASTM C 665  Corrosiveness to Steel  Non-corrosive

Acoustical Performance:

<table>
<thead>
<tr>
<th>Thickness</th>
<th>125 Hz</th>
<th>250 Hz</th>
<th>500 Hz</th>
<th>1000 Hz</th>
<th>2000 Hz</th>
<th>4000 Hz</th>
<th>NRC</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0&quot;</td>
<td>0.50</td>
<td>0.71</td>
<td>0.85</td>
<td>0.90</td>
<td>0.96</td>
<td>1.01</td>
<td>0.85</td>
</tr>
</tbody>
</table>

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/ft³ 220 kg/m³
Bottom Layer 10.0 lbs/ft³ 160 kg/m³

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

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 your requirements.

***Provisions for lot testing may be required, consult manufacturer.

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.

ROXUL INC. Milton, Ontario Tel: 905-878-8474
www.roxul.com Tel: 1-800-265-6878
Fax: 905-878-8077 Fax: 1-800-991-0110
Revised: May 25, 2012
Supersedes: March 13, 2012
1. Identification:

1.1 Product Generic Name: Mineral Wool Insulation

1.2 Product Use: Commercial, Industrial and Residential Insulation

1.3 Products:

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:

| Ingredient Name | CAS Number       | %
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mineral Fiber</td>
<td>RN 65997-17-3</td>
</tr>
<tr>
<td>Cured Urea Extended Phenolic Formaldehyde Binder</td>
<td>25104+55+6</td>
</tr>
</tbody>
</table>

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:

<table>
<thead>
<tr>
<th>Source</th>
<th>Legal or Recommended Exposure Limit</th>
<th>Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>OSHA</td>
<td>1 f/cc TWA (recommended)</td>
<td>Synthetic Vitreous Fibers, &gt; 5 µm length, &lt; 3 µm diameter</td>
</tr>
<tr>
<td>ACGIH</td>
<td>1 f/cc TWA (threshold limit value = TLV)</td>
<td>Synthetic Vitreous Fibers, &gt; 5 µm length, &lt; 3 µm diameter</td>
</tr>
<tr>
<td>OSHA</td>
<td>15 mg/m³ TWA-PEL (total particulate) 5 mg/m³ TWA-PEL (respirable particulate)</td>
<td>Inert dust and particulates not otherwise regulated</td>
</tr>
<tr>
<td>ACGIH</td>
<td>10 mg/m³ TWA-TLV (inhalable particulate) 3 mg/m³ TWA-TLV (respirable particulate)</td>
<td>Particulates not otherwise classified, containing no asbestos and ≤1% crystalline silica</td>
</tr>
</tbody>
</table>
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 **Appearance:**
Grey, green fibrous batt or board

9.2 **State:**
Solid

9.3 **Odor:**
May have slight resin odour

9.4 **Boiling point:**
n.a.

9.5 **Melting point:**
Approximately 2150 °F (1177 °C)

9.6 **Vapour pressure:**
n.a.

9.7 **Vapour Density:**
n.a.

9.8 **Specific Gravity:**
n.a.

9.9 **Evaporation Rate:**
n.a.

9.10 **Freezing Point:**
n.a.

9.11 **Viscosity:**
n.a.

9.12 **Solubility:**
Insoluble (H₂O)

9.13 **Partition coefficient:**
n.a.

n.a. = not applicable
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; Kjærheim 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
Material Name: Mineral Wool Insulation

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:

<table>
<thead>
<tr>
<th>Source</th>
<th>Classification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IARC</td>
<td>Group 3</td>
<td>Not Classifiable as a Human Carcinogen</td>
</tr>
<tr>
<td>ACGIH</td>
<td>Group A3</td>
<td>Confirmed Animal Carcinogen with Unknown Relevance to Humans</td>
</tr>
</tbody>
</table>

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


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; NFPA = National Fire Protection Association; NIOSH = National Institute for Occupational Safety and Health; OSHA = Occupational Safety and Health Administration; PEL = Permissible Exposure Limit; PCRA = Resource Conservation and Recovery Act; RQ = Reportable Quantity; SVP = synthetic vitreous fibers; TSCA = Toxic Substances 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 2190°F (1200°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:

<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
<th>Type MB</th>
<th>Type 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTM C 812</td>
<td>Mineral Fiber Block and Board Thermal Insulation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAN/ULC-S702</td>
<td>Mineral Fibre Thermal Insulation for Buildings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASTM E 119</td>
<td>Behaviour of Materials at 750°C (1382°F)</td>
<td></td>
<td>Non-Combustible</td>
</tr>
<tr>
<td>CAN/ULC S114</td>
<td>Test for Non-Combustibility</td>
<td></td>
<td>Non-Combustible</td>
</tr>
<tr>
<td>ASTM E 84(UL 723)</td>
<td>Surface Burning Characteristics</td>
<td></td>
<td>Flame Spread = 5</td>
</tr>
<tr>
<td>CAN/ULC S102</td>
<td>Surface Burning Characteristics</td>
<td></td>
<td>Smoke Developed = 10</td>
</tr>
</tbody>
</table>

Moisture Resistance:

<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTM C 1104</td>
<td>Moisture Sorption</td>
<td>0.05%</td>
</tr>
</tbody>
</table>

Water Vapour Permeance:

<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTM E 99</td>
<td>Water Vapour Transmission, Desiccant Method</td>
<td>1708 ng/Pa.s.m² (30.9 perm)</td>
</tr>
</tbody>
</table>

Fungi Resistance

<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTM C1338</td>
<td>Determination of Fungi Resistance</td>
<td>Passed</td>
</tr>
</tbody>
</table>

Thermal Resistance:

<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTM C 518 (C 177)</td>
<td>R-value/inch @ 75°F</td>
<td>4.0 hr°F·ft²/ft²</td>
</tr>
<tr>
<td></td>
<td>RSI value/25.4 mm @ 24°C</td>
<td>0.72 m²·K/W</td>
</tr>
</tbody>
</table>

Corrosive Resistance:

<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
<th>Pass/Conforms</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTM C 683</td>
<td>Corrosiveness to Steel</td>
<td>Pass</td>
</tr>
<tr>
<td>ASTM C 795</td>
<td>Stainless Steel Stress Corrosion Specification as per Test</td>
<td>Conforms</td>
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</table>


Acoustical Performance

<table>
<thead>
<tr>
<th>Thickness</th>
<th>125 Hz</th>
<th>250 Hz</th>
<th>500 Hz</th>
<th>1000 Hz</th>
<th>2000 Hz</th>
<th>4000 Hz</th>
<th>NRC</th>
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</thead>
<tbody>
<tr>
<td>1.5&quot;</td>
<td>0.21</td>
<td>0.64</td>
<td>0.92</td>
<td>1.10</td>
<td>0.85</td>
<td>1.01</td>
<td>0.80</td>
</tr>
<tr>
<td>2.0&quot;</td>
<td>0.43</td>
<td>0.78</td>
<td>0.90</td>
<td>0.97</td>
<td>0.97</td>
<td>1.00</td>
<td>0.80</td>
</tr>
<tr>
<td>3.0&quot;</td>
<td>0.75</td>
<td>0.82</td>
<td>0.88</td>
<td>0.94</td>
<td>1.00</td>
<td>1.00</td>
<td>0.80</td>
</tr>
</tbody>
</table>

*MASTER FORMAT 1995 EDITION  **MASTER FORMAT 2001 EDITION  ___ at the time of manufacturing
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/ft³, 128 kg/m³

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

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.

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.

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.

ROXUL INC.
www.roxul.com

Milton, Ontario Tel: 905-878-8474 Fax: 905-878-8077
Tel: 1-800-265-6878 Fax: 1-800-991-0110
Revised: Nov 1, 2011
HORIZONTAL ROUGH SAWN CEDAR

Location: Exterior of Wall
Dimensions:
  Depth: 1”
  Width: 6” / 8”
Finish: Benjamin Moore Exterior Finish Alkyd Transluscent
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

<table>
<thead>
<tr>
<th>Thickness and Width</th>
<th>Nominal (inches)</th>
<th>Nominal (mm)</th>
<th>Rough (inches)</th>
<th>Rough (mm)</th>
<th>Dressed (inches)</th>
<th>Dressed (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>127</td>
<td>4¾</td>
<td>121</td>
<td>4½</td>
<td>114</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>152</td>
<td>5¼</td>
<td>146</td>
<td>5½</td>
<td>140</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>203</td>
<td>7¾</td>
<td>197</td>
<td>7½</td>
<td>191</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>254</td>
<td>9¼</td>
<td>248</td>
<td>9½</td>
<td>241</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>305</td>
<td>11¾</td>
<td>298</td>
<td>11½</td>
<td>292</td>
<td></td>
</tr>
<tr>
<td>Over 12</td>
<td>Over 305</td>
<td>¼ off</td>
<td>6mm off</td>
<td>½ off</td>
<td>13mm off</td>
<td></td>
</tr>
</tbody>
</table>

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
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

To order, call (207) 989 4335 or toll free: (800) 777 6953; email us at info@northrtd.com; or look us up at www.northrtd.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 hardwoods
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

© 2009 North Road Technologies LLC
Made in the USA
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

Available for In-Store Pick Up

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

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Assembled Depth (in.)</th>
<th>4.5 in</th>
<th>Assembled Height (in.)</th>
<th>4.5 in</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assembled Width (in.)</td>
<td>5.75 in</td>
<td>Color Family</td>
<td>Metallics</td>
</tr>
<tr>
<td>Manufacturer Warranty</td>
<td>No</td>
<td>Package Quantity</td>
<td>530</td>
</tr>
<tr>
<td>Product Depth (in.)</td>
<td>4.5</td>
<td>Product Height (in.)</td>
<td>4.5</td>
</tr>
<tr>
<td>Product Weight (lb.)</td>
<td>5</td>
<td>Product Width (in.)</td>
<td>5.75</td>
</tr>
</tbody>
</table>
FIRESTONE THERMOPLASTIC POLYOLEFIN [TPO] MEMBRANE

Model: UltraPly TPO
Location: Roof
Dimensions:
  Length: 12’4”
Thickness: 0.060”
Color: White
Available: Firestone
Description:
Firestone UltraPly™ TPO is a flexible Thermoplastic Polyolefin roofing membrane that is produced with polyester wet-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

<table>
<thead>
<tr>
<th>Packaging:</th>
<th>Widths</th>
<th>Lengths</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>.045&quot; UltraPly TPO and .060&quot; UltraPly TPO</td>
<td>5' (1.5 m)</td>
<td>100' (30.5 m)/200' (61 m)</td>
<td>0.23 lb/ft² (2.1 kg/m²)</td>
</tr>
<tr>
<td></td>
<td>8' (2.4 m)</td>
<td>100' (30.5 m)/200' (61 m)</td>
<td>0.31 lb/ft² (2.9 kg/m²)</td>
</tr>
<tr>
<td></td>
<td>10' (3.05 m)</td>
<td>100' (30.5 m)/200' (61 m)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12'4&quot; (3.76 m)</td>
<td>100' (30.5 m)/200' (61 m)</td>
<td></td>
</tr>
</tbody>
</table>

Compliance:
- Post Consumer Recycled Content: 0%
- Pre Consumer Recycled Content: 15%
- Manufacturing Location: Wellford, SC, Tuscumbia, AL
# TECHNICAL INFORMATION SHEET

## Physical Properties:

<table>
<thead>
<tr>
<th>Property</th>
<th>ASTM D Specification</th>
<th>Units</th>
<th>Performance Minimum</th>
<th>Typical Values 45 mil</th>
<th>Typical Values 60 mil</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Thickness</td>
<td>D 751</td>
<td>In(mm)</td>
<td>0.039(1)</td>
<td>0.045 (1.14)±10%</td>
<td>0.060(1.15)±10%</td>
</tr>
<tr>
<td>Coating over Scrim</td>
<td>D 7635</td>
<td>In(mm)</td>
<td>0.015(1)</td>
<td>0.017(0.44)</td>
<td>0.021(0.54)</td>
</tr>
<tr>
<td>Breaking Strength</td>
<td>D 751 Grab</td>
<td>Lb(N)</td>
<td>220(975)</td>
<td>340(1,510)</td>
<td>390(1,730)</td>
</tr>
<tr>
<td>Elongation at Reinforcement Break</td>
<td>D 751 Grab</td>
<td>%</td>
<td>15</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Tearing Strength</td>
<td>D 751</td>
<td>Lb(N)</td>
<td>55(245)</td>
<td>120(530)</td>
<td>120(530)</td>
</tr>
<tr>
<td>Brittleness Point</td>
<td>D 2137</td>
<td>°F(°C)</td>
<td>-40(40)</td>
<td>Pass</td>
<td>Pass</td>
</tr>
<tr>
<td>Britteness Point</td>
<td>D 1149</td>
<td>Pass</td>
<td>Pass</td>
<td>Pass</td>
<td>Pass</td>
</tr>
<tr>
<td>Properties after Heat Aging</td>
<td>D 573</td>
<td>°F(°C)</td>
<td>670 h @ 240°F(116°C)</td>
<td>&gt;90</td>
<td>&gt;90</td>
</tr>
<tr>
<td>Retention of Breaking Strength</td>
<td>D 751 Grab</td>
<td>%</td>
<td>90, minimum</td>
<td>&gt;90</td>
<td>&gt;90</td>
</tr>
<tr>
<td>Retention of Elongation at Break</td>
<td>D 751 Grab</td>
<td>%</td>
<td>90, minimum</td>
<td>&gt;90</td>
<td>&gt;90</td>
</tr>
<tr>
<td>Retention of Tearing Strength</td>
<td>D 751</td>
<td>%</td>
<td>60, minimum</td>
<td>&gt;60</td>
<td>&gt;60</td>
</tr>
<tr>
<td>Weight of Change</td>
<td>D 1204, 6h at 158°F(70°C)</td>
<td>%</td>
<td>±1, maximum</td>
<td>&lt;1</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Linear Dimension Change</td>
<td>D 471</td>
<td>%</td>
<td>±1, maximum</td>
<td>&lt;1</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Water Absorption</td>
<td>G 155,</td>
<td>kj/m²</td>
<td>10,080, minimum</td>
<td>&gt;20,160</td>
<td>&gt;20,160</td>
</tr>
<tr>
<td>Dynamic Puncture Resistance MD</td>
<td>D 5635</td>
<td>---</td>
<td>265(1,180)</td>
<td>300(1,300)</td>
<td></td>
</tr>
<tr>
<td>Dynamic Puncture Resistance CD</td>
<td>D 5635</td>
<td>---</td>
<td>Pass (20 J)</td>
<td>Pass (40 J)</td>
<td></td>
</tr>
<tr>
<td>Static Puncture Resistance</td>
<td>D 5602</td>
<td>---</td>
<td>Pass (25 J)</td>
<td>Pass (50 J)</td>
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</tr>
</tbody>
</table>

## Reflectivity:

<table>
<thead>
<tr>
<th>Property</th>
<th>Initial</th>
<th>Weathered</th>
<th>#</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar Reflectance</td>
<td>0.79</td>
<td>0.68</td>
<td></td>
</tr>
<tr>
<td>Thermal Emittance</td>
<td>0.85</td>
<td>0.83</td>
<td></td>
</tr>
<tr>
<td>SRI</td>
<td>98</td>
<td>81</td>
<td></td>
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</tbody>
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## Compliance:

<table>
<thead>
<tr>
<th>Property</th>
<th>Test Method</th>
<th>White</th>
<th>Tan</th>
<th>Gray</th>
<th>Energy Star®</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar Reflectance</td>
<td>ASTM E903</td>
<td>0.81</td>
<td>0.63</td>
<td>0.37</td>
<td></td>
</tr>
<tr>
<td>Thermal Emittance</td>
<td>ASTM E408</td>
<td>0.95</td>
<td>0.95</td>
<td>0.95</td>
<td></td>
</tr>
<tr>
<td>Solar Reflectance Index (SRI)</td>
<td>ASTM E1980</td>
<td>102</td>
<td>77</td>
<td>43</td>
<td></td>
</tr>
</tbody>
</table>

**Energy Star®**

- Initial Solar Reflectance
- Aged Solar Reflectance (3 years)
- Cleared prior to aged test?
- Initial Emittance

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.

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Firestone Building Products • 250 W. 96th Street, Indianapolis, IN 46260 • Sales: (800) 428-4442 • Technical (800) 428-4511 • www.firestonebpc.com

S723-RFS-112

12.8.2011
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

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Common Name</th>
<th>CAS #:</th>
<th>% (by wt)</th>
<th>Exposure Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonhazardous as per 29 CFR 1910.1200.</td>
<td>None</td>
<td>None</td>
<td>100</td>
<td>None Established</td>
</tr>
</tbody>
</table>

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

August 15, 2011

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 grey sheet, white sheet with fleece back membrane, white sheet, grey sheet, or tan sheet. Essentially no odor.
Flash Point: Not Applicable
Method Used: Not Applicable
Evaporation Rate: Not Applicable
pH (undiluted product): Not Applicable
Solubility in Water: Insoluble
Vapor Density: Not Applicable
Vapor Pressure: Not Applicable
Lower Explosive Limit: None
Upper Explosive Limit: None
Boiling Point: None
Melting Point: Unknown
Specific Gravity: 0.94
Percent Volatile: Unknown

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

August 15, 2011

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.
DENSDEEK ROOF BOARD

Location: Roof
Nominal Thickness: 1/2”
Dimensions:
  Width: 4’ ± 1/8”
  Length: 8’ ± 1/4”
Weight: 1.2 lbs./sq. ft.
Surfacing: Fiberglass mat
Available: Georgia-Pacific Canada
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.
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, fiberglass and perforate insulation. DensDeck Prime Roof Board is resistant to the growth of mold when tested as manufactured, per ASTM D 3273.

Primary Uses
Rooftop 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, recovery board, as well as an overlay for polysulfuronate and polyester 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 06-0908.10

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 as 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 roof 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 (224°C) and 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 presence 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 core, 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.

continued→

Submittal Approvals
| Job Name |
| Contractor |
| Date |

Stamps / Signatures
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 interior (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 Approval: 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 4492 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®.

Physical Properties

<table>
<thead>
<tr>
<th>Properties</th>
<th>1/4&quot; (6.4 mm)</th>
<th>1/2&quot; (12.7 mm)</th>
<th>5/8&quot; (15.9 mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickness, nominal</td>
<td>1/4&quot; (6.4 mm)</td>
<td>1/2&quot; (12.7 mm)</td>
<td>5/8&quot; (15.9 mm)</td>
</tr>
<tr>
<td>Width, standard</td>
<td>4 (1219 mm)</td>
<td>4 (1219 mm)</td>
<td>4 (1219 mm)</td>
</tr>
<tr>
<td>Length, standard</td>
<td>4 (1219 mm)</td>
<td>4 (1219 mm)</td>
<td>4 (1219 mm)</td>
</tr>
<tr>
<td>Weight, nominal, lbs./sq. ft. (Kg/m²)</td>
<td>1.2 (5.8)</td>
<td>2.0 (8.8)</td>
<td>2.6 (12.7)</td>
</tr>
<tr>
<td>Surfacing</td>
<td>Fiberglass mat with non-drip coating</td>
<td>Fiberglass mat with non-drip coating</td>
<td>Fiberglass mat with non-drip coating</td>
</tr>
<tr>
<td>Flexural Strength, parallel, lbf. / min. (N)</td>
<td>40 (176)</td>
<td>80 (366)</td>
<td>100 (444)</td>
</tr>
<tr>
<td>R-value, ft²·°F·hr/ft²·BTU (m²·K/W)</td>
<td>&gt;25 (4950)</td>
<td>&gt;35 (1995)</td>
<td>42 (1924)</td>
</tr>
<tr>
<td>Linear Variation with Change in Temp., in/in °F (mm/mm/°C)</td>
<td>6.5 x 10⁻⁴ (15.3 x 10⁻⁴)</td>
<td>6.25 x 10⁻⁴ (15.3 x 10⁻⁴)</td>
<td>6.25 x 10⁻⁴ (15.3 x 10⁻⁴)</td>
</tr>
<tr>
<td>Linear Variation with Change in Moisture</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Water Absorption, % max</td>
<td>10.0</td>
<td>10.0</td>
<td>10.0</td>
</tr>
<tr>
<td>Compressive Strength, psi nominal</td>
<td>900</td>
<td>900</td>
<td>900</td>
</tr>
<tr>
<td>Surface Water Absorption, grams, nominal</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Frame Spread, Smoke Developed (ASTM E 84)</td>
<td>0/0</td>
<td>0/0</td>
<td>0/0</td>
</tr>
<tr>
<td>Bending Radius, in (152.4 mm)</td>
<td>5 (125.4 mm)</td>
<td>6 (152.8 mm)</td>
<td>8 (203 mm)</td>
</tr>
</tbody>
</table>

1. Tested in accordance with ASTM C 472 method B.
2. Tested in accordance with ASTM C 661.
3. Tested in accordance with ASTM C 96 by flow 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.

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WARRANTIES, REMEDIES AND TERMS OF SALE For current warranty information for this product, please go to www.gyp.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.gyp.com.

UPDATES AND CURRENT INFORMATION The information in this document may change without notice. Visit our website at www.gyp.com for updates and current information.

CAUTION For product fire, safety and use information, go to www.gyp.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 irritation, 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 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
UltraPly™ Bonding Adhesive

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.
Recommended cleaner is Toluene (while fluid).

Compliance:
Post Consumer Recycled Content: 0%
Pre Consumer Recycled Content: 0%
Manufacturing Location: South Bend, IN

Packaging:
- Size: 5 Gallon (18.9 L)
- Weight: 41 lbs (18.6 kg)
- Coverage:
  A coverage rate of 45 - 60 ft² per gallon (1.10 – 1.47 m² 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 two 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:
- 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 255T 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 – ¾” 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, ¾” 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 ¾” diameter hose, Up to 200’ of dual ½” diameter hose, ¾” 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 ¾” 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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S723-RFS-059 1.10.2012
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

Method Used: Tagliabue closed tester

Evaporation Rate: 1.9-9.5 (Ether=1)

pH (undiluted product): Unknown

Solubility in Water: Insoluble

Vapor Density: 2-4 (Air=1)

Vapor Pressure: 9.5-185 mm Hg @ 68°F

Lower Explosive Limit: 1%

Upper Explosive Limit: 12.8%

Boiling Point: 131-288°F

Melting Point: Not Applicable

Specific Gravity: 0.844

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, alkalis 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 172.101 Adhesives, UN1133, IMDG Class 3.2, Pg. 3174, Flash Point -18°C
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.
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
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, alkali's 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 172.101 Adhesives, UN1133, IMDG Class 3.2, Pg.3174, Flash Point -18° C
Firestone Building Products Company
Material Safety Data Sheet

June 10, 2010

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

<table>
<thead>
<tr>
<th>Physical</th>
<th>Material</th>
<th>Thermoplastic Polyolefin (TPO)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colour</td>
<td>White or gray</td>
<td></td>
</tr>
</tbody>
</table>
| Sizes    | Universal (25.4 mm to 152.4 mm)
|          | Large (152.4 mm to 203.2 mm) |

6. Packaging / Storage / Shelf Life

<table>
<thead>
<tr>
<th>Pipe Boot Size</th>
<th>O/D of Penetration</th>
<th>Pieces per Carton</th>
</tr>
</thead>
<tbody>
<tr>
<td>Universal</td>
<td>25.4 mm to 152.4 mm</td>
<td>10</td>
</tr>
<tr>
<td>Large</td>
<td>152.4 mm to 203.2 mm</td>
<td>10</td>
</tr>
</tbody>
</table>

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.
ReflexEON™ Universal Pipe Boot

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: Benesville, IL; Wellford, SC

Product Data:
- Material: Thermoplastic Polyolefin (TPO)
- Colors: ReflexEON White
- Size: Universal – Fits 1” to 6 ¼” (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

January 11, 2012

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
HMIS Hazard Rating: Health 0, Flammability 1, Reactivity 0

SECTION 2: CHEMICAL COMPOSITION

<table>
<thead>
<tr>
<th>Chemical Name:</th>
<th>Common Name:</th>
<th>CAS #:</th>
<th>% (by wt):</th>
<th>Exposure Limits:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonhazardous as per 29 CFR 1910.1200.</td>
<td>None</td>
<td>None</td>
<td>100</td>
<td>None Established</td>
</tr>
</tbody>
</table>

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
### SECTION 6: PRECAUTIONS FOR SAFE HANDLING AND USE

<table>
<thead>
<tr>
<th>Steps to Be Taken in Case Material is Released or Spilled:</th>
<th>Not Applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precautions to Be Taken in Handling and Storing:</td>
<td>No special handling precautions. Store where materials are not exposed to excessive heat, cold or moisture.</td>
</tr>
</tbody>
</table>

### SECTION 7: EXPOSURE CONTROLS / PERSONAL PROTECTION

<table>
<thead>
<tr>
<th>Ventilation:</th>
<th>Store and use in well ventilated areas.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory Protection:</td>
<td>None required</td>
</tr>
<tr>
<td>Eye Protection:</td>
<td>None required</td>
</tr>
<tr>
<td>Skin Protection:</td>
<td>None required</td>
</tr>
<tr>
<td>Other:</td>
<td>None</td>
</tr>
<tr>
<td>Work / Hygienic Practices:</td>
<td>Wash exposed skin prior to eating, drinking or smoking and at the end of each shift. Wash contaminated clothing prior to reuse.</td>
</tr>
</tbody>
</table>

### SECTION 8: PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Appearance and Odor:</th>
<th>White, tan or gray in color. Essentially no odor.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flash Point:</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Method Used:</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Evaporation Rate:</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>pH (undiluted product):</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Solubility in Water:</td>
<td>Insoluble</td>
</tr>
<tr>
<td>Vapor Density:</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Vapor Pressure:</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Lower Explosive Limit:</td>
<td>None</td>
</tr>
<tr>
<td>Boiling Point:</td>
<td>None</td>
</tr>
<tr>
<td>Melting Point:</td>
<td>Unknown</td>
</tr>
<tr>
<td>Specific Gravity:</td>
<td>Unknown</td>
</tr>
<tr>
<td>Percent Volatile:</td>
<td>Unknown</td>
</tr>
</tbody>
</table>

### 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 |
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
# UNA-Edge DE DripEdge System

**Technical Information Sheet**

**Item Number:**
- System (Complete) (LF): W6DE1SYSYT
- Cleat (LF): W6DE1CLET
- Cover (LF): W6DE1COVR
- Splines (EA): W6DE1SPLC
- Nails (CT 500): W6UE1NAIL

**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, gravel stops, copings, counter flashing, 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 cartons 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:**

<table>
<thead>
<tr>
<th></th>
<th>Steel</th>
<th>Aluminum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post Consumer Recycled Content:</td>
<td>23%</td>
<td>Varies</td>
</tr>
<tr>
<td>Pre Consumer Recycled Content:</td>
<td>7.3%</td>
<td>Varies</td>
</tr>
<tr>
<td>Manufacturing Location:</td>
<td>Anoka, MN</td>
<td></td>
</tr>
</tbody>
</table>

**ANSI/SPRI ES-1 Test Results:**

<table>
<thead>
<tr>
<th>Based on Category III/IV, Exposure D</th>
<th>Height (Max. Ft)</th>
<th>Wind (Max. mph)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>60</td>
<td>120</td>
</tr>
<tr>
<td></td>
<td>120</td>
<td>110</td>
</tr>
<tr>
<td></td>
<td>250</td>
<td>90</td>
</tr>
</tbody>
</table>

**FM 4435 Tested**

---

Firestone Building Products • 250 W. 96th Street, Indianapolis, IN 46260 • Sales: (800) 428-4442 • Technical (800) 428-4511 • www.firestonebpco.com

S723-RFS-282 3.15.2012
<table>
<thead>
<tr>
<th>Physical Properties:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DE material:</strong></td>
<td>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).</td>
</tr>
<tr>
<td><strong>Gauge:</strong></td>
<td>Aluminum: .040” (1.0 mm) or .050” (1.2mm)</td>
</tr>
<tr>
<td></td>
<td>Steel: 24 ga (.64 mm) or 22 ga (.76 mm)</td>
</tr>
<tr>
<td><strong>Face Heights:</strong></td>
<td>Maximum rated system: 8” (203.2 mm)</td>
</tr>
<tr>
<td><strong>Cleat:</strong></td>
<td>20 gauge (.91 mm) galvanized steel</td>
</tr>
<tr>
<td><strong>Splice plates:</strong></td>
<td>Cover matching in either 24ga (.64 mm) G-90 steel or .032” (.81 mm) aluminum</td>
</tr>
<tr>
<td><strong>Fasteners:</strong></td>
<td>Cleat and Cover: 5d SS 1-3/4” annular ring common nails</td>
</tr>
</tbody>
</table>

Please Contact your Firestone Technical Coordinator at 1-800-428-4511 for further information.

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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
Amerimax Home Products 20 in. x 50 ft. Aluminum Drip Edge Flashing
Model # 68020  Store SKU # 269909

$46.75 /EA-Each

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

Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assembled Depth (in.)</td>
<td>5.5 in</td>
</tr>
<tr>
<td>Assembled Height (in.)</td>
<td>20 in</td>
</tr>
<tr>
<td>Assembled Width (in.)</td>
<td>5.5 in</td>
</tr>
<tr>
<td>Commercial / Residential</td>
<td>Residential</td>
</tr>
<tr>
<td>Finish Family</td>
<td>Unfinished</td>
</tr>
<tr>
<td>Gauge</td>
<td>0.0092</td>
</tr>
<tr>
<td>Item Package Type</td>
<td>No Package</td>
</tr>
<tr>
<td>Manufacturer Warranty</td>
<td>No</td>
</tr>
<tr>
<td>Material</td>
<td>Aluminum</td>
</tr>
<tr>
<td>Product Depth (in.)</td>
<td>5.5</td>
</tr>
<tr>
<td>Product Height (in.)</td>
<td>20</td>
</tr>
<tr>
<td>Product Weight (lb.)</td>
<td>10</td>
</tr>
<tr>
<td>Product Width (in.)</td>
<td>5.5 in</td>
</tr>
<tr>
<td>Roofing Product Type</td>
<td>Roll Flashing</td>
</tr>
<tr>
<td>Type</td>
<td>Metal</td>
</tr>
<tr>
<td>Unrolled length (ft.)</td>
<td>50</td>
</tr>
<tr>
<td>Unrolled height (ft.)</td>
<td>1.67</td>
</tr>
</tbody>
</table>

Return To Top
PRE-ASSEMBLED HD FASTENERS WITH HD SEAM PLATES

Model Number: TPO3103
Dimensions:
  Diameter: 3” round plate
Available: Firestone
<table>
<thead>
<tr>
<th>Product</th>
<th>Item Code</th>
<th>White W56...</th>
<th>Tan W56...</th>
<th>Gray W56...</th>
<th>Size</th>
<th>Packaging</th>
<th>Weight</th>
<th>Approx. Coverage Rates</th>
<th>Price (US $)</th>
</tr>
</thead>
<tbody>
<tr>
<td>UltraPly TPO Coated Metal</td>
<td>TPOG213</td>
<td>TPOG213</td>
<td>TPOG213</td>
<td>4' x 10' sheet</td>
<td>10 sheets/pallet</td>
<td>67 lbs/shel</td>
<td>—</td>
<td>—</td>
<td>$235/sheet</td>
</tr>
<tr>
<td>UltraPly TPO Walkway Pad</td>
<td>TPOG243</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>0.156&quot; thick</td>
<td>30' x 50' roll</td>
<td>0.59 lbs/sq ft</td>
<td>125 sq ft</td>
<td>$4.45/sq ft</td>
</tr>
<tr>
<td>UltraPly TPO X-Tread Walkway Pad (white)</td>
<td>TPO201X</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>0.540&quot; thick</td>
<td>30' x 30' roll</td>
<td>1.3 lbs/shel</td>
<td>—</td>
<td>$12.60/sq ft</td>
</tr>
<tr>
<td>UltraPly TPO 8&quot; Cover Strip - .060</td>
<td>TPO205B8</td>
<td>TPO205B8</td>
<td>TPO205B8</td>
<td>8' x 50'</td>
<td>2 rolls/ctn</td>
<td>23 lbs/ctn</td>
<td>—</td>
<td>—</td>
<td>$185/ctn</td>
</tr>
<tr>
<td>UltraPly TPO Insides/Outsides Molded Corners</td>
<td>TPO201IC</td>
<td>TPO201IC</td>
<td>TPOG101IC</td>
<td>—</td>
<td>20 corners/ctn</td>
<td>8 lbs/ctn</td>
<td>—</td>
<td>—</td>
<td>$160/ctn</td>
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<tr>
<td>UltraPly TPO T-Joint Covers</td>
<td>TPO2014</td>
<td>TPO2014</td>
<td>TPOG1014</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>$53/ctn</td>
</tr>
<tr>
<td>UltraPly TPO Universal Pipe Flashing</td>
<td>TPO201U</td>
<td>TPO201U</td>
<td>TPOG101U</td>
<td>1&quot; x 6&quot;</td>
<td>10 boots &amp; 10 clamps/ctn</td>
<td>15 lbs/ctn</td>
<td>—</td>
<td>—</td>
<td>$310/ctn</td>
</tr>
<tr>
<td>UltraPly TPO Large Pipe Flashing</td>
<td>TPO2013</td>
<td>TPO2013</td>
<td>TPOG1013</td>
<td>6&quot; x 8&quot;</td>
<td>10 boots &amp; 10 clamps/ctn</td>
<td>16 lbs/ctn</td>
<td>—</td>
<td>—</td>
<td>$330/ctn</td>
</tr>
<tr>
<td>UltraPly TPO Split Pipe Boots</td>
<td>TPO201S13</td>
<td>TPO201S13</td>
<td>TPOG101S13</td>
<td>1&quot; x 3&quot;</td>
<td>10 boots &amp; 10 clamps/ctn</td>
<td>8 lbs/ctn</td>
<td>—</td>
<td>—</td>
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<tr>
<td>UltraPly TPO Split Pipe Boots</td>
<td>TPO201S56</td>
<td>TPO201S56</td>
<td>TPOG101S56</td>
<td>3&quot; x 5½&quot;</td>
<td>10 boots &amp; 10 clamps/ctn</td>
<td>10 lbs/ctn</td>
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<td>TPO201S99</td>
<td>TPOG101S99</td>
<td>5½&quot; x 8&quot;</td>
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<td>—</td>
<td>—</td>
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<tr>
<td>UltraPly TPO Penetration Pockets</td>
<td>TPO201P</td>
<td>TPO201P</td>
<td>TPOG101P</td>
<td>—</td>
<td>6 Pockets/Kit</td>
<td>7 lbs/kit</td>
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<tr>
<td>UltraPly TPO Reinforced Curb Corners</td>
<td>TPO201C7</td>
<td>TPO201C7</td>
<td>TPOG101C7</td>
<td>7&quot;</td>
<td>12 corners/ctn</td>
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<td>3 cuets</td>
<td>—</td>
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<tr>
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<td>TPO201C13</td>
<td>TPOG101C13</td>
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<td>TPOG101C19</td>
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<td>TPO201C31</td>
<td>TPOG101C31</td>
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<td>$395/ctn</td>
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<tr>
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<td>TPO201C37</td>
<td>TPOG101C37</td>
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<td>TPO2017</td>
<td>TPOG1017</td>
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<td>—</td>
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<td>18&quot;</td>
<td>50' roll</td>
<td>45 rolls/pallet</td>
<td>25 bbl/roll</td>
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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
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

<table>
<thead>
<tr>
<th>Roll width</th>
<th>2-3/8” (60mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roll length</td>
<td>98”-5” (30m)</td>
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Technical Specs

<table>
<thead>
<tr>
<th>Layer</th>
<th>Material</th>
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</thead>
<tbody>
<tr>
<td>Carrying membrane</td>
<td>Special Polypropylene fabric</td>
</tr>
<tr>
<td>Reinforcement</td>
<td>Mesh</td>
</tr>
<tr>
<td>Adhesive</td>
<td>Solid Acrylic</td>
</tr>
<tr>
<td>Release paper (2 strips)</td>
<td>Single slit siliconized PE-Foil: app. 1/2”-1 5/8” (app. 12/48 mm)</td>
</tr>
<tr>
<td>Release paper (3 strips)</td>
<td>Double slit siliconized PE-Foil: app. 1/2”-7/8” – 1” (app. 12/23/25 mm)</td>
</tr>
</tbody>
</table>
TESCON 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
TESCON VANA TAPE

Location: Main House
Dimensions:
  Length: 98’ 5”
  Width: 2 3/8”
Available: Four Seven Five
Price: $42 a roll
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
- 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

<table>
<thead>
<tr>
<th>Roll width</th>
<th>2-6/16” (60mm)</th>
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</thead>
<tbody>
<tr>
<td>Roll length</td>
<td>98’-5” (30m)</td>
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</table>

Technical Specs

<table>
<thead>
<tr>
<th>Layer</th>
<th>Material</th>
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<tr>
<td>Carrying membrane</td>
<td>Special Polypropylene fabric</td>
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<tr>
<td>Reinforcement</td>
<td>Mesh</td>
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<td>Adhesive</td>
<td>Solid Acrylic</td>
</tr>
<tr>
<td>Release paper</td>
<td>Siliconized release paper</td>
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</table>

Four Seven Five
High Performance Building Supply
131 Union St. Brooklyn, NY 11231
info@foursevenfive.com
718-622-1600
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, Polyethylene 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'-6" (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.

475 High Performance Building Supply
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) : 95.5 - 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 T4 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 tungsten arc or ammonia–acetylene is preferred. Resistance welding is not recommended.
<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
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<tbody>
<tr>
<td>Length</td>
<td>25 ft</td>
</tr>
<tr>
<td>WT/FT</td>
<td>1.988</td>
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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  $U_g = 0.106$

**Sash:** 1: Doorstep: ALUMINUM
**Lock:** 3-point key-operated lock with latch
**Handle:** Door handle 35/2200, white
**Accessories:**
- Lock cylinder 50/50 - 1.00 unit

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Area</th>
<th>Price, USD</th>
<th>Quantity, Qnt</th>
<th>Total</th>
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<td>1041 x 2354</td>
<td>2.5 m²</td>
<td>1888.85</td>
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WALL MOUNT SLIDING DOOR HARDWARE

Model Number: 2610F72B or equal
Location: Bathroom, Master Bedroom
Length: 72”
Finish: Bronze
Available: A. Johnson Hardware
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.
INSTRUCTIONS

2610F SERIES WALL MOUNT
OPEN POCKET SINGLE DOOR

- 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) 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.
- 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.

PLEASE CALL 1-800-837-5664 IF PARTS ARE MISSING / DO NOT RETURN TO PLACE OF PURCHASE

L.E. JOHNSON PRODUCTS, INC. - 2100 STERLING AVE. - ELKHART, IN 46516 - (574) 293-5664

IN2610FP

-----INSTRUCTION SHEET IS SUBJECT TO CHANGE-----

Rev. 09/12
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, Portes, Puertas:
2X Door width -1"
2X Ancho de la Puerta -25mm
2X Largeur de Porte -25mm

3 Door, Portes, Puertas:
3X Door width -2"
3X Ancho de la Puerta -50mm
3X Largeur de Porte -50mm

4 Door, Portes, Puertas:
4X Door width -2"
4X Ancho de la Puerta -50mm
4X Largeur de Porte -50mm
INSTRUCTIONS

100SD SERIES
SLIDING DOOR HARDWARE

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

3 Door, Portes, Puertas:
- 3X Door width -2"
- 3X Ancho de la Puerta -50mm
- 3X Largeur de Porte -50mm

4 Door, Portes, Puertas:
- 4X Door width -2"
- 4X Ancho de la Puerta -50mm
- 4X Largeur de Porte -50mm

IN100BYP  L.E. JOHNSON PRODUCTS, INC. • 2100 STERLING AVE. • ELKHART, IN USA 46516 • (574) 293-5664  Rev. 05/11
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 GLISSIÈRE 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 vis 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 À 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 diá.) 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 POGNEES: #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. Adjústelo en su lugar con la palanca de ajuste.

ACCRIOCHEZ LES PORTES: Insérez l'axe pivotant des attaches 1120 dans les roulettes 1125. Fixez sur place avec le levier de blocage.
**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 GUÍA DE LA PUERTA:** Mueva las dos puertas hacia un lado de la jamba. Coloque la Guía 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:** Deplacez les deux portes vers un coté 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.

**ADJUST HANGERS,** If necessary, to plumb doors with jamb.

**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.

**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 tirador que no sea el #30, ajuste la ubicación del tope para permitir acceso al tirador trasero de la puerta.

**INSTALLLEZ 2155:** Attachez le Stop 2155 à l'arrière de la porte de devant à 38mm du coté 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.

**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 Stoppers 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 - SEUL**

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.

Guid 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.
5/4” X 6” TONGUE AND GROOVE PINE DECKING BOARDS

Location: Bathroom, Bedrooms
Finish: Vermont Natural Coatings
Species: Pine
Grade: #3 or better
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)

(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.

![Diagram](image-url)

Figure 1. 2 x Nominal V-Joint Pattern. (See regional grading rules listed 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 fbm 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

<table>
<thead>
<tr>
<th>Species</th>
<th>Grading Rules Under Which Graded</th>
<th>Paragraph Number of Grading Rules Under Which Graded&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Select Quality&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Cedar, Northern White</td>
<td>NELMA</td>
<td>15.1</td>
</tr>
<tr>
<td>Cedars, Western</td>
<td>WWPA, WCLIB</td>
<td>55.11, 127-b</td>
</tr>
<tr>
<td>Cedars, Western (North)</td>
<td>NLGA (Canadian)</td>
<td>127-b</td>
</tr>
<tr>
<td>Coast Species</td>
<td>NLGA (Canadian)</td>
<td>127-b</td>
</tr>
<tr>
<td>Douglas Fir-Larch</td>
<td>WWPA, WCLIB</td>
<td>55.11, 127-b</td>
</tr>
<tr>
<td>Douglas Fir-Larch (North)</td>
<td>NLGA (Canadian)</td>
<td>127-b</td>
</tr>
<tr>
<td>Douglas Fir (South)</td>
<td>WWPA</td>
<td>55.11</td>
</tr>
<tr>
<td>Fir, Balsam</td>
<td>NELMA</td>
<td>15.1</td>
</tr>
<tr>
<td>Hem-Fir</td>
<td>WWPA, WCLIB</td>
<td>55.11, 127-b</td>
</tr>
<tr>
<td>Hem-Fir (North)</td>
<td>NLGA (Canadian)</td>
<td>127-b</td>
</tr>
<tr>
<td>Hemlock, Eastern-Tamarack</td>
<td>NELMA</td>
<td>15.1</td>
</tr>
<tr>
<td>Hemlock, Eastern-Tamarack (North)</td>
<td>NLGA (Canadian)</td>
<td>127-b</td>
</tr>
<tr>
<td>Hemlock, Western</td>
<td>WCLIB</td>
<td>127-b</td>
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<tr>
<td>Hemlock, Western (North)</td>
<td>NLGA (Canadian)</td>
<td>127-b</td>
</tr>
<tr>
<td>Northern Species</td>
<td>NLGA (Canadian)</td>
<td>127-b</td>
</tr>
<tr>
<td>Pine, Eastern White</td>
<td>NELMA</td>
<td>15.1</td>
</tr>
<tr>
<td>Pine, Eastern White (North)</td>
<td>NLGA (Canadian)</td>
<td>127-b</td>
</tr>
<tr>
<td>Pine, Northern</td>
<td>NELMA</td>
<td>15.1</td>
</tr>
<tr>
<td>Pine, Ponderosa</td>
<td>NLGA (Canadian)</td>
<td>127-b</td>
</tr>
<tr>
<td>Pine, Red</td>
<td>NLGA (Canadian)</td>
<td>127-b</td>
</tr>
<tr>
<td>Pine, Southern&lt;sup&gt;d,e&lt;/sup&gt;</td>
<td>SPIB</td>
<td>412</td>
</tr>
<tr>
<td>Pine, Western White</td>
<td>NLGA (Canadian)</td>
<td>127-b</td>
</tr>
<tr>
<td>Redwood, California</td>
<td>RIS</td>
<td>315</td>
</tr>
<tr>
<td>SPF, South</td>
<td>NELMA, WWPA</td>
<td>15.1, 55.11</td>
</tr>
<tr>
<td>Spruce, Coast Sitka</td>
<td>NLGA (Canadian)</td>
<td>127-b</td>
</tr>
<tr>
<td>Spruce, Eastern</td>
<td>NELMA</td>
<td>15.1</td>
</tr>
<tr>
<td>Spruce-Pine-Fir</td>
<td>NLGA (Canadian)</td>
<td>127-b</td>
</tr>
<tr>
<td>Spruce, Sitka</td>
<td>WCLIB</td>
<td>127-b</td>
</tr>
<tr>
<td>Western Woods</td>
<td>WWPA</td>
<td>55.11</td>
</tr>
</tbody>
</table>

<sup>a</sup> When species may be graded under WCLIB and WWPA rules, the first paragraph number is for WWPA and the second for WCLIB rules.

<sup>b</sup> Select quality grades are as follows for the grading rules indicated:

<table>
<thead>
<tr>
<th>WCLIB;</th>
<th>Select Dex</th>
</tr>
</thead>
<tbody>
<tr>
<td>WWPA;</td>
<td>Selected Decking</td>
</tr>
<tr>
<td>NELMA;</td>
<td>Selected Decking</td>
</tr>
</tbody>
</table>

<sup>c</sup> Commercial quality grades are as follows for the grading rules indicated:

<table>
<thead>
<tr>
<th>WCLIB;</th>
<th>Commercial Dex</th>
</tr>
</thead>
<tbody>
<tr>
<td>WWPA;</td>
<td>Commercial Decking</td>
</tr>
<tr>
<td>NELMA;</td>
<td>Commercial Decking</td>
</tr>
</tbody>
</table>

<sup>d</sup> Southern Pine decking is also available in the following grades:

| Dense Standard Decking, para. 411; | Dense Select Decking, para. 412.1; | Dense Commercial Decking, para. 413.1 |

<sup>e</sup> 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](image-url)

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.
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.

![Simple Span Layup](image)

6.4.2 Controlled Random Layup. 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.
6.4.2.2 Three and Four Inch Decking. There shall be a minimum distance of 4 ft between end joints in adjacent courses.

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.
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 Layup.](image)

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 Layup.](image)

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

<table>
<thead>
<tr>
<th>Species</th>
<th>1-1/2 in. net(^b) (2 in. nom.)</th>
<th>2-1/2 in. net(^c) (3 in. nom.)</th>
<th>3-1/2 in. net (4 in. nom.)</th>
<th>Agency(^d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cedar, Northern White</td>
<td>2.7</td>
<td>4.5</td>
<td>6.3</td>
<td>1</td>
</tr>
<tr>
<td>Cedars, Western(^d)</td>
<td>3.0</td>
<td>4.9</td>
<td>6.9</td>
<td>3,4</td>
</tr>
<tr>
<td>Cedars, Western (North)(^e)</td>
<td>2.9</td>
<td>4.8</td>
<td>6.7</td>
<td>2</td>
</tr>
<tr>
<td>Coast Species(^e)</td>
<td>3.9</td>
<td>6.4</td>
<td>9.0</td>
<td>2</td>
</tr>
<tr>
<td>Douglas Fir-Larch(^d)</td>
<td>4.3</td>
<td>7.2</td>
<td>10.1</td>
<td>3,4</td>
</tr>
<tr>
<td>Douglas Fir-Larch (North)(^e)</td>
<td>4.4</td>
<td>7.3</td>
<td>10.3</td>
<td>2</td>
</tr>
<tr>
<td>Douglas Fir (South)</td>
<td>4.1</td>
<td>6.9</td>
<td>9.6</td>
<td>3</td>
</tr>
<tr>
<td>Fir, Balsam</td>
<td>3.2</td>
<td>5.4</td>
<td>7.5</td>
<td>1</td>
</tr>
<tr>
<td>Hem-Fir(^e)</td>
<td>3.7</td>
<td>6.1</td>
<td>8.6</td>
<td>3,4</td>
</tr>
<tr>
<td>Hem-Fir (North)(^e)</td>
<td>3.8</td>
<td>6.3</td>
<td>8.8</td>
<td>2</td>
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<tr>
<td>Hemlock, Eastern-Tamarack(^e)</td>
<td>3.8</td>
<td>6.3</td>
<td>8.8</td>
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</tr>
<tr>
<td>Hemlock, Eastern-Tamarack (North)(^d,e)</td>
<td>4.0</td>
<td>6.7</td>
<td>9.4</td>
<td>2</td>
</tr>
<tr>
<td>Hemlock, Western</td>
<td>4.0</td>
<td>6.7</td>
<td>9.4</td>
<td>4</td>
</tr>
<tr>
<td>Northern Species(^f)</td>
<td>2.9-5.3</td>
<td>4.6-8.8</td>
<td>6.7-12.4</td>
<td>2</td>
</tr>
<tr>
<td>Pine, Eastern White</td>
<td>3.3</td>
<td>5.5</td>
<td>7.7</td>
<td>1</td>
</tr>
<tr>
<td>Pine, Eastern White (North)</td>
<td>3.4</td>
<td>5.7</td>
<td>8.0</td>
<td>2</td>
</tr>
<tr>
<td>Pine, Northern(^f)</td>
<td>3.6-4.5</td>
<td>6.3-7.5</td>
<td>8.8-10.5</td>
<td>1</td>
</tr>
<tr>
<td>Pine, Ponderosa</td>
<td>4.1</td>
<td>6.9</td>
<td>9.6</td>
<td>2</td>
</tr>
<tr>
<td>Pine, Red</td>
<td>3.7</td>
<td>6.1</td>
<td>8.6</td>
<td>2</td>
</tr>
<tr>
<td>Pine, Southern(^e)</td>
<td>4.6</td>
<td>7.6</td>
<td>10.7</td>
<td>5</td>
</tr>
<tr>
<td>Pine, Western White</td>
<td>3.4</td>
<td>5.7</td>
<td>8.0</td>
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<td>Redwood, California</td>
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<td>6.1</td>
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</tr>
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<td>SPF, South</td>
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<td>6.1</td>
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<td>Spruce, Coast Sitka</td>
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<td>5.5</td>
<td>7.7</td>
<td>2</td>
</tr>
<tr>
<td>Spruce, Eastern</td>
<td>3.6</td>
<td>6.0</td>
<td>8.4</td>
<td>1</td>
</tr>
<tr>
<td>Spruce-Pine-Fir(^f)</td>
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<td>5.1-6.7</td>
<td>7.1-8.4</td>
<td>2</td>
</tr>
<tr>
<td>Spruce, Sitka</td>
<td>3.6</td>
<td>6.0</td>
<td>8.4</td>
<td>4</td>
</tr>
<tr>
<td>Western Woods(^f)</td>
<td>2.9-4.6</td>
<td>4.8-7.6</td>
<td>6.7-10.7</td>
<td>3</td>
</tr>
</tbody>
</table>

---

\(^a\) 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**

<table>
<thead>
<tr>
<th>Species</th>
<th>Select Quality</th>
<th>Commercial Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bending Stress</td>
<td>Modulus of Elasticity</td>
</tr>
<tr>
<td></td>
<td>psi</td>
<td>psi</td>
</tr>
<tr>
<td>Cedar, Northern White</td>
<td>1100</td>
<td>800,000</td>
</tr>
<tr>
<td>Cedars, Western</td>
<td>1450</td>
<td>1,100,000</td>
</tr>
<tr>
<td>Cedars, Western (North)</td>
<td>1400</td>
<td>1,100,000</td>
</tr>
<tr>
<td>Coast Species</td>
<td>1450</td>
<td>1,500,000</td>
</tr>
<tr>
<td>Douglas Fir-Larch</td>
<td>2000</td>
<td>1,800,000</td>
</tr>
<tr>
<td>Douglas Fir-Larch (North)</td>
<td>2000</td>
<td>1,600,000</td>
</tr>
<tr>
<td>Douglas Fir (South)</td>
<td>1900</td>
<td>1,400,000</td>
</tr>
<tr>
<td>Fir, Balsam</td>
<td>1650</td>
<td>1,500,000</td>
</tr>
<tr>
<td>Hem-Fir</td>
<td>1600</td>
<td>1,500,000</td>
</tr>
<tr>
<td>Hem-Fir (North)</td>
<td>1500</td>
<td>1,500,000</td>
</tr>
<tr>
<td>Hemlock, Eastern-Tamarack</td>
<td>1700</td>
<td>1,300,000</td>
</tr>
<tr>
<td>Hemlock, Eastern-Tamarack (North)</td>
<td>1700</td>
<td>1,300,000</td>
</tr>
<tr>
<td>Hemlock, Western</td>
<td>1750</td>
<td>1,600,000</td>
</tr>
<tr>
<td>Hemlock, Western (North)</td>
<td>1750</td>
<td>1,600,000</td>
</tr>
<tr>
<td>Northern Species</td>
<td>1050</td>
<td>1,100,000</td>
</tr>
<tr>
<td>Pine, Eastern White</td>
<td>1300</td>
<td>1,200,000</td>
</tr>
<tr>
<td>Pine, Eastern White (North)</td>
<td>1050</td>
<td>1,200,000</td>
</tr>
<tr>
<td>Pine, Northern</td>
<td>1550</td>
<td>1,400,000</td>
</tr>
<tr>
<td>Pine, Ponderosa</td>
<td>1450</td>
<td>1,300,000</td>
</tr>
<tr>
<td>Pine, Red</td>
<td>1350</td>
<td>1,300,000</td>
</tr>
<tr>
<td>Pine, Southern</td>
<td>1650</td>
<td>1,600,000</td>
</tr>
<tr>
<td>Pine, Western White</td>
<td>1300</td>
<td>1,400,000</td>
</tr>
<tr>
<td>Redwood, California</td>
<td>1700</td>
<td>1,100,000</td>
</tr>
<tr>
<td>SPF, South</td>
<td>1350</td>
<td>1,400,000</td>
</tr>
<tr>
<td>Spruce, Coast Sitka</td>
<td>1450</td>
<td>1,700,000</td>
</tr>
<tr>
<td>Spruce, Eastern</td>
<td>1300</td>
<td>1,500,000</td>
</tr>
<tr>
<td>Spruce-Pine-Fir</td>
<td>1400</td>
<td>1,500,000</td>
</tr>
<tr>
<td>Spruce, Sitka</td>
<td>1500</td>
<td>1,500,000</td>
</tr>
<tr>
<td>Western Woods</td>
<td>1300</td>
<td>1,200,000</td>
</tr>
</tbody>
</table>

---

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:

<table>
<thead>
<tr>
<th>Thickness</th>
<th>C_F</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 in.</td>
<td>1.10</td>
</tr>
<tr>
<td>3 in.</td>
<td>1.04</td>
</tr>
</tbody>
</table>

Design values for visually graded decking are those recommended by the regional lumber rules writing agencies. These values are ased 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:

\[
C_M = \frac{F_b}{F_{cL}} \times E
\]

* When (F_b) / (F_{cL}) < 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), WMRA (3), WClLib (4), SPIE (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**<sup>a</sup>

**ALLOWABLE ROOF LOAD LIMITED BY BENDING**

<table>
<thead>
<tr>
<th>Bending Stress, psi</th>
<th>Allowable Uniformly Distributed Total Roof Load&lt;sup&gt;b,c,d,e&lt;/sup&gt; psf</th>
<th>Controlled Random Layup Span, ft</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Simple Span, ft</td>
<td>6</td>
</tr>
<tr>
<td>875</td>
<td>73</td>
<td>54</td>
</tr>
<tr>
<td>950</td>
<td>79</td>
<td>58</td>
</tr>
<tr>
<td>1000</td>
<td>83</td>
<td>61</td>
</tr>
<tr>
<td>1050</td>
<td>88</td>
<td>64</td>
</tr>
<tr>
<td>1100</td>
<td>92</td>
<td>67</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1150</td>
<td>96</td>
<td>70</td>
</tr>
<tr>
<td>1200</td>
<td>100</td>
<td>73</td>
</tr>
<tr>
<td>1250</td>
<td>104</td>
<td>76</td>
</tr>
<tr>
<td>1300</td>
<td>108</td>
<td>80</td>
</tr>
<tr>
<td>1350</td>
<td>112</td>
<td>83</td>
</tr>
<tr>
<td>1400</td>
<td>117</td>
<td>86</td>
</tr>
<tr>
<td>1450</td>
<td>121</td>
<td>89</td>
</tr>
<tr>
<td>1500</td>
<td>125</td>
<td>92</td>
</tr>
<tr>
<td>1550</td>
<td>129</td>
<td>95</td>
</tr>
<tr>
<td>1600</td>
<td>133</td>
<td>98</td>
</tr>
</tbody>
</table>

---

<sup>a</sup> 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.

<sup>b</sup> 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.

<sup>c</sup> Duration of load, $C_D = 1.0$ used in this table. For other durations of load, adjust by the appropriate factor.

<sup>d</sup> No increase for size effect has been applied ($C_F = 1.00$). $F_a$ values have been previously adjusted.

<sup>e</sup> Dry conditions of use.
TABLE 5
TWO INCH NOMINAL THICKNESS<sup>a</sup>
ALLOWABLE ROOF LOAD LIMITED BY DEFLECTION

<table>
<thead>
<tr>
<th>Modulus of Elasticity psi</th>
<th>Deflection Limit&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Allowable Uniformly Distributed Total Roof Load&lt;sup&gt;c,d&lt;/sup&gt;, psf</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Simple Span, ft</td>
<td>Controlled Random Layup Span, ft</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>700,000</td>
<td>$t/180$</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>$t/240$</td>
<td>24</td>
</tr>
<tr>
<td>800,000</td>
<td>$t/180$</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td>$t/240$</td>
<td>28</td>
</tr>
<tr>
<td>900,000</td>
<td>$t/180$</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>$t/240$</td>
<td>31</td>
</tr>
<tr>
<td>1,000,000</td>
<td>$t/180$</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>$t/240$</td>
<td>35</td>
</tr>
<tr>
<td>1,100,000</td>
<td>$t/180$</td>
<td>51</td>
</tr>
<tr>
<td></td>
<td>$t/240$</td>
<td>38</td>
</tr>
<tr>
<td>1,200,000</td>
<td>$t/180$</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td>$t/240$</td>
<td>42</td>
</tr>
<tr>
<td>1,300,000</td>
<td>$t/180$</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>$t/240$</td>
<td>45</td>
</tr>
<tr>
<td>1,400,000</td>
<td>$t/180$</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td>$t/240$</td>
<td>49</td>
</tr>
<tr>
<td>1,500,000</td>
<td>$t/180$</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td>$t/240$</td>
<td>52</td>
</tr>
<tr>
<td>1,600,000</td>
<td>$t/180$</td>
<td>74</td>
</tr>
<tr>
<td></td>
<td>$t/240$</td>
<td>55</td>
</tr>
<tr>
<td>1,700,000</td>
<td>$t/180$</td>
<td>79</td>
</tr>
<tr>
<td></td>
<td>$t/240$</td>
<td>59</td>
</tr>
<tr>
<td>1,800,000</td>
<td>$t/180$</td>
<td>83</td>
</tr>
<tr>
<td></td>
<td>$t/240$</td>
<td>62</td>
</tr>
</tbody>
</table>

<sup>a</sup> 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.

<sup>b</sup> For a deflection limit $t/360$, use 1/2 the tabulated value for a deflection limit of $t/180$.

<sup>c</sup> 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

<sup>d</sup> 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)

<table>
<thead>
<tr>
<th>Bending Stress psi</th>
<th>Allowable Uniformly Distributed Total Roof Load (^a, c, e, f, g), psf</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3 inch Nominal Thickness (^b)</td>
</tr>
<tr>
<td></td>
<td>Span, ft</td>
</tr>
<tr>
<td></td>
<td>8</td>
</tr>
<tr>
<td>875</td>
<td></td>
</tr>
<tr>
<td>950</td>
<td></td>
</tr>
<tr>
<td>1000</td>
<td></td>
</tr>
<tr>
<td>1050</td>
<td></td>
</tr>
<tr>
<td>1100</td>
<td></td>
</tr>
<tr>
<td>1150</td>
<td></td>
</tr>
<tr>
<td>1200</td>
<td></td>
</tr>
<tr>
<td>1250</td>
<td></td>
</tr>
<tr>
<td>1300</td>
<td></td>
</tr>
<tr>
<td>1350</td>
<td></td>
</tr>
<tr>
<td>1400</td>
<td></td>
</tr>
<tr>
<td>1450</td>
<td></td>
</tr>
<tr>
<td>1500</td>
<td></td>
</tr>
<tr>
<td>1550</td>
<td></td>
</tr>
<tr>
<td>1600</td>
<td></td>
</tr>
<tr>
<td>1650</td>
<td></td>
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<tr>
<td>1700</td>
<td></td>
</tr>
<tr>
<td>1750</td>
<td></td>
</tr>
<tr>
<td>1800</td>
<td></td>
</tr>
<tr>
<td>1850</td>
<td></td>
</tr>
<tr>
<td>1900</td>
<td></td>
</tr>
<tr>
<td>1950</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td></td>
</tr>
</tbody>
</table>

\(a\) 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

<table>
<thead>
<tr>
<th>Modulus of Elasticity, psi</th>
<th>Deflection Limit</th>
<th>3 inch Thickness&lt;sup&gt;b&lt;/sup&gt;, Span, ft</th>
<th>Allowable Uniformly Distributed Total Roof Load&lt;sup&gt;d&lt;/sup&gt;, psf</th>
<th>4 inch Thickness&lt;sup&gt;c&lt;/sup&gt;, Span, ft</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1/180</td>
<td>8 9 10 11 12 13 14 15</td>
<td>8 9 10 11 12 13 14 15</td>
<td>8 9 10 11 12 13 14 15</td>
</tr>
<tr>
<td>700,000</td>
<td>1/240</td>
<td>63 44 32 24 19 15 12 10 8</td>
<td>174 122 89 67 51 40 32 26 22 18 15 13 11</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>47 33 24 18 14 11 9 7 6</td>
<td>130 91 67 50 38 30 24 20 16 14 11 10 8</td>
<td></td>
</tr>
<tr>
<td>800,000</td>
<td>1/180</td>
<td>72 51 37 28 21 17 13 11 9</td>
<td>198 139 102 76 59 46 37 30 25 21 17 15 13</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1/240</td>
<td>54 38 28 21 16 13 10 8 7</td>
<td>149 104 76 57 44 35 28 22 19 16 13 11 10</td>
<td></td>
</tr>
<tr>
<td>900,000</td>
<td>1/180</td>
<td>81 67 42 31 24 19 15 12 10</td>
<td>223 157 114 86 66 52 42 34 28 23 20 17 14</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1/240</td>
<td>61 43 31 23 18 14 11 9 8</td>
<td>167 116 86 64 50 39 31 25 21 17 15 13 11</td>
<td></td>
</tr>
<tr>
<td>1,000,000</td>
<td>1/180</td>
<td>90 64 46 35 27 21 17 14 11</td>
<td>248 174 127 95 74 58 45 38 31 26 22 19 16</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1/240</td>
<td>68 48 35 26 20 16 13 10 8</td>
<td>186 131 95 72 55 43 35 28 23 19 16 14 12</td>
<td></td>
</tr>
<tr>
<td>1,100,000</td>
<td>1/180</td>
<td>99 70 51 38 29 23 19 15 12</td>
<td>273 192 140 105 81 64 51 41 34 28 24 20 17</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1/240</td>
<td>75 52 38 29 22 17 14 11 9</td>
<td>205 144 105 79 61 48 38 31 26 21 18 15 13</td>
<td></td>
</tr>
<tr>
<td>1,200,000</td>
<td>1/180</td>
<td>108 76 56 42 32 25 20 16 14</td>
<td>298 209 153 114 88 69 56 45 37 31 26 22 19</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1/240</td>
<td>81 57 42 31 24 19 15 12 10</td>
<td>223 157 114 86 66 52 42 34 28 23 20 17 14</td>
<td></td>
</tr>
<tr>
<td>1,300,000</td>
<td>1/180</td>
<td>117 83 60 45 35 27 22 18 15</td>
<td>322 227 165 124 96 75 60 49 40 34 28 24 21</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1/240</td>
<td>88 62 45 34 26 21 16 13 11</td>
<td>142 170 124 93 72 56 45 37 30 25 21 18 15</td>
<td></td>
</tr>
<tr>
<td>1,400,000</td>
<td>1/180</td>
<td>127 89 65 49 38 30 24 19 15</td>
<td>347 244 178 134 103 81 65 53 43 36 30 26 22</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1/240</td>
<td>95 67 49 37 28 22 18 14 12</td>
<td>261 183 133 100 77 61 49 40 33 27 23 19 17</td>
<td></td>
</tr>
<tr>
<td>1,500,000</td>
<td>1/180</td>
<td>136 95 69 52 40 32 25 21 17</td>
<td>372 261 191 143 110 87 69 56 47 39 33 28 24</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1/240</td>
<td>102 71 52 39 30 24 19 15 13</td>
<td>279 196 143 107 83 65 52 42 35 29 25 21 18</td>
<td></td>
</tr>
<tr>
<td>1,600,000</td>
<td>1/180</td>
<td>145 102 74 56 43 34 27 22 18</td>
<td>397 279 203 153 118 93 74 60 50 41 35 30 25</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1/240</td>
<td>109 76 56 42 32 25 20 16 14</td>
<td>298 209 152 115 88 69 56 45 37 31 26 22 19</td>
<td></td>
</tr>
<tr>
<td>1,700,000</td>
<td>1/180</td>
<td>154 108 79 59 46 36 29 23 19</td>
<td>422 296 216 162 125 98 79 64 53 44 37 31 27</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1/240</td>
<td>115 81 59 44 34 27 22 17 14</td>
<td>316 222 162 122 94 74 59 48 40 33 28 24 20</td>
<td></td>
</tr>
<tr>
<td>1,800,000</td>
<td>1/180</td>
<td>163 114 83 63 48 38 30 25 20</td>
<td>446 314 229 172 132 104 83 68 56 47 39 33 26</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1/240</td>
<td>122 86 62 47 36 28 23 19 15</td>
<td>335 235 172 129 99 78 62 51 42 35 29 25 21</td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup> For a deflection limit of 1/360, use 1/2 the tabulated value for a deflection limit of 1/180.

<sup>b</sup> 2-1/2 in. net thickness. To determine allowable loads for 2-5/8 in. net thickness, multiply tabulated loads by 1.147.

<sup>c</sup> 3-1/2 in. net thickness.

<sup>d</sup> 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)

<table>
<thead>
<tr>
<th>Modulus of Elasticity, psi</th>
<th>Deflection Limit</th>
<th>Allowable Uniformly Distributed Total Roof Load a, b, c, d, e, f, psf</th>
</tr>
</thead>
<tbody>
<tr>
<td>700,000</td>
<td>(1/180)</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>(1/240)</td>
<td>96</td>
</tr>
<tr>
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**Notes:**
- To determine allowable uniformly distributed total roof load 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.
- For a deflection limit of \(\varepsilon/380\), use 1/2 the tabulated value for a deflection limit of \(\varepsilon/180\).
- 2-1/2 in. net thickness. To determine allowable loads for 2-5/8 in. net thickness, multiply tabulated loads by 1.16.
- 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.
- 3-1/2 in. net thickness.
- Dry conditions of use.
1" X 4" DIMENSIONED LUMBER

Location: Master Bedroom Closet
Height: 24 1/2"
1 x 4 x 6 Select Pine Lumber

Model # 922220  Store SKU # 922220

$7.64 / each

Store Only
Buy Online, Pick Up in Store Today
Check Store Inventory

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 usable 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 superior 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 warp, 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
- Not. Product may vary by store.
- MFG Model #: 922220
- MFG Part #: 922220

SPECIFICATIONS

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<tr>
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<td>Nominal product width (in.)</td>
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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  
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  
Accessories:  
- Connect profile KP14/KP14, white - 2.21 m  

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4  WW1-01  
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 & turn  

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5  WW1-02  
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  

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<td>Window</td>
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<tr>
<td></td>
<td>Inside view</td>
<td>System: EFORTE</td>
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<td></td>
<td></td>
<td>Fittings: MACO</td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Frame: INOUTIC passive house window profile</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Color (inside/outside): White/White</td>
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<tr>
<td></td>
<td></td>
<td>Filler:</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>1: CG4x16HxF4x16HxCG4, Triple glazed unit with 2 low-emissivity 1.0 glass, Ug = 0.088</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Sash: 1: Tilt</td>
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<tr>
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<td>Window width reduced, over max width limit</td>
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<table>
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<th>WS1-03</th>
<th>Window</th>
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<tbody>
<tr>
<td></td>
<td>Inside view</td>
<td>System: EFORTE</td>
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<tr>
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<td>Fittings: MACO</td>
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<td>Filler:</td>
</tr>
<tr>
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<td>1: Sel6x18HxF4x16HxSel6, Triple glazed unit with 2 low-emissivity glass, Ug = 0.088</td>
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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
**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

Technical Information:
1-800-NATIONAL
(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 consists 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
- 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.
- 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.
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- 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.

GREENGUARD CERTIFIED
XP Fire-Shield Gypsum Board is GREENGUARD Children’s & 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)
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-resistant qualities. XP Fire-Shield Gypsum Board contains no asbestos.
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 | Product Name
-------------|-------------
⅛" Gypsum Board – Square Edge  
⅛" Gypsum Board – Tapered Edge  
¾" Gypsum Board – Tapered Edge  
⅜" Gypsum Board – High Strength LITE Gypsum Board  
⅜" Fire-Shield® Gypsum Board  
⅜" High Strength Ceiling Board  
¼" High Flex® Gypsum Board  
¼" Sta-Smooth® Gypsum Board  
⅛" FS Sta-Smooth® Gypsum Board  
⅛" FS C Gypsum Board  
⅛" Fire-Shield® C Gypsum Board  
⅛" High Strength Ceiling Board  

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)
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

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<td>And may contain:</td>
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<tr>
<td>Fiberglas, synthetic, vitreous, continuous</td>
<td>65997-17-3</td>
<td>&lt;1%</td>
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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/PERSOAL PROTECTION

Exposure Guidelines

<table>
<thead>
<tr>
<th>Component</th>
<th>Exposure Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OSHA PEL (mg/m3)</td>
</tr>
<tr>
<td>Calcium Sulfate Dihydrate (Gypsum)</td>
<td>15 (T) 5 (R)</td>
</tr>
<tr>
<td>Crystalline Silica (Quartz)</td>
<td>0.1 (R)</td>
</tr>
<tr>
<td>Cellulose (Paper Fiber)</td>
<td>15 (T) 5 (R)</td>
</tr>
<tr>
<td>Fiberglass, synthetic, vitreous, continuous</td>
<td>15 (T) 5 (R)</td>
</tr>
</tbody>
</table>

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].

Invivo and Invitro 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

AGCHM  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 GREENVIRONMENT Children and Schools Certification meet stricter emission guidelines than those with GREENVIRONMENT Indoor Air Quality Certification. GREENVIRONMENT Children and Schools Certification also meet CHPS Low-Emitting Materials.

1. Product Certificate for GREENVIRONMENT 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.

© 2010 National Gypsum Properties, LLC
GRIPRITE COARSE THREAD DRYWALL SCREWS

Model: 114CDWS1
Location: Interior Walls
Dimensions: 8 x 2 1/2"
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

Available for In-Store Pick Up

** ** (2)  Write a Review

View Local Store Pricing

This item cannot be shipped to the following state(s): AK, GU, HI, PR, VI

Ships FREE with $45.00 Order

Buy Online, Pick Up In Store Today
Check Store Inventory

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
- Philips drive style
- Includes 1 lb. of drywall screws
- MFG Brand Name: Grip-Rite
- MFG Model #: 114CDWS1
- MFG Part #: 114CDWS1
# Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assembled Depth (in.)</td>
<td>3.5 in</td>
</tr>
<tr>
<td>Assembled Height (in.)</td>
<td>1.875 in</td>
</tr>
<tr>
<td>Assembled Width (in.)</td>
<td>4.75 in</td>
</tr>
<tr>
<td>Drive Style</td>
<td>Phillips</td>
</tr>
<tr>
<td>Driver bit included</td>
<td>No</td>
</tr>
<tr>
<td>Fastener Callout Size</td>
<td>#6 X 1 1/4&quot;</td>
</tr>
<tr>
<td>Fastener Head Style</td>
<td>Bugle</td>
</tr>
<tr>
<td>Fastener Thread Type</td>
<td>Coarse</td>
</tr>
<tr>
<td>Fastener length (in.)</td>
<td>1.25</td>
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<tr>
<td>Finish</td>
<td>Phosphate Plated</td>
</tr>
<tr>
<td>Finish Family</td>
<td>Black</td>
</tr>
<tr>
<td>Head diameter (in.)</td>
<td>0.325</td>
</tr>
<tr>
<td>Indoor/Outdoor</td>
<td>Indoor</td>
</tr>
<tr>
<td>Item Package Type</td>
<td>Cardboard Container</td>
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<tr>
<td>Manufacturer Warranty</td>
<td>No</td>
</tr>
<tr>
<td>Package Quantity</td>
<td>258</td>
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<tr>
<td>Primary Use</td>
<td>Attatching gypsum board to wood studs</td>
</tr>
<tr>
<td>Product Weight (lb.)</td>
<td>1</td>
</tr>
<tr>
<td>Returnable</td>
<td>90-Day</td>
</tr>
<tr>
<td>Self drilling</td>
<td>No</td>
</tr>
<tr>
<td>Self tapping</td>
<td>No</td>
</tr>
<tr>
<td>Tamper Resistant</td>
<td>No</td>
</tr>
</tbody>
</table>
OSI GREENSERIES F-38 DRYWALL AND PANEL ADHESIVE

Model Number: F-38
Location: Main House
Available: OSI Sealants
OSI® 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
Recommended Uses
- Bonding drywall to wood or metal framing
- Adhering trimboard, decorative paneling and other types of panels onto wood frame 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.
TECHNICAL DATA SHEET

OSI® GreenSeries™ F-38 Drywall & Panel Adhesive

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, hardwood, 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
- Use on non-porous surfaces
- Bonding polyethylene, polypropylene, Nylon™ or Teflon™
- Use on Cement Board (Durock™)

FEATURES & BENEFITS:

<table>
<thead>
<tr>
<th>Feature</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ultra low VOC content</td>
<td>GREENGUARD® approved and qualifies for LEED® points</td>
</tr>
<tr>
<td>Water-based adhesive</td>
<td>Non-flammable and environmentally friendly</td>
</tr>
<tr>
<td>Low odor</td>
<td>Great for indoor projects — no strong solvent odor</td>
</tr>
<tr>
<td>Bonds to most building materials</td>
<td>Provides a strong, durable bond to multiple surfaces</td>
</tr>
<tr>
<td>Gap filling</td>
<td>Will bridge minor gaps when bonding irregular Surfaces</td>
</tr>
<tr>
<td>Easy cleanup with water (uncured adhesive)</td>
<td>Eliminates the use of harsh cleaning Chemicals</td>
</tr>
<tr>
<td>High Grab</td>
<td>Reduces nailing and fastener requirements by up to 50%</td>
</tr>
</tbody>
</table>

OSI® GreenSeries™ F-38
Drywall & Panel Adhesive

Page 1 of 4
COVERAGE

For a 28 fl oz cartridge:
A ¼" (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, OS1® 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. Precut 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 ¼" (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 Furring Strips:
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 ½" 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 ½" 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-H 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 ½" 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.

OS1® GreenSeries™ F-38
Drywall & Panel Adhesive
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## Typical Uncured Physical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color</td>
<td>Tan</td>
</tr>
<tr>
<td>Appearance</td>
<td>Thick paste</td>
</tr>
<tr>
<td>Base</td>
<td>Acrylic</td>
</tr>
<tr>
<td>Odor</td>
<td>Mild acrylic odor</td>
</tr>
<tr>
<td>Viscosity</td>
<td>225,000 to 325,000 cps</td>
</tr>
<tr>
<td>Solids Content</td>
<td>66.3% by weight (At 266°F (130°C) to constant weight)</td>
</tr>
<tr>
<td>VOC Content</td>
<td>0.1% by weight (&lt; 2 g/L)</td>
</tr>
<tr>
<td>Shelf Life</td>
<td>24 months from date of manufacture (Unopened)</td>
</tr>
<tr>
<td>Lot Code Explanation</td>
<td>YYDDD: YY = Last two digits of year of manufacture, DDD = Day of manufacture based on 365 days in a year. For example: 09061 = 61st day of 2009 = March 2, 2009</td>
</tr>
</tbody>
</table>

## Typical Application Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application Temperature</td>
<td>40°F (4°C) to 100°F (38°C)</td>
</tr>
<tr>
<td>Repositioning Time</td>
<td>20 minutes @ 70°F, 50% Relative Humidity</td>
</tr>
<tr>
<td>Cure Time</td>
<td>48 hours</td>
</tr>
<tr>
<td>Cure time</td>
<td>Cure time depends upon temperature, humidity, porosity of substrate and amount of adhesive used.</td>
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## Typical Cured Performance Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
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<tbody>
<tr>
<td>Color</td>
<td>Tan</td>
</tr>
<tr>
<td>Cured Form</td>
<td>Non-flammable solid</td>
</tr>
<tr>
<td>Service Temperature</td>
<td>10°F (-12°C) to 170°F (77°C)</td>
</tr>
<tr>
<td>Water Resistant</td>
<td>Yes, the adhesive is water-resistant once fully cured. Do not use outdoors if rain is expected within 24 hours.</td>
</tr>
</tbody>
</table>

### ASTM C 557 - Shear Strength Results

- (Plywood to Drywall Paper Backing)
  - Ref. # 10.1.4: 24 hours @ 73°F: 26.3 psi (Requirement: > 10 psi)
  - Ref. # 10.1.5: 14 days @ 73°F: 42.3 psi (Requirement: > 40 psi)

### ASTM C 557 - Tensile Strength Results

- (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)

### ASTM D 3498 - Dry Lumber Bonding

- (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)

### ASTM D 3498 - Gap Filling @ 0.06 inches

- (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
1. PRODUCT AND COMPANY IDENTIFICATION

Product name: OSI Green Series Formula 38 Drywall & Metal Framing Adhesive
IDH number: 1498717

Product type: Water based adhesive

Company address:
Henkel Corporation
One Henkel Way
Rocky Hill, Connecticut 06067

Region: United States

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

<table>
<thead>
<tr>
<th>HMIS</th>
<th>HEALTH:</th>
<th>FLAMMABILITY:</th>
<th>PHYSICAL HAZARD:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state:</td>
<td>Paste</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Color:</td>
<td>Tan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Odor:</td>
<td>mild</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Hazardous components</th>
<th>CAS NUMBER</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limestone</td>
<td>1317-65-3</td>
<td>30 - 60</td>
</tr>
<tr>
<td>Kaolin</td>
<td>1332-58-7</td>
<td>1 - 5</td>
</tr>
<tr>
<td>Ethylene glycol</td>
<td>107-21-1</td>
<td>1 - 5</td>
</tr>
<tr>
<td>Quartz (SiO2)</td>
<td>14808-60-7</td>
<td>0.1 - 1</td>
</tr>
</tbody>
</table>

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.
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.

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 ºC (32ºF)
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

<table>
<thead>
<tr>
<th></th>
<th>ACGIH TLV</th>
<th>OSHA PEL</th>
<th>AIHA WEEL</th>
<th>OTHER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limestone</td>
<td>10 mg/m³ TWA Total dust.</td>
<td>5 mg/m³ TWA Respirable fraction. 15 mg/m³ TWA Total dust.</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Kaolin</td>
<td>2 mg/m³ TWA Respirable fraction.</td>
<td>5 mg/m³ TWA Respirable fraction. 15 mg/m³ TWA Total dust.</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Ethylene glycol</td>
<td>100 mg/m³ Ceiling Aerosol.</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Quartz (SiO₂)</td>
<td>0.025 mg/m³ TWA Respirable fraction.</td>
<td>2.4 MPPCF TWA Respirable. 0.1 mg/m³ TWA Respirable. 0.3 mg/m³ TWA Total dust.</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

### 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).

### Eye/face 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 flash point. 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:

#### Incompatible materials:
None

#### Conditions to avoid:
Heat. Do not freeze.
11. TOXICOLOGICAL INFORMATION

<table>
<thead>
<tr>
<th>Hazardous components</th>
<th>NTP Carcinogen</th>
<th>IARC Carcinogen</th>
<th>OSHA Carcinogen (Specifically Regulated)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limestone</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Kaolin</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Ethylene glycol</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Quartz (SiO2)</td>
<td>Known To Be Human Carcinogen.</td>
<td>Group 1</td>
<td>No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hazardous components</th>
<th>Health Effects/Target Organs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limestone</td>
<td>Nuisance dust</td>
</tr>
<tr>
<td>Kaolin</td>
<td>Nuisance dust</td>
</tr>
<tr>
<td>Ethylene glycol</td>
<td>Blood,Bone Marrow, Central nervous system, Developmental, Eyes, Irritant, Kidney, Liver, Metabolic Immune system, Lungs, Som evidence of carcinogenicity</td>
</tr>
<tr>
<td>Quartz (SiO2)</td>
<td></td>
</tr>
</tbody>
</table>

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/MDG)

- 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
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 Ceiling throughout house
### 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.

Trademark:
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.

Trademark:
The following trademarks used herein are owned by United States Gypsum Company: SHEETROCK, MOLD TOUGH, TRIF-HOE.

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## SECTION 1
### CHEMICAL PRODUCT AND IDENTIFICATION

<table>
<thead>
<tr>
<th>United States Gypsum Company</th>
<th>Product Safety: 1 (800) 507-8899</th>
</tr>
</thead>
<tbody>
<tr>
<td>550 West Adams Street</td>
<td><a href="http://www.usg.com">www.usg.com</a></td>
</tr>
<tr>
<td>Chicago, Illinois 60661-3637</td>
<td>Version Date: January 1, 2011</td>
</tr>
<tr>
<td>A Subsidiary of USG Corporation</td>
<td>Version: 7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PRODUCT(S)</th>
<th>SHEETROCK® All Purpose Joint Compound</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>CHEMICAL FAMILY / GENERAL CATEGORY</th>
<th>Joint Treatment</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>SYNONYMS</th>
<th>Joint Compound, Taping Compound, Mud</th>
</tr>
</thead>
</table>

## SECTION 2
### HAZARD IDENTIFICATION

**EMERGENCY OVERVIEW:**

⚠️ **WARNING!**

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.
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.

<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>IARC</th>
<th>NTP</th>
<th>ACGIH</th>
<th>CAL-65</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crystalline silica</td>
<td>1</td>
<td>1</td>
<td>A2</td>
<td>Listed</td>
</tr>
</tbody>
</table>

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 carcinogenic; 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

<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>WT%</th>
<th>CAS #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limestone</td>
<td>&gt;65</td>
<td>1317-65-3</td>
</tr>
<tr>
<td>Or Dolomite</td>
<td></td>
<td>16389-88-1</td>
</tr>
<tr>
<td>Mica</td>
<td>&lt;20</td>
<td>12001-26-2</td>
</tr>
<tr>
<td>Attapulgite</td>
<td>&lt;5</td>
<td>12174-11-7</td>
</tr>
<tr>
<td>Vinyl Alcohol Polymer</td>
<td>&lt;5</td>
<td>9002-89-5</td>
</tr>
<tr>
<td>Hydroxypropyl Amylopectin Phosphate</td>
<td>&lt;5</td>
<td>113894-92-1</td>
</tr>
<tr>
<td>Crystalline Silica</td>
<td>&lt;5</td>
<td>14808-60-7^</td>
</tr>
</tbody>
</table>

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 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 (CO2). |

| Flash Point | Not Determined |
| Method Used | Not Applicable |
| Upper Flammable Limit (UFL) | Not Determined |
| Lower Flammable Limit (LFL) | Not Determined |

| Auto Ignition | Not Applicable |
| Flammability Classification | Not Applicable |
| Rate of Burning | Not Applicable |

### 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.
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

<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>WT%</th>
<th>TLV (mg/m³)</th>
<th>PEL (mg/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limestone</td>
<td>&gt;65</td>
<td>10</td>
<td>15(T)/5(R)</td>
</tr>
<tr>
<td>Or Dolomite</td>
<td></td>
<td>10</td>
<td>15(T)/5(R)</td>
</tr>
<tr>
<td>Mica</td>
<td>&lt;20</td>
<td>3(R)</td>
<td>20 mppcf</td>
</tr>
<tr>
<td>Attapulgite</td>
<td>&lt;5</td>
<td>(NE)</td>
<td>(NE)</td>
</tr>
<tr>
<td>Vinyl Alcohol Polymer</td>
<td>&lt;5</td>
<td>(NE)</td>
<td>(NE)</td>
</tr>
<tr>
<td>Hydroxypropyl Amylopectin Phosphate</td>
<td>&lt;5</td>
<td>(NE)</td>
<td>(NE)</td>
</tr>
<tr>
<td>Crystalline Silica</td>
<td>&lt;5</td>
<td>0.025(R)</td>
<td>0.1(R)</td>
</tr>
</tbody>
</table>

(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

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>White to off white</td>
</tr>
<tr>
<td>Odor</td>
<td>Low to no odor</td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>Not Determined</td>
</tr>
<tr>
<td>Physical State</td>
<td>Solid/ Powder</td>
</tr>
<tr>
<td>pH @ 25 °C</td>
<td>~7.5-9</td>
</tr>
<tr>
<td>Melting Point</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Vapor Density (Air = 1)</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Specific Gravity (H₂O = 1)</td>
<td>~2.3 - 2.6</td>
</tr>
<tr>
<td>Solubility in water (g/100g)</td>
<td>~ 0.15 g/100 g</td>
</tr>
<tr>
<td>Partition Coefficient</td>
<td>Not Determined</td>
</tr>
<tr>
<td>Auto-ignition Temp</td>
<td>Not Determined</td>
</tr>
<tr>
<td>Decomposition Temp</td>
<td>Not Determined</td>
</tr>
</tbody>
</table>
**SECTION 10**
CHEMICAL STABILITY AND REACTIVITY

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stability</strong></td>
<td>Stable</td>
</tr>
<tr>
<td><strong>Conditions to Avoid</strong></td>
<td>Contact with incompatibles (see below)</td>
</tr>
<tr>
<td><strong>Incompatibility</strong></td>
<td>None known</td>
</tr>
<tr>
<td><strong>Hazardous Polymerization</strong></td>
<td>None known</td>
</tr>
<tr>
<td><strong>Hazardous Decomposition</strong></td>
<td>Above 800º C – limestone may decompose to calcium oxide (CaO) and carbon dioxide (CO2).</td>
</tr>
</tbody>
</table>

**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
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.

<table>
<thead>
<tr>
<th>Shipping Name</th>
<th>Same as product name.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazard Class</td>
<td>Not classified.</td>
</tr>
<tr>
<td>UN/NA #</td>
<td>None. Not classified.</td>
</tr>
<tr>
<td>Packing Group</td>
<td>None.</td>
</tr>
<tr>
<td>Label (s) Required</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>GGVSec/MDG-Code</td>
<td>Not classified.</td>
</tr>
<tr>
<td>ICAO/IATA-DGR</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>RID/ADR</td>
<td>None.</td>
</tr>
<tr>
<td>ADNR</td>
<td>None.</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>WT%</th>
<th>3 0</th>
<th>3 0</th>
<th>3 1</th>
<th>CERCLA</th>
<th>CAA Sec. 112</th>
<th>RCRA Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limestone</td>
<td>&gt;65</td>
<td>NL</td>
<td>NL</td>
<td>NL</td>
<td>NL</td>
<td>NL</td>
<td>NL</td>
</tr>
<tr>
<td>Or Dolomite</td>
<td></td>
<td>NL</td>
<td>NL</td>
<td>NL</td>
<td>NL</td>
<td>NL</td>
<td>NL</td>
</tr>
<tr>
<td>Mica</td>
<td>&lt;20</td>
<td>NL</td>
<td>NL</td>
<td>NL</td>
<td>NL</td>
<td>NL</td>
<td>NL</td>
</tr>
<tr>
<td>Attapulgite</td>
<td>&lt;5</td>
<td>NL</td>
<td>NL</td>
<td>NL</td>
<td>NL</td>
<td>NL</td>
<td>NL</td>
</tr>
<tr>
<td>Vinyl Alcohol Polymer</td>
<td>&lt;5</td>
<td>NL</td>
<td>NL</td>
<td>NL</td>
<td>NL</td>
<td>NL</td>
<td>NL</td>
</tr>
</tbody>
</table>
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).

<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>WT%</th>
<th>IDL Item #</th>
<th>WHMIS Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limestone</td>
<td>&gt;65</td>
<td>Not Listed</td>
<td>D2A</td>
</tr>
<tr>
<td>Or Dolomite</td>
<td></td>
<td>Not Listed</td>
<td>Not Listed</td>
</tr>
<tr>
<td>Mica</td>
<td>&lt;20</td>
<td>1088</td>
<td>Not Listed</td>
</tr>
<tr>
<td>Attapulgite</td>
<td>&lt;5</td>
<td>Not Listed</td>
<td>Not Listed</td>
</tr>
<tr>
<td>Vinyl Alcohol Polymer</td>
<td>&lt;5</td>
<td>Not Listed</td>
<td>Not Listed</td>
</tr>
<tr>
<td>Hydroxypropyl Amylopectin Phosphate</td>
<td>&lt;5</td>
<td>Not Listed</td>
<td>Not Listed</td>
</tr>
<tr>
<td>Crystalline Silica</td>
<td>&lt;5</td>
<td>1406</td>
<td>D2A</td>
</tr>
</tbody>
</table>

IDL Item#: Canadian Hazardous Products Act – Ingredient Disclosure List Item #
WHMIS Classification: Workplace Hazardous Material Information System

R-Phrase(s): R36/37/38
S-Phrase(s): S51 S38 S39

SECTION 16
OTHER INFORMATION

Label Information

⚠️ 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.
## INFORMATION FOR HANDLING AND IDENTIFICATION OF CHEMICAL HAZARDS

<table>
<thead>
<tr>
<th>NFPA Ratings:</th>
<th>HMIS Ratings:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health: 1</td>
<td>Health: 1</td>
</tr>
<tr>
<td>Fire: 0</td>
<td>Fire: 0</td>
</tr>
<tr>
<td>Reactivity: 0</td>
<td>Reactivity: 0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HEALTH</th>
<th>FLAMMABILITY</th>
<th>PHYSICAL HAZARD</th>
<th>PERSONAL PROTECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>*</td>
<td>1</td>
<td>E</td>
</tr>
</tbody>
</table>

0 = Minimal Hazard  
1 = Slight Hazard  
2 = Moderate Hazard  
3 = Serious Hazard  
4 = Severe Hazard  

E – Safety glasses, gloves and dust respirator; * - Contains silica

### Key/Legend

<table>
<thead>
<tr>
<th>ANSI</th>
<th>American National Standards Institute</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACGIH</td>
<td>American Conference of Governmental Industrial Hygienists</td>
</tr>
<tr>
<td>CAA</td>
<td>Clean Air Act</td>
</tr>
<tr>
<td>CAS</td>
<td>Chemical Abstracts Service (Registry Number)</td>
</tr>
<tr>
<td>CERCLA</td>
<td>Comprehensive Environmental Response, Compensation and Liability Act of 1980</td>
</tr>
<tr>
<td>CFR</td>
<td>Code of Federal Regulations</td>
</tr>
<tr>
<td>DOT</td>
<td>United States Department of Transportation</td>
</tr>
<tr>
<td>DSL</td>
<td>Canadian Domestic Substances List</td>
</tr>
<tr>
<td>EPA</td>
<td>United States Environmental Protection Agency</td>
</tr>
<tr>
<td>EPCRA</td>
<td>Emergency Planning &amp; Community Right-to-know Act</td>
</tr>
<tr>
<td>HMIS</td>
<td>Hazardous Materials Identification System</td>
</tr>
<tr>
<td>IARC</td>
<td>International Agency for Research on Cancer</td>
</tr>
<tr>
<td>MSHA</td>
<td>Mine Safety and Health Administration</td>
</tr>
<tr>
<td>NDSL</td>
<td>Canadian Non-Domestic Substances List</td>
</tr>
<tr>
<td>NFPA</td>
<td>National Fire Protection Association</td>
</tr>
<tr>
<td>NIOSH</td>
<td>National Institute for Occupational Safety and Health</td>
</tr>
<tr>
<td>OSHA</td>
<td>Occupational Health and Safety Administration</td>
</tr>
<tr>
<td>PEL</td>
<td>Permissible Exposure Limit</td>
</tr>
<tr>
<td>PPE</td>
<td>Personal Protection Equipment</td>
</tr>
<tr>
<td>RCRA</td>
<td>Resource Conservation and Recovery Act</td>
</tr>
<tr>
<td>SARA</td>
<td>Superfund Amendments and Reauthorization Act of 1986</td>
</tr>
<tr>
<td>TLV</td>
<td>Threshold Limit Value</td>
</tr>
<tr>
<td>TSCA</td>
<td>Toxic Substances Control Act</td>
</tr>
<tr>
<td>UN/NA#</td>
<td>United Nations/North America number</td>
</tr>
<tr>
<td>WHMIS</td>
<td>Workplace Hazardous Material Information System</td>
</tr>
</tbody>
</table>

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
2-1/16 in. x 250 ft. Drywall Joint Tape
Roll 152120

Model # 152120  Store SKU # 258423

$1.75 / each

Store Only

Buy Online, Pick Up In Store Today
Check Store Inventory +

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
- Watertight 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

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assembled Depth (In.)</td>
<td>6.125 In</td>
</tr>
<tr>
<td>Assembled Height (In.)</td>
<td>2.063 In</td>
</tr>
<tr>
<td>Assembled Width (In.)</td>
<td>6.125 In</td>
</tr>
<tr>
<td>Fiberglass Mesh</td>
<td>No</td>
</tr>
<tr>
<td>Moisture Resistant</td>
<td>No</td>
</tr>
<tr>
<td>Mold Resistant</td>
<td>No</td>
</tr>
<tr>
<td>Perforated</td>
<td>No</td>
</tr>
<tr>
<td>Product Length (ft.)</td>
<td>250 ft</td>
</tr>
<tr>
<td>Product Thickness (mm)</td>
<td>0.009 mm</td>
</tr>
<tr>
<td>Product Weight (lb.)</td>
<td>1.25</td>
</tr>
<tr>
<td>Product Width (In.)</td>
<td>2.065</td>
</tr>
<tr>
<td>Self Adhesive</td>
<td>No</td>
</tr>
</tbody>
</table>
## SECTION 1
### CHEMICAL PRODUCT AND IDENTIFICATION

<table>
<thead>
<tr>
<th>PRODUCT(S)</th>
<th>BEADEX® Drywall Joint Tape</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEMICAL FAMILY / GENERAL CATEGORY</td>
<td>Tape</td>
</tr>
<tr>
<td>SYNONYMS</td>
<td>Cellulose Tape</td>
</tr>
</tbody>
</table>

## SECTION 2
### HAZARD IDENTIFICATION

**EMERGENCY OVERVIEW:**

*CAUTION!* 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.
- **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

<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>IARC</th>
<th>NTP</th>
<th>ACGIH</th>
<th>CAL-65</th>
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</thead>
<tbody>
<tr>
<td>Crystalline silica</td>
<td>1</td>
<td>1</td>
<td>A2</td>
<td>Listed</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>WT%</th>
<th>CAS #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cellulose</td>
<td>&gt;99</td>
<td>9004-34-6</td>
</tr>
<tr>
<td>Limestone</td>
<td>&lt;1</td>
<td>1317-65-3</td>
</tr>
<tr>
<td>Aluminum Sulfate</td>
<td>&lt;1</td>
<td>10043-01-3</td>
</tr>
<tr>
<td>Crystalline Silica</td>
<td>&lt;5</td>
<td>14808-60-7^</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>General Fire Hazards</th>
<th>Emits toxic gases under fire conditions.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extinguishing Media</td>
<td>Water or use extinguishing media appropriate for surrounding fire.</td>
</tr>
<tr>
<td>Special Fire Fighting Procedures</td>
<td>Wear appropriate personal protective equipment. See section 8.</td>
</tr>
<tr>
<td>Unusual Fire/ Explosion Hazards</td>
<td>If paper fiber or dust is dried to bone dry condition, a paper or cellulose dust explosion problem exists.</td>
</tr>
<tr>
<td>Hazardous Fire Combustion Products</td>
<td>Emits toxic gases under fire conditions.</td>
</tr>
<tr>
<td>Flash Point</td>
<td>Not Determined</td>
</tr>
<tr>
<td>Method Used</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Upper Flammable Limit (UFL)</td>
<td>Not Determined</td>
</tr>
<tr>
<td>Lower Flammable Limit (LFL)</td>
<td>Not Determined</td>
</tr>
<tr>
<td>Auto Ignition</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Flammability Classification</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Rate of Burning</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>

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) |
Cellulose &
Limestone & <1 &<1 &<5 &<1
Aluminum Sulfate & Crystalline Silica & 10 & 15(T)/5(R) & 10 & 15(T)/5(R) & 2* & 15(T)/5(R) & 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

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Manila paper in various widths.</td>
</tr>
<tr>
<td>Odor</td>
<td>Low to no odor.</td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>Not Determined</td>
</tr>
<tr>
<td>Physical State</td>
<td>Solid/ Tape</td>
</tr>
<tr>
<td>pH @ 25 º C</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Melting Point</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Freezing Point</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Boiling Point</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Flash Point</td>
<td>Not Determined</td>
</tr>
<tr>
<td>Evaporation Rate (BuAc = 1)</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Upper Flammable Limit (UFL)</td>
<td>Not Determined</td>
</tr>
<tr>
<td>Lower Flammable Limit (LFL)</td>
<td>Not Determined</td>
</tr>
<tr>
<td>Vapor Pressure (mm Hg)</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Vapor Density (Air = 1)</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Specific Gravity (H₂O = 1)</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Solubility in water (g/100g)</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Partition Coefficient</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Auto-ignition Temp</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Decomposition Temp</td>
<td>Not Determined</td>
</tr>
<tr>
<td>Viscosity</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Particle Size</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Bulk Density</td>
<td>Not Determined</td>
</tr>
<tr>
<td>Molecular Weight</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>VOC Content</td>
<td>Zero g/L</td>
</tr>
<tr>
<td>Percent Volatile</td>
<td>Zero</td>
</tr>
</tbody>
</table>

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 | 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.
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.

<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>WT%</th>
<th>302</th>
<th>304</th>
<th>313</th>
<th>CERCLA</th>
<th>CAA Sec. 112</th>
<th>RCRA Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cellulose</td>
<td>&gt;99</td>
<td>NL</td>
<td>NL</td>
<td>NL</td>
<td>NL</td>
<td>NL</td>
<td>NL</td>
</tr>
<tr>
<td>Limestone</td>
<td>&lt;1</td>
<td>NL</td>
<td>NL</td>
<td>NL</td>
<td>NL</td>
<td>NL</td>
<td>NL</td>
</tr>
<tr>
<td>Aluminum Sulfate</td>
<td>&lt;1</td>
<td>NL</td>
<td>NL</td>
<td>NL</td>
<td>5,000NL</td>
<td>NL</td>
<td></td>
</tr>
<tr>
<td>Crystalline Silica</td>
<td>&lt;5</td>
<td>NL</td>
<td>NL</td>
<td>NL</td>
<td>NL</td>
<td>NL</td>
<td></td>
</tr>
</tbody>
</table>

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).

<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>WT%</th>
<th>IDL Item #</th>
<th>WHMIS Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cellulose</td>
<td>&gt;99</td>
<td>Not Listed</td>
<td>Not Listed</td>
</tr>
<tr>
<td>Limestone</td>
<td>&lt;1</td>
<td>Not Listed</td>
<td>D2A</td>
</tr>
<tr>
<td>Aluminum Sulfate</td>
<td>&lt;1</td>
<td>53</td>
<td>D2B</td>
</tr>
<tr>
<td>Crystalline Silica</td>
<td>&lt;5</td>
<td>1406</td>
<td>D2A</td>
</tr>
</tbody>
</table>

IDL Item#: Canadian Hazardous Products Act – Ingredient Disclosure List Item #
WHMIS Classification: Workplace Hazardous Material Information System

R-Phrase(s): None known.
S-Phrase(s): None known.
SECTION 16  OTHER INFORMATION

Label Information

⚠️ CAUTION!

INFORMATION FOR HANDLING AND IDENTIFICATION OF CHEMICAL HAZARDS

<table>
<thead>
<tr>
<th>NFPA Ratings:</th>
<th>HMIS Ratings:</th>
<th>HEALTH</th>
<th>FLAMMABILITY</th>
<th>PHYSICAL HAZARD</th>
<th>PERSONAL PROTECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health: 0</td>
<td>Health: 0</td>
<td>0 = Minimal Hazard</td>
<td>1 = Slight Hazard</td>
<td>2 = Moderate Hazard</td>
<td>3 = Serious Hazard</td>
</tr>
<tr>
<td>Fire: 0</td>
<td>Fire: 0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reactivity: 0</td>
<td>Reactivity: 0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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
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
Lisbon Cork Por do Sol Cork

Comparable Price $1.88/sq. ft.
Our Low Price $1.40/sq. ft.
Special Price $1.22/sq. ft.
Save up to 50.70% (35%)

Your Square Feet: [Blank]
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

Customer Rating

4 Stars
Read 8 Reviews
Write A Review
Customer Images

Product Description

Brand: Lisbon Cork
FLOORING SKU: 100023508
SAMPLE SKU: 100023511
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: 120mm
Thickness: 3 mm
Construction: Cork
Installation Type: Glue
Sq. Ft. Per Box: 115.25
Hardness Rating: N/A
Vitasal: 106
Weight per box/unit: 58.12
Installation Details: Installation Guide.pdf
Catalog Page: Lisbon Cork Catalog Page

Please click here to download Adobe Reader.
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:
• 255 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
<table>
<thead>
<tr>
<th>Plum Creek AC Sanded Plywood</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SPECS</strong></td>
</tr>
<tr>
<td>• Slow growth inland Douglas Fir and Larch yield fine-grained, smooth faces</td>
</tr>
<tr>
<td>• All Group 1, Struc 1 Species</td>
</tr>
<tr>
<td><strong>FACES</strong></td>
</tr>
<tr>
<td>• &quot;A&quot; grade veneer</td>
</tr>
<tr>
<td>• Quality wood plugs or putty repairs, minimal use of polyurethane patch</td>
</tr>
<tr>
<td>• 15 plug average assures the highest face quality</td>
</tr>
<tr>
<td>• Fully sanded face</td>
</tr>
<tr>
<td><strong>BACKS, CENTERS &amp; CORES</strong></td>
</tr>
<tr>
<td>• Plum Creek’s High Integrity Ultra-Core™ construction features composed cross bands for tight core gap tolerance more stringent than APA and industry specs</td>
</tr>
<tr>
<td>• One piece &quot;C&quot; grade or better center and back</td>
</tr>
<tr>
<td><strong>CONSTRUCTION &amp; THICKNESS</strong></td>
</tr>
<tr>
<td>Thickness</td>
</tr>
<tr>
<td>1/4&quot;</td>
</tr>
<tr>
<td>3/8&quot;</td>
</tr>
<tr>
<td>1/2&quot;</td>
</tr>
<tr>
<td>5/8&quot;</td>
</tr>
<tr>
<td>3/4&quot;</td>
</tr>
<tr>
<td>• Standard size 4' x 8'</td>
</tr>
<tr>
<td>• Panel thickness to 1 1/2&quot;</td>
</tr>
<tr>
<td>• Solid long length to 102&quot;</td>
</tr>
<tr>
<td>• Scarfed panels to 16'</td>
</tr>
<tr>
<td>• Tongue and groove available on 5/8&quot; - 1 1/8&quot;</td>
</tr>
<tr>
<td>• Underlayment stamp available</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color in Container</td>
<td>Milky White</td>
</tr>
<tr>
<td>Clarity (Dry)</td>
<td>Crystal</td>
</tr>
<tr>
<td>Solids Content</td>
<td>28.5%</td>
</tr>
<tr>
<td>Chemical Resistance</td>
<td>No visual defects</td>
</tr>
<tr>
<td>VOC</td>
<td>Coating: ≤180 g/L (wet) Material: 58 g/L (dry)</td>
</tr>
<tr>
<td>Flash Point</td>
<td>None</td>
</tr>
<tr>
<td>Sheen</td>
<td>Semi-Gloss: 45 units (±5) @ 60° Satin: 20 units (±5) @ 60°</td>
</tr>
<tr>
<td>Freeze/Thaw Stability</td>
<td>Do not freeze</td>
</tr>
<tr>
<td>Pot Life</td>
<td>12 months from date of manufacture</td>
</tr>
<tr>
<td>Dry Time</td>
<td>1-2 hours under normal conditions</td>
</tr>
<tr>
<td>Clean Up</td>
<td>Soap and hot water</td>
</tr>
<tr>
<td>Scent</td>
<td>Neutral</td>
</tr>
<tr>
<td>Boiling Point</td>
<td>212°F</td>
</tr>
<tr>
<td>Maximum Cure</td>
<td>One week</td>
</tr>
<tr>
<td>Coverage</td>
<td>500-600 sq. ft. per gallon</td>
</tr>
</tbody>
</table>

Packaging

Quart, gallon, five gallon, 55-gallon drum
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, 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), taking care to prevent the finish from puddling.
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
### SECTION I - MANUFACTURER IDENTIFICATION

- **Manufacturer's Name:** Vermont Natural Coatings
- **Information Phone:** (802) 472-8700
- **Address:** Box 512, Hardwick, VT 05843
- **Emergency Phone:** (802) 472-8700
- **Replaces:** 1/1/07
- **Date Revised:** April 21, 2009
- **Date of Issue:** 5/24/08

### SECTION II - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

<table>
<thead>
<tr>
<th>OCCUPATIONAL EXPOSURE LIMITS</th>
<th>VAPOR PRESSURE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mm Hg @ TEMP</td>
</tr>
<tr>
<td>CAS NUMBER</td>
<td>OSHA PEL</td>
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<tr>
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<td>---------</td>
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<tr>
<td>DIPROPYLENE GLYCOL MONOMETHYL ETHER</td>
<td>34590-94-8</td>
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<tr>
<td>TRIPROPYLENE GLYCOL METHYL ETHER</td>
<td>25498-49-1</td>
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<tr>
<td>TRIETHYLAMINE</td>
<td>121-44-8</td>
</tr>
<tr>
<td>DIPROPYLENE GLYCOL BUTYL ETHER</td>
<td>29911-28-2</td>
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</table>

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
- **Melting Point:** Greater than 32 Deg. F
- **Vapor Density:** Heavier than air
- **Solubility In Water:** Dilutable
- **Vapor Pressure:** Less than 1 mm Hg
- **Specific Gravity (H2O=1):** 1.0
- **Appearance And Odor:** Milky liquid with slight odor.
- **Evaporation Rate:** Slower than ether
- **Coating V.O.C.:** 1.50 Lb/Gl (180 Gr/Lt)
- **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
- **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 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
**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

**SPECIFICATIONS**

**Block**
1 ct. Loxon Block Surfacer*
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.
**SURFACE PREPARATION**

**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.

**Wood**
Sand any exposed wood to a fresh surface. Patch all holes and imperfections with a wood filler or putty and sand smooth.

**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.

**Caulking**
Gaps between walls, ceilings, crown moldings, and other interior trim can be filled with the appropriate caulk after priming the surface.

**APPLICATION**

<table>
<thead>
<tr>
<th>Method</th>
<th>Pressure</th>
<th>Tip</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brush</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roller</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spray—Airless</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Apply at temperatures above 50°F. No reduction necessary.

**Brush**—Use a nylon/polyester brush.

**Roller**—Use a 3/8" - 3/4" nap synthetic roller cover.

**Spray—Airless**
Pressure.................................. 2000 psi
Tip ......................................  .013"-.017"

**CLEANUP INFORMATION**

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.

**CAUTIONS**

For interior use only. Protect from freezing. Non-photochemically reactive.

**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.

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.
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

SECTION 2 — COMPOSITION/INFORMATION ON INGREDIENTS

% by Weight | CAS Number | Ingredient | Units | Vapor Pressure
-------------|------------|------------|-------|------------------
0.1 | 13463-41-7 | Zinc Pyrithione | | ACIGI TLV Not Available
| | | | OSHA PEL Not Available
14 | 13463-67-7 | Titanium Dioxide | | ACIGI 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.

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
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, underlyng 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

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<th>Value</th>
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<tr>
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<tr>
<td>pH</td>
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<td>VOLATILE ORGANIC COMPOUNDS (VOC Theoretical - As Packaged)</td>
<td>0.01 lb/gal 1 g/l Less Water and Federally Exempt Solvents</td>
<td>0.00 lb/gal 0 g/l Emitted VOC</td>
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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

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<td>Zinc Pyrithione</td>
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<td>177 mg/kg</td>
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<td>13463-67-7</td>
<td>Titanium Dioxide</td>
<td>LC50 RAT 4HR</td>
<td>LD50 RAT 4HR</td>
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</table>

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
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.

Features

**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

Related Products
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

2. COMPOSITION INFORMATION ON COMPONENTS

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<thead>
<tr>
<th>Hazardous Components</th>
<th>Chemical Name</th>
<th>CAS-No</th>
<th>Weight % (max)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tung Oil</td>
<td>8001-20-5</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Distillates, petroleum, hydrotreated light</td>
<td>64742-47-8</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>4-Chlorobenzotrifluoride</td>
<td>98-56-6</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Stoddard solvent</td>
<td>8052-41-3</td>
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<tr>
<td></td>
<td>Silica, amorphous</td>
<td>7631-86-9</td>
<td>10</td>
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<tr>
<td></td>
<td>Titanium dioxide</td>
<td>13463-67-7</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Zinc borate hydrate</td>
<td>138265-88-0</td>
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</tr>
<tr>
<td></td>
<td>Ethyl benzene</td>
<td>100-41-4</td>
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<tr>
<td></td>
<td>2-Butoxyethanol</td>
<td>111-76-2</td>
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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

<table>
<thead>
<tr>
<th>Flash Point (°F)</th>
<th>Flash Point (°C)</th>
<th>Flash Point Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>107</td>
<td>42</td>
<td>PMCC</td>
</tr>
</tbody>
</table>

Flammability Limits In Air

<table>
<thead>
<tr>
<th>Lower Explosion Limit</th>
<th>Upper Explosion Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not available</td>
<td>Not available</td>
</tr>
</tbody>
</table>

NFPA

<table>
<thead>
<tr>
<th>Health: 1</th>
<th>Flammability: 2</th>
<th>Instability: 0</th>
<th>Special: Not Applicable</th>
</tr>
</thead>
</table>

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

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>ACGIH</th>
<th>OSHA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tung Oil</td>
<td>N/E</td>
<td>N/E</td>
</tr>
<tr>
<td>Distillates, petroleum, hydrotreated light</td>
<td>N/E</td>
<td>N/E</td>
</tr>
<tr>
<td>4-Chlorobenzotrifluoride</td>
<td>2.5 mg/m³ - TWA</td>
<td>2.5 mg/m³ - TWA</td>
</tr>
<tr>
<td>Stoddard solvent</td>
<td>100 ppm - TWA</td>
<td>2900 mg/m³ - TWA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>500 ppm - TWA</td>
</tr>
<tr>
<td>Silica, amorphous</td>
<td>N/E</td>
<td>- (80)(% SiO2) mg/m³ TWA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 mppcf - TWA</td>
</tr>
<tr>
<td>Titanium dioxide</td>
<td>10 mg/m³ - TWA</td>
<td>15 mg/m³ - TWA total</td>
</tr>
<tr>
<td>Zinc borate hydrate</td>
<td>N/E</td>
<td>N/E</td>
</tr>
<tr>
<td>Ethyl benzene</td>
<td>100 ppm - TWA</td>
<td>100 ppm - TWA</td>
</tr>
<tr>
<td></td>
<td>125 ppm - STEL</td>
<td>435 mg/m³ - TWA</td>
</tr>
<tr>
<td>2-Butoxyethanol</td>
<td>20 ppm - TWA</td>
<td>240 mg/m³ - TWA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50 ppm - TWA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>prevent or reduce skin absorption</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>liquid</td>
</tr>
<tr>
<td>Odor</td>
<td>solvent</td>
</tr>
<tr>
<td>Density (lbs/gal)</td>
<td>8.0 - 8.4</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>0.95 - 1.01</td>
</tr>
<tr>
<td>pH</td>
<td>Not available</td>
</tr>
<tr>
<td>Viscosity (centistokes)</td>
<td>Not available</td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>Not available</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>Not available</td>
</tr>
<tr>
<td>Vapor Density</td>
<td>Not available</td>
</tr>
<tr>
<td>Wt. % Solids</td>
<td>50 - 60</td>
</tr>
<tr>
<td>Vol. % Solids</td>
<td>45 - 55</td>
</tr>
<tr>
<td>Wt. % Volatiles</td>
<td>40 - 50</td>
</tr>
<tr>
<td>Vol. % Volatiles</td>
<td>45 - 55</td>
</tr>
<tr>
<td>VOC Regulatory Limit (g/L)</td>
<td>&lt; 350</td>
</tr>
<tr>
<td>Boiling Point (°F)</td>
<td>279</td>
</tr>
<tr>
<td>Boiling Point (°C)</td>
<td>137</td>
</tr>
<tr>
<td>Freezing Point (°F)</td>
<td>Not available</td>
</tr>
<tr>
<td>Freezing Point (°C)</td>
<td>Not available</td>
</tr>
<tr>
<td>Flash Point (°F)</td>
<td>107</td>
</tr>
<tr>
<td>Flash Point (°C)</td>
<td>42</td>
</tr>
<tr>
<td>Flash Point Method</td>
<td>PMCC</td>
</tr>
<tr>
<td>Upper Explosion Limit</td>
<td>Not available</td>
</tr>
<tr>
<td>Lower Explosion Limit</td>
<td>Not available</td>
</tr>
</tbody>
</table>

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.)
Chronic Toxicity

Carcinogenicity
The information below indicates whether each agency has listed any ingredient as a carcinogen:

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>ACGIH</th>
<th>IARC</th>
<th>NTP</th>
<th>OSHA Carcinogen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Titanium dioxide</td>
<td></td>
<td>2B - Possible Human Carcinogen</td>
<td>Listed</td>
<td></td>
</tr>
<tr>
<td>Ethyl benzene</td>
<td></td>
<td>A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans</td>
<td>2B - Possible Human Carcinogen</td>
<td>Listed</td>
</tr>
<tr>
<td>2-Butoxyethanol</td>
<td></td>
<td>A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

• 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

<table>
<thead>
<tr>
<th>Hazard Category</th>
<th>Yes/No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Health Hazard</td>
<td>Yes</td>
</tr>
<tr>
<td>Chronic Health Hazard</td>
<td>Yes</td>
</tr>
<tr>
<td>Fire Hazard</td>
<td>Yes</td>
</tr>
<tr>
<td>Sudden Release of Pressure Hazard</td>
<td>No</td>
</tr>
<tr>
<td>Reactive Hazard</td>
<td>No</td>
</tr>
</tbody>
</table>

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:

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS-No</th>
<th>Weight % (max)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zinc borate hydrate</td>
<td>138265-88-0</td>
<td>5</td>
</tr>
<tr>
<td>Ethyl benzene</td>
<td>100-41-4</td>
<td>0.5</td>
</tr>
<tr>
<td>2-Butoxyethanol</td>
<td>111-76-2</td>
<td>0.5</td>
</tr>
</tbody>
</table>

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:
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

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Massachusetts</th>
<th>New Jersey</th>
<th>Pennsylvania</th>
<th>Louisiana</th>
<th>Rhode Island</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-Chlorobenzotrifluoride</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Stoddard solvent</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Silica, amorphous</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Titanium dioxide</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Zinc borate hydrate</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Ethyl benzene</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>2-Butoxyethanol</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

This product may contain trace amounts of (other) HAPs chemicals. Contact the preparer for further information.

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**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color in Container</td>
<td>Caspian Clear: bluish-gray</td>
</tr>
<tr>
<td></td>
<td>Acorn Brown: brown</td>
</tr>
<tr>
<td></td>
<td>Lakeside Cedar: tan</td>
</tr>
<tr>
<td></td>
<td>Autumn Red: rust red</td>
</tr>
<tr>
<td>Clarity (Dry)</td>
<td>Transparent</td>
</tr>
<tr>
<td></td>
<td>Semi-transparent</td>
</tr>
<tr>
<td>Solids (volume)</td>
<td>≥ 26%</td>
</tr>
<tr>
<td>Solids (weight)</td>
<td>≥ 29%</td>
</tr>
<tr>
<td>Solvent type</td>
<td>Water</td>
</tr>
<tr>
<td>VOC: Coating Material:</td>
<td>≤ 95 g/L (wet)</td>
</tr>
<tr>
<td></td>
<td>≤ 48 g/L (dry)</td>
</tr>
</tbody>
</table>

**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
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.
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 website 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
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
Information Phone: (802) 472-8700
Emergency Phone: (802) 472-8700
Date Revised: June 29, 2010
Date of Issue: June 29, 2010

SECTION II - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

HAZARDOUS COMPONENTS

<table>
<thead>
<tr>
<th>CAS NUMBER</th>
<th>OCCUPATIONAL EXPOSURE LIMITS</th>
<th>VAPOR PRESSURE</th>
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<tbody>
<tr>
<td></td>
<td>OSHA PEL</td>
<td>ACGIH TLV</td>
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<tr>
<td>TRIETHYLAMINE</td>
<td>121-44-8</td>
<td>10PPM</td>
</tr>
<tr>
<td>DIPROPYLENE GLYCOL N-BUTYL ETHER</td>
<td>29911-28-2</td>
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<tr>
<td>C. L PIGMENT WHITE 6</td>
<td>13463-67-7</td>
<td>3PPM</td>
</tr>
<tr>
<td>C. L PIGMENT YELLOW 42</td>
<td>51274-00-1</td>
<td>0.7PPM</td>
</tr>
<tr>
<td>IRON OXIDE</td>
<td>1317-60-8</td>
<td>0.8PPM</td>
</tr>
<tr>
<td>C. L PIGMENT BLACK 7</td>
<td>1333-86-4</td>
<td>20PPM</td>
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</tbody>
</table>

Contains one or more toxic chemicals subject to the reporting requirements of SARA, 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/moxygen 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 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/HYGIE NIC 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
4 x 4 x 8 #2 Pine Pressure-Treated Lumber

Model #: 256276  Store SKU #: 256276

Write a Review

$7.77 / each

Store Only

Buy Online, Pick Up In Store Today
Check Store Inventory

PRODUCT OVERVIEW

This 4 in. x 4 in. x 0.5 ft. Pressure-Treated Pine Lumber features a microritized 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, stairs, 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 0.5 ft.
- Can be painted or stained
- Ground contact allowed
- Pressure-treated lumber, pine pressure-treated lumber, dimension lumber, pine dimension lumber
- This can be painted or stained features a microritized 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 #: 4210234

SPECIFICATIONS

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<thead>
<tr>
<th>Actual product thickness (in.)</th>
<th>Actual product width (in.)</th>
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<td>3.5</td>
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<table>
<thead>
<tr>
<th>Assembled Depth (in.)</th>
<th>Assembled Height (in.)</th>
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<td>5.5 in.</td>
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<th>Assembled Width (in.)</th>
<th>Chemical retention (lb/cu. ft.)</th>
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<td>.16</td>
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<table>
<thead>
<tr>
<th>Contact Type Allowed</th>
<th>Fastener recommendation</th>
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</thead>
<tbody>
<tr>
<td>Ground Contact</td>
<td>Hot Dipped Galvanized or Stainless Steel</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Lumber quality</th>
<th>Manufacturer Warranty</th>
<th>Lifetime Limited Warranty Against Rot, Decay, and Termites</th>
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<tbody>
<tr>
<td>Premium</td>
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<table>
<thead>
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<th>Nominal Length</th>
<th>Nominal Product H x W (in.)</th>
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<td>96 in.</td>
<td>4x4</td>
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<table>
<thead>
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<th>Nominal Product Height (in.)</th>
<th>Nominal Product Length (ft.)</th>
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<td>8</td>
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<th>Nominal Width</th>
<th>Nominal product width (in.)</th>
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<td>4</td>
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</table>

<table>
<thead>
<tr>
<th>Portion of product made from wood (%)</th>
<th>Product Length (ft.)</th>
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<td>100</td>
<td>0.8 ft.</td>
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<table>
<thead>
<tr>
<th>Product Length (in.)</th>
<th>Texture</th>
<th>Type of Pressure Treatment</th>
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<tr>
<td>96</td>
<td>Smooth</td>
<td>MCA - Micronized Copper Azole</td>
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</tbody>
</table>

| Water Resistant | No      |
PVC SCHEDULE 40 DRAINAGE PIPE

Location: Kiosk
Dimensions: 8.625” Outside Diameter
Circumference: 27.0825”
Height: 16”
**Schedule 40 PVC Pipe Specifications**

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>O.D.</th>
<th>A.D.</th>
<th>MIN WALL</th>
<th>NOM WEIGHT</th>
<th>MAX WT/LF</th>
<th>LP PSI</th>
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<tr>
<td>1/8&quot;</td>
<td>.405</td>
<td>.248</td>
<td>.066</td>
<td>.051</td>
<td>610</td>
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<tr>
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<td>.344</td>
<td>.088</td>
<td>.088</td>
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<tr>
<td>3/8&quot;</td>
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<td>.473</td>
<td>.101</td>
<td>.115</td>
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<td>.129</td>
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<td>.153</td>
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<td>1.028</td>
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<td>.333</td>
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<td>1.360</td>
<td>.214</td>
<td>.420</td>
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<td>1 1/4&quot;</td>
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<td>1.660</td>
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<td>33.882</td>
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</tr>
</tbody>
</table>
L BRACKETS

Location: Kiosk
Dimensions: 1.5” X 1.5”
**PRODUCT OVERVIEW**

The Everbilt 1-1/2 in. Zinc-Plated 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
- MPG Model #: 16304
- MPG Part #: 16504

**SPECIFICATIONS**

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<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
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</tr>
<tr>
<td>Assembled Height (in.)</td>
<td>1.5 in</td>
</tr>
<tr>
<td>Assembled Width (in.)</td>
<td>0.5 in</td>
</tr>
<tr>
<td>Builders Hardware Product Type</td>
<td>Mending Plates</td>
</tr>
<tr>
<td>Gauge</td>
<td>3</td>
</tr>
<tr>
<td>Material</td>
<td>Steel</td>
</tr>
<tr>
<td>Number of pieces</td>
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</tr>
<tr>
<td>Number of mounting holes</td>
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</tr>
<tr>
<td>Product Height (in.)</td>
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</tr>
<tr>
<td>Product Thickness (in.)</td>
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</tr>
<tr>
<td>Product Weight (lb)</td>
<td>0.1</td>
</tr>
<tr>
<td>Product Width (in.)</td>
<td>0.5 in</td>
</tr>
<tr>
<td>Type</td>
<td>Corner brace</td>
</tr>
</tbody>
</table>

**Info & Guides**

Installation Guide

You will need Adobe® Acrobat® Reader to view PDF documents. Download a free copy from the Adobe® Web site.
POLYCARBONATE

Location: Kiosk
Dimensions: 1/8” x 1 3/4”
LEXAN 12 in. x 24 in. Clear Polycarbonate Sheet

Model #: GE-33  Internet #: 202038063  Store SKU #: 987359

Quantity: 1
- Ship to Home Free (with $45.00 Order)
- Pick Up In Store Free
- Available TODAY
- 18 In stock at Williston
- Change Pick-Up Store

Write a Review
$14.28 / each

This item cannot be shipped to the following states: GU, PR, VI

Ships FREE with $45.00 Order
Buy Online, Pick Up In Store Today

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

SPECIFICATIONS

| Assembled Depth (In.) | 24 In |
| Assembled Height (In.) | 0.093 In |
| Mirrored | No |
| Product Length (In.) | 12 In |
| Product Weight (lb.) | 1.16 |
| Returnable | 90-Day |
| Surface Type | Clear |

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.

CUSTOMERS WHO VIEWED THIS ITEM PURCHASED...

- $9.88
  - Husky 10-Piece T-Handle Wrench Set DISCONTINUED
  - (3)

- $23.70
  - Screw-It Tile Binging and Twin Thread Multi-Purpose Wood Screw #14
  - Assorted meters

- $167.00

Return To Top

ADD TO CART
HIGH DENSITY OVERLAY

Location: Kiosk
Thickness: 3/4”
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.

<table>
<thead>
<tr>
<th>Material</th>
<th>Percent of Production</th>
<th>Percent of Energy Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wood</td>
<td>47</td>
<td>4</td>
</tr>
<tr>
<td>Steel</td>
<td>23</td>
<td>48</td>
</tr>
<tr>
<td>Aluminum</td>
<td>2</td>
<td>8</td>
</tr>
</tbody>
</table>

- 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.
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 Overlay (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.

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.

**Industry**

There is virtually no limit to the industrial uses of HDO and MDO. Because HDO requires no painting and resists scuffs, mars 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.
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.

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>
<thead>
<tr>
<th>Panel Performance Category</th>
<th>Across Grain (ft.)</th>
<th>Parallel to Grain (ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>5/16</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>3/8</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>1/2</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>5/8</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td>3/4</td>
<td>12</td>
<td>20</td>
</tr>
</tbody>
</table>
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**

<table>
<thead>
<tr>
<th>Product</th>
<th>Surface Finish</th>
<th>Perms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exterior-type Plywood (3/8 Performance Category)</td>
<td>None</td>
<td>0.8</td>
</tr>
<tr>
<td>Exterior-type Plywood (3/8 Performance Category)</td>
<td>One coat exterior primer plus two coats exterior house paint (oil system)</td>
<td>0.2</td>
</tr>
<tr>
<td>Exterior Medium Density Overlay Plywood One Side (3/8 Performance Category)</td>
<td>None</td>
<td>0.3</td>
</tr>
<tr>
<td>Exterior High Density Overlay Plywood Both Sides (1/2 and 5/8 Performance Categories)</td>
<td>None</td>
<td>0.1</td>
</tr>
</tbody>
</table>

### TABLE 3

**APPROXIMATE THERMAL RESISTANCE OF PLYWOOD**

<table>
<thead>
<tr>
<th>Panel Performance Category</th>
<th>“R Value”UH (Degrees F/hr-sq ft/Blu)</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/32</td>
<td>0.43</td>
</tr>
<tr>
<td>3/8</td>
<td>0.47</td>
</tr>
<tr>
<td>15/32</td>
<td>0.59</td>
</tr>
<tr>
<td>1/2</td>
<td>0.62</td>
</tr>
<tr>
<td>19/32</td>
<td>0.74</td>
</tr>
<tr>
<td>5/8</td>
<td>0.78</td>
</tr>
<tr>
<td>23/32</td>
<td>0.90</td>
</tr>
<tr>
<td>3/4</td>
<td>0.94</td>
</tr>
</tbody>
</table>

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 TenHulda, A., J. D. McNatt, and L. Krain. 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/87-2169/1. 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, alkalis, 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>
<thead>
<tr>
<th>Reagent</th>
<th>Effect on HDO-Industrial</th>
<th>Effect on MDO-General</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amyl Acetate</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Acetic Acid 10% and 99.5%</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Acetone</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Amyl Alcohol</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Benzene</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Calcium Hypochlorite 30%</td>
<td>N</td>
<td>D-red-brown</td>
</tr>
<tr>
<td>Carbon Tetrachloride</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Chloroform</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Cresol</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Formalin 37%</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Formic Acid 88-90%</td>
<td>S, D-grey</td>
<td>R, S, D-yellow-red</td>
</tr>
<tr>
<td>Hydrochloric Acid 10%</td>
<td>N</td>
<td>S, D-yellow-brown</td>
</tr>
<tr>
<td>Hydrochloric Acid 37%</td>
<td>S, R, D-pink</td>
<td>S, R, D-red-brown</td>
</tr>
<tr>
<td>Hydrogen Peroxide 30%</td>
<td>N</td>
<td>D, yellow</td>
</tr>
<tr>
<td>Methyl Alcohol</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Monochlorobenzene</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Nitric Acid 1%</td>
<td>D-brown</td>
<td>D-yellow</td>
</tr>
<tr>
<td>Nitric Acid 5%</td>
<td>S, R, D-brown</td>
<td>S, D-yellow-brown</td>
</tr>
<tr>
<td>Nitric Acid 30%</td>
<td>S, R, D-brown</td>
<td>R, S, D-yellow-brown</td>
</tr>
<tr>
<td>Nitric Acid 70%</td>
<td>S-to plywood, R, D-brown (surface gone)</td>
<td>R, S, D-orange-yellow</td>
</tr>
<tr>
<td>Phosphoric Acid 85%</td>
<td>S, R</td>
<td>R, S, D-yellow-red-brown</td>
</tr>
<tr>
<td>Soapless Detergent (Dreme)</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Sodium Carbonate 25%</td>
<td>D-brown</td>
<td>D-red-brown</td>
</tr>
<tr>
<td>Sodium Chloride 10%</td>
<td>N</td>
<td>D-yellow-brown</td>
</tr>
<tr>
<td>Sodium Chloride 25%</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Sodium Hydroxide 1%</td>
<td>D-red-brown</td>
<td>R, S, D-red-brown</td>
</tr>
<tr>
<td>Sodium Hydroxide 30%</td>
<td>S, R, D-brown</td>
<td>R, S, D-red-orange</td>
</tr>
<tr>
<td>Sulfuric Acid 10%</td>
<td>N</td>
<td>R, S, D-yellow-purple</td>
</tr>
<tr>
<td>Sulfuric Acid 35%</td>
<td>N</td>
<td>R, S, D-yellow-purple</td>
</tr>
<tr>
<td>Sulfuric Acid 50%</td>
<td>D-pink-orange</td>
<td>R, S, D-yellow-purple</td>
</tr>
<tr>
<td>Sulfuric Acid 70%</td>
<td>S, R, D-brown</td>
<td>R, S, D-yellow-purple</td>
</tr>
<tr>
<td>Sulfuric Acid 97%</td>
<td>S, R, D-black</td>
<td>R, S, D-yellow-purple</td>
</tr>
<tr>
<td>Zinc Chloride 50%</td>
<td>N</td>
<td>D-brown</td>
</tr>
</tbody>
</table>
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.

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. Predrill 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 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 practicable 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, glu-lam 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
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".

<table>
<thead>
<tr>
<th>Dia</th>
<th>Pkg. Qty</th>
<th>Pkg.</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
<tr>
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<td>1/8&quot;</td>
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<td>100</td>
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<td>25</td>
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<tr>
<td>3/8&quot;</td>
<td>25</td>
<td>9291K31</td>
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<td>9291K38</td>
</tr>
<tr>
<td>1&quot;</td>
<td>1</td>
<td>9291K39</td>
</tr>
</tbody>
</table>
ACRYLIC

Location: Kiosk
Thickness: 1.4”
OPTIX 24" x 18" Clear Acrylic

$19.97

Specifications:
- Length (Feet): 2.0
- Thickness (Inches): 0.22
- Impact Strength: 0.4
- Color: Clear
- UV Stabilized: Yes
- Color Family: Clear

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"
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

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, mounding 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

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.) | 1 x 3 |
| 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 |
BENJAMIN MOORE STUDIO FINISHES

Model Number: 308
Location: Office Wall Chalkboard
Finish: Chalkboard Paint
### 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

<table>
<thead>
<tr>
<th>Colors — Standard:</th>
<th>Technical Data◊</th>
<th>Base 1X</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td>Vehicle Type</td>
<td>100% Acrylic</td>
</tr>
<tr>
<td></td>
<td>Pigment Type</td>
<td>Titanium Dioxide</td>
</tr>
<tr>
<td></td>
<td>Volume Solids</td>
<td>40%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>— Tint Bases:</th>
<th>Coverage per quart at Recommended Film Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>1X, 2X, 3X and 4X</td>
<td>100 – 110 Sq. Ft.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>— Special Colors:</th>
<th>Recommended Film Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>– Wet 3.8 mls</td>
</tr>
<tr>
<td></td>
<td>– Dry 1.5 mls</td>
</tr>
</tbody>
</table>

### Certification
- Very low in VOC’s
- VOC compliant in all regulated areas

### Qualifies for LEED® Credit
(INTERIOR NON-FLAT)

### 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.

### Technical Data
- **Dry Time @ 77° F (25° C) @ 50% RH**
  - To Touch: 2 Hours
  - 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
- Max. 90° F

### Thin With
- Clean Water

### Clean Up Thinner
- Clean Water

### Weight Per Gallon
- 10.5 lbs

### Storage Temperature
- Min. 40° F
- Max. 90° F

### Volatile Organic Compounds (VOC)
- 2 Grams/Liter 0.017 lbs./Gallon

◊ Reported values are for Base 1X. Contact Benjamin Moore for values of other bases or colors.
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

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

2. COMPOSITION INFORMATION ON COMPONENTS

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS-No</th>
<th>Weight % (max)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nepheline syenite</td>
<td>37244-96-5</td>
<td>30</td>
</tr>
<tr>
<td>Titanium dioxide</td>
<td>13463-67-7</td>
<td>20</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>NFPA</th>
<th>Health: 1</th>
<th>Flammability: 0</th>
<th>Instability: 0</th>
<th>Special: Not Applicable</th>
</tr>
</thead>
</table>

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**

<table>
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<tr>
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<th>Chemical Name</th>
<th>ACGIH</th>
<th>OSHA</th>
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<tr>
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<td>Nepheline syenite</td>
<td>N/E</td>
<td>5 mg/m³ - TWA (nuisance dust)</td>
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<tr>
<td></td>
<td>Titanium dioxide</td>
<td>10 mg/m³ - TWA</td>
<td>15 mg/m³ - TWA total</td>
</tr>
</tbody>
</table>
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

<table>
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<tr>
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<th>Value</th>
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<tr>
<td>Odor</td>
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<tr>
<td>Density (lbs/gal)</td>
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<tr>
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<tr>
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<tr>
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<tr>
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<tr>
<td>Wt. % Volatiles</td>
<td>30 - 50</td>
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<td>Vol. % Volatiles</td>
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<tr>
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<tr>
<td>Boiling Point (*C)</td>
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<tr>
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</tr>
<tr>
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<tr>
<td>Flash Point Method</td>
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<tr>
<td>Upper Explosion Limit</td>
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<tr>
<td>Lower Explosion Limit</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

### 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:

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>ACGIH</th>
<th>IARC</th>
<th>NTP</th>
<th>OSHA Carcinogen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Titanium dioxide</td>
<td></td>
<td>2B - Possible Human Carcinogen</td>
<td>Listed</td>
<td></td>
</tr>
</tbody>
</table>

- 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

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Massachusetts</th>
<th>New Jersey</th>
<th>Pennsylvania</th>
<th>Louisiana</th>
<th>Rhode Island</th>
</tr>
</thead>
<tbody>
<tr>
<td>Titanium dioxide</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

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

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
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"

SPECIFICATIONS

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Collection</td>
<td>N/A</td>
</tr>
<tr>
<td>CTC (inches)</td>
<td>N/A</td>
</tr>
<tr>
<td>Length (inches)</td>
<td>1.312</td>
</tr>
<tr>
<td>CTC (mm)</td>
<td>N/A</td>
</tr>
<tr>
<td>Finish</td>
<td>Permabrite Zinc</td>
</tr>
<tr>
<td>Width Inches</td>
<td>0.25</td>
</tr>
<tr>
<td>Width (mm)</td>
<td>6.35</td>
</tr>
<tr>
<td>Projection (mm)</td>
<td>12.7</td>
</tr>
</tbody>
</table>
BLUM 170 DEGREE SNAP CLOSE CLIP TOP FRAMELESS OVERLAY HINGES

Model: 55840
Location: Desk of Office Wall
Finish: Nickel
Blum® 170° Snap Close Clip Top Frameless Overlay Hinges

$17.99 Pair

Average Rating: ★★★★★ (15 customer reviews)

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-dose 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...
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
Plexiglass Sheets in Clear 1/8"x24"x48" sheet

Item ID: ACRYCLR10.125PM24X48
.125"x24"x48" Clear Plexiglass Acrylic Sheet Paper Masked

Item Weight: 5.85 lb
Sales Unit: Each

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Price each</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$35.31</td>
</tr>
<tr>
<td>3</td>
<td>$31.85</td>
</tr>
<tr>
<td>10</td>
<td>$28.28</td>
</tr>
<tr>
<td>25</td>
<td>$25.48</td>
</tr>
</tbody>
</table>

Need this cut?
Please enter the sizes you would like in the cutting box.
Be sure to add a Labor line – click HERE

Qty: [ ] Add to Cart
1" X 6" TRANSOM FRAMING MATERIAL

Location: Auxiliary Bedroom Transom
Dimensions:
  Thickness: 3/4"
  Width: 5.5"
Species: Pine
1 x 6 x 6 Select Pine Lumber

Model #: 925787  Store SKU #: 925787

Rating: ★★★★★ (1)  |  Write a Review

$13.12 / each

Store Only

Buy Online, Pick Up In Store Today
Check Store Inventory

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 usable 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 trimmouldings, 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 #: 925787
- MFG Part #: 925787

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.)   | 1 x 6 |
| Nominal Product Height (in.)  | 1 |
| Nominal Product Width (in.)   | 6 |
| Nominal Width                 | 6 In |
| Nominal product width (in.)   | 6 |
| Portion of product made from wood (%) | 100 |
| Primed                        | No |
| Product Length (ft.)          | 6 |
| Product Length (in.)          | 72 In |
| Texture                       | Smooth |
| Water Resistant               | No |
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
**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
- Downloads for this product:
  - Assembly instructions

Key features
- Concealed suspension hardware.

Designer:
Cecilia Stoop

Package measurement and weight
Package: 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
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 description
Cover: Stainless steel
Knob: Stainless steel, Stainless steel
Main parts: Polyamide

Product dimensions
Package quantity: 2 pack

This product requires assembly

Documents
Download for this product:
Assembly Instructions

Key features
- Concealed suspension hardware.

Designer:
Mikael Warnhammer

Package measurement and weight
Packet(s): 1
Article Number: 300.612.47
Width: 2 1/2"
Height: 1 1/4"
Length: 3 1/4"
Weight: 0 lb
Quantity: 1

Article Number: 300.612.47
Width: 6 cm
Height: 3 cm
Length: 8 cm
Weight: 0.1 kg
Quantity: 1
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  
OK

Store selection may vary and prices may differ from those online.

Assembly instructions

Downloads

Services

Home furnishing advice

Matching Products  Product information

LILHOLMEN
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 1/4 "
Width: 5 "

Length: 14,5 cm
Width: 12,5 cm

This product requires assembly

Documents

Downloads for this product:
Assembly instructions

Designer:
Cecilia Stöpp

Package measurement and weight
Packages: 1
Article Number: 501.493.86
Width: 6"
Height: 1 5/8"
Length: 6 1/8"
Weight: 1 lb
Quantity: 1

Article Number: 501.493.86
Width: 13 cm
Height: 4 cm
Length: 16 cm
Weight: 0.3 kg
Quantity: 1

Go to LILHOLMEN 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
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

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Assembled Depth (in.)</th>
<th>3.25 in</th>
<th>Assembled Height (in.)</th>
<th>13.75 in</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assembled Width (in.)</td>
<td>4.75 in</td>
<td>Electrical Product Type</td>
<td>Fire Extinguisher</td>
</tr>
<tr>
<td>Item Package Type</td>
<td>Cardboard Container</td>
<td>Returnable</td>
<td>90-Day</td>
</tr>
</tbody>
</table>

Return To Top ↑
Full Home Fire Extinguisher

Part number 21006704

Full Home use

Single use

UL Rated 3-A, 40-B:C

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

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:

A - Flash
B - Wood
C - Electrical Equipment

Product Specification

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Net agent weight (Average)</td>
<td>5.5 lb.</td>
</tr>
<tr>
<td>Unit weight (Average)</td>
<td>8.25 lb.</td>
</tr>
<tr>
<td>Diameter</td>
<td>4.5 inches</td>
</tr>
<tr>
<td>Height</td>
<td>16.07 inches</td>
</tr>
<tr>
<td>Discharge time</td>
<td>13-15 seconds</td>
</tr>
<tr>
<td>Discharge range</td>
<td>12-18 feet</td>
</tr>
<tr>
<td>Operating pressure</td>
<td>195 psi</td>
</tr>
<tr>
<td>Cylinder</td>
<td>Seamless aluminum</td>
</tr>
<tr>
<td>Valve, handle, lever</td>
<td>Nylon</td>
</tr>
<tr>
<td>Wall hanger</td>
<td>UL Listed</td>
</tr>
</tbody>
</table>

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
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
(foremergencies 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

<table>
<thead>
<tr>
<th>Component Name</th>
<th>CAS#/Codes</th>
<th>Concentration</th>
<th>R Phrases</th>
<th>EU Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monoammonium Phosphate</td>
<td>7722-76-1, EC#2317645</td>
<td>55 - 65%</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Ammonium Sulfate</td>
<td>7783-20-2, EC#2319841</td>
<td>30 - 40%</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Mica</td>
<td>12001-26-2</td>
<td>1 - 4%</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

Revision Date: February 28, 2011
3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Component Name</th>
<th>CAS#/Codes</th>
<th>Concentration</th>
<th>R Phrases</th>
<th>EU Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clay</td>
<td>8031-18-3</td>
<td>&lt;2%</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Amorphous Silica</td>
<td>7631-86-9, EC#2315454</td>
<td>&lt;2%</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Dye</td>
<td>NA</td>
<td>&lt;0.1%</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

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
8. EXPOSURE CONTROLS/PERSOAL 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.
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

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.
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
Closet Max 72 in. x 1.5/16 in. Heavy Duty Chrome Closet Pole

Model: 0016-6CH | Internet #: 2021831688 | Store SKU #: 886167

$19.96/EA-Each

Product Description

The joint slanting 72 in. Heavy Duty Closet Pole has a tubular design that helps maintain shape along the pole, making it easier to install and adjust. The metal rod's ability to expand the swinging and swinging that often occurs in wooden poles. Finished in stylish chrome finish, 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
- This style and a larger diameter combine to offer strength and durability
- Tubular steel design offers greater range movement for easy adjustment
- Can be cut to fit your unique closet shape with a hacksaw or pole cutter
- BIFMA Recertification: Closet Max
- BIFMA Model #: 0016-6CH
- BIFMA Parts #: 0016-6CH

Specifications

<table>
<thead>
<tr>
<th>Accessory Type</th>
<th>Finish</th>
<th>Adjusted Length (in)</th>
<th>Weight (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assembled Depth (in)</td>
<td>1.3125</td>
<td>72 in.</td>
<td>1.2125</td>
</tr>
<tr>
<td>Assembled Height (in)</td>
<td>1.3125</td>
<td>72 in.</td>
<td>1.2125</td>
</tr>
<tr>
<td>Material</td>
<td>Steel (\times 0.0625)</td>
<td>Product Depth (in)</td>
<td>0.75</td>
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<tr>
<td>Product Height (in)</td>
<td>1.2125</td>
<td>Product Length (in)</td>
<td>72</td>
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<tr>
<td>Product Weight (oz)</td>
<td>1.75</td>
<td>Product Width (in)</td>
<td>90-125</td>
</tr>
<tr>
<td>Storage Product Type</td>
<td>Hanging Rod</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.
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
Closet Max 1-5/16 in. Heavy-Duty Chrome Closet Pole Sockets (2-Pack)

Model #: CD-0010-CH  Internet #: 2021502176  Store #: 001-0177

Write the First Review

$5.57 /EA-Each

PRODUCT DESCRIPTION

The Joint Sterling 1-5/16 in. Heavy-Duty Closet Pole Sockets (2-Pack) includes 1 open-lip socket and 1 closed-lip socket, making it easier to install a closet pole all the way to the wall. Designed for use with closet poles from 1-3/16 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 easy installation.

- Helps you install a closet pole all the way to the wall
- For use with closet poles from 1-3/16 in. to 1-5/16 in. in diameter
- Solid cast zinc bodies
- Shiny chrome plating finish
- 1 open-lip socket helps you install the sockets before inserting a closet pole
- Part 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

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Accessory Type</th>
<th>Brackets</th>
<th>Adjustable Length (in.)</th>
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<tr>
<td>Assembled Depth (in.)</td>
<td>2.72 in</td>
<td>Assembled Height (in.)</td>
<td>2.72 in</td>
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<tr>
<td>Assembled Width (in.)</td>
<td>0.876 in</td>
<td>Color Family</td>
<td>Silver metallic</td>
</tr>
<tr>
<td>Item Package Type</td>
<td>Plastic Container</td>
<td>Manufacturer Warranty</td>
<td>Lifetime Limited Warranty</td>
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<tr>
<td>Material</td>
<td>Other</td>
<td>Product Depth (in.)</td>
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<tr>
<td>Product Height (in.)</td>
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<td>Product Length (in.)</td>
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<tr>
<td>Product Weight (lb.)</td>
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<td>Hasmailable</td>
<td>00-02-6</td>
</tr>
<tr>
<td>Storage Product Type</td>
<td>Hanging Rail</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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
ALLEN LUMBER IS YOUR LUMBER SOURCE! WE CAN SPECIAL ORDER VIRTUALLY ANY WOOD PRODUCT FOR YOUR HOME OR CONSTRUCTION PROJECT!

WE STOCK A LARGE RANGE OF SIZES IN LUMBER

- Eastern White Pine sets the standard for use in building projects that require quality, appearance, and durability. The 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
Allen Lumber is your lumber source! We can special order virtually any wood product for your home or construction project!

We stock a large range of sizes in lumber.

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.

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Cedar - boards, bevel siding and decking...Nothing compares to the natural, rich warmth and stunning beauty of cedar.
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
ALLEN LUMBER IS YOUR LUMBER SOURCE! WE CAN SPECIAL ORDER VIRTUALLY ANY WOOD PRODUCT FOR YOUR HOME OR CONSTRUCTION PROJECT!

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Cedar - boards, bevel siding and decking...Nothing compares to the natural, rich warmth and stunning beauty of cedar!
2 X 4 X 10 STUD

Location: Water tank shading device
Dimensions:
  - Thickness: 1 3/4"
  - Width: 3 1/2"
  - Length: 10’
Available: Allen Lumber
Proudly
Serving Vermont
For Over
125 Years!

FOR SALES & SPECIALS
Click Here!

ALLEN LUMBER IS YOUR LUMBER SOURCE! WE CAN SPECIAL ORDER VIRTUALLY ANY WOOD PRODUCT FOR YOUR HOME OR CONSTRUCTION PROJECT!

WE STOCK A LARGE RANGE OF SIZES IN LUMBER

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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.
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
Paint Sprayers
Drop Cloths

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 mls 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.

<table>
<thead>
<tr>
<th>Size</th>
<th>Pkg.</th>
<th>Qty</th>
<th>Partial Pkg.</th>
<th>Full Pkg.</th>
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<tbody>
<tr>
<td>Canvas</td>
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<tr>
<td>5' x 5'</td>
<td>12</td>
<td>7884T17</td>
<td>$11.73</td>
<td>$10.53</td>
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<tr>
<td>4' x 15'</td>
<td>12</td>
<td>7884T19</td>
<td>16.80</td>
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<td>9' x 12'</td>
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<td>7884T25</td>
<td>24.89</td>
<td>22.50</td>
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<tr>
<td>12' x 15'</td>
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<td>7884T26</td>
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<tr>
<td>14' x 16'</td>
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<td>Polyethylene</td>
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<tr>
<td>9' x 12'</td>
<td>12</td>
<td>3546T62</td>
<td>5.61</td>
<td>4.91</td>
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<td>12' x 15'</td>
<td>6</td>
<td>3546T69</td>
<td>8.88</td>
<td>8.07</td>
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<tr>
<td>Nonskid Fabric</td>
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<td></td>
<td></td>
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<tr>
<td>40' x 12'</td>
<td>10</td>
<td>8362T31</td>
<td>18.55</td>
<td>15.76</td>
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<tr>
<td>40' x 100'</td>
<td>1</td>
<td>8362T32</td>
<td></td>
<td>93.84</td>
</tr>
</tbody>
</table>
DIVISION 11 EQUIPMENT
SONY DVD HOME THEATER SYSTEM

Model Number: DAV-TZ140
Location: Living Room
Available: Sony Electronics
Price: $129.00
Sony 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 DVDs near 1080p HD quality.

In Stock Estimated ship date: 11/09/2012
Free shipping on all orders $25 and over

$129.99
Add To Cart

Earn 130 Sony Rewards points on this purchase.

Step up to 1000w of power.
Shop Now

Need help deciding?
Call 1-877-805-7009.
### 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

**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)

**Equalizer**
- Preset EQ: Yes (Auto/Movie/Music/TV/Game)

**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.P.D. Multi: Yes
- A.P.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™ Upcaling: Yes (up to 1080p)

### Center Speaker

**General**
- Enclosure Type: Bass Reflex
- Front Grillie/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/VCDCD Player

**Playback Features**
- Play Mode(s): Repeat All (CD/DVD/VC)
- Repeat Title/Chapter/Track: Program (CD Only) Shuffle, Resume from Power Off (CD/DVD/VC), Resume from Stop (CD/DVD/VC/CD/ID/ID/ID)

### 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 to 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 to 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

<table>
<thead>
<tr>
<th>Specs:</th>
<th>Details:</th>
<th>Description:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warranty Terms - Parts</td>
<td>1 year limited</td>
<td>(Also known as the CPU). The part of the computer that interprets and executes instructions. Think of it as the brain of the computer.</td>
</tr>
<tr>
<td>Warranty Terms - Labor</td>
<td>1 year limited</td>
<td></td>
</tr>
<tr>
<td>Height</td>
<td>1 inches</td>
<td></td>
</tr>
<tr>
<td>Width</td>
<td>14.3 inches</td>
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<td>Depth</td>
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</tr>
<tr>
<td>Weight</td>
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<td></td>
</tr>
<tr>
<td>Processor Brand</td>
<td>Intel®</td>
<td></td>
</tr>
<tr>
<td>Processor</td>
<td>Intel® Core™ i7</td>
<td></td>
</tr>
<tr>
<td>Processor Speed</td>
<td>2.6GHz</td>
<td>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).</td>
</tr>
<tr>
<td>Battery Type</td>
<td>Lithium Polymer (Li-Polymer)</td>
<td>The type of battery used to power the phone, usually NiCd (nickel-cadmium), NiMH (nickel-metal hydride) or LiIon (lithium-ion).</td>
</tr>
<tr>
<td>Display Type</td>
<td>Widescreen LED-backlit (1440 x 900)</td>
<td>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.</td>
</tr>
<tr>
<td>Screen Size (Measured Diagonally)</td>
<td>15.4&quot;</td>
<td>123</td>
</tr>
<tr>
<td>Cache Memory</td>
<td>6MB on die Level 3</td>
<td>A small segment of memory that stores frequently used information for fast access by the processor, improving response time.</td>
</tr>
<tr>
<td>System Memory (RAM)</td>
<td>8GB</td>
<td>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.</td>
</tr>
<tr>
<td>Type of Memory (RAM)</td>
<td>DDR3 SDRAM</td>
<td></td>
</tr>
<tr>
<td>Hard Drive Type</td>
<td>SATA</td>
<td>Hard drives are classified based on the interface they use to connect to a computer. Common interfaces for internal hard drives include EIDE, PATA (also known as, ATA and IDE), SATA and SCSI. Common interfaces for external hard drives include USB 2.0, FireWire and eSATA.</td>
</tr>
<tr>
<td>Computer Hard Drive Size</td>
<td>750GB</td>
<td>Capacity for storing programs, photos, video, music and other electronic information. Hard drive capacities range from a few gigabytes to several hundred.</td>
</tr>
<tr>
<td>Operating System Platform</td>
<td>Mac</td>
<td></td>
</tr>
<tr>
<td>Operating System</td>
<td>Mac OS X Mountain Lion</td>
<td>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.</td>
</tr>
<tr>
<td>ENERGY STAR Qualified</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Backlit Keyboard</td>
<td>Yes</td>
<td></td>
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<tr>
<td>UPC</td>
<td>885909531064</td>
<td>Product images, including color, may differ from actual product appearance.</td>
</tr>
</tbody>
</table>
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

$429.99

Sold by Sears and Fulfilled by Sears

Additional colors

Delivery
Starts at $69.59

Store Pickup
FREE

In stock for 05663
Delivery by 08/22/13.

Add to Cart

Description

The Frigidaire FFPT16F3NW 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 FFPT16F3NW top-freezer refrigerator has convenient features like adjustable glass shelves that help maximize space for more efficient storage.

Support & Price Matching

Get help with a Sears expert now.

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

<table>
<thead>
<tr>
<th>Dimension and Capacity</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjustable Legs</td>
<td>Yes</td>
</tr>
<tr>
<td>Cord Length (ft.)</td>
<td>13.5</td>
</tr>
<tr>
<td>Standard or Counter Depth</td>
<td>Standard Depth</td>
</tr>
<tr>
<td>Depth w/ Door Open 90 Degrees</td>
<td>47.5</td>
</tr>
<tr>
<td>Depth w/ Handle (in.)</td>
<td>33.9</td>
</tr>
<tr>
<td>Depth w/o Door Handle (in.)</td>
<td>32.9</td>
</tr>
<tr>
<td>Freezer Capacity (Cu. Ft.)</td>
<td>2.6</td>
</tr>
<tr>
<td>Height to Top of Case (in.)</td>
<td>55.5</td>
</tr>
<tr>
<td>Height to Top of Hinges (in.)</td>
<td>60</td>
</tr>
<tr>
<td>Overall Capacity (Cu. Ft.)</td>
<td>10</td>
</tr>
<tr>
<td>Panel Dimensions</td>
<td>22.625 x 20.575 x 23.215</td>
</tr>
<tr>
<td>Refrigerator Capacity</td>
<td>17.2</td>
</tr>
<tr>
<td>Width w/ Door Closed (in.)</td>
<td>34.0</td>
</tr>
<tr>
<td>Width w/Door Open 90 Degrees</td>
<td>34.0</td>
</tr>
<tr>
<td>Depth without Door (in.)</td>
<td>22.5</td>
</tr>
</tbody>
</table>

**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-Primed 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 Horsepower (HP): 4.5
- Control Type: Mechanical
- kwHrs per Year: 387

**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
Frigidaire 5.3 cu. ft. Electric Range - FFEF3015L

Sears Item#: 02200730000 | 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 $9.99

In stock for 06/23
Delivery by 08/22/13.

More Options

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Available for Layaway—the easy way to pay.

Special pricing for Hawaii, Alaska and Puerto Rico
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
Whirlpool 24" Dishwasher w/ AnyWare™ Plus Silverware Basket - Stainless Steel ENERGY STAR®

**Sears Item: 02134503000 | Model: WDF510PAYW**

**Reg Price:** $449.99  
**Save:** $20.00

**$419.99**

Selected by Sears and Fulfilled by Sears

In stock for 09/63  
Delivery by 09/15/13.

**Description**
Take advantage of the AnyWare™ Plus silverware baskets' 100% usable rack space with this ENERGY STAR® and CEE Tier 1® qualified model. This basket design allows the dishwasher to hold 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 this 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 sears.com for more information.
***According to a leading consumer magazine.
****Available on Whirlpool® models MDRP $449 and above.

**Support & Price Matching**
Chat live with a Sears expert now.

**Availability & Rewards**
Sears members earn 4200 SHOP YOUR WAY® points on this item.  
Available for Layaway — the easy way to pay.
Special pricing for Hawaii, Alaska and Puerto Rico.

<table>
<thead>
<tr>
<th>Specifications &amp; Dimensions</th>
</tr>
</thead>
</table>
| **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 79 |
| **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: 250  
Minimum Circuit Breaker: 20 amps  
Sound Level (Decibels): 60 |

| **General Features** | Control Location: No 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 Deposits: No  
General Warranty: Year limited  
Power Cord Included: No  
Sensor Washing: No  
Wash Tower: No |

| **Convenience Features** | Detergent Dispenser: Yes  
Quick Packages: Yes |

| **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 Spillguard: No  
Silverware Basket w/Covers: Yes  
Steamware 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 Complaint: No  
ENERGY STAR Complaint: Yes |
FRIGIDAIRE 0.7 CU. FT. COUNTERTOP MICROWAVE

Model Number: FFCMO734LS 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"

External 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
GE JVE40STSS

30" Under-Cabinet Range Hood with 200 CFM Internal Blower, 2 Fan Speeds, Convertible Venting, Stainless Steel

Your Price: $419.00

Qty: 
Add to Cart

 Specification

<table>
<thead>
<tr>
<th>Features</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Venting Type</td>
<td>Convertible</td>
</tr>
<tr>
<td>Exhaust CFM Back Rectangular</td>
<td>180 CFM</td>
</tr>
<tr>
<td>Exhaust CFM Top Round</td>
<td>200 CFM</td>
</tr>
<tr>
<td>Exhaust CFM Top Rectangular</td>
<td>180 CFM</td>
</tr>
<tr>
<td>Fan Controls</td>
<td>Rocker</td>
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<tr>
<td>Ducting</td>
<td>3-Way Convertible</td>
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<tr>
<td>Light Controls</td>
<td>On/Off</td>
</tr>
<tr>
<td>Control Location</td>
<td>Front</td>
</tr>
<tr>
<td>Removable Grease Filter(s)</td>
<td>Mesh</td>
</tr>
<tr>
<td>Lighting</td>
<td>2 - 15 Watts CFLs</td>
</tr>
<tr>
<td>Filter Cleaning</td>
<td>Dishwasher Safe Mesh</td>
</tr>
<tr>
<td>Fan Speed Control</td>
<td>2-Speed</td>
</tr>
<tr>
<td>Exhaust Options</td>
<td>3 1/4&quot; x 10&quot; Rectangular Duct</td>
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</tbody>
</table>

Claims and Certifications

ULI: Yes
ENERGY STAR Qualified: Yes

Dimensions and Weights

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Measurement</th>
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</thead>
<tbody>
<tr>
<td>Overall Width</td>
<td>29 7/8&quot;</td>
</tr>
<tr>
<td>Overall Depth</td>
<td>19 1/2&quot;</td>
</tr>
<tr>
<td>Overall Height</td>
<td>5 7/8&quot;</td>
</tr>
<tr>
<td>Net Weight</td>
<td>20 Lbs</td>
</tr>
<tr>
<td>Approx. Shipping Weight</td>
<td>29 Lbs</td>
</tr>
</tbody>
</table>
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

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°: 36.5

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 VAC/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

<table>
<thead>
<tr>
<th>Model</th>
<th>Haiku® Bamboo</th>
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<tbody>
<tr>
<td>Model number</td>
<td>S3150-XO-48</td>
</tr>
<tr>
<td>Fan diameter</td>
<td>60 in. (1524 mm)</td>
</tr>
<tr>
<td>Motor and assembly finishes</td>
<td>Black or white</td>
</tr>
<tr>
<td>Airfoil material</td>
<td>Bamboo</td>
</tr>
<tr>
<td>Airfoil finishes</td>
<td>Caramel or Cocoa</td>
</tr>
<tr>
<td>Number of airfoils</td>
<td>3</td>
</tr>
<tr>
<td>Motor type</td>
<td>EC motor with a digital inverter drive</td>
</tr>
<tr>
<td>Controller included</td>
<td>Yes, remote</td>
</tr>
<tr>
<td>Controller features</td>
<td>On/Off, Sleep mode, Off timer, Whooosh mode, Reverse</td>
</tr>
<tr>
<td>Mount and drop tube</td>
<td>55.9” (1419mm)</td>
</tr>
<tr>
<td>Hanging weight</td>
<td>14.0 lb (6.4 kg)</td>
</tr>
<tr>
<td>Number of fan speeds</td>
<td>7</td>
</tr>
<tr>
<td>Operating voltage</td>
<td>100–240 VAC, 10 F</td>
</tr>
<tr>
<td>Operating frequency</td>
<td>50–60 Hz</td>
</tr>
<tr>
<td>RPM (min/max)</td>
<td>35/195 RPM</td>
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<tr>
<td>Amps (min/max)</td>
<td>0.05 - 0.363 A</td>
</tr>
<tr>
<td>Watts (min/max)</td>
<td>2/30 W</td>
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<tr>
<td>Ambient operational temperature range</td>
<td>32°–120° F (0–49° C)</td>
</tr>
<tr>
<td>Environment</td>
<td>UL listed for dry locations</td>
</tr>
<tr>
<td>Fan mode indicator</td>
<td>LED display</td>
</tr>
<tr>
<td>Warranty*</td>
<td>Limited lifetime</td>
</tr>
</tbody>
</table>

* See Haiku warranty in installation guide for complete details.

---

855-MY HAIKU (855-694-2458) | WWW.HAIKUFAN.COM

---

### Controller

![Controller diagram](image)

### Color Options

- **Caramel Bamboo**
- **Cocoa Bamboo**

---

**Note:** This document contains information about a Haiku® Bamboo ceiling fan, including its technical specifications, controller features, and color options.
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 Qualified
Base Mineral: Oil
Finish: Satin
BRING THE MOVIE THEATER 3D EXPERIENCE HOME!

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.

VIZIO 3D GLASSES
Theater 3D glasses are affordable enough to outfit the entire family, even friends - perfect for 3D sports, movies or concerts. Even use them at your local movie theater*

*Compatible with RealD 3D

VIZIO THEATER 3D™
Theater 3D HDTVs display both traditional HDTV programming and 3D content and are compatible with the widest array of 3D formats.

VIZIO INTERNET APPS®
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.

THEATER 3D
VIZIO
DYNAMIC 200,000:1
SRS® TRUHD®
VIZIO
32" CLASS THEATER 3D™
LCD HDTV WITH
VIZIO INTERNET APPS®

TV SPECIFICATIONS

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
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</thead>
<tbody>
<tr>
<td>Screen Size</td>
<td>32&quot; Class</td>
</tr>
<tr>
<td>Viewable</td>
<td>31.55&quot;</td>
</tr>
<tr>
<td>TV Type</td>
<td>CCFL</td>
</tr>
<tr>
<td>Refresh Rate</td>
<td>60Hz</td>
</tr>
<tr>
<td>Maximum Resolution</td>
<td>1920 x 1080</td>
</tr>
<tr>
<td>Dynamic Contrast Ratio</td>
<td>200,000:1</td>
</tr>
<tr>
<td>Response Time</td>
<td>10ms</td>
</tr>
<tr>
<td>Internet Connectivity</td>
<td>802.11n Single-Band, Ethernet</td>
</tr>
<tr>
<td>Remote Control Type</td>
<td>XRT110</td>
</tr>
<tr>
<td>Ambient Light Sensor</td>
<td>Yes</td>
</tr>
<tr>
<td>Energy Star Qualified</td>
<td>Energy Star 5.3</td>
</tr>
<tr>
<td>Certifications</td>
<td>CSA, CSA-US, FCC Class B, HDMI V1.4 incl. CEC, ARC, VIZIO PQI, VIZIO AQA</td>
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</table>

CONNECTIONS

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDMI Inputs</td>
<td>3 (2 rear, 1 side)</td>
</tr>
<tr>
<td>Component Video Inputs</td>
<td>1</td>
</tr>
<tr>
<td>Composite Inputs</td>
<td>1 (shared with component)</td>
</tr>
<tr>
<td>RF Antenna Input</td>
<td>1</td>
</tr>
<tr>
<td>USB Ports</td>
<td>2 (side)</td>
</tr>
<tr>
<td>PC Input</td>
<td>1</td>
</tr>
<tr>
<td>Audio Outputs</td>
<td>1</td>
</tr>
<tr>
<td>Number of Speakers / Watts</td>
<td>2 x 10W</td>
</tr>
<tr>
<td>Surround / Simulated Surround</td>
<td>SRS StudioSound HD™</td>
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</tbody>
</table>

DIMENSIONS (WxHxD)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
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<tbody>
<tr>
<td>Product Dimensions</td>
<td>31.2&quot; x 22.5&quot; x 7.4&quot;</td>
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<tr>
<td>Product Weight</td>
<td>20.0 lbs</td>
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<tr>
<td>Product Dimensions w/o Stand</td>
<td>31.2&quot; x 20.0&quot; x 3.2&quot;</td>
</tr>
<tr>
<td>Product Weight w/o Stand</td>
<td>10.0 lbs</td>
</tr>
<tr>
<td>Shipping Dimensions</td>
<td>35.2&quot; x 24.2&quot; x 6.1&quot;</td>
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<tr>
<td>Shipping Weight</td>
<td>26.6 lbs</td>
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</tbody>
</table>

WARRANTY

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 year</td>
</tr>
</tbody>
</table>
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
## Bar-Angles

<table>
<thead>
<tr>
<th>Description</th>
<th>&quot;A&quot;</th>
<th>&quot;B&quot;</th>
<th>&quot;T&quot;</th>
<th>Stock Length</th>
<th>Wt/Ft</th>
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</thead>
<tbody>
<tr>
<td>Angle 1/2 x 1/2 x 1/8</td>
<td>1/2</td>
<td>1/2</td>
<td>1/8</td>
<td>20'</td>
<td>0.588</td>
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<tr>
<td>Angle 3/4 x 3/4 x 1/8</td>
<td>3/4</td>
<td>3/4</td>
<td>1/8</td>
<td>20'</td>
<td>0.596</td>
</tr>
<tr>
<td>Angle 1 x 1 x 1/8</td>
<td>1</td>
<td>1</td>
<td>1/8</td>
<td>20'</td>
<td>0.800</td>
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<tr>
<td>Angle 1 x 1 x 3/16</td>
<td>1</td>
<td>1</td>
<td>3/16</td>
<td>20'</td>
<td>1.186</td>
</tr>
<tr>
<td>Angle 1 x 1 x 1/4</td>
<td>1</td>
<td>1/4</td>
<td>1/4</td>
<td>20'</td>
<td>1.495</td>
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<tr>
<td>Angle 1-1/4 x 1-1/4 x 1/8</td>
<td>1-1/4</td>
<td>1-1/4</td>
<td>1/8</td>
<td>20'</td>
<td>1.816</td>
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<tr>
<td>Angle 1-1/4 x 1-1/4 x 3/16</td>
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<td>1-1/4</td>
<td>3/16</td>
<td>20'</td>
<td>1.481</td>
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<tr>
<td>Angle 1-1/4 x 1-1/4 x 1/4</td>
<td>1-1/4</td>
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<td>20'</td>
<td>1.926</td>
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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.

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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

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 lags (Packed with brackets): 2

Weight per lineal ft.: 2.2 lbs.

*Brackets mounted on 12" centers.

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.

CANNON BALL HNP, LLC
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.

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.

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.
DERLIN & STEEL SINGLE-TRUCK, ADJUSTABLE TROLLEY HANGERS

Model: CB-8
Location: Solar Shade
Dimensions: 7” x 5 5/8”
Finish: Galvanized
Available: Cannonball HNP
DELORIN & STEEL SINGLE-TRUCK, ADJUSTABLE TROLLEY HANGERS FOR USE WITH METAL FRAME DOORS

NEW DELORIN 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.

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<th>Door Thickness:</th>
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<td>Door Leaf Weight Steel:</td>
<td>Up to 400 lbs. per pair with 13- or 14-gauge track</td>
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</tbody>
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| 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 |

CANNON BALL-HNP, LLC
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.

**CAD** For technical drawings and 3-D models, click on a part number.

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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
Amerock Magnetic Catch with Steel Strike

Model #: BP9795AW  Internet #: 202176373  Store SKU #: 376464

★★★★★ | Write The First Review

$1.98 / each

This item cannot be shipped to the following state(s): AK, GU, HI, PR, VI

Ships FREE with $45.00 Order

Buy Online, Pick up In Store Today
Check Store Inventory

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 mushroom 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 #: BP9795AW
- MFG Part #: BP9795AW

Specifications

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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
   - CD8B5 L or R
   - CD8B3 L or R

B. Corner Sink Front
   - CSF4 L or R
   - CSF4 R

C. Corner Sink Front Bottom
   - CSF

D. Base Corner
   - BC35 L or R
   - BC4 L or R
   - BC45 L or R
   - BC54 L or R

E. Base Lazy Susan Corner with Revolving Door
   - BC3635

F. Corner Diagonal Base
   - CD0L5 L or R
   - CD0M5 L or R
   - CD0L5 L or R

G. Base Easy Reach
   - BE355 L or R
   - BE355 L or R

H. Asymmetrical Base Easy Reach
   - BE3555 L or R
   - BE3555 L or R

I. Base Corner Super Susan
   - BC35P5 L or R
   - BC35S5 L or R
   - BC35P5 L or R
   - BC35S5 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
   - 3BD15
   - 3BD18
   - 3BD21
   - 3BD24
   - 3BD27
   - BD30D
   - BD33D
   - BD36D

B. Three Drawer Base Special
   - BD188B

C. Four Drawer Base
   - 4BD12
   - 4BD15
   - 4BD18
   - 4BD21
   - 4BD24
   - 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
  - Two adjustable half-shelves
  - Two drawers

Base Island Cabinets
## HOMECREST CUSTOM CABINET

<table>
<thead>
<tr>
<th>Model Number: MBC1824-24.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location: Kitchen</td>
</tr>
<tr>
<td>Dimensions:</td>
</tr>
<tr>
<td>Width: 18”</td>
</tr>
<tr>
<td>Height: 34.5”</td>
</tr>
<tr>
<td>Depth: 24”</td>
</tr>
<tr>
<td>Finish: Maple</td>
</tr>
<tr>
<td>Available: Home Crest</td>
</tr>
</tbody>
</table>
PLYWOOD SHELVING

Location: Kitchen
Dimensions:
  - Length: 8’
  - Thickness: 3/4”
  - Width: 4’
Wood: Maple
Top Choice 3/4 Top Choice Maple Hardwood

Item #: 75514 | Model #: 75514

$52.95

Product is sold in individual pieces; please review the product specifications for details.

Description | Specifications | Reviews | Community Q&A
--- | --- | --- | ---
Pre-Cut | Yes | | |
Species | Maple | | |
Face Grade | N/A | | |
Back Grade | N/A | | |
Nominal Thickness in Inches | 3/4 | | |
Nominal Length (Feet) | 8.0 | | |
Nominal Width (Feet) | 4.0 | | |
Actual Thickness (Inches) | 0.75 | | |
Actual Length (Inches) | 96.0 | | |
Actual Width (Inches) | 48.0 | | |
Weather Exposure | For interior use | | |
Struct 1 | No | | |
Environmental Certification | N/A | | |
CARB Compliant | No | | |
No Added Formaldehyde (NAF) Compliant | No | | |
AMEROCK BP19009SS TKNOB

Model Number: BP19009SS
Location: Kitchen Drawers
Material: Stainless Steel
Price: $6.57
Available: Knobs and Hardware
Overview

Modern styling with unadorned surfaces. Smooth styling in high quality stainless steel.

Size
1-1/4" (dia)

Finish
Stainless Steel

Materials
Stainless Steel
GRASS TEC 864 SIDE MOUNT 45 MM SCREW ON HINGE

Model Number: 03050
Location: Kitchen
Swing: 108 Degrees
Finish: Polished nickel
Tec 864 1-1/4" Side Mount 45MM Screw On Hinge (#03050) by Grass

Item # GHA3050 - Sold Each Without Screws

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

<table>
<thead>
<tr>
<th>QTY</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit Price</td>
<td>$3.70</td>
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</tbody>
</table>

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
- Set: Each
- Product Type: Hinge & Plate: Face Frame
- Material: Metal

Add to Shopping Cart
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
- Cam depth adjustment
- Height adjustment at mounting screw

<table>
<thead>
<tr>
<th>Side-mount - 42mm drilling pattern</th>
<th>Dowelled Hinge Cup</th>
<th>Screw-on Hinge Cup</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overlay (mm)</td>
<td>Door Clearance (mm)</td>
<td>Arm Clearance (mm)</td>
</tr>
<tr>
<td>6 [⅜&quot;]</td>
<td>11 [⅞&quot;]</td>
<td>14.5 [⅞&quot;]</td>
</tr>
<tr>
<td>12.5 [⅜&quot;]</td>
<td>9.5 [⅞&quot;]</td>
<td>11 [⅞&quot;]</td>
</tr>
<tr>
<td>19 [⅞&quot;]</td>
<td>0</td>
<td>11 [⅞&quot;]</td>
</tr>
<tr>
<td>25 [¹&quot;]</td>
<td>0</td>
<td>11 [⅞&quot;]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Wrap-around - 42mm drilling pattern</th>
<th>Dowelled Hinge Cup</th>
<th>Screw-on Hinge Cup</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overlay (mm)</td>
<td>Door Clearance (mm)</td>
<td>Arm Clearance (mm)</td>
</tr>
<tr>
<td>6 [⅜&quot;]</td>
<td>11 [⅞&quot;]</td>
<td>14.5 [⅞&quot;]</td>
</tr>
<tr>
<td>12.5 [⅜&quot;]</td>
<td>9.5 [⅞&quot;]</td>
<td>11 [⅞&quot;]</td>
</tr>
<tr>
<td>19 [⅞&quot;]</td>
<td>0</td>
<td>11 [⅞&quot;]</td>
</tr>
<tr>
<td>25 [¹&quot;]</td>
<td>0</td>
<td>11 [⅞&quot;]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Side-mount - 45mm drilling pattern</th>
<th>Dowelled Hinge Cup</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overlay (mm)</td>
<td>Door Clearance (mm)</td>
</tr>
<tr>
<td>6 [⅜&quot;]</td>
<td>11 [⅞&quot;]</td>
</tr>
<tr>
<td>12.5 [⅜&quot;]</td>
<td>9.5 [⅞&quot;]</td>
</tr>
<tr>
<td>25 [¹&quot;]</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Wrap-around - 45mm drilling pattern</th>
<th>Dowelled Hinge Cup</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overlay (mm)</td>
<td>Door Clearance (mm)</td>
</tr>
<tr>
<td>11 [⅛&quot;]</td>
<td>5 [⅛&quot;]</td>
</tr>
<tr>
<td>12.5 [⅛&quot;]</td>
<td>2.5 [⅛&quot;]</td>
</tr>
<tr>
<td>19 [⅝&quot;]</td>
<td>0</td>
</tr>
<tr>
<td>25 [¹&quot;]</td>
<td>0</td>
</tr>
</tbody>
</table>

Dimensions in millimeter, fractional inch equivalents as noted.
Technical Specifications

<table>
<thead>
<tr>
<th>Dimensions - Door Closed</th>
<th>Minimum Reveal</th>
<th>Door Open - Clearances</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Overlay</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 [5/32&quot;]</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Door Thickness</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.9 [1/8&quot;]</td>
<td>9.5 [3/8&quot;]</td>
<td>8.5 [7/16&quot;]</td>
</tr>
<tr>
<td>[7/64&quot;]</td>
<td>[9/64&quot;]</td>
<td>[15/64&quot;]</td>
</tr>
<tr>
<td>2.5 [1/16&quot;]</td>
<td></td>
<td></td>
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</tbody>
</table>

**TEC 864 Minimum Reveal**

<table>
<thead>
<tr>
<th>Door Thickness</th>
<th>Minimum Reveal</th>
<th>Door Open - Clearances</th>
</tr>
</thead>
<tbody>
<tr>
<td>16 [5/8&quot;]</td>
<td>4.2 [1/4&quot;]</td>
<td>20 [5/32&quot;]</td>
</tr>
<tr>
<td>17.5 [7/32&quot;]</td>
<td>5.4 [1/8&quot;]</td>
<td>25 [9/32&quot;]</td>
</tr>
<tr>
<td>[5/16&quot;]</td>
<td>[1/8&quot;]</td>
<td>[1/8&quot;]</td>
</tr>
</tbody>
</table>

Based on door with square edge.

**Adjustment Details**

1. **Side Adjustment** ....... +/-1.5mm [1/8"]
   Rotate micro screw.

2. **Height Adjustment** ....... +/-2mm [3/32"]
   Loosen screw, align door, tighten screw.

3. **Depth Adjustment** ............. out 2.5mm [1/8"], in .5mm [1/32"]
   Rotate cam screw.

**Mounting Screws**

- Hinge cup to door, #6 x 1/4" Flat head screw
- Base plate to face frame, #8 x 1/4" Pan head screw

**Overall Dimensions**

**42mm drilling pattern**

**45mm drilling pattern**

---

Subject to technical modifications without notice.

U.S. Patent nos. 5,647,591 and 5,604,946

Grass America™
**Grass TEC 864**

108° Opening Angle - 1¾” to 1 ½” 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

### Side-mount - 42mm drilling pattern

<table>
<thead>
<tr>
<th>Overlay</th>
<th>Door Clearance</th>
<th>Arm Clearance</th>
<th>Dowelled Hinge Cup</th>
<th>Screw-on Hinge Cup</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[in]</td>
<td>[in]</td>
<td>Reference #</td>
<td>Item #</td>
</tr>
<tr>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32 [1 ¾&quot;]</td>
<td>0</td>
<td>10 [¾&quot;]</td>
<td>864VS (31-01)</td>
<td>09048-15</td>
</tr>
<tr>
<td>35 [1 ¾&quot;]</td>
<td>0</td>
<td>10 [¾&quot;]</td>
<td>864VS (16-01)</td>
<td>09086-15</td>
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<tr>
<td>38 [1 ½&quot;]</td>
<td>0</td>
<td>10 [¾&quot;]</td>
<td>864VS (33-01)</td>
<td>09066-15</td>
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</tbody>
</table>

### Wrap-around - 42mm drilling pattern

<table>
<thead>
<tr>
<th>Overlay</th>
<th>Door Clearance</th>
<th>Arm Clearance</th>
<th>Dowelled Hinge Cup</th>
<th>Screw-on Hinge Cup</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[in]</td>
<td>[in]</td>
<td>Reference #</td>
<td>Item #</td>
</tr>
<tr>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32 [1 ¾&quot;]</td>
<td>0</td>
<td>10 [¾&quot;]</td>
<td>864VS (31-02)</td>
<td>02932-15</td>
</tr>
<tr>
<td>35 [1 ¾&quot;]</td>
<td>0</td>
<td>10 [¾&quot;]</td>
<td>864VS (16-02)</td>
<td>02936-15</td>
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<td>864VS (33-02)</td>
<td>02940-15</td>
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</table>

### Side-mount - 45mm drilling pattern

<table>
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<tr>
<th>Overlay</th>
<th>Door Clearance</th>
<th>Arm Clearance</th>
<th>Dowelled Hinge Cup</th>
<th>Screw-on Hinge Cup</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[in]</td>
<td>[in]</td>
<td>Reference #</td>
<td>Item #</td>
</tr>
<tr>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32 [1 ¾&quot;]</td>
<td>0</td>
<td>10 [¾&quot;]</td>
<td>864VS-45 (31-01)</td>
<td>03049-15</td>
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<tr>
<td>35 [1 ¾&quot;]</td>
<td>0</td>
<td>10 [¾&quot;]</td>
<td>864VS-45 (16-01)</td>
<td>03087-15</td>
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<tr>
<td>38 [1 ½&quot;]</td>
<td>0</td>
<td>10 [¾&quot;]</td>
<td>864VS-45 (33-01)</td>
<td>03099-15</td>
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### Wrap-around - 45mm drilling pattern

<table>
<thead>
<tr>
<th>Overlay</th>
<th>Door Clearance</th>
<th>Arm Clearance</th>
<th>Dowelled Hinge Cup</th>
<th>Screw-on Hinge Cup</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[in]</td>
<td>[in]</td>
<td>Reference #</td>
<td>Item #</td>
</tr>
<tr>
<td>mm</td>
<td>mm</td>
<td>mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32 [1 ¾&quot;]</td>
<td>0</td>
<td>10 [¾&quot;]</td>
<td>864VS-45 (31-02)</td>
<td>02933-15</td>
</tr>
<tr>
<td>35 [1 ¾&quot;]</td>
<td>0</td>
<td>10 [¾&quot;]</td>
<td>864VS-45 (16-02)</td>
<td>02937-15</td>
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<tr>
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<td>10 [¾&quot;]</td>
<td>864VS-45 (33-02)</td>
<td>02941-15</td>
</tr>
</tbody>
</table>

**IMPORTANT**

To determine the correct application, Grass strongly recommends a trial mounting for all hinges and base plates.
Technical Specifications

<table>
<thead>
<tr>
<th>Dimensions - Door Closed</th>
<th>Minimum Reveal</th>
<th>Door Open - Clearances</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Overlay</strong></td>
<td><strong>#8 x 3/4” pan head screw</strong></td>
<td><strong>Arm Clearance</strong></td>
</tr>
<tr>
<td>4.9 [7/16”]</td>
<td>9.5 [3/4”]</td>
<td>6.5 [1/4”]</td>
</tr>
<tr>
<td>Door Thickness</td>
<td>Min. Reveal</td>
<td>Arm and Door clearances see Page 8.</td>
</tr>
<tr>
<td>10.5 [7/16”]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5 [3/8”]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 [3/4”]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TEC 864 Minimum Reveal

- Door Thickness: 16 [7/8”], 17.5 [7/4”], 19 [3/4”]
- Minimum Reveal: 4.2 [7/8”], 5.4 [7/4”], 6.7 [3/4”]

Based on door with square edge.

Adjustment Details

1. **Side Adjustment** ...... +/- 1.5mm [7/32”]
   Rotate cam screw.

2. **Height Adjustment** ...... +/- 2mm [7/64”]
   Loosen screw, align door, tighten screw.

3. **Depth Adjustment** ...... out 2.5mm [7/32”], in .5mm [7/64”]
   Rotate cam screw.

Mounting Screws

- Hinge cup to door, #8 x 3/4” 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

- 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

U.S. Patent # 6,932,200

Cabinet member fastening:
- Wood screw: ........#7 x 5/8” flat head
- Euro screw: ........05mm x 13mm (1/2”)

Front locking device:
- Wood screw: ........#6 x 1/2” flat head

Grass Elite 16 slides with Airmatic controlled closing

<table>
<thead>
<tr>
<th>REFERENCE NUMBER</th>
<th>CABINET MEMBER LENGTH</th>
<th>DRAWER LENGTH</th>
<th>ITEM NUMBERS</th>
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<tbody>
<tr>
<td></td>
<td>mm</td>
<td>mm inch</td>
<td>mm inch</td>
</tr>
<tr>
<td>7523 - 16 / 250 / 240</td>
<td>250 9 13/16”</td>
<td>240 9 7/8”</td>
<td>60485</td>
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<tr>
<td>7523 - 16 / 317 / 305</td>
<td>317 12 1/2”</td>
<td>305 12”</td>
<td>60488</td>
</tr>
<tr>
<td>7523 - 16 / 394 / 381</td>
<td>394 15 1/2”</td>
<td>381 15”</td>
<td>60490</td>
</tr>
<tr>
<td>7523 - 16 / 470 / 457</td>
<td>470 18 1/2”</td>
<td>457 18”</td>
<td>60493</td>
</tr>
<tr>
<td>7523 - 16 / 550 / 533</td>
<td>550 21 5/8”</td>
<td>533 21”</td>
<td>60496</td>
</tr>
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</table>

Grass Elite 19 slides with Airmatic controlled closing

<table>
<thead>
<tr>
<th>REFERENCE NUMBER</th>
<th>CABINET MEMBER LENGTH</th>
<th>DRAWER LENGTH</th>
<th>ITEM NUMBERS</th>
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<tbody>
<tr>
<td></td>
<td>mm</td>
<td>mm inch</td>
<td>mm inch</td>
</tr>
<tr>
<td>7523-19 / 250 / 240</td>
<td>250 9 13/16”</td>
<td>240 9 7/8”</td>
<td>60519</td>
</tr>
<tr>
<td>7523-19 / 317 / 305</td>
<td>317 12 1/2”</td>
<td>305 12”</td>
<td>60522</td>
</tr>
<tr>
<td>7523-19 / 394 / 381</td>
<td>394 15 1/2”</td>
<td>381 15”</td>
<td>60524</td>
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<tr>
<td>7523-19 / 470 / 457</td>
<td>470 18 1/2”</td>
<td>457 18”</td>
<td>60527</td>
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<td>7523-19 / 550 / 533</td>
<td>550 21 5/8”</td>
<td>533 21”</td>
<td>60530</td>
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Front Locking Device Kit

<table>
<thead>
<tr>
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<th>DESCRIPTION</th>
<th>ITEM NUMBERS</th>
<th>BOX QTY.</th>
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<tbody>
<tr>
<td>7523-FLD-KIT</td>
<td>Polybagged right and left locking devices plus (4) #6 x 1/2” Flat head</td>
<td>02236</td>
<td>5</td>
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<tr>
<td></td>
<td>Phillips attachment screws (5 kits per bag / 200 kits per box)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7523-FLD-LH</td>
<td>Left Front Locking Device</td>
<td>02234</td>
<td>200</td>
</tr>
<tr>
<td>7523-FLD-RH</td>
<td>Right Front Locking Device</td>
<td>02235</td>
<td>200</td>
</tr>
</tbody>
</table>

IMPORTANT: To determine the correct application, Grass strongly recommends a trial mounting for all drawer slides.
**Drawer Dimension Instructions**

Interior Cabinet Width (ICW)

- Elite 16 = 21 [1 5/16”]
- Elite 19 = 25 [1 15/16”]

Interior drawer width formula
- Elite 16...ICW + 42 [1 5/8”]
- Elite 19...ICW + 49 [1 15/16”]

Max. drawer side
- Elite 16 = 16 [5/8”]
- Elite 19 = 19 [3/4”]

Min. top clearance
- 6 [1/4”]

Max. drawer height
- 11 [3/32”]

Opening height
- 26 [1 3/16”]

Rear notch
- 50 [1 15/16”]

Top clearance
- 14 [9/16”]

Bottom clearance
- 5 [3/32”]

Air grate sits 1.5 [1/16”] below cabinet member midway back.

**Cabinet Member Fastening Positions**

- 250/240
- 317/305
- 394/381
- 470/457
- 550/533

**Drawer Box Length**

- Drawer Box Length
- Overall Slide Length

<table>
<thead>
<tr>
<th>Slide code cabinet member/drawer box</th>
<th>Overall slide length</th>
<th>Dimensions with screw-on rear brackets in face frame cabinets</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mm</td>
<td>inch</td>
</tr>
<tr>
<td>250/240</td>
<td>250</td>
<td>9 13/16”</td>
</tr>
<tr>
<td>317/305</td>
<td>317</td>
<td>12 1/2”</td>
</tr>
<tr>
<td>394/381</td>
<td>394</td>
<td>15 1/2”</td>
</tr>
<tr>
<td>470/457</td>
<td>470</td>
<td>18 1/2”</td>
</tr>
<tr>
<td>550/533</td>
<td>550</td>
<td>21 5/8”</td>
</tr>
</tbody>
</table>
# 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.

<table>
<thead>
<tr>
<th>Description</th>
<th>Item Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bracket Kit</td>
<td>02207</td>
</tr>
<tr>
<td>7523 Bracket Kit for Face Frame (5/30)</td>
<td></td>
</tr>
<tr>
<td>Kit includes one each:</td>
<td></td>
</tr>
<tr>
<td>Front Locking Device 7523 L/R with 4 x #6x1/2 wood screws</td>
<td></td>
</tr>
<tr>
<td>7523/6603 22mm Adj. Bracket - LH - screw on</td>
<td></td>
</tr>
<tr>
<td>7523/6603 22mm Adj. Bracket - RH - screw on</td>
<td></td>
</tr>
<tr>
<td>Bracket, Rear, Straight 6610 - Grass Elite LH, metal</td>
<td></td>
</tr>
<tr>
<td>Bracket, Rear, Straight 6610 - Grass Elite RH, metal</td>
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<table>
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<th>Description</th>
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<tr>
<td>Straight rear brackets</td>
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<tr>
<td>Bracket, Rear, Straight 6610 - Grass Elite LH, metal (200)</td>
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<tr>
<td>Bracket, Rear, Straight 6610 - Grass Elite RH, metal (200)</td>
<td></td>
</tr>
<tr>
<td>Bracket, Rear, Straight 6600 - Grass Elite LH, metal (200)</td>
<td></td>
</tr>
<tr>
<td>Bracket, Rear, Straight 6600 - Grass Elite RH, metal (200)</td>
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<tr>
<td>7523/6603 22mm Adj. Bracket - LH - screw on (200)</td>
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<tr>
<td>7523/6603 22mm Adj. Bracket - RH - screw on (200)</td>
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<table>
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<tr>
<td>V-notch rear brackets</td>
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<td>Bracket, Rear, VN-6610 - Grass Elite LH (5)</td>
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<tr>
<td>Bracket, Rear, VN-6610 - Grass Elite RH (5)</td>
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<tr>
<td>Bracket, Rear, VN-6610 - Grass Elite LH (200)</td>
<td></td>
</tr>
<tr>
<td>Bracket, Rear, VN-6610 - Grass Elite RH (200)</td>
<td></td>
</tr>
<tr>
<td>02214</td>
<td>02215</td>
</tr>
</tbody>
</table>
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 Decorators Collection
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

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"H x 72"W
Color White/stone
Price $45
Shipping Standard $6

Stock Status Available
Quantity: 1

Add To Wish List | Email | Print
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" (500 cm)

Add to cart

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.

Assembly instructions

Downloads

Services

Home furnishing advice.

Good to know
Includes 1 curtain wire and 2 fixtures. For stability you need to use extra support fixtures for curtain wires longer than 98". Up to 110", 1 extra fitting; up to 155", 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

Product dimensions
Length: 197"
Max. load: 22 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
Package: 1
Article Number: 600.752.95
Width: 6 7/16"
Height: 3/4"
Length: 6 7/8"
Weight: 3 lb
Quantity: 1

Article Number: 600.752.95
Width: 15 cm
Height: 2 cm
Length: 18 cm
Weight: 0.4 kg
Quantity: 1
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
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/ CTYJ1

S210 POCKET GANCIO
GANCIO/ HANGER/ HAKEN/
CROCHET/ GANCHO/ KPI040K

SEDILE E SCHIENALE/ SEAT AND BACK
LEGNO/ WOOD

PZ80  PZ99  PZ61

LACCATO LUCIDO/
HIGH GLOSS LACQUERED

LL61

STRUTTURA/ STRUCTURE
METALLO/ METAL

MT93

MT92
NEW TABLE CONCEPT

Location: Auxiliary Bedroom
Dimensions: 19.75” x 27.5” x 1.25”
Color: White
Available: Resource Furniture
## Dimensions:

<table>
<thead>
<tr>
<th>cm 50x50x3</th>
<th>19.75&quot;x19.75&quot;x1.25&quot;</th>
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<tbody>
<tr>
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<tr>
<td>cm 65x100x3</td>
<td>25.5&quot;x39.5&quot;x1.25&quot;</td>
</tr>
<tr>
<td>cm 65x120x3</td>
<td>25.5&quot;x47.25&quot;x1.25&quot;</td>
</tr>
</tbody>
</table>

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”
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

- ash ($3,190.00)
- birch ($3,510.00)
- oak ($3,510.00)
- maple ($3,635.00)
- cherry ($3,795.00)
- walnut ($3,990.00)
- bird's eye maple ($6,380.00)

Couch
32h x 80w x 32d
starting at $3,190.00

calculate price
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
COLEY 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
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

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: C988-7809 |
>Furniture > Bedroom Furniture > Beds

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 functional 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 kids 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: 8.5" H x 87" W x 21" D
- Weight: 124 lbs

Recommended Care:
- Never let liquids or damp cloths sit on this furniture
- Do not place 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
MID-CENTURY NIGHTSTAND
$249.00

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.
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
3/4" x 4' x 8' Marine Grade Plywood

Model Number: 1251000 | Menards SKU: 1251000

Enter Your ZIP Code for Local Price & Status

--

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
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.


Specifications
Lengths: 8', 10'
Widths: 4', 5'

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

### PRODUCT IDENTIFICATIONS:
None

### SYNONYMS:
Meranti

### TRADE NAME:
Meranti

### DESCRIPTION:
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. 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.

### POTENTIAL AIRBORNE RELEASE:

#### PHYSICAL DATA:
- Boiling Point: Not applicable
- Specific Gravity ($\text{H}_2\text{O} = 1$): < 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).

### FIRE AND EXPLOSION DATA:
- 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 is a dust particle contacts an ignition source. An airborne concentration of 40 grams of dust per cubic meter is air is often used as the LEL of wood dust.

### REACTIVITY DATA:
- Conditions Contributing to Instability: Stable under normal conditions
- Incompatibility: Avoid contact with oxidizing agents. Avoid open flame. Product may ignition 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

### HEALTH EFFECTS INFORMATION:
#### Exposure Limits:
- 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

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.

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.

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.

National Cancer Institute (NCI) conducted an epidemiological study of industrial workers exposed to formaldehyde (published June 1986). The NCI concluded that the rate provides little evidence that mortality from cancer is associated with formaldehyde exposure at the levels experienced by workers in the study.

Wood Dust

May cause nasal dryness, irritation and obstruction. Coughing, wheezing, and sneezing; sinusitis and prolonged colds have also been reported.

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.

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

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.

Effective Date

06/01/00

Prepared By

STAFF

Superseded Date

N/A
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

$35.77 /EA-Each

Buy Online, Pick Up In Store Today
Check Store Inventory

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

SPECIFICATIONS

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<thead>
<tr>
<th>Actual product thickness (in.)</th>
<th>0.47</th>
<th>Actual product width (in.)</th>
<th>47.938</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assembled Depth (in.)</td>
<td>0.72 in</td>
<td>Assembled Height (in.)</td>
<td>96 in</td>
</tr>
<tr>
<td>Assembled Width (in.)</td>
<td>48 in</td>
<td>Manufacturer Warranty</td>
<td>NONE</td>
</tr>
<tr>
<td>Plywood Type</td>
<td>Sanded Plywood</td>
<td>Portion of product made from wood (%)</td>
<td>100</td>
</tr>
<tr>
<td>Pressure Treated</td>
<td>No</td>
<td>Product Length (ft.)</td>
<td>96 ft</td>
</tr>
<tr>
<td>Tongue &amp; Groove</td>
<td>No</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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

Model #: E7020  Store SKU #: 801216

Write The First Review  |  Ask a Question

$4.68 /EA-Each

Store Only

Buy Online, Pick Up in Store Today
Check Store Inventory

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 to 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

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Adhesion level</th>
<th>Medium</th>
<th>Adhesive Product Type</th>
<th>Glue/Epoxy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assembled Depth (in.)</td>
<td>9.25 in</td>
<td>Assembled Height (in.)</td>
<td>1.8 in</td>
</tr>
<tr>
<td>Assembled Width (in.)</td>
<td>3.56 in</td>
<td>Curing time (hours)</td>
<td>12</td>
</tr>
<tr>
<td>Dries clear</td>
<td>Yes</td>
<td>Drillable</td>
<td>Yes</td>
</tr>
<tr>
<td>Glue/epoxy type</td>
<td>Wood glue</td>
<td>Indoor/Outdoor</td>
<td>Indoor</td>
</tr>
<tr>
<td>Manufacturer Warranty</td>
<td>None</td>
<td>Moisture Resistant</td>
<td>Yes</td>
</tr>
<tr>
<td>Product Depth (in.)</td>
<td>3.58</td>
<td>Product Height (in.)</td>
<td>9.250</td>
</tr>
<tr>
<td>Product Width (in.)</td>
<td>1.6</td>
<td>Recommended surfaces</td>
<td>Coated wood, Painted wood, Woodwork</td>
</tr>
<tr>
<td>Sandable</td>
<td>Yes</td>
<td>Solvent resistant</td>
<td>No</td>
</tr>
<tr>
<td>UV/sunlight resistant</td>
<td>No</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Material Safety Data Sheet

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

     Emergency Phone Number
     Poison Control Center
     1-888-516-2502

     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.

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
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

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent Volatiles</td>
<td>54.5</td>
</tr>
<tr>
<td>pH @ 25°C</td>
<td>5.0</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>1.08</td>
</tr>
<tr>
<td>Appearance</td>
<td>Light yellow liquid</td>
</tr>
<tr>
<td>Autoignition Temperature</td>
<td>Not available</td>
</tr>
<tr>
<td>Boiling Point</td>
<td>100°C (212°F)</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>INGESTION:</th>
<th>A similar product was found to be non-toxic orally when tested as described in 16 CFR Part 1500.3(c)(1) and (2).</th>
</tr>
</thead>
<tbody>
<tr>
<td>INHALATION:</td>
<td>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).</td>
</tr>
<tr>
<td>SKIN ABSORPTION:</td>
<td>A similar product was found to be non-toxic dermally when tested as described in 16 CFR Part 1500.3 (c)(1) and (2).</td>
</tr>
<tr>
<td>SKIN:</td>
<td>A similar product was not an irritant when tested as described in 16 CFR Part 1500.41.</td>
</tr>
</tbody>
</table>
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


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.
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:
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.
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
Amerock BP19018SS Stainless Steel Pull

Part of the Stainless Steel Collection by Amerock

List Price: $74.34  Low Price Guarantee
Price: $23.79
You Save: $50.55
You Earn: 24 Reward Points

Finish: Stainless Steel

Hole Spacing: 25.197/640mm

Quantity: 1

Add to Cart

Dimensions & Weights

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Center to Center</td>
<td>25.2 inches</td>
</tr>
<tr>
<td>Length</td>
<td>28.345 inches</td>
</tr>
<tr>
<td>Projection</td>
<td>1.375 inches</td>
</tr>
<tr>
<td>Width</td>
<td>0.450 inches</td>
</tr>
</tbody>
</table>

Overview


Materials

Stainless Steel
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 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.**

<table>
<thead>
<tr>
<th>Common Hole Center Measurements</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-1/2 in.</td>
</tr>
<tr>
<td>2-3/4 in.</td>
</tr>
<tr>
<td>3 in.</td>
</tr>
<tr>
<td>3-1/4 in.</td>
</tr>
<tr>
<td>3-1/2 in.</td>
</tr>
<tr>
<td>96 mm</td>
</tr>
<tr>
<td>4 in.</td>
</tr>
<tr>
<td>128 mm</td>
</tr>
</tbody>
</table>

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
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 unique design, with a K-Factor of 4.0 (70.5 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 1/2" (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 CEULus Listed; Category VK4/W

Refer to the Approval Chart on page 147a and Design Criteria on page 147x for cULus Listing requirements that must be followed.

3. TECHNICAL DATA

Specifications:

Available since 2003.

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. (70.5 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
Diffractor: Phosphor Bronze UNS-C51100
Diffractor Pins: Stainless Steel UNS-S30200
Bushing: Brass UNS-C36000
Seal Assembly: Brass UNS-C36000
Compression Screw: Brass UNS-C36000
Fuseable Element Assembly: Beryllium Nickel, coated with black acrylic paint
Levers: Stainless Steel UNS-S31803
Lever Bar: Copper Alloy UNS-C72500
Belleville Spring Seating Assembly: Nickel Alloy, coated on both sides with Teflon Tape
Cover Adapter: Cold Rolled Steel UNS-G10080, Finish: Clear Chromate 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.

Form No. F_072907

Replaces page 147u-z, dated Sept. 9, 2011. (Added QM Brass to sprinkler materials and added reference to TIA K282R.)
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. 14694AC (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:
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. 13823WB (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 ½” 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**

<table>
<thead>
<tr>
<th>Sprinkler Temperature Classification</th>
<th>Sprinkler Nominal Temperature Rating(^1)</th>
<th>Maximum Ambient Ceiling Temperature(^2)</th>
<th>Temperature Rating of the Cover Assembly (Required)</th>
<th>Cover Plate Base Part Number(^2)</th>
<th>Large Cover Plate Base Part Number(^2)</th>
<th>Square Cover Plate Base Part Number(^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ordinary</td>
<td>165°F (74°C)</td>
<td>100°F (38°C)</td>
<td>135°F (57°C)</td>
<td>13504</td>
<td>13642</td>
<td>15394</td>
</tr>
</tbody>
</table>

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.
## Approval Chart

Residential Concealed Pendent Sprinkler VK457

For systems designed to NFPA 13D or NFPA 13R.

For systems designed to NFPA 13, refer to the design criteria on page 147x.

<table>
<thead>
<tr>
<th>Sprinkler Base Part Number¹</th>
<th>SIN</th>
<th>Nominal K-Factor</th>
<th>Maximum Water Working Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>14694A</td>
<td>VK457</td>
<td>1/2 inches</td>
<td>175 psi (12 bar)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15 mm</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>metric²</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>70.6</td>
<td></td>
</tr>
</tbody>
</table>

### Maximum Areas of Coverage

- Installed below smooth, flat, horizontal ceilings, including ceilings with slopes up to and including 21/2 (5.5°).
- Installed below ceilings with slopes up to and including a 6/12 (33.7°) pitch. Refer to Figure 5 on page 147z.

### Minimum Water Supply Requirements

<table>
<thead>
<tr>
<th>Area</th>
<th>Flow Rate (gpm)</th>
<th>Pressure (psi)</th>
<th>Flow Rate (L/min)</th>
<th>Pressure (kPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 ft. x 12 ft. (3.7 m x 3.7 m)</td>
<td>13 gpm @ 7.0 psi (49.2 L/min @ 0.48 bar)</td>
<td>AX1</td>
<td>See Footnote 5.</td>
<td></td>
</tr>
<tr>
<td>14 ft. x 14 ft. (4.3 m x 4.3 m)</td>
<td>13 gpm @ 7.0 psi (49.2 L/min @ 0.48 bar)</td>
<td>AX1</td>
<td>See Footnote 5.</td>
<td></td>
</tr>
<tr>
<td>16 ft. x 16 ft. (4.9 m x 4.9 m)</td>
<td>13 gpm @ 7.0 psi (49.2 L/min @ 0.48 bar)</td>
<td>AX1</td>
<td>See Footnote 5.</td>
<td></td>
</tr>
<tr>
<td>18 ft. x 18 ft. (5.5 m x 5.5 m)</td>
<td>17 gpm @ 12.0 psi (64.4 L/min @ 0.83 bar)</td>
<td>AX1</td>
<td>See Footnote 5.</td>
<td></td>
</tr>
<tr>
<td>20 ft. x 20 ft. (6.1 m x 6.1 m)</td>
<td>20 gpm @ 16.7 psi (75.7 L/min @ 1.15 bar)</td>
<td>AX1</td>
<td>See Footnote 5.</td>
<td></td>
</tr>
</tbody>
</table>

### Cover Plate Finishes

- 1 - Polished Chrome, Brushed Chrome, Bright Brass, Antique Brass, Brushed Brass, Brushed Copper, Painted White, Painted Ivory, or Painted Black

---

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, 2006.
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 1026R 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.
**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

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**DESIGN CRITERIA**
(Also refer to the Approval Chart on page 147w.)

**eUL vs 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.

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**Figure 1: Sprinkler Installation and Correct Use of Wrenches**

1. Carefully slide the wrench sideways around the deflector and pins
2. A 1/2" ratchet is required (not available from Viking)
3. Carefully press the wrench upward and turn slightly to ensure engagement with sprinkler wrench flats.
Note: Upon sprinkler activation, the deflector descends to approximately 13/16" (20.6 mm) below the sprinkler body.

Figure 2: Sprinkler Dimensions and Cover Installation

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
Figure 5:
Installation Instructions - Sloped Ceilings

Notes:
1. Listed areas of coverage correspond to areas measured along ceiling slope. (For sloped ceiling installations, actual floor coverage in the horizontal plane under sloped ceilings will be less than the listed area.)
2. Actual installations may require multiple sprinklers. A single sprinkler installation has been shown for clarity.
3. For "cathedral" ceiling applications, install sprinklers in a symmetrical mirror-image of Figure 5.

Refer to the Approval Chart for listed areas of coverage.

Maximum ceiling slope = 8/12 (33.7°).

See Note 1 below.
1. DESCRIPTION

Viking Freedom® Residential Concealed Horizontal Sidewall Sprinkler VK480 is a small high-sensitivity spider link and lower 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 supplied with a pipe guide to properly locate the sprinkler and allow the 1/4" adjustment of the cover plate.

2. LISTINGS AND APPROVALS

cULus Listed: Category VKW (VK480)

Refer to the Approval Chart and Design Criteria on page 153c for cULus Listing requirements that must be followed.

3. TECHNICAL DATA

Specifications:
Available since 2001
Minimum Operating Pressure: Refer to the Approval Chart
Maximum Operating 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 10.2

Available Cover Plate Horizontal Adjustment: 1/4" (6.4 mm)
Overall Length (Sprinkler Body): 2" (50 mm)

Materials:
Sprinkler Body: QM Bras and Brass UNS-C84400
Bellows: 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
Haos: Brass UNS-C31400 or Phosphor Bronze UNS-C51000
Flow Shaper: Phosphor Bronze UNS-C51000
Lev Raiser: Brass UNS-C31400 or Brass UNS-C84400
Compression Screw: 18-8 Stainless Steel
Fusible Link Assembly: Nickel Alloy and Eutectic Sealer
Fusible Link Levers: Stainless Steel UNS-S31000
Guide Pin: Stainless Steel UNS-S43000
Shipping Cap: Polyethylene

Cover Assembly Materials:
Cover Plate Assembly: Copper UNS-C11000 and Brass UNS-C28000
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. 10118AC (includes a 105 °F (41 °C) rated sprinkler with a protective plastic cap covering the unit).
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 16287*** (available since 2010)
C. Optional Large Concealed Cover Plate Installer Tool Part No. 14887 (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.

**TABLE 1: AVAILABLE SPRINKLER TEMPERATURE RATINGS AND FINISHES**

<table>
<thead>
<tr>
<th>Sprinkler Temperature Classification</th>
<th>Sprinkler Nominal Temperature Rating</th>
<th>Maximum Ambient Ceiling Temperature</th>
<th>Temperature Rating of the Cover Assembly (Required)</th>
<th>Cover Plate Base Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ordinary</td>
<td>165 °F (74 °C)</td>
<td>100 °F (38 °C)</td>
<td>135 °F (57 °C)</td>
<td>16207</td>
</tr>
</tbody>
</table>

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.
Approval Chart

Residential Concealed Horizontal Sidewall Sprinkler VK480
For systems designed to NFPA 13D or NFPA 13R.
For systems designed to NFPA 13, refer to the design criteria below.

<table>
<thead>
<tr>
<th>Sprinkler Part Number</th>
<th>SIN</th>
<th>NPT Thread Size</th>
<th>Nominal K-Factor</th>
<th>Maximum Water Working Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>16116AC</td>
<td>VK480</td>
<td>1/2</td>
<td>15 mm</td>
<td>4.0 metric 57.7</td>
</tr>
</tbody>
</table>

Maximum Areas of Coverage

Width x Length Minimum Water Supply Requirements

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 152 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 @ 14 psi (60.6 L/min @ 1.1 bar)    | AX1           | See Footnote 5               | –               |
| 16 ft. x 16 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 (53.1 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 16 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)
- X - 135°F (57°C) Cover Plate Rating

Cover Part No. 16207

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 1028A 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 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/ft. over the “design area” in accordance with sections 5.5.2.1 or 5.6.1.2 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.
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.

Orient the sprinkler and wrench as shown then slide the wrench over the sprinkler body and the protective sprinkler cap.

Figure 2: Sprinkler VK480 Installation and Correct Use of Wrench

Keep the top of the element oriented parallel to the ceiling.

Centerline of sprinkler (Corresponds with the centerline of the wrench.)

Measure from the centerline of the sprinkler to the ceiling.

The top of the sprinkler is marked "TOP". The sprinkler MUST be oriented as shown.

Distance from the ceiling affects water supply requirements. Refer to the Approval Chart.

Figure 3: Sprinkler VK480 Correct Deflector Orientation

NOTE: To install the Cover Plate Assembly, gently press it onto the sprinkler body with even pressure using the palm of the hand.

Figure 4: Sprinkler VK480 Dimensions and Cover Installation
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
Figure 7: Sprinkler VK480 Installation - Soffit

Refer to the Approval Chart for minimum and maximum allowable distance from the centerline of the sprinkler to the ceiling.

2-3/16" (56 mm) Max
1-15/16" (49.2 mm) Min.

8" Maximum (203 mm)
(NFPA 13, NFPA 13R, & NFPA 13D)

12" Maximum (305 mm)
Directly above cabinets
(NFPA 13R & NFPA 13D)
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
1. DESCRIPTION

Viking Micromatic® and Micromatic HP® 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.

2. LISTINGS AND APPROVALS

- cULus Listed: Category VNIV
- FM Approved: Classes 2012 and 2015
- LPC Approved: Ref. No. 006e/06

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.

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® Coated
- For 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.
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.
For example, sprinkler VK104 with a 1/2” thread, Brass finish and a 155 °F/68 °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. 10896WB (available since 2000).
B. Wrench for recessed sprinklers with protective shields: Part No. 13655WB* (available since 2003)
C. Wrench for wax coated sprinklers: Part No. 13577WB** (available since 2006)
   **A ¼” 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 10896WB
TABLE 1: AVAILABLE SPRINKLER TEMPERATURE RATINGs AND FINISHES

<table>
<thead>
<tr>
<th>Sprinkler Temperature Classification</th>
<th>Sprinkler Nominal Temperature Rating¹</th>
<th>Maximum Ambient Ceiling Temperature²</th>
<th>Bulb Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ordinary</td>
<td>135 °F (57 °C)</td>
<td>100 °F (38 °C)</td>
<td>Orange</td>
</tr>
<tr>
<td>Ordinary</td>
<td>155 °F (68 °C)</td>
<td>100 °F (38 °C)</td>
<td>Red</td>
</tr>
<tr>
<td>Intermediate</td>
<td>175 °F (79 °C)</td>
<td>150 °F (65 °C)</td>
<td>Yellow</td>
</tr>
<tr>
<td>Intermediate</td>
<td>200 °F (93 °C)</td>
<td>150 °F (65 °C)</td>
<td>Green</td>
</tr>
<tr>
<td>High</td>
<td>286 °F (141 °C)</td>
<td>225 °F (107 °C)</td>
<td>Blue</td>
</tr>
<tr>
<td>Extra High</td>
<td>360 °F (182 °C)</td>
<td>300 °F (149 °C)</td>
<td>Mauve</td>
</tr>
</tbody>
</table>

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

Footnotes

¹ 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

*Note: A 1/2" ratchet is required (not available from Viking).
## Approval Chart 1 (UL)

### Micromatic® and Micromatic® HP Standard Response Horizontal Sidewall Sprinklers

<table>
<thead>
<tr>
<th>Base Part Number</th>
<th>SIN</th>
<th>Maximum Pressure</th>
<th>Thread Size</th>
<th>Nominal K-Factor</th>
<th>Overall Length</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>NPT</td>
<td>U.S.</td>
<td></td>
</tr>
<tr>
<td>10224</td>
<td>VK104</td>
<td>175 psi</td>
<td>1/2*</td>
<td>5.6</td>
<td>2-7/16 to 62.4</td>
</tr>
<tr>
<td>10171</td>
<td>VK104</td>
<td>175 psi</td>
<td>15 mm</td>
<td>5.6</td>
<td>2-7/16 to 62.4</td>
</tr>
<tr>
<td>09126</td>
<td>VK016</td>
<td>175 psi</td>
<td>10 mm</td>
<td>4.2</td>
<td>2-7/16 to 62.4</td>
</tr>
</tbody>
</table>

### Standard Orifice

- **cULus**
- **NVC**
- **LPCB**

### Small Orifice

- **cULus**
- **NVC**
- **LPCB**

### Standard Orifice, for installation 4" to 12" (102 mm to 305 mm) below the ceiling.

<table>
<thead>
<tr>
<th>Base Part Number</th>
<th>SIN</th>
<th>Maximum Pressure</th>
<th>Thread Size</th>
<th>Nominal K-Factor</th>
<th>Overall Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>09849</td>
<td>VK116</td>
<td>250 psi</td>
<td>1/2*</td>
<td>5.6</td>
<td>2-11/16 to 67.6</td>
</tr>
</tbody>
</table>

### Maximum 250 PSI (17 Bar) WWP

### Small Orifice, for installation 4" to 6" (102 mm to 152 mm) below the ceiling.

<table>
<thead>
<tr>
<th>Base Part Number</th>
<th>SIN</th>
<th>Maximum Pressure</th>
<th>Thread Size</th>
<th>Nominal K-Factor</th>
<th>Overall Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>09997</td>
<td>VK015</td>
<td>250 psi</td>
<td>1/2*</td>
<td>2.8</td>
<td>2-3/4 to 69</td>
</tr>
</tbody>
</table>

### Approved Temperature Ratings

- **A** - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 256 °F (124 °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), 256 °F (124 °C), and 360 °F (182 °C)

### Approved Finishes

1. Brass, Chrome-Eny®, White Polyester, Black Polyester, and Black Teflon
2. Brass, Chrome-Eny®, 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)

### 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.
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.
**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
## Approval Chart 2 (FM)

**Micromatic® Standard Response Horizontal Sidewall Sprinklers**

<table>
<thead>
<tr>
<th>Base Part Number</th>
<th>SIN</th>
<th>Maximum Pressure</th>
<th>Thread Size</th>
<th>Nominal K-Factor</th>
<th>Overall Length</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>NPT</td>
<td>BSP</td>
<td>U.S.</td>
</tr>
<tr>
<td>10224</td>
<td>VK104</td>
<td>175 psf</td>
<td>1/2&quot;</td>
<td></td>
<td>15 mm</td>
</tr>
<tr>
<td>10171</td>
<td>VK104</td>
<td>175 psf</td>
<td></td>
<td>15 mm</td>
<td></td>
</tr>
</tbody>
</table>

### Approved Temperature Ratings

- **A**: 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 286 °F (141 °C).
- **B**: 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), and 200 °F (93 °C).

### 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.

### Approved Finishes

- 1 - Brass and Chrome-Enloy®

### 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 cULs and/or NFPA criteria.

**IMPORTANT:** Always refer to Bulletin Form No. F_0916999 - 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.
MICROMATIC® AND MICROMATICCHP® 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

Figure 4: Sidewall Sprinkler Dimensions with a Standard Escutcheon and the Model F-1 Adjustable Escutcheon

Figure 5: Sidewall Sprinkler Dimensions with the Model E-1 or E-2 Escutcheons

Figure 6: Sidewall Sprinkler Dimensions with the Model G-1 Recessed Escutcheons
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 (MEIA) Approved, LPCB Approved.

### CPVC PIPE PHYSICAL DATA

<table>
<thead>
<tr>
<th>Nominal Pipe Size</th>
<th>Actual Outside Diameter</th>
<th>Average Inside Diameter</th>
<th>Weight per 15' (4.6 m) Length</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inch D11 mm</td>
<td>Inch</td>
<td>mm</td>
<td>Inch</td>
<td>mm</td>
</tr>
<tr>
<td>3/4” DN20</td>
<td>1.050</td>
<td>26.710</td>
<td>0.674</td>
<td>22.199</td>
</tr>
<tr>
<td>1” DN25</td>
<td>1.315</td>
<td>33.401</td>
<td>1.101</td>
<td>27.935</td>
</tr>
<tr>
<td>1 1/4” DN32</td>
<td>1.600</td>
<td>40.640</td>
<td>1.304</td>
<td>33.605</td>
</tr>
<tr>
<td>1 1/2” DN40</td>
<td>1.880</td>
<td>48.260</td>
<td>1.598</td>
<td>40.950</td>
</tr>
<tr>
<td>2” DN50</td>
<td>2.375</td>
<td>60.325</td>
<td>2.003</td>
<td>50.875</td>
</tr>
<tr>
<td>2 1/2” DN65</td>
<td>2.875</td>
<td>73.000</td>
<td>2.423</td>
<td>61.500</td>
</tr>
<tr>
<td>3” DN80</td>
<td>3.500</td>
<td>88.900</td>
<td>2.950</td>
<td>74.900</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nominal Pipe Size</th>
<th>Actual Outside Diameter</th>
<th>Average Inside Diameter</th>
<th>Weight per 10’ (3.05 m) Length</th>
<th>Length</th>
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<tbody>
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<td>Inch D11 mm</td>
<td>Inch</td>
<td>mm</td>
<td>Inch</td>
<td>mm</td>
</tr>
<tr>
<td>3/4” DN20</td>
<td>1.050</td>
<td>26.710</td>
<td>0.674</td>
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<tr>
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<td>1.315</td>
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<tr>
<td>1 1/4” DN32</td>
<td>1.600</td>
<td>40.640</td>
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<td>33.605</td>
</tr>
<tr>
<td>1 1/2” DN40</td>
<td>1.880</td>
<td>48.260</td>
<td>1.598</td>
<td>40.950</td>
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<tr>
<td>2” DN50</td>
<td>2.375</td>
<td>60.325</td>
<td>2.003</td>
<td>50.875</td>
</tr>
<tr>
<td>2 1/2” DN65</td>
<td>2.875</td>
<td>73.000</td>
<td>2.423</td>
<td>61.500</td>
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<tr>
<td>3” DN80</td>
<td>3.500</td>
<td>88.900</td>
<td>2.950</td>
<td>74.900</td>
</tr>
</tbody>
</table>

**NOTE:** CPVC Pipe is produced in GDR 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 Liberty.*

*Specifications subject to change without notice.

*Unit pipe weight*

*IMPORTANT: Installers should receive thorough hands-on training in the proper methods of assembly and installation of CPVC products.*

**Trusted above all**
Viking Plastics

BlazeMaster® CPVC Pipe

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 81 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.

Trusted above all™
## BlazeMaster® Fire Protection Fittings – STANDARD

### ELBOWS

#### 45° Elbow

<table>
<thead>
<tr>
<th>UNIV. FIG. NO.</th>
<th>NOM. SIZE</th>
<th>APPROX. NET WT./ABS.</th>
<th>DIM. J INCHES</th>
<th>JOINT</th>
</tr>
</thead>
<tbody>
<tr>
<td>5006</td>
<td>3/4&quot;</td>
<td>0.06</td>
<td>0.32</td>
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</tr>
<tr>
<td>5006</td>
<td>1&quot;</td>
<td>0.12</td>
<td>0.39</td>
<td>SXS</td>
</tr>
<tr>
<td>5006</td>
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<td>SXS</td>
</tr>
<tr>
<td>5006</td>
<td>1-1/2&quot;</td>
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<td>0.54</td>
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<tr>
<td>5006</td>
<td>2-1/2&quot;</td>
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<td>0.65</td>
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<tr>
<td>5006</td>
<td>3&quot;</td>
<td>1.28</td>
<td>0.76</td>
<td>SXS</td>
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</table>

#### 90° Elbow

<table>
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<tr>
<th>UNIV. FIG. NO.</th>
<th>NOM. SIZE</th>
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<th>DIM. B INCHES</th>
<th>JOINT</th>
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</thead>
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<tr>
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<td>0.56</td>
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<td>5007</td>
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<td>1.66</td>
<td>1.81</td>
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<tr>
<td>5007-R</td>
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<td>0.12</td>
<td>0.61</td>
<td>0.75</td>
<td>SXS</td>
</tr>
</tbody>
</table>
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.

# CPVC Cross Reference Sheet

## STANDARD FITTINGS

<table>
<thead>
<tr>
<th>NIBCO FIG. NO.</th>
<th>SIZE</th>
<th>SPEARS FIG. NO.</th>
<th>TYCO FIG. NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>5011-R</td>
<td>1&quot;x3/4&quot;x1&quot;</td>
<td>4201-126</td>
<td>80134</td>
</tr>
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<td>5011-R</td>
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<td>4201-125</td>
<td>80133</td>
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<td>80262</td>
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## THREAD FITTINGS

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<th>TYCO FIG. NO.</th>
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## ADAPTERS

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<th>TYCO FIG. NO.</th>
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## CROSSES

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## UNIONS

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<td>TCBR-3</td>
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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 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
R.O. Box 1167
Elkhart, IN 46515-1167
USA
Phone: 800.234.0227
Fax: 800.234.0557

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www.nibco.com

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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 System Compatible 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 20 ft. 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 30 ft. 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
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

"Backed By The Name You Can Trust"
BRASTIC™ Sprinkler Head Adapters

SIZE RANGE — ¾” x ½” and 1” x ½” (Socket x F NPT)

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 6,186,559

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 pendant 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
- UL Listed
- Factory Mutual Approved
  - Factory Mutual Approval exposed
  - Factory Mutual Approval above drop-in ceilings
- LPCB Approved
- NSF Certification - pw Annex G

INSTALLATION INSTRUCTIONS —
For complete installation instructions see NIBCO’s “Installation and Design Manual”
or for Brastic installation instructions reference form No. IM-BLBF-0910.
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

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<th>DIM. B INCHES</th>
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<td>0.57</td>
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<td>GM1-H</td>
<td>1-1/4” x 1-1/4”</td>
<td>0.40</td>
<td>0.80</td>
<td>0.80</td>
<td>0.80</td>
<td>SSSS</td>
</tr>
<tr>
<td>GM1-H</td>
<td>1-1/4” x 1”</td>
<td>0.40</td>
<td>0.80</td>
<td>0.80</td>
<td>0.80</td>
<td>SSSS</td>
</tr>
<tr>
<td>GM1-H</td>
<td>1-3/4” x 1”</td>
<td>0.16</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>SSSS</td>
</tr>
<tr>
<td>GM1-H</td>
<td>2” x 2”</td>
<td>0.18</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>SSSS</td>
</tr>
<tr>
<td>GM1-H</td>
<td>2” x 2”</td>
<td>0.18</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>SSSS</td>
</tr>
<tr>
<td>GM1-H</td>
<td>2-1/2” x 2-1/2”</td>
<td>1.16</td>
<td>1.83</td>
<td>1.83</td>
<td>1.83</td>
<td>SSSS</td>
</tr>
<tr>
<td>GM1-H</td>
<td>2” x 2-1/2”</td>
<td>1.16</td>
<td>1.83</td>
<td>1.83</td>
<td>1.83</td>
<td>SSSS</td>
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<tr>
<td>GM1-H</td>
<td>3” x 3”</td>
<td>2.87</td>
<td>1.84</td>
<td>1.84</td>
<td>1.84</td>
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</tr>
<tr>
<td>GM1-H</td>
<td>3” x 3-1/2”</td>
<td>2.87</td>
<td>1.84</td>
<td>1.84</td>
<td>1.84</td>
<td>SSSS</td>
</tr>
</tbody>
</table>
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 fire stop 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.


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 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 also have other rights which vary from state to state.

NIBCO INC. World Headquarters • 1516 Middlebury St. • Elkhart, IN 46516-4740 USA • www.nibco.com

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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.

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
**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:
  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

<table>
<thead>
<tr>
<th>Motor HP</th>
<th>Single Pump System</th>
<th>Dual Pump System</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Catalog No.</td>
<td>Price</td>
</tr>
<tr>
<td>5</td>
<td>SFP2210</td>
<td>SFPC2210</td>
</tr>
<tr>
<td>.75</td>
<td>SFPCB2201</td>
<td>SFPCB2201</td>
</tr>
<tr>
<td>1</td>
<td>SFPC2201</td>
<td>SFPC2201</td>
</tr>
<tr>
<td>1.5</td>
<td>SFPCD2201</td>
<td>SFPCD2201</td>
</tr>
<tr>
<td>2</td>
<td>SFPC2201</td>
<td>SFPC2201</td>
</tr>
<tr>
<td>3</td>
<td>SFPC2201</td>
<td>SFPC2201</td>
</tr>
<tr>
<td>5</td>
<td>SFP2201</td>
<td>SFP2201</td>
</tr>
<tr>
<td>7.5</td>
<td>SFP2201</td>
<td>SFP2201</td>
</tr>
</tbody>
</table>

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
NPE END SUCTION CENTRIFUGAL PUMP

Model Number: 316L SS
Material: Stainless Steel
Inlet: 1 ¼”
Outlet: 1”
NPE
316L SS
NPE SERIES END SUCTION CENTRIFUGAL PUMPS
BOMBAS CENTRÍFUGAS DE SUCCIÓN FINAL SERIE NPE
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.

Materials 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.

Impulso deEficiencia Superior: El impulso 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 contrastes 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 gotear, 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

| ST | 2 | C1 | 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.

<table>
<thead>
<tr>
<th>Seal Code, Código del Sello</th>
<th>Rotary, Rotatorio</th>
<th>Stationary, Estacionario</th>
<th>Elastomers, Elastómeros</th>
<th>Metal Parts, Partes Metálicas</th>
<th>Part No., Piéz Número</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 Carbon</td>
<td>Silicon</td>
<td>EPR</td>
<td>50 Hz, 4 pole, 2900 RPM</td>
<td>Viton</td>
<td>10K55</td>
</tr>
<tr>
<td>4 EPR</td>
<td>Viton</td>
<td>316 SS</td>
<td>60 Hz, 3 pole, 1450 RPM</td>
<td>Viton</td>
<td>10K81</td>
</tr>
<tr>
<td>5 Viton 316 SS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10K62</td>
</tr>
<tr>
<td>6 EPR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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 Impulso Opcional
Para impulsos con diámetros opcionales modificar el número de orden del catálogo con el código del impulso anotado. Escoger el impulso con diámetro opcional de la curva de funcionamiento de la bomba.

<table>
<thead>
<tr>
<th>Impeller Code, Código del Impulso</th>
<th>Pump Size, Tamaño de la Bomba</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 x 1¼ – 6</td>
<td>1¼ x 1½ – 6</td>
</tr>
<tr>
<td>Diameter</td>
<td>Diameter</td>
</tr>
<tr>
<td>K</td>
<td>6”</td>
</tr>
<tr>
<td>G</td>
<td>5½”</td>
</tr>
<tr>
<td>H</td>
<td>5”</td>
</tr>
<tr>
<td>A</td>
<td>4½”</td>
</tr>
<tr>
<td>B</td>
<td>4½”</td>
</tr>
<tr>
<td>C</td>
<td>-</td>
</tr>
<tr>
<td>D</td>
<td>-</td>
</tr>
<tr>
<td>E</td>
<td>-</td>
</tr>
<tr>
<td>F</td>
<td>-</td>
</tr>
</tbody>
</table>

Driver, Conductor
For frame mounted version, substitute the letters “FRM” in these positions.

<table>
<thead>
<tr>
<th>Driver, Hertz/Pole/RPM, Conductora: Hérculos/Polo/RPM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 = 60 Hz, 2 pole, 3500 RPM</td>
</tr>
<tr>
<td>2 = 60 Hz, 4 pole, 7150 RPM</td>
</tr>
<tr>
<td>3 = 60 Hz, 6 pole, 1150 RPM</td>
</tr>
<tr>
<td>4 = 50 Hz, 2 pole, 2900 RPM</td>
</tr>
<tr>
<td>5 = 50 Hz, 4 pole, 1450 RPM</td>
</tr>
<tr>
<td>HP Rating, HP Potencia</td>
</tr>
<tr>
<td>C = 1½ HP, J = 2 HP</td>
</tr>
<tr>
<td>D = ¾ HP, F = 1½ HP</td>
</tr>
<tr>
<td>ST = Stainless steel, Acero inoxidable</td>
</tr>
</tbody>
</table>

Material

ST = Stainless steel, Acero inoxidable

Pump Size, Tamaño de la Bomba

For frame mounted version, substitute the letters “FRM” in these positions.

<table>
<thead>
<tr>
<th>Pump Size, Tamaño de la Bomba</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 = 1 x 1¼ – 6</td>
</tr>
</tbody>
</table>

Pumpcatalog.com (800)-810-1053
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**

<table>
<thead>
<tr>
<th>Item No., Parte No.</th>
<th>Description, Descripción</th>
<th>Materials, Materiales</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>Casing; Carcasa</td>
<td>AISI 316L SS;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AISI 316L</td>
</tr>
<tr>
<td>101</td>
<td>Impeller; Impulsor</td>
<td></td>
</tr>
<tr>
<td>108</td>
<td>Motor adapter; Adaptador del motor</td>
<td>AISI 316L</td>
</tr>
<tr>
<td>108A</td>
<td>Motor adapter seal vent/flush; Sello válvula/chorro del adaptador del motor</td>
<td>Acero inoxidable</td>
</tr>
<tr>
<td>123</td>
<td>Deflector; Deflector</td>
<td>BUNA-N</td>
</tr>
<tr>
<td>184</td>
<td>Seal housing; Alojamiento del sello</td>
<td>AISI 316L SS;</td>
</tr>
<tr>
<td>184A</td>
<td>Seal housing seal vent/flush; Sello válvula/chorro del alojamiento del sello</td>
<td>AISI 316L Acero inoxidable</td>
</tr>
<tr>
<td>347</td>
<td>Deflector; Deflector</td>
<td></td>
</tr>
<tr>
<td>349</td>
<td>Socket head screws, casing; Encajes cabezas de tornillos, carcasa</td>
<td>AISI 410 SS;</td>
</tr>
<tr>
<td>349</td>
<td>Guidevane; Difusor</td>
<td>AISI 410 Acero inoxidable</td>
</tr>
<tr>
<td>349</td>
<td>Seal ring, guidevane; Anillo del sello, difusor</td>
<td>Viton</td>
</tr>
<tr>
<td>370</td>
<td>Socket head screws, casing; Encajes cabezas de tornillos, carcasa</td>
<td>AISI 410 SS;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AISI 410 Acero inoxidable</td>
</tr>
<tr>
<td>371</td>
<td>Bolts, motor; Tornillos, motor</td>
<td>Plated steel;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Acero chapeado</td>
</tr>
<tr>
<td>383</td>
<td>Mechanical seal; Sello mecánico</td>
<td><strong>see chart, ver tabla</strong></td>
</tr>
<tr>
<td>408</td>
<td>Drain and vent plug, casing; Enchufes de drenaje y válvula, carcasa</td>
<td>AISI 316L SS;</td>
</tr>
<tr>
<td>408</td>
<td></td>
<td>AISI 316L Acero inoxidable</td>
</tr>
<tr>
<td>412B</td>
<td>O-ring, drain and vent plug; Anillo 'O', enchufe de drenaje y válvula</td>
<td>Viton (Standard, estándar)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EPR (Optional, Opcional)</td>
</tr>
<tr>
<td>513</td>
<td>O-ring, casing; Anillo 'O', carcasa</td>
<td></td>
</tr>
<tr>
<td>Motor</td>
<td>NEMA standard, 56J flange;</td>
<td></td>
</tr>
<tr>
<td>Motor</td>
<td>NEMA estándar, brida 56J</td>
<td></td>
</tr>
</tbody>
</table>

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**

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description, Descripción</th>
<th>Materials, Materiales</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>Casing; Carcasa</td>
<td>AISI 316L SS; Acero inoxidable</td>
</tr>
<tr>
<td>101</td>
<td>Impeller; Impulsor</td>
<td>AISI 316L SS; Acero inoxidable</td>
</tr>
<tr>
<td>108</td>
<td>Motor adapter seal vent/flush; Sello válvula/chorro del adaptador del motor</td>
<td></td>
</tr>
<tr>
<td>109</td>
<td>Bearing cover; Cubierta de balineras</td>
<td>Cast iron; Hierro fundido</td>
</tr>
<tr>
<td>112</td>
<td>Ball bearing (outboard)</td>
<td>Steel; Acero</td>
</tr>
<tr>
<td>122</td>
<td>Shaft; Eje</td>
<td>AISI 316 SS; AISI 316 Acero inoxidable</td>
</tr>
<tr>
<td>138</td>
<td>Lip seal (inboard); Sello cubierto (interior)</td>
<td>BUNA/steel; BUNA/acero</td>
</tr>
<tr>
<td>139</td>
<td>Lip seal (outboard); Sello cubierto (exterior)</td>
<td>BUNA/steel; BUNA/acero</td>
</tr>
<tr>
<td>168</td>
<td>Ball bearing (inboard); Balineras de bolas (interior)</td>
<td>Steel; Acero</td>
</tr>
<tr>
<td>184</td>
<td>Seal housing; Alojamiento del sello</td>
<td>AISI 316L SS; AISI 316L Acero inoxidable</td>
</tr>
<tr>
<td>184A</td>
<td>Seal housing seal vent/flush; Sello válvula/chorro del alojamiento del sello</td>
<td>AISI 316L Acero inoxidable</td>
</tr>
<tr>
<td>228</td>
<td>Bearing frame; Armazón de balineras</td>
<td>Cast iron; Hierro fundido</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description, Descripción</th>
<th>Materials, Materiales</th>
</tr>
</thead>
<tbody>
<tr>
<td>304</td>
<td>Impeller locknut; Contratuerca del impulsor</td>
<td>AISI 316 SS; AISI 316 Acero inoxidable</td>
</tr>
<tr>
<td>347</td>
<td>Guidevane; Difusor</td>
<td>AISI 316; Acero inoxidable</td>
</tr>
<tr>
<td>349</td>
<td>Seal ring, guidevane; Anillo del sello, difusor</td>
<td>Viton</td>
</tr>
<tr>
<td>361</td>
<td>Retaining ring; Anillo de retención</td>
<td>Steel; Acero</td>
</tr>
<tr>
<td>370</td>
<td>Socket head screws, casing; Encaje cabeza del tornillo, carcasa</td>
<td>AISI 410 SS; AISI 410 Acero inoxidable</td>
</tr>
<tr>
<td>370C</td>
<td>Hex head screw, bearing cover; Tornillo de cabeza hexagonal, cubierta de balineras</td>
<td>Plated steel; Acero chapeado</td>
</tr>
<tr>
<td>371</td>
<td>Hex head screw, bearing frame; Tornillo de cabeza hexagonal, armazón de balineras</td>
<td>Plated steel; Acero chapeado</td>
</tr>
<tr>
<td>383</td>
<td>Mechanical seal; Sello mecánico</td>
<td><strong>see chart; ver tabla</strong></td>
</tr>
<tr>
<td>400</td>
<td>Shaft key; Llave del eje</td>
<td>Steel</td>
</tr>
<tr>
<td>408</td>
<td>Drain and vent plug, casing; Enchufes de drenaje y válvula, carcasa</td>
<td>AISI 316 SS; AISI 316 Acero inoxidable</td>
</tr>
<tr>
<td>412B</td>
<td>O-ring, drain and vent plug; Anillo ‘O’, enchufe de drenaje y válvula</td>
<td>Viton (Standard, estándar) EPR (Optional, Opcional)</td>
</tr>
<tr>
<td>513</td>
<td>O-ring, casing; Anillo ‘O’, carcasa</td>
<td><strong>see chart; ver tabla</strong></td>
</tr>
</tbody>
</table>

**Seal Face Vent/Flush Option, Opción Cara del Sello Válvula/Chorro**

---

Pumpcatalog.com (800)-810-1053
PERFORMANCE CURVES - 60 HZ, 3500 RPM
CURVAS DE FUNCIONAMIENTO - 60 HZ, 3500 RPM

Model NPE / 1ST Size (Tamaño) 1 x 1¹⁄₂-6
RPM 3500 Curve (Curva) CN0231R01

NOTE: Not recommended for operation beyond printed H-Q curve.

NOTA: No se recomienda para funcionamiento superior al impreso en la curva H-Q.

Impeller Selections for ODP & TEFC Motors
Selecciones del Impulsor para Motores ODP & TEFC

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 | ¼ | 3½"
E | 1 | 4¼
D | 1½ | 4¾
C | 2 | 4¾
B | 3 | 5¾
A | 3 | 5½
H | 5 | 5½
G | 5 | 5½

**NOTE:** Although not recommended, the pump may pass a 3/16” sphere.

**NOTE:** Si bien no se recomienda, la bomba puede pasar una esfera de 3/16”.

---

**Model NPE / 2ST Size (Tamaño) 1' x 1' x 6 RPM 3500 Curve (Curva) CN0235R02**

**Impeller Selections for ODP & TEFC Motors**

Secciones del Impulsor para Motores ODP & TEFC

**Ordering Code, Código de Pedido** | **Standard HP Rating, Estándar HP Potencia** | **Imp. Dia.**
--- | --- | ---
F | ¼ | 3½"
E | 1 | 4¼
D | 1½ | 4¾
C | 2 | 4¾
B | 3 | 5¾
A | 3 | 5½
H | 5 | 5½
G | 5 | 5½

**NOTE:** Although not recommended, the pump may pass a 3/16” sphere.

**NOTE:** Si bien no se recomienda, la bomba puede pasar una esfera de 3/16”.

---

**Model NPE / 2ST Size (Tamaño) 1' x 1' x 6 RPM 3500 Curve (Curva) CN0235R01**

**Impeller Selections for Exp. Proof Motors**

Selecciones del Impulsor para Motores Exp. Proof

**Ordering Code, Código de Pedido** | **Standard HP Rating, Estándar HP Potencia** | **Imp. Dia.**
--- | --- | ---
F | 1 | 3½"
E | 1½ | 4⅞
D | 2 | 4¾
B | 3 | 5⅞

**NOTE:** Although not recommended, the pump may pass a 3/16” sphere.

**NOTE:** Si bien no se recomienda, la bomba puede pasar una esfera de 3/16”.

---

**Pumpcatalog.com (800)-810-1053**

**PAGE 7**
### PERFORMANCE CURVES - 60 HZ, 3500 RPM
### CURVAS DE FUNCIONAMIENTO - 60 HZ, 3500 RPM

**Model NPE / 3ST Size (Tamaño) 1 1/2 x 2-6**

RPM 3500 Curve (Curva) No. CN0239RO2

<table>
<thead>
<tr>
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<th>Feet (Pies)</th>
</tr>
</thead>
<tbody>
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<td>62.7 ft</td>
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<tr>
<td>20</td>
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</table>

**TOTAL DYNAMIC HEAD (CARGA DINAMICA TOTAL)**

<table>
<thead>
<tr>
<th>Meters</th>
<th>Feet (Pies)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
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<tr>
<td>1</td>
<td>3.3 ft</td>
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</tr>
<tr>
<td>20</td>
<td>66.0 ft</td>
</tr>
</tbody>
</table>

**NOTE:** Not recommended for operation beyond printed H-Q curve.

**NOTA:** No se recomienda para funcionamiento superior al impreso en la curva H-Q.

### Impeller Selections for ODP & TEFC Motors

#### Selectores del Impulsor para Motores ODP & TEFC

<table>
<thead>
<tr>
<th>Código de Pedido</th>
<th>Código Estándar</th>
<th>Imp. Potencia</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
<td>1</td>
<td>3 7/8”</td>
</tr>
<tr>
<td>D</td>
<td>1 1/2</td>
<td>4 7/8”</td>
</tr>
<tr>
<td>C</td>
<td>2</td>
<td>4 7/8”</td>
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<tr>
<td>B</td>
<td>3</td>
<td>4 7/8”</td>
</tr>
<tr>
<td>A</td>
<td>3</td>
<td>4 7/8”</td>
</tr>
<tr>
<td>H</td>
<td>5</td>
<td>5”</td>
</tr>
<tr>
<td>G</td>
<td>5</td>
<td>5 3/8”</td>
</tr>
</tbody>
</table>

**NOTE:** Although not recommended, the pump may pass a 1 11/32” sphere.

**NOTA:** Si bien no se recomienda, la bomba puede pasar una esfera de 1 11/32”.

---

**Model NPE / 3ST Size (Tamaño) 1 1/2 x 2-6**

RPM 3500 Curve (Curva) CN0239R01

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<th>Meters</th>
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<td>9.9 ft</td>
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<td>5</td>
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<td>19</td>
<td>62.7 ft</td>
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<tr>
<td>20</td>
<td>66.0 ft</td>
</tr>
</tbody>
</table>

**TOTAL DYNAMIC HEAD (CARGA DINAMICA TOTAL)**

<table>
<thead>
<tr>
<th>Meters</th>
<th>Feet (Pies)</th>
</tr>
</thead>
<tbody>
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<td>0</td>
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<tr>
<td>19</td>
<td>62.7 ft</td>
</tr>
<tr>
<td>20</td>
<td>66.0 ft</td>
</tr>
</tbody>
</table>

**NOTE:** Not recommended for operation beyond printed H-Q curve.

**NOTA:** No se recomienda para funcionamiento superior al impreso en la curva H-Q.

### Impeller Selections for Exp. Proof Motors

#### Selectores del Impulsor para Motores Exp. Proof

<table>
<thead>
<tr>
<th>Código de Pedido</th>
<th>Código Estándar</th>
<th>Imp. Potencia</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
<td>1 1/2</td>
<td>3 7/8”</td>
</tr>
<tr>
<td>D</td>
<td>2</td>
<td>4 7/8”</td>
</tr>
<tr>
<td>B</td>
<td>3</td>
<td>4 7/8”</td>
</tr>
</tbody>
</table>

**NOTE:** Although not recommended, the pump may pass a 1 11/32” sphere.

**NOTA:** Si bien no se recomienda, la bomba puede pasar una esfera de 1 11/32”.
PERFORMANCE CURVES – 60 HZ, 1750 RPM
CURVAS DE FUNCIONAMIENTO – 60 HZ, 1750 RPM

Model NPE / 1ST Size (Tamaño) 1 x 1\'\(^{\frac{1}{8}}\)-6
RPM 1750 Curve (Curva) CN0233R00

NOTE: Not recommended for operation beyond
printed H-Q curve.

Model NPE / 2ST Size (Tamaño) 1\'\(^{\frac{1}{8}}\) x 1\'\(^{\frac{1}{8}}\)-6
RPM 1750 60 Hz

NOTE: Not recommended for operation beyond
printed H-Q curve.

Optional Impeller, Impulsor Opcional

Ordering Code, Código de Pedido Dia.

A  6\(^{\frac{1}{8}}\)“
B 5\(^{\frac{3}{4}}\)“
C  5\(^{\frac{15}{16}}\)“
D  4\(^{\frac{3}{4}}\)“
E  4\(^{\frac{7}{16}}\)“
F  4\(^{\frac{1}{16}}\)“

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”.

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”.

Pumpcatalog.com (800)-810-1053
**PERFORMANCE CURVES - 60 HZ, 1750 RPM**

**Model NPE / 3ST Size (Tamaño) 1 x 1-1/2 DIA.**

RPM 1750 60 Hz

**NOTE:** Not recommended for operation beyond printed H-Q curve.

**NOTA:** No se recomienda para funcionamiento superior al impreso en la curva H-Q.

---

**PERFORMANCE CURVES - 50 HZ, 2900 RPM**

**Model NPE / 1ST Size (Tamaño) 1 x 1-1/2 DIA.**

RPM 2900 50 Hz

**NOTE:** Not recommended for operation beyond printed H-Q curve.

**NOTA:** No se recomienda para funcionamiento superior al impreso en la curva H-Q.

---

**Optional Impeller, Impulsor Opcional**

<table>
<thead>
<tr>
<th>Ordering Code, Código de Pedido</th>
<th>Dia.</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>5 1/8&quot;</td>
</tr>
<tr>
<td>H</td>
<td>5 1/2</td>
</tr>
<tr>
<td>A</td>
<td>4 1/2</td>
</tr>
<tr>
<td>B</td>
<td>4 1/2</td>
</tr>
<tr>
<td>C</td>
<td>4 1/2</td>
</tr>
<tr>
<td>D</td>
<td>4 1/16</td>
</tr>
<tr>
<td>E</td>
<td>3 1/2</td>
</tr>
</tbody>
</table>

**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".

---

**Optional Impeller, Impulsor Opcional**

<table>
<thead>
<tr>
<th>Ordering Code, Código de Pedido</th>
<th>Dia.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>6 1/8</td>
</tr>
<tr>
<td>B</td>
<td>5</td>
</tr>
<tr>
<td>C</td>
<td>5 3/16</td>
</tr>
<tr>
<td>D</td>
<td>4</td>
</tr>
<tr>
<td>E</td>
<td>4 1/16</td>
</tr>
<tr>
<td>F</td>
<td>4 1/16</td>
</tr>
</tbody>
</table>

**Note:** Although not recommended, the pump may pass a 1 3/32" sphere.

**NOTA:** Si bien no se recomienda, la bomba puede pasar una esfera de 1 3/32".
PERFORMANCE CURVES – 50 HZ, 2900 RPM
CURVAS DE FUNCIONAMIENTO – 50 HZ, 2900 RPM

Optional Impeller, Impulsor Opcional

<table>
<thead>
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<th>Dia.</th>
</tr>
</thead>
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<tr>
<td>G</td>
<td>5⅝&quot;</td>
</tr>
<tr>
<td>H</td>
<td>5¾&quot;</td>
</tr>
<tr>
<td>A</td>
<td>5¾&quot;</td>
</tr>
<tr>
<td>B</td>
<td>4⅜&quot;</td>
</tr>
<tr>
<td>C</td>
<td>4¾&quot;</td>
</tr>
<tr>
<td>D</td>
<td>4⅛&quot;</td>
</tr>
<tr>
<td>E</td>
<td>3¾&quot;</td>
</tr>
</tbody>
</table>

Model NPE / 2ST Size (Tamaño) 1½ x 1½-6
RPM 2900 50 Hz

NOTE: Not recommended for operation beyond printed H-Q curve.
NOTA: No se recomienda para funcionamiento superior al impresos en la curva H-Q.

Optional Impeller, Impulsor Opcional

<table>
<thead>
<tr>
<th>Ordering Code, Código de Pedido</th>
<th>Dia.</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>5⅝&quot;</td>
</tr>
<tr>
<td>H</td>
<td>5&quot;</td>
</tr>
<tr>
<td>A</td>
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</tr>
<tr>
<td>B</td>
<td>4¾&quot;</td>
</tr>
<tr>
<td>C</td>
<td>4¾&quot;</td>
</tr>
<tr>
<td>D</td>
<td>4⅛&quot;</td>
</tr>
<tr>
<td>E</td>
<td>3¾&quot;</td>
</tr>
</tbody>
</table>

NOTE: Although not recommended, the pump may pass a 11⁄32" sphere.
NOTA: Si bien no se recomienda, la bomba puede pasar una esfera de 11⁄32".

Model NPE / 3ST Size (Tamaño) 1½ x 2-6
RPM 2900 50 Hz

NOTE: Not recommended for operation beyond printed H-Q curve.
NOTA: No se recomienda para funcionamiento superior al impresos en la curva H-Q.

Optional Impeller, Impulsor Opcional

<table>
<thead>
<tr>
<th>Ordering Code, Código de Pedido</th>
<th>Dia.</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>5⅝&quot;</td>
</tr>
<tr>
<td>H</td>
<td>5&quot;</td>
</tr>
<tr>
<td>A</td>
<td>4¾&quot;</td>
</tr>
<tr>
<td>B</td>
<td>4¾&quot;</td>
</tr>
<tr>
<td>C</td>
<td>4¾&quot;</td>
</tr>
<tr>
<td>D</td>
<td>4⅛&quot;</td>
</tr>
<tr>
<td>E</td>
<td>3¾&quot;</td>
</tr>
</tbody>
</table>

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".
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

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
250° F (121° C)

Direction of rotation:
Clockwise when viewed from motor end.

Motor specifications:
NEMA 56J frame, 1750 RPM, ½ HP. 3500 RPM ½ 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 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 56J NEMA, 1750 RPM ½ HP. 3500 RPM ½ a 5 HP. Cubiertas abiertas resguardadas, totalmente encerradas en fridas 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 reseoteo 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 ACOPLE 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

<table>
<thead>
<tr>
<th>Pump, Bomba</th>
<th>Suction, Succión</th>
<th>Discharge, Descarga</th>
<th>HP</th>
<th>W</th>
<th>X</th>
<th>Y</th>
<th>L</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>1ST</td>
<td>1¼</td>
<td>1</td>
<td>½</td>
<td>3</td>
<td>½</td>
<td>2</td>
<td>4½</td>
<td>7¾</td>
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<tr>
<td>2ST</td>
<td>1½</td>
<td>1¼</td>
<td>¾</td>
<td>3½</td>
<td>½</td>
<td>2¼</td>
<td>5¼</td>
<td>7¼</td>
</tr>
<tr>
<td>3ST</td>
<td>2</td>
<td>1½</td>
<td>1</td>
<td>3½</td>
<td>½</td>
<td>3</td>
<td>²/₃</td>
<td>7¼</td>
</tr>
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</table>

Available Motor Weights and Dimensions
Pesos y Dimensiones Disponibles del Motor

<table>
<thead>
<tr>
<th>HP</th>
<th>Motor Weights,Pesos del Motor</th>
<th>C Max, Length, (Longitud)</th>
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<tr>
<td></td>
<td>ODP</td>
<td>TEFC</td>
</tr>
<tr>
<td>½</td>
<td>16</td>
<td>21</td>
</tr>
<tr>
<td>¾</td>
<td>19</td>
<td>24</td>
</tr>
<tr>
<td>1</td>
<td>22</td>
<td>26</td>
</tr>
<tr>
<td>1¼</td>
<td>28</td>
<td>35</td>
</tr>
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<td>1½</td>
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<td>3</td>
<td>42</td>
<td>45</td>
</tr>
<tr>
<td>5</td>
<td>42</td>
<td>–</td>
</tr>
</tbody>
</table>

NOTES:
1. 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.
2. Motor dimensions may vary with motor manufacturers.
3. Dimensions in inches, weights in pounds.
4. For explosion proof motor dimensions consult factory for information.
5. Not to be used for construction purposes unless certified.

NOTAS:
1. 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.
2. Las dimensiones del motor puede que varíen con los fabricantes.
3. Dimensiones en pulgadas, pesos en libras.
4. Para las dimensiones de los motores a prueba de explosión consultar con la fábrica para información.
5. 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 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 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

Pumpcatalog.com (800)-810-1053
### Dimensions and Weights

**Dimensions and Weights - Determined by Pump, Dimensiones y Pesos - Determinados por la Bomba**

<table>
<thead>
<tr>
<th>Pump, Bomba</th>
<th>Suct. NPT, Succión NPT</th>
<th>Disch. NPT, Descarga NPT</th>
<th>CP</th>
<th>L</th>
<th>W</th>
<th>X</th>
<th>Y</th>
<th>Wt., Peso</th>
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<tr>
<td>1ST</td>
<td>1⁷⁄₈ 1</td>
<td>12⁷⁄₈</td>
<td>6⁷⁄₁₆</td>
<td>4⁷⁄₁₆</td>
<td>2</td>
<td>22⁷⁄₈</td>
<td>4⁷⁄₈</td>
<td>6⁷⁄₈</td>
</tr>
<tr>
<td>2ST</td>
<td>11⁄₂ 1¼</td>
<td>13⁷⁄₈</td>
<td>7</td>
<td>3⁷⁄₈</td>
<td>4⁷⁄₈</td>
<td>2 ½</td>
<td>23</td>
<td>5¹⁄₈ 7</td>
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<td></td>
<td></td>
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<td></td>
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### Available Motor and Bedplate Dimensions and Weights,
**Pesos y Dimensiones Disponibles de la Fundación y del Motor**

<table>
<thead>
<tr>
<th>Motor Frame, Armazón del Motor</th>
<th>HA</th>
<th>HB</th>
<th>HD</th>
<th>HE</th>
<th>HF</th>
<th>HG</th>
<th>HP</th>
<th>Wt. Max., Peso Máx</th>
<th>Shims, Deflector</th>
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</thead>
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<tr>
<td>56 143T 145T</td>
<td>8</td>
<td>26</td>
<td>6⁷⁄₈</td>
<td>3⁷⁄₈</td>
<td>22⁷⁄₈</td>
<td>2½</td>
<td>1</td>
<td>30 1*</td>
<td></td>
</tr>
<tr>
<td>182T 184T</td>
<td>10</td>
<td>26</td>
<td>7¹⁄₄</td>
<td>3⁷⁄₈</td>
<td>24 2²⁄₄</td>
<td>½</td>
<td>43</td>
<td>–</td>
<td></td>
</tr>
</tbody>
</table>

**NOTES:**
1. 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.
2. Motor dimensions may vary with motor manufacturers.
3. Dimensions in inches, weights in pounds.
4. For explosion proof motor dimensions consult factory for information.
5. Not to be used for construction purposes unless certified.

### Horsepower, Fuerza

<table>
<thead>
<tr>
<th>Frame Size, Tamaño del Armazón</th>
<th>3500 RPM</th>
<th>C Max.</th>
<th>Wt. Max., Peso Máx</th>
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</thead>
<tbody>
<tr>
<td>Single Phase, Monofásicos</td>
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<td></td>
<td></td>
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<tr>
<td>Three Phase, Trifásicos</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ODP TEFC ODP TEFC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>56 1⁷⁄₈ - 1¹⁄₂ ½ - 1¹⁄₂ ½ - 1 ½ - 1</td>
<td>13 45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>143T 145T</td>
<td>2 2 1¹⁄₂ - 3 1¹⁄₂ - 2</td>
<td>14¹⁄₄ 52</td>
<td></td>
</tr>
<tr>
<td>182T 184T</td>
<td>3 3 5 3</td>
<td>16¹⁄₂ 63</td>
<td></td>
</tr>
<tr>
<td>184T</td>
<td>5 5 5</td>
<td>18¹⁄₄ 112</td>
<td></td>
</tr>
</tbody>
</table>

**NOTAS:**
1. 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.
2. Las dimensiones del motor pueden que varíen con los fabricantes.
3. Dimensiones en pulgadas, pesos en libras.
4. Para las dimensiones de los motores a prueba de explosión consultar con la fábrica para información.
5. No usar para propósitos de construcción sin certificar.
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

TYPICAL APPLICATIONS, APLICACIONES TÍPICAS

- Car Wash, Lavadero de Autos
- Pure Water/OEM, Agua Pura/OEM
- Pressure Booster System, Sistema de Aumento de Presión
- Chiller, Enfriador

Xylem Inc.
2881 East Bayard Street Ext., Suite A
Seneca Falls, NY 13148
Phone: (866) 325-4210
Fax: (888) 322-5877
www.xyleminc.com/brands/gouldswatertechnology

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BNPE R1  
June 2012

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Goulds Pumps
G&L SERIES
MODEL NPE/NPE-F
Installation, Operation and Maintenance Instructions

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Engineered for life
Owner’s Information

Pump Model Number: ______________________
Pump Serial Number: ______________________
dealer: ______________________
dealer Phone No.: ______________________
Date of Purchase: ______________________
Date of Installation: ______________________

Current Readings at Startup:

<table>
<thead>
<tr>
<th>1 Ø</th>
<th>3 Ø</th>
<th>L1-2</th>
<th>L2-3</th>
<th>L3-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amps: _____</td>
<td>Amps: _____</td>
<td>_____</td>
<td>_____</td>
<td>_____</td>
</tr>
<tr>
<td>Volts: _____</td>
<td>Volts: _____</td>
<td>_____</td>
<td>_____</td>
<td>_____</td>
</tr>
</tbody>
</table>
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.

**DANGER**
Warns of hazards that WILL cause serious personal injury, death or major property damage.

**WARNING**
Warns of hazards that CAN cause serious personal injury, death or major property damage.

**CAUTION**
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.

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.

**CAUTION**
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.

**CAUTION**
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.

**CAUTION**
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.
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.

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.

   **CAUTION** Parallel

   **CAUTION** Angular

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:


6.1.2. 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 counterclockwise 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

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
<th>Materials of Construction</th>
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<tbody>
<tr>
<td>100</td>
<td>Casing</td>
<td>AISI 316L Stainless Steel</td>
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<tr>
<td>101</td>
<td>Impeller</td>
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</tr>
<tr>
<td>108A</td>
<td>Motor adapter with foot</td>
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</tr>
<tr>
<td>108B</td>
<td>Motor adapter less foot</td>
<td></td>
</tr>
<tr>
<td>108C</td>
<td>Motor adapter with foot and flush</td>
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<tr>
<td>108D</td>
<td>Motor adapter less foot with flush</td>
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<tr>
<td>123</td>
<td>Deflector</td>
<td>BUNA-N</td>
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<td>184A</td>
<td>Seal housing std.</td>
<td>AISI 316L S.S.</td>
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<tr>
<td>184B</td>
<td>Seal housing with seal flush</td>
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<tr>
<td>240</td>
<td>Motor support</td>
<td>300 S.S.</td>
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<tr>
<td>304</td>
<td>Impeller locknut</td>
<td>AISI 316 S.S.</td>
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<tr>
<td>347</td>
<td>Guidevane</td>
<td>AISI 316L S.S.</td>
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<td>349</td>
<td>Seal-Ring, guidevane</td>
<td>Viton (standard)</td>
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<tr>
<td>370</td>
<td>Socket head screw, casing</td>
<td>AISI 410 S.S.</td>
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<tr>
<td>371</td>
<td>Bolts, motor</td>
<td>Steel/plated</td>
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<tr>
<td>383</td>
<td>Mechanical seal</td>
<td>AISI 316 S.S.</td>
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<tr>
<td>408</td>
<td>Drain and vent plug, casing</td>
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<tr>
<td>412B</td>
<td>O-Ring, drain plugs</td>
<td>Viton (standard)</td>
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<tr>
<td>513</td>
<td>O-Ring, casing</td>
<td>Viton (standard)</td>
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**NOTE:** Optional Seal Flush Components

### MECHANICAL SEAL APPLICATION CHART

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
<th>Rotary</th>
<th>Stationary</th>
<th>Elastomers</th>
<th>Metal Parts</th>
<th>Part No.</th>
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<tbody>
<tr>
<td>383</td>
<td>Mechanical Seal (1/4&quot; seal)</td>
<td>Carbon</td>
<td>Sil-Carbide</td>
<td>EPR</td>
<td>316SS</td>
<td>10K18</td>
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<td>Viton</td>
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<td>10K62</td>
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**NOTE:** Close coupled units supplied with ½ HP 1750 RPM, ½ - 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.
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
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

FLOW

FLOW

THREADING 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

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<tr>
<td>D</td>
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<td>J</td>
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MATERIAL LIST

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<th>SPECIFICATION</th>
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<td>Body</td>
<td>Bronze</td>
<td>ASTM 584</td>
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<td>4</td>
<td>Handle</td>
<td>Brass</td>
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<td>5</td>
<td>Disc</td>
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<td>Disc Seal</td>
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<tr>
<td>7</td>
<td>Switch Housing</td>
<td>Die Cast Aluminum</td>
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</tr>
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</table>
CONTROL BOX

Model Number: RPC-115230V-50A
RESIDENTIAL PUMP CONTROLLER

MODEL: RPC

Wiring schematic

BUILT TO UL 508A STANDARDS

Drawing for information only.
Manufacturer reserves the right to modify this drawing without notice.
For drawing for approval or installation, please contact manufacturer.
RESIDENTIAL PUMP CONTROLLER
MODEL: RPC

Enclosure

BUILT TO UL 508A STANDARDS.

NEMA/CSA 2 ENCLOSURE

- Dimension may change at manufacturer discretion.

TERMINAL STRIP

LEGEND
AL: ALARM BELL
G: MOTOR CONTACTOR
GB: CIRCUIT BREAKER
CR: CONTROL RELAY
FS: FLOW SWITCH
FU: FUSE
IP: 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
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
The Model VSR-SF is a vane type workflow 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 workflow 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 workflow. 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 workflow.

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).
VSR-SF
VANE TYPE WATERFLOW
ALARM SWITCH WITH RETARD

Fig. 1
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.

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.

Typical Electrical Connections

Fig. 4
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
<table>
<thead>
<tr>
<th>Size</th>
<th>UPC#</th>
<th>No. Per Carton</th>
<th>No. Per Pallet</th>
<th>List Price Each</th>
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<td>Sanitary Tee (ALL HUB)</td>
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<tr>
<td>1½</td>
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<td>8x8x6**</td>
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<td>2</td>
<td>24</td>
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Note: Shading indicates new part.

6) 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

---
PVC piping products are not recommended for use with compressed air or gases.
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 ____________________________________________ Contractor ________________________________
Job Location __________________________________________ Approval ______________________________________
Engineer ______________________________________________ Contractor’s P.O. No. _______________________
Approval ______________________________________________ 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:

<table>
<thead>
<tr>
<th>FITTING STYLE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>CrimpRing Fittings</td>
<td>Ductile Copper CrimpRing™ compressed over WaterPEX/CrimpRing fitting.</td>
</tr>
<tr>
<td>Compression Fittings</td>
<td>Brass Compression Nut tightened around WaterPEX® and CompNut® fitting.</td>
</tr>
</tbody>
</table>

*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.

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

WATTS®
## Dimensions - Weights

<table>
<thead>
<tr>
<th>MODEL</th>
<th>NOMINAL TUBE SIZE</th>
<th>COIL/STICK LENGTH</th>
<th>BEND RADIUS</th>
<th>FLUID CAPACITY PER 100'</th>
<th>PKG. WEIGHT</th>
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<tbody>
<tr>
<td></td>
<td>in.</td>
<td>mm</td>
<td>in.</td>
<td>mm</td>
<td>ft</td>
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<td>Red Coils</td>
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<td>WPTC06-100R</td>
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<td>½</td>
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<td>100</td>
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### Red Sticks

- WPTS08-50R (50 sticks)
- WPTS12-25R (25 sticks)

### Blue Sticks

- WPTS08-50B (50 sticks)
- WPTS12-25B (25 sticks)

### White Sticks

- WPTS08-50W (50 sticks)
- WPTS12-25W (25 sticks)
- WPTS16-5W (5 sticks)
- WPTS20-5W (5 sticks)
- WPTS24-5W (5 sticks)
- WPTS28-5W (5 sticks)
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


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.

PLEASE CONTACT YOUR JM EAGLE REPRESENTATIVE OR VISIT WWW.JMEAGLE.COM FOR MORE INFORMATION.
## F480 WELL CASING

**SUBMITTAL AND DATA SHEET**

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Prior to ordering or specifying, please consult JM Eagle™ for product and/or listing availability.

**Notes:**
- 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

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Product Standard: ASTM F480
Pipe Compound: ASTM D1784 Cells Class 12454
Certifications: ANSI/NSF Standard 61
End Finish: Bell 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”

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*Pipe pressure ratings must be devalued for higher temperatures.

Xirtec 140

All Xirtec 140 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.

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 gallons
Electrical:
   Amps: 10.8/5.5
   Voltage: 115/230 V
Available: Grainger Corporate Office
Price: $445.25
DAYTON Shallow Well Jet Pump Sys, 1/2HP, 115/230V

Grainger Item # 5UXK8
Price (ea.) $445.25
Brand DAYTON
Mfr. Model # 5UXK8
UNSPSC # 40151511
Ship Qty 1
Sell Qty (Wt.-Call) 1
Ship Weight (lbs.) 100.0
Availability Ready to Ship
Catalog Page No. 3926
Country of Origin China

Add Grainger TripleGuard® repair & replacement coverage for $89.95 each.

Add to Order Add to Personal List Compare Alternates

When can I get it? Use your ZIP code to estimate availability.

Tech Specs

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<tr>
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<td>Pump and Tank, 1 x 3/4 In, Adaptor, Ejector 5UXL4, Nozzle, Venturi</td>
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LIBERTY COMMERCIAL SINK PUMP SYSTEM

Model Number: 405  
Above Grade, ½ HP  
Voltage: 115  
Amps: 7.3  
Max Temp: 180 degrees Fahrenheit
LIBERTY Commercial Sink Pump System, 1/2 HP, 2 In

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

<table>
<thead>
<tr>
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<td>Includes</td>
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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 USA
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
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
7 X 7 FLAT (4) PLACES

(3) SPACES @ 7.1 = 21.3

866-310-2556
305 GALLON VERTICAL TANK

JTP 16FEB97

SIZE
A

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

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### Diagram:

- **1**: Safety thermal cut-out
- **2**: Flow sensor
- **3**: Electronic control unit
- **4**: Housing
- **5**: Electronic sequence selector
- **6**: Motor-operating valve
- **7**: Heating system
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

BODY CONSTRUCTION: Heavy Gauge Steel
BODY FINISH: Electrostatically Applied Baked-On Polyester
TANK PRECHARGE: 40 psi Nitrogen-Rich charge
TANK CAPACITY: 6 gal
EQUIVQELICY 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: 15"
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

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

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.

Product Range

- Code 5230_0A Adjustable thermostatic mixing valve with replaceable cartridge for centralized systems connections 1", 1-1/4", 1-1/2", 2" NPT male union
- Code 5230_6A Adjustable thermostatic mixing valve with replaceable cartridge for centralized systems connections 1"sweat
- Code 5230_8A Adjustable thermostatic mixing valve with replaceable cartridge for centralized systems connections 3/4", 1", 1-1/4"sweat union
- Code 52317A Adjustable thermostatic mixing valve with replaceable cartridge and outlet temperature gauge connections 1-1/4"sweat union

Technical Specification

- Materials:
  - Body: Brass
  - Shutters: Brass, chemical nickel plated
  - Springs: Stainless steel
  - Seals: EPDM

- Medium:
  - Water

- Maximum percentage of glycol solution: 30% glycol solution

- Setting range:
  - See table on page 3

- Temperature stability:
  - ± 5°F (± 3°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 - 26.9°C)

- Maximum inlet pressure ratio (HIC or CAH):
  - 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

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3/4” Blue PEX Tubing (100 ft Coil)
SKU: 075-100-B  Brand: Rifeng

| QTY | PRICE          |
|-----|----------------
|     | $41.85 / each  |
|     | $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: 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

| QTY | PRICE          |
|-----|----------------
|     | $41.85 / each  |
|     | $119.25 / box (3 units x $39.75) |

ADD TO CART
In Stock! Ships in 24-48 hours
396 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: 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 CL 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.penguintonetoilets.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
- 16 Gauge Stainless Steel
- 30" X 18" X 10"
- 20mm/0.75 Radius Coved Corners
- Single Bowl under mounted 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 are 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.
Under mount sink installation

Stainless Steel Sink

Counter Top

Anchor (epoxy glued)

Screw

Silicone (adhesive)

3/4" (min. height)

1/32"  1/4"

16 ga.
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
KRAUS SOAP DISPENSER

Model Number: SD-20
Location: Kitchen Sink
Color: Stainless Steel
Length: 4.5"
Height: 3"
Hole Diameter Required: 1.25"
KRAUS Soap Dispenser in Stainless Steel

Model #: SD-20  Internet #: 20305820

Rating: ★★★★★ (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

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

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assembled Depth (in.)</td>
<td>8</td>
</tr>
<tr>
<td>Assembled Width (in.)</td>
<td>14</td>
</tr>
<tr>
<td>Assembled Height (in.)</td>
<td>4</td>
</tr>
<tr>
<td>Color/Finish</td>
<td>Stainless Steel</td>
</tr>
<tr>
<td>Kitchen Product Type</td>
<td>Sink Accessory</td>
</tr>
<tr>
<td>Manufacturer Warranty</td>
<td>Limited Lifetime</td>
</tr>
<tr>
<td>Material</td>
<td>Stainless Steel</td>
</tr>
<tr>
<td>Product Depth (in.)</td>
<td>8</td>
</tr>
<tr>
<td>Product Height (in.)</td>
<td>4.0</td>
</tr>
<tr>
<td>Product Width (in.)</td>
<td>14.0</td>
</tr>
<tr>
<td>Returnable</td>
<td>90-Day</td>
</tr>
<tr>
<td>Rust Resistant</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Info & Guides

Installation Guide
You will need Adobe® Acrobat® Reader to view PDF documents. Download a free copy from the Adobe Web site.
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
## Description

- **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

## Specifications

- **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
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 (#8) 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 (#8) onto the brass screw (#5).
10. Place the plastic enclosure (#9) onto the hose and situate the smaller opening onto the brass screw (#6).
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

**MODEL-KPF-1621**

<table>
<thead>
<tr>
<th>Code</th>
<th>Parts List</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Faucet Body</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Aerator Head</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Spout</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Rubber O-Ring</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>Brass Screw</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>Brass Nut</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>Rubber Washer</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>Metal Washer</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>Plastic Enclosure</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>Red Hard Washer</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>Hose</td>
<td>1</td>
</tr>
<tr>
<td>12</td>
<td>Hose Inlet</td>
<td>1</td>
</tr>
<tr>
<td>13</td>
<td>Spring</td>
<td>1</td>
</tr>
<tr>
<td>14</td>
<td>Faucet Extender (optional)</td>
<td>1</td>
</tr>
<tr>
<td>15</td>
<td>Hot &amp; Cold Water Lines</td>
<td>2</td>
</tr>
</tbody>
</table>

Flush the pipe

Do Not Disassemble

Contact us toll-free at 1-800-775-0703; or visit our website at www.kraususa.com. Copyright ©2008 - 2009, Kraus USA Inc.
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.

Available Options:

Finish:  

![Model: 371023**](image-url)
KOHLER CORALAIŠ 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
**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

### Description

<table>
<thead>
<tr>
<th>Color/Finish Family</th>
<th>Chrome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturer Color/Finish</td>
<td>Polished chrome</td>
</tr>
<tr>
<td>Collection Name</td>
<td>Coralais</td>
</tr>
<tr>
<td>Number of Faucet Handles</td>
<td>1-handle</td>
</tr>
<tr>
<td>Handle Type</td>
<td>Knob</td>
</tr>
<tr>
<td>Pressure Balance/Scald Guard</td>
<td>No</td>
</tr>
<tr>
<td>Items Required for Standard Installation</td>
<td>Adjustable wrenches, strap wrench, plumbers putty, thread sealant</td>
</tr>
<tr>
<td>Connection Type</td>
<td>NPT</td>
</tr>
<tr>
<td>Drain Included</td>
<td>No</td>
</tr>
<tr>
<td>Showerhead Type</td>
<td>Single function</td>
</tr>
</tbody>
</table>

### Specifications

<table>
<thead>
<tr>
<th>WaterSense Certified</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faucet Type</td>
<td>Tub/shower</td>
</tr>
<tr>
<td>Maximum Flow Rate (Showerhead) (GPM)</td>
<td>2.5</td>
</tr>
<tr>
<td>ADA Compliant</td>
<td>Yes</td>
</tr>
<tr>
<td>Valve Included</td>
<td>No</td>
</tr>
<tr>
<td>Temperature Limit Control</td>
<td>No</td>
</tr>
<tr>
<td>Integral Stops</td>
<td>No</td>
</tr>
<tr>
<td>Valve Model Required</td>
<td>Rite-Temp(R) pressure-balancing valve</td>
</tr>
<tr>
<td>Showerhead Width (Inches)</td>
<td>3.97</td>
</tr>
<tr>
<td>Body Sprays Included</td>
<td>No</td>
</tr>
</tbody>
</table>
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

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

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>5-7/8” – 150mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diameter unit</td>
<td></td>
</tr>
<tr>
<td>Exterior diameter tube</td>
<td>6-3/8” – 163mm</td>
</tr>
<tr>
<td>Minimum wall thickness</td>
<td>12” – 300 mm</td>
</tr>
<tr>
<td>Installation tube (can be cut)</td>
<td>6”-3/18 to 19-1/2” - 160 to 500 mm</td>
</tr>
<tr>
<td>Inside cover</td>
<td>7-1/16” x 7-1/16” – 180 x 180 mm</td>
</tr>
<tr>
<td>Outside grill diameter</td>
<td>7-1/16” – 180 or LUNOthermnn transferbox</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Technical Specs</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat recovery efficiency</td>
<td>90.6%</td>
</tr>
<tr>
<td>Humidity recovery</td>
<td>20-30%</td>
</tr>
<tr>
<td>Flow rates</td>
<td>17/32/38 m³/hr</td>
</tr>
<tr>
<td></td>
<td>10/18/22 CFM</td>
</tr>
<tr>
<td>Operating noise</td>
<td>16.5 dB at 17 m³/hr (10CFM)</td>
</tr>
<tr>
<td></td>
<td>19dB at 32 m³/hr (18 CFM)</td>
</tr>
<tr>
<td></td>
<td>26dB at 38 m³/hr (22CFM)</td>
</tr>
<tr>
<td>Power consumption</td>
<td>1.4 W (17 m³/hr)</td>
</tr>
<tr>
<td>Fan &lt;0.1amp</td>
<td>2.8 W (32 m³/hr)</td>
</tr>
<tr>
<td>Fan efficiency</td>
<td>0.09 Wh/m³</td>
</tr>
<tr>
<td>Filter</td>
<td>G3 or Pollen (F5)</td>
</tr>
</tbody>
</table>
Maximum Volumen setting: within 3 seconds, switching back and forth between 15/30 and 30/15 will activate the 38m³/hr / 22CFM ventilation flow.

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)
- LUNOtherm transferbox for hidden ventilation opening under/next to windows
**Installation Manual**

Local Ventilation System with Heat Recovery – Type e²

- Please hand out to user -

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<td>6</td>
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<td>Replacement ALD-R 160 / ALD-R 160 L for e²</td>
<td>7</td>
</tr>
<tr>
<td>Filter replacement, Cleaning</td>
<td>8</td>
</tr>
<tr>
<td>Additional replacement parts</td>
<td>8</td>
</tr>
</tbody>
</table>

### 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](image)
- ![This symbol is a danger warning in connection with risk of injury from electricity](image)

### 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

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage:</td>
<td>110 VAC 60 Hz</td>
</tr>
<tr>
<td>Device voltage:</td>
<td>12 VDC SELV</td>
</tr>
<tr>
<td>Type of protection:</td>
<td>IP 22</td>
</tr>
<tr>
<td>Volume flow:</td>
<td>15m³/h; 30m³/h, max.</td>
</tr>
<tr>
<td>Measuring sound pressure level</td>
<td>16,5 dB; 19,5 dB</td>
</tr>
<tr>
<td>Sound level difference:</td>
<td>42 dB</td>
</tr>
</tbody>
</table>

### 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.
Local ventilation devices with heat recovery of the type e^s 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)

Type 9/R 160 Order No.: 36 765
Pipe
Protection lid For cleaning

Outside grid (min 2x, max 4x)

Type 1/WE 180 white Order No.: 39 852
Type 1/GE 180 light grey Order No.: 39 853
Type 1/RE 180 red-brown Order No.: 39 854

Heat exchanger unit – Indoor blind (min 2x, max 4x)

Heat exchanger unit
Indoor blind

Switch and circuitry

Switch type 5/WE Order No.: 39 849
+ Installation instructions

Control unit type 5/SE Order No.: 39 848
Functions:
ON/OFF
three flow stages
Filter replacement indicator
+ In-wall power outlet Ø 70 mm,
total height 95 mm
+ Installation instructions

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).
Attention! Assemble 1 pair minimum, 2 pairs maximum!

Make the wall openings for the assembly pipes (e.g. by coring, core bit Ø 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).

Further outdoor grids upon request!
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).

Maximum volume flow: Actuate the rocker switch 15/30 once within 3 seconds, reset by switching from 15 to 30 or from 30 to 15 according to the switch position (more than 3 seconds).
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 SI is in position "I") The ventilation openings may not be cluttered up or covered.

Please draw up the filter replacement below:

<table>
<thead>
<tr>
<th>Filter replacement date</th>
<th>Expected filter replacement</th>
<th>Type of filter used</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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
- Replacement filter G3, 9/FIB3R, pack of 3
- Noise absorption set 9/SW
- Wind pressure fuse 9/WDSE (for assembly pipe from 370 mm length)

<table>
<thead>
<tr>
<th>Item</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indoor blind compl. 9/IBE</td>
<td>39 851</td>
</tr>
<tr>
<td>Replacement filter G3, 9/FIB3R, pack of 3</td>
<td>37 214</td>
</tr>
<tr>
<td>Noise absorption set 9/SW</td>
<td>39 850</td>
</tr>
<tr>
<td>Wind pressure fuse 9/WDSE</td>
<td>39 860</td>
</tr>
</tbody>
</table>
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
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 NHCA 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
- Backlight
- 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

<table>
<thead>
<tr>
<th>Description</th>
<th>Wireless Remote Controller Kit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use with</td>
<td>M-Series &amp; P-Series Inverter Systems</td>
</tr>
</tbody>
</table>
**SUBMITTAL DATA:** MSZ-FE09NA-8 ......... 5,000 BTUH WALL-MOUNTED INDOOR UNIT FOR MXZ MULTI-ZONE HEAT-PUMP SYSTEMS

<table>
<thead>
<tr>
<th>Job Name:</th>
<th>Location:</th>
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</thead>
<tbody>
<tr>
<td>Purchaser:</td>
<td>Engineer:</td>
</tr>
<tr>
<td>Submitted to:</td>
<td>For [ ] Reference [ ] Approval [ ] Construction</td>
</tr>
<tr>
<td>System Designation:</td>
<td>Schedule No.:</td>
</tr>
</tbody>
</table>

**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 (SU3100-230; 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 (MCHC1; for use with Wireless Remote Controller Kit MHK1)*
  - Outdoor Air Sensor (MOS1) for use with Wireless Remote Controller (MRCH1), Wireless Remote Controller Kit (MHK1) and Portable Central Controller (MCHC1)*

  *See Submittal for information on each option.
  - Wall-mounted Wired Remote Controller (PAR-21M1A, req. MAC-3971F)
  - MA Contact Terminal Interface (MAC-3971F)
  - M-NET Control Adapter (MAC-3689F)
  - Remote Temperature Sensor (M21-JKO-307)
  - Lockdown Bracket for Hand-held Controller (RCMKP1CB)

- Cooling Capacity*: 9,000 Btu/h
- Heating Capacity*: 10,000 Btu/h

**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
  - 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**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Unit Inches / MM</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>31-3/8 / 799</td>
</tr>
<tr>
<td>D</td>
<td>10-1/8 / 257</td>
</tr>
<tr>
<td>H</td>
<td>11-5/8 / 295</td>
</tr>
</tbody>
</table>

- 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.: 3/8" / 9.52 mm
- Gas Side: 1/4" / 6.35 mm
- Liquid Side: 1/4" / 6.35 mm
- Connection Method: Flared

**MXZ-B SERIES HEAT-PUMP OUTDOOR UNITS**

1. Ducted Indoor Units:
   - SEZ-KD09, 12, 15, 18, NA4, PEAD-A24A4
   - PCA-A24A4K8, 12, 15, 18, NA4
2. Non-ducted Indoor Units:
   - MSZ-GE08, 09, 12, 15, 18, B-24NA, NA4
   - MSZ-FE09, 12NA, 18NA, SLZ-KA09, 12, 15, 18NA
   - PCA-A24A4K8, 12, 15, 18, NA4
   - PLZ-A12, 18, 24BA4
3. Combination of both Ducted and Non-ducted Indoor Units
   - Refer to the separate submittal forms for the MSZ-GE, MSZ-FE, MFZ-KA, SEZ-KD, SLZ-KA, PEAD, PCA, PLZ Indoor Units, and MXZ Outdoor Units.

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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**

<table>
<thead>
<tr>
<th>Job Name:</th>
<th>Location:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchaser:</td>
<td>Engineer:</td>
<td></td>
</tr>
<tr>
<td>Submitted to:</td>
<td>For Reference</td>
<td>Approval</td>
</tr>
<tr>
<td>System Designation:</td>
<td>Schedule No.:</td>
<td></td>
</tr>
</tbody>
</table>

**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 (MRH1) with Remote Controller (MRH1), Wireless Receiver (MFR1), and cable (MRC1)*
- Setback down to 50°F when used with MRC1 Remote Control
- Portable Central Controller (MC11; for use with Wireless Remote Controller Kit MHC1)*
- Outdoor Air Sensor (MOS1; for use with Remote Controller (MRH1), Wireless Remote Controller Kit (MRH1) and Portable Central Controller (MC11))*
  *See Submit for information on each option.
- Wall-mounted Wired Remote Controller (PAR-211A) requires MAC-307/7F
- MA Contact Terminal Interface (MAC-307/7F)
- M-NET Control Adapter (MAC-306/7F)
- Remote Temperature Sensor (M21-KJA-30T)
- Lockdown Bracket for Hand-held Controller (RCMKP1CB)

**Cooling Capacity**
- 6,000 Btu/h

**Heating Capacity**
- 7,200 Btu/h

**DIMENSIONS**

<table>
<thead>
<tr>
<th>UNIT INCHES/MM</th>
</tr>
</thead>
<tbody>
<tr>
<td>W 31.7/76/990</td>
</tr>
<tr>
<td>D 9.0/229/232</td>
</tr>
<tr>
<td>H 11.5/290</td>
</tr>
</tbody>
</table>

**Weight**
- 22 lbs. / 10 kg

**Field Drainpipe Size O.D.**
- 3/8" / 9.53 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, 18NAA, PEAD-A24AA4
- Nonducted Indoor Units: 4 MSZ-GE06, 09, 12, 15, 18NAA, 24NAA, MSZ-FE09, 12NAA, 8-18NAA, MFZ-KA09, 12, 18NAA, PCA-A24AA4, SLZ-KA09, 12, 15NAA, and PLA-A12, 18, 24BAA4
- A combination of both Ducted and Nonducted Indoor Units

Refer to the separate submittal forms for the MSZ-GE, MSZ-GE, MFZ-KA, SEZ-KD, SLZ-KA, PEAD, PCA, PLA Indoor Units, and MXZ Outdoor Units.
**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

**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 / 8,800 Btu/h
- Total Input (Non-ducted/Ducted): 1,440 W / 2,160 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

**OPERATING RANGE**

<table>
<thead>
<tr>
<th>Indoor Intake Air Temp.</th>
<th>Outdoor Intake Air Temp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooling</td>
<td>Heating</td>
</tr>
<tr>
<td>Maximum</td>
<td>Maximum</td>
</tr>
<tr>
<td>59°F (20°C) DB / 71°F (22°C) WB</td>
<td>115°F (46°C) DB / 149°F (65°C) WB</td>
</tr>
<tr>
<td>Minimum</td>
<td>Minimum</td>
</tr>
<tr>
<td>67°F (19°C) DB / 75°F (16°C) WB</td>
<td>109°F (43°C) DB / 141°F (61°C) WB</td>
</tr>
</tbody>
</table>

**Electrical Requirements**
- Power Supply: 208 / 230V, 1-Phase, 60 Hz
- Recommended Fuse/Breaker Size: 20 A
- MCA: 15 A

**Voltage**
- Indoor: 208 / 230V
- Outdoor: DC 12 - 24V

**COMPATIBLE INDOOR UNITS**
- Horizontal-ducted Indoor Units: SEZ-KD09,12,15NA4
- Ceiling-cassette Indoor Units: SLZ-KA05,12,15NA
- 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

**MXZ-2B20NA-1 ENERGY EFFICIENCIES**

<table>
<thead>
<tr>
<th>Indoor Unit Type</th>
<th>SEER</th>
<th>EER</th>
<th>HSPF</th>
<th>COP @ 47°F</th>
<th>COP @ 17°F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-ducted (09 + 09)</td>
<td>18.0</td>
<td>12.5</td>
<td>8.9</td>
<td>3.91</td>
<td>2.71</td>
</tr>
<tr>
<td>Ducted and Non-ducted</td>
<td>16.75</td>
<td>10.8</td>
<td>8.7</td>
<td>3.77</td>
<td>2.64</td>
</tr>
<tr>
<td>Ducted (09 + 12)</td>
<td>15.5</td>
<td>9.10</td>
<td>8.5</td>
<td>3.82</td>
<td>2.56</td>
</tr>
</tbody>
</table>
**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.

<table>
<thead>
<tr>
<th>Operation Performance for Indoor Unit Combinations (Unit A + Unit B)</th>
<th>Cooling Capacity Range (Btu/h)</th>
<th>Heating Capacity Range (Btu/h)</th>
<th>Total Range</th>
<th>Power Usage Range (W)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unit A</td>
<td>Unit B</td>
<td>Total Range</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>5,000</td>
<td>-</td>
<td>5,400 - 9,000</td>
<td>490 - 660</td>
</tr>
<tr>
<td></td>
<td>7,400</td>
<td>-</td>
<td>7,400 - 14,400</td>
<td>480 - 4,400</td>
</tr>
<tr>
<td>9</td>
<td>5,000</td>
<td>-</td>
<td>5,400 - 9,000</td>
<td>490 - 750</td>
</tr>
<tr>
<td></td>
<td>9,000 - 11,000</td>
<td>-</td>
<td>9,000 - 11,000</td>
<td>480 - 1,430</td>
</tr>
<tr>
<td>12</td>
<td>12,000</td>
<td>-</td>
<td>12,000 - 24,000</td>
<td>490 - 1,010</td>
</tr>
<tr>
<td></td>
<td>13,600</td>
<td>-</td>
<td>13,600 - 27,200</td>
<td>480 - 1,460</td>
</tr>
<tr>
<td>15</td>
<td>15,000</td>
<td>-</td>
<td>15,000 - 30,000</td>
<td>490 - 1,550</td>
</tr>
<tr>
<td></td>
<td>18,000</td>
<td>-</td>
<td>18,000 - 36,000</td>
<td>480 - 2,100</td>
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<tr>
<td>6 + 6</td>
<td>6,000</td>
<td>6,000</td>
<td>12,000 - 24,000</td>
<td>510 - 1,820</td>
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<tr>
<td></td>
<td>7,400</td>
<td>7,400</td>
<td>14,800 - 28,800</td>
<td>520 - 2,410</td>
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<tr>
<td>6 + 9</td>
<td>6,000</td>
<td>9,000</td>
<td>15,000 - 24,000</td>
<td>630 - 1,820</td>
</tr>
<tr>
<td></td>
<td>7,400</td>
<td>10,900 - 11,000</td>
<td>21,300 - 25,500</td>
<td>520 - 2,550</td>
</tr>
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<td>6 + 12</td>
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<td>12,000</td>
<td>17,000 - 34,000</td>
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<td>7,400</td>
<td>13,600</td>
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<tr>
<td>6 + 15</td>
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<td>14,200</td>
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<td>15,600</td>
<td>21,600 - 36,200</td>
<td>520 - 2,530</td>
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<tr>
<td>9 + 9</td>
<td>9,000</td>
<td>9,000</td>
<td>18,000 - 18,000</td>
<td>630 - 1,830</td>
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<tr>
<td></td>
<td>10,900 - 11,000</td>
<td>10,900 - 11,000</td>
<td>21,800 - 22,000</td>
<td>520 - 2,630</td>
</tr>
<tr>
<td>9 + 12</td>
<td>8,500</td>
<td>11,500</td>
<td>17,500 - 23,000</td>
<td>630 - 2,230</td>
</tr>
<tr>
<td></td>
<td>9,500</td>
<td>12,500</td>
<td>21,500 - 25,500</td>
<td>520 - 2,620</td>
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<tr>
<td>9 + 15</td>
<td>7,500</td>
<td>13,750</td>
<td>21,250 - 23,000</td>
<td>630 - 2,230</td>
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<tr>
<td></td>
<td>8,420</td>
<td>13,750</td>
<td>22,220 - 25,500</td>
<td>520 - 2,630</td>
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<tr>
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<td>20,000 - 23,000</td>
<td>630 - 2,230</td>
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<tr>
<td></td>
<td>11,000</td>
<td>11,000</td>
<td>22,000 - 25,000</td>
<td>520 - 2,630</td>
</tr>
</tbody>
</table>

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1. Installation space
Note: Leave both sides free of obstruction.

Note: Leave overhead free of obstruction.

2. Service space

Mitsubishi Electric
Cooling & Heating
Live Better

AHRI CERTIFIED
www.ahri.org

ETL US

Intertek

3400 Lawrenceville Suwanee Rd
Suwanee, GA 30024
Tel: 678-375-2500 • Fax: 800-889-9904
Toll Free: 800-433-4822 (US)
www.mehvac.com
Specifications are subject to change without notice.
Operating Range  MXZ-2B20NA

<table>
<thead>
<tr>
<th>Cooling</th>
<th>Indoor intake air temperature</th>
<th>Outdoor intake air temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum</td>
<td>95°FDB, 71°FWB</td>
<td>115°FDB</td>
</tr>
<tr>
<td>Minimum</td>
<td>67°FDB, 57°FWB</td>
<td>14°FDB</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Heating</th>
<th>Indoor intake air temperature</th>
<th>Outdoor intake air temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum</td>
<td>80°FDB, 67°FWB</td>
<td>75°FDB, 65°FWB</td>
</tr>
<tr>
<td>Minimum</td>
<td>70°FDB, 60°FWB</td>
<td>6°FDB, 5°FWB</td>
</tr>
</tbody>
</table>

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.).

### Extension pipe diameter

<table>
<thead>
<tr>
<th>Indoor unit class</th>
<th>Extension pipe diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>09 or less</td>
<td>Liquid: 1/4, Gas: 3/8</td>
</tr>
<tr>
<td>12</td>
<td>Liquid: 1/4, Gas: 3/8</td>
</tr>
<tr>
<td>15</td>
<td>Liquid: 1/4, Gas: 1/2</td>
</tr>
</tbody>
</table>

### Outdoor unit union diameter

<table>
<thead>
<tr>
<th>For</th>
<th>Indoor unit A</th>
<th>Indoor unit B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquid</td>
<td>1/4</td>
<td>1/4</td>
</tr>
<tr>
<td>Gas</td>
<td>3/8</td>
<td>3/8</td>
</tr>
</tbody>
</table>
### Operating Range MXZ-3B24NA MXZ-3B30NA

<table>
<thead>
<tr>
<th></th>
<th>Indoor intake air temperature</th>
<th>Outdoor intake air temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cooling</strong></td>
<td>Maximum</td>
<td>95°FDB, 71°FWB</td>
</tr>
<tr>
<td></td>
<td>Minimum</td>
<td>67°FDB, 57°FWB</td>
</tr>
<tr>
<td><strong>Heating</strong></td>
<td>Maximum</td>
<td>80°FDB, 67°FWB</td>
</tr>
<tr>
<td></td>
<td>Minimum</td>
<td>70°FDB, 60°FWB</td>
</tr>
</tbody>
</table>

### MAX. REFRIGERANT PIPING LENGTH & PIPE SIZE SELECTION

- 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.).

### Extension pipe diameter

<table>
<thead>
<tr>
<th>Indoor unit class</th>
<th>Extension pipe diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Liquid</td>
</tr>
<tr>
<td>09 or less</td>
<td>1/4</td>
</tr>
<tr>
<td>12</td>
<td>1/4</td>
</tr>
<tr>
<td>15</td>
<td>1/4</td>
</tr>
<tr>
<td>17</td>
<td>1/4</td>
</tr>
<tr>
<td>18</td>
<td>1/4</td>
</tr>
<tr>
<td>24 (MXZ-3B30NA only)</td>
<td>1/4</td>
</tr>
</tbody>
</table>

### Outdoor unit union diameter

<table>
<thead>
<tr>
<th>For</th>
<th>Liquid</th>
<th>Gas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indoor unit A</td>
<td>1/4</td>
<td>1/2</td>
</tr>
<tr>
<td>Indoor unit B</td>
<td>1/4</td>
<td>3/8</td>
</tr>
<tr>
<td>Indoor unit C</td>
<td>1/4</td>
<td>3/8</td>
</tr>
</tbody>
</table>

Unit: inch
### Operating Range MXZ-4B36NA

<table>
<thead>
<tr>
<th></th>
<th>Indoor intake air temperature</th>
<th>Outdoor intake air temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cooling</strong></td>
<td>Maximum 95°FDB, 71°FWB</td>
<td>115°FDB</td>
</tr>
<tr>
<td></td>
<td>Minimum 67°FDB, 57°FWB</td>
<td>14°FDB</td>
</tr>
<tr>
<td><strong>Heating</strong></td>
<td>Maximum 80°FDB, 67°FWB</td>
<td>75°FDB, 65°FWB</td>
</tr>
<tr>
<td></td>
<td>Minimum 70°FDB, 60°FWB</td>
<td>6°FDB, 5°FWB</td>
</tr>
</tbody>
</table>

### MAX. REFRIGERANT PIPING LENGTH & PIPE SIZE SELECTION MXZ-4B36NA

<table>
<thead>
<tr>
<th>Description</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Piping length each indoor unit (a, b, c, d)</td>
<td>82 ft. MAX.</td>
</tr>
<tr>
<td>Total piping length (a+b+c+d)</td>
<td>230 ft. MAX.</td>
</tr>
<tr>
<td>Bending point for each unit</td>
<td>25 MAX.</td>
</tr>
<tr>
<td>Total bending point</td>
<td>70 MAX.</td>
</tr>
</tbody>
</table>

*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.).

#### Indoor unit class

<table>
<thead>
<tr>
<th>Indoor unit class</th>
<th>Extension pipe diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>09 or less</td>
<td>Liquid 1/4, Gas 3/8</td>
</tr>
<tr>
<td>12</td>
<td>Liquid 1/4, Gas 3/8</td>
</tr>
<tr>
<td>15</td>
<td>Liquid 1/4, Gas 1/2</td>
</tr>
<tr>
<td>17</td>
<td>Liquid 1/4, Gas 1/2</td>
</tr>
<tr>
<td>18</td>
<td>Liquid 1/4, Gas 1/2</td>
</tr>
<tr>
<td>24</td>
<td>Liquid 1/4, Gas 5/8</td>
</tr>
</tbody>
</table>

#### Outdoor unit union diameter

<table>
<thead>
<tr>
<th>For</th>
<th>Liquid</th>
<th>Gas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indoor unit A</td>
<td>1/4</td>
<td>1/2</td>
</tr>
<tr>
<td>Indoor unit B</td>
<td>1/4</td>
<td>3/8</td>
</tr>
<tr>
<td>Indoor unit C</td>
<td>1/4</td>
<td>3/8</td>
</tr>
<tr>
<td>Indoor unit D</td>
<td>1/4</td>
<td>3/8</td>
</tr>
</tbody>
</table>
MSZ-GE06NA MSZ-GE09NA MSZ-GE12NA MSZ-GE15NA MSZ-GE18NA
MSY-GE09NA MSY-GE12NA MSY-GE15NA MSY-GE18NA

Unit: inch

Refrigerant pipe ø3/8 (MSZ-GE06/09/12NA, MSY-GE09/12NA)
ø1/2 (MSZ-GE15/18NA, MSY-GE15/18NA)

Indoor heat exchanger

Indoor coil thermistor RT12 (main)

Indoor coil thermistor RT13 (sub)

Room temperature thermistor RT11

Flared connection

Refrigerant pipe ø1/4
(with heat insulator)

Refrigerant flow in cooling

Refrigerant flow in heating
SUBMITTAL DATA: SEZ-KD15NA & SUZ-KA15NA
15,000 BTU/H HORIZONTAL-DUCTED HEAT-PUMP SYSTEMS

Job Name: Location: Date:

Purchaser: Engineer:

Submitted to: For ☐ Reference ☐ Approval ☐ Construction

System Designation: Schedule No.:

GENERAL FEATURES
• Horizontal-ducted indoor unit for residential applications
• Ultra thin body: 7-7/8" high
• Built-in drain mechanism for condensate removal; lifts to 21-11/16"
• Air filter is included with indoor unit
• Quiet operation — as low as 23 dBA
• PAR-21MAA wired remote controller is included
• Indoor unit powered from outdoor unit using A-Control
• Automatic fan speed control
• Auto restart following a power outage
• Limited warranty: five years on parts and defects and seven years on compressors

OPTIONAL ACCESSORIES
Indoor Unit
• M-NET Control Adapter (MAC-399IF)
• External Heat Adapter (PAC-YU25HT)
• CN24 Relay Kit (CN24RELAY-KIT-CM)
• Three-pole Disconnect Switch (TAZ-MS303)

Outdoor Unit
• Drain Pan Heater (MAC-640BH-U)
• Drain Socket (MAC-860DS)

Cooling
- Rated Capacity: 14,100 Btu/h
- Capacity Range: 3,800 - 17,000 Btu/h
- SEER: 15.5
- Maximum Capacity: 13,700 Btu/h
- Maximum Total Input: 1,650 W
- Cooling at 47°F: Rated Capacity: 18,000 Btu/h
- Capacity Range: 4,800 - 21,100 Btu/h
- HSPF: 10.0
- Total Input: 1,500 W

Heating
- Rated Capacity: 13,700 Btu/h
- Capacity Range: 4,800 - 21,100 Btu/h
- Maximum Capacity: 18,000 Btu/h
- Maximum Total Input: 1,650 W
- Heating at 17°F: Rated Capacity: 11,900 Btu/h
- Total Input: 1,200 W

Electrical Requirements
- Breaker Size: 15 A
- Voltage: Indoor - Outdoor S1-S2: AC 208 / 230V
- Outdoor - Remote Controller: DC 12-24V

OPERATING RANGE
<table>
<thead>
<tr>
<th>Operating Condition</th>
<th>Indoor Intake Air Temp.</th>
<th>Outdoor Intake Air Temp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooling Maximum</td>
<td>90°F (32°C) DB, 73°F (23°C) WB</td>
<td>115°F (46°C) DB</td>
</tr>
<tr>
<td>Cooling Minimum</td>
<td>67°F (19°C) DB, 57°F (14°C) WB</td>
<td>14°F (-10°C) DB</td>
</tr>
<tr>
<td>Heating Maximum</td>
<td>90°F (32°C) DB, 67°F (19°C) WB</td>
<td>75°F (24°C) DB, 65°F (18°C) WB</td>
</tr>
<tr>
<td>Heating Minimum</td>
<td>70°F (21°C) DB, 60°F (16°C) WB</td>
<td>-4°F (-20°C) DB, 5°F (-15°C) WB</td>
</tr>
</tbody>
</table>

DIMENSIONS
<table>
<thead>
<tr>
<th>Indoor Unit</th>
<th>Outdoor Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>39 / 990</td>
</tr>
<tr>
<td>D</td>
<td>27-9/16 / 700</td>
</tr>
<tr>
<td>H</td>
<td>7-7/8 / 200</td>
</tr>
</tbody>
</table>

Weight: Indoor - Outdoor S1-S2: 54 lbs / 24 kg
External Finish: Galvanized-steel Sheets, 1-1/4" x 32 mm
Wall-mounted Remote Controller: PAR-21MAA (see Data Submittal Sheet)

Temperature Rating Conditions (Cooling) - Indoor: 80°F (27°C) DB, 67°F (19°C) WB; Outdoor: 95°F (35°C) DB, 77°F (25°C) WB.
Temperature Rating Conditions (Heating) - Indoor: 70°F (21°C) DB, 60°F (16°C) WB; Outdoor: 47°F (8°C) DB, 43°F (6°C) WB.

Sound Pressure Level (Lo - Med - Hi) Cooling: 49 dB(A)
Sound Pressure Level (Lo - Med - Hi) Heating: 51 dB(A)

Inverter
- Compressor: DC Inverter-driven Twin Rotary
- MCA: 1 A
- Fan Type Quantity: Sirocco Fan x 3
- Fan Motor Type: Direct-driven DC Brushless Motor
- Fan Motor Output: 96 W
- Fan Motor: 0.74 F.L.A.
- Airflow (Lo - Med - Hi): 353 - 441 - 529 Dry CFM
- Field Drainsize O.D.: 1-1/4" / 32 mm
- Wall-mounted Remote Controller: PAR-21MAA

Weight: Indoor Intake Air Temp.: 80 lbs / 36 kg
External Finish: Munsell No. 3Y 7.8 / 1.1

Refrigerant Type: R410A
Refrigerant Pipe Size O.D.: 1/2" / 12.7 mm
Gas Side: Liquid Side: 1/4" / 6.35 mm
Max. Refrigerant Pipe Length: 65' / 19 m
Max. Refrigerant Pipe Height Difference: 40' / 12 m
Connection Method: Flared

DIMENSIONS
<table>
<thead>
<tr>
<th>Indoor Intake Air Temp.</th>
<th>Outdoor Intake Air Temp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>31-1/2 / 800</td>
</tr>
<tr>
<td>D</td>
<td>11-1/4 / 285</td>
</tr>
<tr>
<td>H</td>
<td>21-5/8 / 550</td>
</tr>
</tbody>
</table>
### DIMENSIONS: SEZ-KD15NA

**Unit:** mm (in.)

- **Drain pipe (O.D. ø32 (1-1/4))**
  - Emergency draining
  - Spontaneous draining

- **Refrigerant piping**
  - Flare connection (gas)
  - Flare connection (liquid)

- **Knockout hole ø27 (1-3/32)**
  - Indoor/outdoor connecting line
  - Remote controller transmission line

- **Control box**
  - Air filter
  - Suspension bolt hole 4-14X30 (9/16X1-3/16) Slot

**Required space for service and maintenance**

**Table of Dimensions:**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>SEZ-KD09NA</td>
<td>700</td>
<td>792</td>
<td>792</td>
<td>660</td>
<td>792</td>
<td>800</td>
<td>293</td>
<td>315</td>
<td>792</td>
<td>800</td>
<td>293</td>
<td>315</td>
<td>500</td>
<td>625</td>
<td>20</td>
</tr>
<tr>
<td>SEZ-KD12NA</td>
<td>900</td>
<td>952</td>
<td>999</td>
<td>860</td>
<td>999</td>
<td>860</td>
<td>999</td>
<td>860</td>
<td>999</td>
<td>999</td>
<td>860</td>
<td>999</td>
<td>700</td>
<td>1039</td>
<td>40</td>
</tr>
<tr>
<td>SEZ-KD15NA</td>
<td>1100</td>
<td>1152</td>
<td>1196</td>
<td>1060</td>
<td>1196</td>
<td>1060</td>
<td>1196</td>
<td>1060</td>
<td>1196</td>
<td>1196</td>
<td>1060</td>
<td>1196</td>
<td>1100</td>
<td>1323</td>
<td>60</td>
</tr>
<tr>
<td>SEZ-KD18NA</td>
<td>1390</td>
<td>1442</td>
<td>1486</td>
<td>1356</td>
<td>1486</td>
<td>1356</td>
<td>1486</td>
<td>1356</td>
<td>1486</td>
<td>1486</td>
<td>1356</td>
<td>1486</td>
<td>1390</td>
<td>1613</td>
<td>80</td>
</tr>
</tbody>
</table>

**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.
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.

**Accessories:**
- Drain pipe (O.D. ø32 (1-1/4))
- Drain hose (I.D. ø32 (1-1/4))

**Ceiling surface Access door**

Make the access door at the appointed position properly for service maintenance.

**Access door**

Access door

Note2. Access door

Required space for service and maintenance

**<accessory>**

- Access door
- Ceiling surface
- Drain hose (I.D. ø32 (1-1/4))
REQUIRED SPACE

Basically open 4 inch or more without any obstruction in front and on both sides of the unit.

Open two sides of left, right, or rear side.

4 in. or more
8 in. or more
14 in. or more
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

<table>
<thead>
<tr>
<th></th>
<th>Outdoor Dry Bulb</th>
<th>Outdoor Wet Bulb</th>
<th>Outdoor Rel.Hum</th>
<th>Indoor Rel.Hum</th>
<th>Indoor Dry Bulb</th>
<th>Grains Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winter</td>
<td>-11</td>
<td>-11.42</td>
<td>n/a</td>
<td>n/a</td>
<td>72</td>
<td>n/a</td>
</tr>
<tr>
<td>Summer</td>
<td>86</td>
<td>69</td>
<td>43%</td>
<td>50%</td>
<td>75</td>
<td>15</td>
</tr>
</tbody>
</table>

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 (ft³) 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.
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

<table>
<thead>
<tr>
<th>Component Description</th>
<th>Area Quan</th>
<th>Sen Loss</th>
<th>Lat Gain</th>
<th>Sen Gain</th>
<th>Total Gain</th>
</tr>
</thead>
<tbody>
<tr>
<td>1G-hf-f: Glazing-Triple pane, fixed sash, heat-absorbing, insulated fiberglass frame, u-value 0.085, SHGC 0.3</td>
<td>152</td>
<td>1,073</td>
<td>0</td>
<td>1,006</td>
<td>1,006</td>
</tr>
<tr>
<td>11P: Door-Metal - Polyurethane Core</td>
<td>53.3</td>
<td>376</td>
<td>0</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>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</td>
<td>1119.6</td>
<td>2,044</td>
<td>0</td>
<td>163</td>
<td>163</td>
</tr>
<tr>
<td>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</td>
<td>936.2</td>
<td>1,321</td>
<td>0</td>
<td>207</td>
<td>207</td>
</tr>
<tr>
<td>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</td>
<td>789.6</td>
<td>2,217</td>
<td>0</td>
<td>123</td>
<td>123</td>
</tr>
</tbody>
</table>

Subtotals for structure: 7,031 0 1,599 1,599
People: 0 0 0 0
Equipment: 0 0 0 0
Lighting: 0 0 0 0
Ductwork: 0 0 0 0
Infiltration: Winter CFM: 41, Summer CFM: 41 3,693 419 489 908
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 |
| Square ft. of Room Area: | 936 Square ft. Per Ton: 3,794 |
| Volume (ft³) 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.
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
# Bionaire® Small Space Mini Dehumidifier BDQ01-UC

**Availability:** Usually ships same day  
**Stock No:** WBB8462657  
**Price:** $42.95

<table>
<thead>
<tr>
<th>Product Specifications</th>
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<tbody>
<tr>
<td>CONSTRUCTION</td>
<td>Plastic</td>
</tr>
<tr>
<td>DEPTH INCHES</td>
<td>6-1/2</td>
</tr>
<tr>
<td>HEIGHT INCHES</td>
<td>17-11/16</td>
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<tr>
<td>VOLTS</td>
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<td>WEIGHT LBS</td>
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<tr>
<td>WIDTH INCHES</td>
<td>9-13/16</td>
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<tr>
<td>AMPS</td>
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<td>LIMITED WARRANTY YEARS</td>
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<td>cETLus Listed</td>
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<td>CORD TYPE</td>
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<tr>
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<td>Sunbeam by Jarden Consumer Solutions</td>
</tr>
<tr>
<td>COLOR FINISH</td>
<td>Gray/Blue</td>
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<td>BDQ01-UC</td>
</tr>
<tr>
<td>WATTS</td>
<td>60</td>
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</tbody>
</table>
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
SIMpull THHN® Cable with ALUMAFLEX® Conductors

- 600 Volts
- Alumaflex® aluminum (AA-8176) conductor
- Thermoplastic insulation/SIM nylon sheath
- Heat, moisture, gasoline, and oil resistant
- 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

Copyright 2012, Southwire Company. All Rights Reserved.

*Southwire is a registered trademark of Southwire Company.
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.

SPECIFICATIONS
Southwire SIMPULL THHN conductors comply with:
- ASTM B-800 and B-801
- UL Standard 83
- CSA
- 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
- RoHS/REACH Compliant

CONSTRUCTION
Southwire SIMPULL THHN conductors are AlumaFlex TM AA-8000 series aluminum alloy compact stranded. Insulated with a tough, heat and moisture resistant polyvinyl chloride (PVC), over which a SIM (SLIKQWI® 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

<table>
<thead>
<tr>
<th>Size</th>
<th>Number of Strands</th>
<th>Insulation Thickness (mils)</th>
<th>Jacket Thickness (mils)</th>
<th>Nominal O.D. (mils)</th>
<th>Approx. Net Weight Per 1000' (lbs.)</th>
<th>Allowable Amperages+</th>
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<td>7</td>
<td>30</td>
<td>5</td>
<td>204</td>
<td>27</td>
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<td>6</td>
<td>7</td>
<td>30</td>
<td>5</td>
<td>239</td>
<td>38</td>
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<td>40</td>
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<td>360</td>
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<td>7</td>
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<td>8</td>
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<td>971</td>
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<td>285 340 385</td>
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<td>70</td>
<td>9</td>
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<td>804</td>
<td>310 375 420</td>
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<td>70</td>
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<td>856</td>
<td>320 385 435</td>
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<td>58</td>
<td>70</td>
<td>9</td>
<td>1139</td>
<td>1013</td>
<td>355 425 480</td>
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<td>70</td>
<td>9</td>
<td>1218</td>
<td>1117</td>
<td>375 445 500</td>
</tr>
</tbody>
</table>

+ Allowable amperages 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 amperages 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 amperage adjustment purposes using NEC section 310.15.

**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.
BLAZESTOP INTUMESCENT FIRESTOP CAULK

Model Number: WF320  
Location: Inside Walls where gaps are formed from electrical wiring  
ASTM E-814  
Rating: UL 1479
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 (ANSI/UL 1479) as well as the time/temperature requirements of ASTM E 119 (ANSI/UL 263). 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.

SYSTEM COMPATIBLE

PHYSICAL PROPERTIES

<table>
<thead>
<tr>
<th>Properties</th>
<th>Series WF300</th>
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</thead>
<tbody>
<tr>
<td>Color</td>
<td>Red</td>
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<tr>
<td>Odor</td>
<td>Mild Latex</td>
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<tr>
<td>Density</td>
<td>11.4 lbs/gal (1.35 kg/L)</td>
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<tr>
<td>Solids Content</td>
<td>81%</td>
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<tr>
<td>pH</td>
<td>7.4 to 8.4</td>
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<tr>
<td>In Service Temperature</td>
<td>185°F (85°C)</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>40°F (4°C) - 95°F (35°C)</td>
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</table>

<table>
<thead>
<tr>
<th>Properties</th>
<th>Series WF300</th>
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</thead>
<tbody>
<tr>
<td>Flame Spread</td>
<td>0'</td>
</tr>
<tr>
<td>Smoke Developed</td>
<td>20'</td>
</tr>
<tr>
<td>STC Rating (ASTM E90/ASTM C919)</td>
<td>61</td>
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<tr>
<td>VOC Content</td>
<td>33.3 lb/gal (40.0 g/L)</td>
</tr>
<tr>
<td>Expansion Begins</td>
<td>350°F (176°C)</td>
</tr>
<tr>
<td>Volume Expansion</td>
<td>&gt;5X Free Expansion</td>
</tr>
<tr>
<td>Shelf Life</td>
<td>2 Years</td>
</tr>
</tbody>
</table>

*ASTM E 84 (UL723) @ 14% surface coverage (modified test for caulks and sealants)*
**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 39000 Special Construction Fire Suppression & Supervisory Systems

DIV.  15 15250 Mechanical Insulation – Fire Protection

DIV.  16 16050 Basic Electrical Materials & Methods

---

**SEALANT REQUIREMENTS IN CUBIC INCHES PER 1/4 INCH OF INSTALLED DEPTH**

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</tr>
</tbody>
</table>

**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.

<table>
<thead>
<tr>
<th>Cat. No.</th>
<th>Description</th>
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<tbody>
<tr>
<td>WF310</td>
<td>10.1 oz. Tube (300 ml) 18.2 cu.in.</td>
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<tr>
<td>WF329</td>
<td>29 oz. Tube (858 ml) 52 cu.in.</td>
</tr>
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<td>WF320</td>
<td>20 oz. Sausage (592 ml) 36 cu. in.</td>
</tr>
<tr>
<td>WF305</td>
<td>5 Gal. Pail (19.0 liters) 1,155 cu. in.</td>
</tr>
</tbody>
</table>

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.

MADE IN THE USA – COPYRIGHT © 2008 SPECIFIED TECHNOLOGIES, INC.

Specified Technologies Inc.
210 Evans Way • Somerville, NJ 08876 USA | Toll Free: 800-992-1180 • F: 908.526.9623
Material Safety Data Sheet

Blazestop™ SERIES WF300 FIRESTOP CAULK

04-JUNE-2010

CHEMICAL PRODUCT/DISTRIBUTOR 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

<table>
<thead>
<tr>
<th>INGREDIENT NAME</th>
<th>CAS NUMBER</th>
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<tbody>
<tr>
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<td>82539-93-3</td>
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<td>CALCIUM CARBONATE</td>
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<td>PETROLEUM DISTILLATES</td>
<td>64742-47-8</td>
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<tr>
<td>GRAPHITE</td>
<td>7782-42-5</td>
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</tbody>
</table>
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 FORM: Paste with minimal odor
SPECIFIC GRAVITY: 1.18 g/ml
PERCENT VOLATILES: 19 to 20
EVAPORATION RATE: >1
BOILING POINT: 100 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.
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.

<table>
<thead>
<tr>
<th>Properties</th>
<th>Series WF300</th>
<th>Properties</th>
<th>Series WF300</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color</td>
<td>Red</td>
<td>Smoke Developed</td>
<td>20*</td>
</tr>
<tr>
<td>Odor</td>
<td>Mild Latex</td>
<td>STC Rating (ASTM E90/ASTM C919)</td>
<td>61</td>
</tr>
<tr>
<td>Density</td>
<td>11.4 lbs/gal (1.36 kg/L)</td>
<td>VOC Content (EPA Method 24/ASTM D3960)</td>
<td>33.3 lb/gal. (40.0 g/L)</td>
</tr>
<tr>
<td>Solids Content</td>
<td>81%</td>
<td>Expansion Begins</td>
<td>350°F (176°C)</td>
</tr>
<tr>
<td>pH</td>
<td>7.4 to 8.4</td>
<td>Volume Expansion</td>
<td>&gt;5X Free Expansion</td>
</tr>
<tr>
<td>Max. In Service Temperature</td>
<td>120°F (49°C)</td>
<td>Shelf Life</td>
<td>12 Months</td>
</tr>
<tr>
<td>Flame Spread</td>
<td>0*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*ASTM E 84 (UL723) @ 14% surface coverage (modified test for caulks and sealants)

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Part #</th>
<th>Description</th>
<th>Packaging</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>WF310</td>
<td>Intumescent Firestop Caulk</td>
<td>10.1 oz. Tube</td>
<td>18.2 cu in. (300ml)</td>
</tr>
<tr>
<td>WF329</td>
<td>Intumescent Firestop Caulk</td>
<td>29 oz. Tube</td>
<td>52 cu in. (858 ml)</td>
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<tr>
<td>WF330</td>
<td>Intumescent Firestop Caulk</td>
<td>20 oz. Sausage</td>
<td>36 cu in. (592ml)</td>
</tr>
<tr>
<td>WF305</td>
<td>Intumescent Firestop Caulk</td>
<td>5 Gal. Pail</td>
<td>1,155 cu in. (19 liters)</td>
</tr>
</tbody>
</table>

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
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.

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Matching Threadless Coupling</th>
<th>Nominal Diameter X Length</th>
<th>Actual Diameter Inches</th>
<th>Sub &amp; MasterBundle</th>
<th>Wt. per 100</th>
<th>NAED UPC No.</th>
<th>Color Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>5005</td>
<td>—</td>
<td>1/2” x 5’</td>
<td>0.471-0.481</td>
<td>5 / 100</td>
<td>305</td>
<td>61125-1</td>
<td>Green</td>
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<tr>
<td>5006</td>
<td>—</td>
<td>1/2” x 6’</td>
<td>0.471-0.481</td>
<td>5 / 100</td>
<td>370</td>
<td>61126-8</td>
<td>Green</td>
</tr>
<tr>
<td>5008L*</td>
<td>50-TC</td>
<td>1/2” x 8’</td>
<td>0.500-0.510</td>
<td>5 / 100</td>
<td>545</td>
<td>61138-1</td>
<td>Orange</td>
</tr>
<tr>
<td>5010L*</td>
<td>50-TC</td>
<td>1/2” x 10’</td>
<td>0.500-0.510</td>
<td>5 / 100</td>
<td>690</td>
<td>61130-5</td>
<td>Orange</td>
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<tr>
<td>6254</td>
<td>—</td>
<td>5/8” x 4’</td>
<td>0.555-0.565</td>
<td>5 / 100</td>
<td>340</td>
<td>61487-0</td>
<td>Red</td>
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<tr>
<td>6255</td>
<td>—</td>
<td>5/8” x 5’</td>
<td>0.555-0.565</td>
<td>5 / 100</td>
<td>424</td>
<td>61585-3</td>
<td>Red</td>
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<tr>
<td>6256</td>
<td>—</td>
<td>5/8” x 6’</td>
<td>0.555-0.565</td>
<td>5 / 100</td>
<td>508</td>
<td>61586-0</td>
<td>Red</td>
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<tr>
<td>6258*</td>
<td>60-TC</td>
<td>5/8” x 8’</td>
<td>0.555-0.565</td>
<td>5 / 100</td>
<td>680</td>
<td>61588-4</td>
<td>Copper</td>
</tr>
<tr>
<td>6258G13**</td>
<td>60-TC</td>
<td>5/8” x 8’</td>
<td>0.561-0.571</td>
<td>5 / 100</td>
<td>700</td>
<td>61217-3</td>
<td>Yellow</td>
</tr>
<tr>
<td>6260*</td>
<td>60-TC</td>
<td>5/8” x 10’</td>
<td>0.555-0.565</td>
<td>5 / 100</td>
<td>847</td>
<td>61580-8</td>
<td>Copper</td>
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<tr>
<td>6260G13**</td>
<td>60-TC</td>
<td>5/8” x 10’</td>
<td>0.561-0.571</td>
<td>5 / 100</td>
<td>860</td>
<td>61218-0</td>
<td>Yellow</td>
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<tr>
<td>6262*</td>
<td>60-TC</td>
<td>5/8” x 12’</td>
<td>0.555-0.565</td>
<td>5 / 100</td>
<td>1000</td>
<td>61474-0</td>
<td>Copper</td>
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<tr>
<td>6265*</td>
<td>60-TC</td>
<td>5/8” x 15’</td>
<td>0.555-0.565</td>
<td>5 / 100</td>
<td>1275</td>
<td>61475-7</td>
<td>Copper</td>
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<tr>
<td>7508*</td>
<td>70-TC</td>
<td>3/4” x 8’</td>
<td>0.673-0.683</td>
<td>5-50</td>
<td>992</td>
<td>61548-8</td>
<td>Black</td>
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<tr>
<td>7510*</td>
<td>70-TC</td>
<td>3/4” x 10’</td>
<td>0.673-0.683</td>
<td>5-50</td>
<td>1240</td>
<td>61340-8</td>
<td>Black</td>
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<tr>
<td>7512*</td>
<td>70-TC</td>
<td>3/4” x 12’</td>
<td>0.673-0.683</td>
<td>5</td>
<td>1475</td>
<td>61476-4</td>
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<tr>
<td>7515*</td>
<td>70-TC</td>
<td>3/4” x 15’</td>
<td>0.673-0.683</td>
<td>5</td>
<td>1850</td>
<td>61477-1</td>
<td>Black</td>
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<tr>
<td>1010*</td>
<td>80-TC</td>
<td>1” x 10’</td>
<td>0.907-0.917</td>
<td>3/50</td>
<td>2248</td>
<td>61440-5</td>
<td>—</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Rod Size</th>
<th>Conductor Range</th>
<th>Sub &amp; Master Pack</th>
<th>Wt. per100</th>
<th>NAED UPC No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>G-3</td>
<td>3/8&quot;</td>
<td>4 Str. - 10 Sol.</td>
<td>100 / 800</td>
<td>6</td>
<td>70706-0</td>
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<tr>
<td>G-4* (Use G-5)</td>
<td>1/2&quot;</td>
<td>2 Str. - 10 Sol.</td>
<td>100 / 800</td>
<td>9</td>
<td>70707-7</td>
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<tr>
<td>G-5* $</td>
<td>5/8-1/2&quot;</td>
<td>2 Str. - 10 Sol.</td>
<td>50 / 400</td>
<td>10</td>
<td>70708-4</td>
</tr>
<tr>
<td>G-6* $†</td>
<td>3/4&quot;</td>
<td>2 Str. - 10 Sol.</td>
<td>50 / 400</td>
<td>11</td>
<td>70709-1</td>
</tr>
</tbody>
</table>

*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
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 THHN-2 in wet or dry locations at temperatures not to exceed 194 °F (90 °Celsius) or not to exceed 157 °F (70 °Celsius) when exposed to oil or coolant
- Sold by-the-foot

Specifications:

<table>
<thead>
<tr>
<th>Description</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wire Type</td>
<td>Stranded</td>
</tr>
<tr>
<td>THHN Wire Gauge</td>
<td>4 AWG</td>
</tr>
<tr>
<td>Max Amps (Amps)</td>
<td>85.0</td>
</tr>
<tr>
<td>Volt Rating (Volts)</td>
<td>600.0</td>
</tr>
<tr>
<td>THHN Jacket Color</td>
<td>Black</td>
</tr>
<tr>
<td>Each Order Quantity Equals</td>
<td>1 ft</td>
</tr>
<tr>
<td>Maximum Roll Length (Feet)</td>
<td>500.0</td>
</tr>
</tbody>
</table>

UL Safety Listing: Yes
CSA Safety Listing: No
ETL Safety Listing: No
Jacket Material: Polyvinyl chloride
Conductor Material: Copper
Insulation Color: Black
Insulation Material: PVC (polyvinyl chloride)
RACEWAY AND CONDUIT

Electric Non-metallic Tubing used as raceway or conduit through walls of house
Rigid PVC Schedule 40 Conduit
Product Specifications

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.

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**PVC Industrial Pipe: Schedule 40**

**Product Specifications**

**Schedule 40 Dimensions**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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<th></th>
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</thead>
<tbody>
<tr>
<td>1/8</td>
<td>0.405</td>
<td>0.249</td>
<td>0.068</td>
<td>0.051</td>
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<tr>
<td>1/4</td>
<td>0.540</td>
<td>0.344</td>
<td>0.088</td>
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<tr>
<td>3/8</td>
<td>0.675</td>
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<td>620</td>
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<tr>
<td>1/2</td>
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<td>0.170</td>
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<tr>
<td>3/4</td>
<td>1.050</td>
<td>0.804</td>
<td>0.113</td>
<td>0.226</td>
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<td>1</td>
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<td>1.029</td>
<td>0.133</td>
<td>0.333</td>
<td>450</td>
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<tr>
<td>* 1-1/4</td>
<td>1.660</td>
<td>1.360</td>
<td>0.140</td>
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<tr>
<td>* 1-1/2</td>
<td>1.900</td>
<td>1.590</td>
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<td>0.537</td>
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<tr>
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<td>0.154</td>
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<td>2-1/2</td>
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* 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.

**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.

---

**De-Rating Factor**

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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
UNSPSC: 39121308
UR: 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**

**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

**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 galvanneal 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

**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**

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**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"
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.

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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"
Milbank 200 Amp Ringless Overhead/Underground Meter Socket

Model #: R7040-XL-TG  SKU #: 762787

$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

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 R6-350 konl 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 continuous, 250 Amp c maximum and up to 600 VAC
- UL Listed for safety
- Must be installed by a licensed electrician
- Includes R6-350 konl 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

SPECIFICATIONS

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SINGLE PHASE MAIN CIRCUIT BREAKER BR4040B200

Model Number: BWH25KAIC
Location: Auxiliary Bedroom
Size: L1
200 Amp Main Breaker
40 breaker slots
### Type BR

#### 3-Phase — Main Circuit Breaker Loadcenters

10,000/22,000/100,000 Amperes Interrupting Capacity

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<th>Main Ampere Rating</th>
<th>Maximum Number 1-inch (25.4 mm) Enclosure Type</th>
<th>Box Size</th>
<th>Wiring Diagram Figure Number</th>
<th>Wire Size Range Cu/Al 60°C or 75°C for Main Breaker</th>
<th>Loadcenter Catalog Number</th>
<th>Price U.S. $</th>
</tr>
</thead>
<tbody>
<tr>
<td>BR</td>
<td>10 kAIC</td>
<td>100 12 24 Indoor C1 CIR 65 #4 – 1/0</td>
<td>3BR1224B100</td>
<td>3BR1224B100S</td>
<td>625</td>
<td>710</td>
<td></td>
</tr>
<tr>
<td>CC</td>
<td>10 kAIC</td>
<td>125 30 42 Indoor L1 LIR 41 #1 – 2/0</td>
<td>3BR3042B125</td>
<td>3BR3042B125S</td>
<td>1160</td>
<td>1160</td>
<td></td>
</tr>
<tr>
<td>200</td>
<td>30 42 Indoor L1 LIR 41 #1 – 250 kcmil</td>
<td>3BR3042B200</td>
<td>3BR3042B200S</td>
<td>1215</td>
<td>1340</td>
<td></td>
<td></td>
</tr>
<tr>
<td>225</td>
<td>42 42 Indoor L2 L2R 43 #1 – 300 kcmil</td>
<td>3BR4242B225</td>
<td>3BR4242B225S</td>
<td>1345</td>
<td>1695</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Main Breaker Type</th>
<th>Main Ampere Rating</th>
<th>Maximum Number 1-inch (25.4 mm) Enclosure Type</th>
<th>Box Size</th>
<th>Wiring Diagram Figure Number</th>
<th>Wire Size Range Cu/Al</th>
<th>Loadcenter Catalog Number</th>
<th>Price U.S. $</th>
</tr>
</thead>
<tbody>
<tr>
<td>BRH</td>
<td>22 kAIC</td>
<td>100 12 24 Indoor C1 65 #4 – 1/0</td>
<td>3BR1224H100</td>
<td>3BR1224H100S</td>
<td>791</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHH</td>
<td>100 kAIC</td>
<td>150 30 42 Indoor L1 LIR 41 #1 – 250 kcmil</td>
<td>3BR3042H150</td>
<td>3BR3042H150S</td>
<td>1465</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHH</td>
<td>100 kAIC</td>
<td>200 30 42 Indoor L1 LIR 41 #1 – 250 kcmil</td>
<td>3BR3042H200</td>
<td>3BR3042H200S</td>
<td>1475</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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. 22,000 AIC series combination rating is obtained when Types BD, BR, BQ, BQC and GFCB branch breakers are used with BRH main.
4. 100,000 AIC series combination rating is obtained when Types BD, BR, BQ, BQC and GFCB branch breakers are used with CHH main.
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 amperes loadcenters, and 200 amperes on loadcenters with 150 amperes 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 doors and trim, 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.
Features, Benefits and Functions

- Extra 1-1/2-inch (38.1 mm) knockout for bundling of wires
- Tangential main knockout
- Standard 14-3/8 inches (365.1 mm) wide enclosures fit snugly between wall studs
- Same size Allen wrench can be used for phase and neutral lugs
- Commercial grade main breaker designed for straight-in wiring that allows for top or bottom feed
- Factory pre-attached neutral bonding strap
- Predrilled mounting holes for ease of installing ground fault breakers
- Maximum variety of concentric knockouts, at rear and sides
- Combination trim has sliding latch and adjustable deadfront for neat, clean appearance
- Drywall marking on enclosure
- Twin neutral design for easier wiring and balancing of the load, located in wireway, away from circuit breakers
- Maximum wiring gutter space for ease of wiring in compliance with NEC requirements
- One piece roll formed metal backpanel with circuit breaker alignment notches assures accurately aligned breaker and bus stabs
- Six mounting holes (three top, three bottom) for ease of installation

Product Selection

Table 3-64. BR Loadcenter Selection Chart

<table>
<thead>
<tr>
<th>Service</th>
<th>Single-phase, three-wire, 120/240V AC</th>
<th>Three-phase, four-wire, 208Y/120V AC</th>
<th>Three-phase, three-wire, 240V AC delta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short Circuit Current Rating</td>
<td>10,000 AIC: All single- and three-phase loadcenters 70 through 225 amperes, 8 to 42 circuits.</td>
<td>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.</td>
<td>25,000 AIC: All convertible and factory installed single-phase loadcenters rated 150 and 200 amperes using Type BWH main breakers.</td>
</tr>
<tr>
<td>Main Breaker/Main Lug Loadcenters</td>
<td>Main Breaker: 100, 125, 150, 200, 225, 400, 600 amperes.</td>
<td>Main Lugs: 70, 125, 150, 200, 225, 400, 600 amperes.</td>
<td>Three-Phase</td>
</tr>
<tr>
<td></td>
<td>Main Breaker: 225, 250, 300, 350, 400, 600 amperes.</td>
<td>Main Lugs: 100, 150, 200, 225, 400, 600 amperes.</td>
<td></td>
</tr>
<tr>
<td>Convertible Loadcenters</td>
<td>Main Breaker: Single-phase up to 200 amperes and three-phase up to 150 amperes</td>
<td>Main Lugs: Single-phase up to 200 amperes and three-phase up to 150 amperes</td>
<td>Three-Phase</td>
</tr>
<tr>
<td>Branch Breakers</td>
<td>Types BR, BRH, and BRH: 10 to 125 amperes.</td>
<td>Type BQ and BQC: 10 to 125 amperes.</td>
<td>Type BQ and BQC Multibreaker: 15 to 30 amperes.</td>
</tr>
<tr>
<td></td>
<td>Types BJ, and BJH: 125 to 225 amperes</td>
<td>One- and two-pole ground fault breakers.</td>
<td>Two- and three-pole.</td>
</tr>
<tr>
<td></td>
<td>Types BD Twin: 10 to 50 amperes</td>
<td>Main and Sub-feed Lugs 125, 150, 225 amperes — two- and three-pole.</td>
<td>Type BR 15 to 100 amperes.</td>
</tr>
<tr>
<td></td>
<td>Two of one-pole. Take one 1-inch (25.4 mm) space.</td>
<td>Type BRW: 15 to 30 amperes.</td>
<td>BR-AFCI arc fault circuit interrupter.</td>
</tr>
<tr>
<td>Enclosures</td>
<td>NEMA Type 1 indoor.</td>
<td>NEMA Type 3R outdoor.</td>
<td>Meets or exceeds UL requirements for indoor or outdoor applications</td>
</tr>
</tbody>
</table>
| Loadcenter and Breaker Accessories | Branch Circuit Breaker Auxiliary components. | Surge Protection
| | Hold Down Kits. | Single-phase plug-on surge protector. |
| | Handle ties. | Single-phase bottle type surge protector. |
| | Lockoffs. | Three-phase bottle type surge protector. |
| | Complete Line of Ground Bar Kits 5, 10, 14, and 21 circuit, some with additional #20 lugs. Each terminal will accommodate: 10, 14, 16, 12, #4 CuAl, or (1) #14 – #12 CuAl | Universal Rainproof Conduit Hubs
| | Main and Sub-feed Lugs 125, 150, 225 amperes — two- and three-pole. | Group One: 3/4, 1, 1-1/4, 1-1/2, 2 inches (19.1, 25.4, 31.8, 38.1, 50.8 mm) |
| | Shunt Trips | Group Two: 2, 2-1/2, 3 inches (50.8, 63.5, 76.2 mm) |
| | Shunt Trips | Adapter plate. |
| | Bussing | Tin-plated aluminum as standard. |
| | Some copper bus panels available. |
**Product Selection**

**Table 3-65. Single- and Three-Phase Through 225 Amperes Catalog Numbering System**

<table>
<thead>
<tr>
<th>Phase</th>
<th>Number of 1-inch (25.4 mm) Spaces</th>
<th>Maximum Number of Poles</th>
<th>Cutler-Hammer Type BR Loadcenter</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>3</td>
<td>30</td>
<td>BR</td>
</tr>
<tr>
<td>1-Phase</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-Phase</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Number of Amperes**
  - 50 = 50 Amperes
  - 70 = 70 Amperes
  - 100 = 100 Amperes
  - 125 = 125 Amperes
  - 150 = 150 Amperes
  - 200 = 200 Amperes
  - 225 = 225 Amperes

- **Enclosure**
  - R = NEMA Type 3R Rainproof
  - S = NEMA Type 1 Indoor with Surface Trim
  - F = NEMA Type 1 Indoor with Flush Trim
  - Blank = NEMA Type 1 Indoor with Combination Trim
  - RIS = Riser Panel
  - PGFI = Spa Panel

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.

---

**Table 3-66. Single- and Three-Phase 400 Amperes Through 600 Amperes Catalog Numbering System**

<table>
<thead>
<tr>
<th>Phase</th>
<th>Number of 1-inch (25.4 mm) Spaces</th>
<th>Maximum Number of Poles</th>
<th>Enclosure</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>3</td>
<td>30</td>
<td>N = Current Design</td>
</tr>
<tr>
<td>1-Phase</td>
<td></td>
<td></td>
<td>F = NEMA Type 1 Indoor with Combination Trim</td>
</tr>
<tr>
<td>3-Phase</td>
<td></td>
<td></td>
<td>R1 = NEMA Type 3R Rainproof</td>
</tr>
</tbody>
</table>

- **Number of Amperes**
  - D = 400 Amperes
  - E = 600 Amperes

- **Enclosure**
  - F = NEMA Type 1 Indoor with Combination Trim
  - R1 = NEMA Type 3R Rainproof

---

No character spaces used.
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

- 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

<table>
<thead>
<tr>
<th>CATALOG NUMBER</th>
<th>SERVICE</th>
<th>CONNECTORS C/W</th>
<th>LINE</th>
<th>LOAD</th>
<th>DIMENSIONS</th>
<th>CONCENTRIC K.O.'S</th>
</tr>
</thead>
<tbody>
<tr>
<td>U5898-O-200</td>
<td>UG</td>
<td>#6-350 kcmil</td>
<td>#6-350 kcmil</td>
<td>4½</td>
<td>17</td>
<td>34½</td>
</tr>
</tbody>
</table>

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 Q with large frame QN order K5820.
SINGLE PHASE MAIN CIRCUIT BREAKER BR4040B200

Model Number:  BWH25K or equal  
Location:  Main house  
Size:  L1  
Amperage Rate:  200  
Available:  Eaton
Loadcenters and Circuit Breakers
Type BR Loadcenters and Circuit Breakers

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

Single-Phase, Three-Wire—120/240 Vac—Factory-Bonded Split Neutral

<table>
<thead>
<tr>
<th>Main Breaker Type</th>
<th>Main Ampere Rating</th>
<th>Maximum Number 1-Inch (25.4 mm) Space</th>
<th>Circuits</th>
<th>Enclosure Type</th>
<th>Box Size</th>
<th>Wire Size Range Cu/Al 60°C or 75°C for Main Breaker</th>
<th>Loadcenter Catalog Number with Combination Cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>BR 10 kAIC</td>
<td>100</td>
<td>20</td>
<td>20</td>
<td>Indoor C2</td>
<td></td>
<td>#4-1/0</td>
<td>BR3020B100</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>16</td>
<td>24</td>
<td>Indoor C1</td>
<td></td>
<td></td>
<td>BR1624B100</td>
</tr>
<tr>
<td>BWH 25 kAIC</td>
<td>150</td>
<td>30</td>
<td>30</td>
<td>Indoor G1</td>
<td></td>
<td>#2-1/0</td>
<td>BR3030B150</td>
</tr>
<tr>
<td></td>
<td>200</td>
<td>20</td>
<td>40</td>
<td>Indoor D1</td>
<td></td>
<td>#2-1/0, #2-3/0</td>
<td>BR2040B200</td>
</tr>
<tr>
<td></td>
<td>200</td>
<td>30</td>
<td>40</td>
<td>Indoor G1</td>
<td></td>
<td></td>
<td>BR2040B200</td>
</tr>
<tr>
<td></td>
<td>200</td>
<td>40</td>
<td>40</td>
<td>Indoor L1</td>
<td></td>
<td></td>
<td>BR4040B200</td>
</tr>
</tbody>
</table>

Notes:
- No character space used.
- 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

Tangential main knockout for easy installation.

Extra 1 5/8-inch (38.1 mm) knockout for bundling of wires.

Drywall marking on enclosure.

Maximum wiring gutter—space for ease of wiring in compliance with NEC requirements.

One piece roll formed metal backpanel with circuit breaker alignment notches ensures accurately aligned breaker and bus stabs.

Six mounting holes (three top, three bottom) for ease of installation.

Standard 1 1/8-inch (36.5 mm) wide enclosures fit snugly between wall studs.

Same size Allen wrench can be used for phase and neutral lugs.

Commercial grade 25 kAIC rated main breaker in 150A and above loadcenters designed for straight-in wiring that allows for top or bottom feed.

Factory pre-attached neutral bonding strap.

Predrilled mounting holes for ease of installing ground bar kits.

Maximum variety of concentric knockouts, at rear and sides.

Combination trim has sliding latch and adjustable deadfront for neat, clean appearance.
## 1.2 Loadcenters and Circuit Breakers

### Type BR Loadcenters and Circuit Breakers

**Single-Phase Three-Wire — 120/240 Vac — Insulated/Bondable Neutral**

<table>
<thead>
<tr>
<th>Main Breaker Type</th>
<th>Main Amps Rating</th>
<th>Maximum Number of 1-Inch (25.4 mm) Spacings</th>
<th>Number of Circuits</th>
<th>Enclosure Type</th>
<th>Box Size</th>
<th>Wire Size Range Co/Al 60°C or 75°C for Main Breaker</th>
<th>Loadcenter Catalog Number with Combination of NEMA Type 3R Cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>BR816B100</td>
<td>100</td>
<td>8</td>
<td>16</td>
<td>Indoor</td>
<td>B1</td>
<td>#4–1/0</td>
<td>BR816B100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10</td>
<td>20</td>
<td>Indoor</td>
<td>A1</td>
<td>BR816B100F11</td>
<td>BR816B100F11</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12</td>
<td>20</td>
<td>Outdoor</td>
<td>A2</td>
<td>BR816B100F11</td>
<td>BR816B100F11</td>
</tr>
<tr>
<td></td>
<td></td>
<td>18</td>
<td>24</td>
<td>Outdoor</td>
<td>B2</td>
<td>BR1212B100</td>
<td>BR1212B100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>18</td>
<td>30</td>
<td>Indoor</td>
<td>A1</td>
<td>BR1212B100</td>
<td>BR1212B100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20</td>
<td>24</td>
<td>Outdoor</td>
<td>B2</td>
<td>BR1212B100</td>
<td>BR1212B100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20</td>
<td>30</td>
<td>Indoor</td>
<td>C1</td>
<td>BR1616B100</td>
<td>BR1616B100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>18</td>
<td>24</td>
<td>Outdoor</td>
<td>C1R</td>
<td>BR1616B100</td>
<td>BR1616B100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30</td>
<td>24</td>
<td>Outdoor</td>
<td>C3R</td>
<td>BR2424B100</td>
<td>BR2424B100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>18</td>
<td>30</td>
<td>Indoor</td>
<td>F</td>
<td>BR2424B100</td>
<td>BR2424B100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20</td>
<td>34</td>
<td>Outdoor</td>
<td>C3R</td>
<td>BR2424B100</td>
<td>BR2424B100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30</td>
<td>30</td>
<td>Indoor</td>
<td>F</td>
<td>BR2424B100</td>
<td>BR2424B100</td>
</tr>
<tr>
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** 注: Combination style covers may be used in surface or flush applications.**

** Wire range size for BR16B/391005 is #6–#1 Cu/Al.**

** Includes through-feed lugs for both phase and neutral conductors.**

** Rainproof panels are furnished with hub closure plates. For rainproof hubs, refer to Page V1-T1-32.”**

** See copper bus offering, Page V1-T1-55.**

** 22 kAIC series combination rating is obtained when Types BO, BR, BO, BOC, and DFC1 10 kAIC branch breakers are used in series with Type BRH main breaker.**

** 25 kAIC series combination rating is obtained when Types BO, BR, BO, BOC and DFC1 10 kAIC branch circuit breakers are used in series with Type BVH main breaker.**

** Supplied with adapter plate to use US Grouth hub on Page V1-T1-32. If 250 mm (9.5 mm) hub is needed, remove adapter and use AR150027105 hub.**

** Neutral is bonded — suitable for service entrance only — cannot be converted for sub-entrance applications.**

** 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 kits priced separately. See Page V1-T1-32.”**
QO ARC FAULT CIRCUIT BREAKER

Model Number: Q0120CAFIC
Amps: 20
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.

### Arc Fault Circuit Interrupters*

<table>
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<tr>
<th>Amps</th>
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<th>UPC Code</th>
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<td>QO120AFIC</td>
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### Combination Arc Fault Circuit Interrupters*

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<tr>
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<td>7-85901-69818-0</td>
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*“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 CO 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.
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.

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.

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

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

<table>
<thead>
<tr>
<th>A</th>
<th>V/AC</th>
<th>NEMA</th>
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<th>Catalog No.</th>
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Commercial Grade, Single & Duplex

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Commercial Floor Box

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<td>Black, Brass Assembly</td>
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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 UL-489, UL493 file nos. E90120 (TRVGF, 9966, 9968), E19506 UL948 (all others)
- CUL Certified to CSA C22.2, no. 42.
- TRFR, UL verified to Fed. Spec. WC-596G.
- NOMANSI Certified.
- TR6797, cULus File E82122, UL498 & UL514C
- cUL to CSA C22.2 No. 18, CSA C22.2 No 42

Material Characteristics

www.CooperWiringDevices.com
## TR Receptacles

**Tamper Resistant Receptacles**

- **Model**: 2-Pole, 3-Wire
- **Rating**: 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

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### Specification Grade, Combination

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### Hospital Grade, Receptacles & GFCI

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</tbody>
</table>

For ordering, include Cat. No. followed by the color code: A (Almond), B (Brown), BK (Black), GA (Gray), LA (Light Almond), RD (Red), V (Ivory), W (White)

### Testing & Code Compliance

- ULus Listed to UL498, UL843 file nos. E50120 (TRVG15, E15058) (all others), except TR800 & TR8015. Listed to UL498, file no. E15058.
- ULus Certified to CSA C22.2, no. 42.
- TRVG15 meets all UL843 and UL498 requirements.
- TR8200, TR8200/8300 UL listed to Federal Spec. WC-666G.
- ULus Listed.

### Material Characteristics

- Environmental: Flammability meets UL94 requirements; TR Combo Devices, TRVG, TR8200, TR8300, 5262, 5362, V2 rated.
- Temperature Rating: TR Combo Devices: -20°C to 60°C (+4°F to 140°F); TRVG -35°C to 60°C (-31°F to 150°F); TR8200, TR8300 0°C to 60°C (+4°F to 140°F); 5262, 5362: -20°C to 70°C (+4°F to 158°F).

www.CooperWiringDevices.com
## WR & TWR Receptacles

**Weather Resistant and Tamper & Weather Resistant Receptacles**

### 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.

**WR Commercial Grade, Duplex**

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**WR Specification Grade GFCI**

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**TWR Residential Grade, Duplex**

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**TWR Commercial Grade, Duplex**

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<th>A</th>
<th>V/AC</th>
<th>NEMA</th>
<th>Description</th>
<th>Catalog No.</th>
<th>Available Colors</th>
</tr>
</thead>
<tbody>
<tr>
<td>15A</td>
<td>125V</td>
<td>5-15R</td>
<td>Duplex Receptacle, Back &amp; Side Wire</td>
<td>TWRBR15</td>
<td>B, GY, V, W</td>
</tr>
<tr>
<td>20A</td>
<td>125V</td>
<td>5-20R</td>
<td>Duplex Receptacle, Back &amp; Side Wire</td>
<td>TWRBR20</td>
<td>B, GY, V, W</td>
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</tbody>
</table>

**TWR Specification Grade, GFCl**

<table>
<thead>
<tr>
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<th>NEMA</th>
<th>Description</th>
<th>Catalog No.</th>
<th>Available Colors</th>
</tr>
</thead>
<tbody>
<tr>
<td>15A</td>
<td>125V</td>
<td>5-15R</td>
<td>GFCl</td>
<td>TWRVGF15</td>
<td>B, GY, LA, V, W</td>
</tr>
<tr>
<td>20A</td>
<td>125V</td>
<td>5-20R</td>
<td>GFCl</td>
<td>TWRVGF20</td>
<td>B, GY, LA, V, W</td>
</tr>
</tbody>
</table>

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 UL489.
- cUL Certified to CSA C22.2, no. 42.
- WR/GF & TWR/GF meet all UL943 (GFCl) and UL489 (Receptacles) requirements.
- WRBR and TWRBR UL verified to Fed. Spec. WC-596G.
- NEMA/ANSI Certified.

### Material Characteristics

- Environmental Flammability meets UL94 requirements;
- TWR270 V2 rated; WRVGF, WRFR, TWRBR, TWRVGF V2 rated.
- Temperatures Rating: TWR270: -20°C to 70°C (-4°F to 149°F);
- WRVGF, TWRVGF: -30°C to 66°C (-21°F to 151°F);
- WRBR, TWRBR: -20°C to 70°C (-4°F to 158°F).
TR Receptacles

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

<table>
<thead>
<tr>
<th>A</th>
<th>V/AC</th>
<th>NEMA</th>
<th>Description</th>
<th>Catalog No.</th>
<th>Available Colors</th>
</tr>
</thead>
<tbody>
<tr>
<td>15A</td>
<td>125V</td>
<td>5-15R</td>
<td>ASPIRE Duplex Receptacle</td>
<td>9505TR</td>
<td>AW, DS, SG, WS</td>
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<tr>
<td></td>
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<td>ASPIRE Single Receptacle</td>
<td>9507TR</td>
<td>AW, DS, SG, WS</td>
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<td></td>
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<td>ASPIRE Duplex GFCI</td>
<td>9566TR</td>
<td>AW, DS, SG, WS</td>
</tr>
<tr>
<td>20A</td>
<td>125V</td>
<td>5-20R</td>
<td>ASPIRE Duplex Receptacle</td>
<td>9510TR</td>
<td>AW, DS, SG, WS</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>ASPIRE Single Receptacle</td>
<td>9508TR</td>
<td>AW, DS, SG, WS</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>ASPIRE Duplex GFCI</td>
<td>9569TR</td>
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Residential Grade, Recessed

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<th>A</th>
<th>V/AC</th>
<th>NEMA</th>
<th>Description</th>
<th>Catalog No.</th>
<th>Available Colors</th>
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</thead>
<tbody>
<tr>
<td>15A</td>
<td>125V</td>
<td>5-15R</td>
<td>Recessed Single Receptacle</td>
<td>TR775</td>
<td>W</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Recessed Duplex Receptacle</td>
<td>TR780</td>
<td>W</td>
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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.
- NOM/ANSI Certified

Material Characteristics
- Environmental: Flammability meets UL94 requirements; 9566TR, 9569TR, 9505TR, 9507TR, 9569TR, 9510TR, TR775, TR780, V2 rated.
- Temperature Rating: 9510TR: -20°C to 70°C (+4°F to 149°F); 9505TR, 9507TR, 9569TR: -20°C to 70°C (+4°F to 158°F); TR775, TR780: -20°C to 70°C (+4°F to 158°F).
- 9566TR, 9569TR: -31°C to 66°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/wthrccvr](http://bit.ly/wthrccvr)

For more information about Cooper Wiring Device’s complete ASPIRE Collection, use the QR code above or visit: [http://bit.ly/aspiresystem](http://bit.ly/aspiresystem)
GFCI RECEPTACLE

Model Number: VGF15W-M-L or equal
Rating: 20A 125V NEMA 5-20R
Color: White
Available: Cooper Wiring Devices
Modular Receptacles

**ARROW/HART ARROWLINK**

**Ground Fault Circuit Interrupter Receptacles**

2-Pole, 3-Wire Grounding
15A 125V/AC
20A 125V/AC

### Specification Grade GFCIs

- 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.
- Shock Sentry™ lock-out function prevents miswired line-load connections and GFCI circuitry damage.

### Back Wire & Side Wire

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalog No.</th>
<th>Color Suffix</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duplex GFCI</td>
<td>VGF15_MOD</td>
<td>A, B, BK, GY, LA, RD, V, W</td>
</tr>
<tr>
<td>Duplex GFCI NAFTA Compliant</td>
<td>VGF15F_MOD</td>
<td>B, BK, GY, LA, RD, V, W</td>
</tr>
<tr>
<td>Tamper Resistant Duplex GFCI</td>
<td>TRVG15F_MOD</td>
<td>A, B, BK, GY, LA, RD, V, W</td>
</tr>
<tr>
<td>Tamper Resistant Duplex GFCI NAFTA Compliant</td>
<td>TRVG15F мод</td>
<td>B, BK, GY, LA, RD, V, W</td>
</tr>
<tr>
<td>Weather Resistant Duplex GFCI</td>
<td>WRVG15_MOD</td>
<td>B, GY, V, W</td>
</tr>
<tr>
<td>Tamper &amp; Weather Resistant Duplex GFCI</td>
<td>TWRVG15_MOD</td>
<td>B, GY, LA, V, W</td>
</tr>
</tbody>
</table>

Includes standard size unbreakable wallplate unless otherwise noted. Consult factory customer service representative for additional packaging options.

### ArrowLink Receptacle Connectors

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Catalog No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ArrowLink SPD</td>
<td>Push-In Building Wire Connector</td>
<td>MCR300FTPI</td>
</tr>
<tr>
<td>ArrowLink SPD</td>
<td>Push-In Building Wire Connector, No Ground Conductor</td>
<td>MCR300FTPING</td>
</tr>
<tr>
<td>ArrowLink SPD</td>
<td>Screw Terminal Building Wire Connector</td>
<td>MCR300FTST</td>
</tr>
<tr>
<td>ArrowLink SPD</td>
<td>Screw Terminal Building Wire Connector, No Ground Conductor</td>
<td>MCR300FTSTNG</td>
</tr>
<tr>
<td>ArrowLink</td>
<td>125V Solid Wire Building Wire Connector</td>
<td>MCR125SOL</td>
</tr>
<tr>
<td>ArrowLink</td>
<td>125V Stranded Wire Building Wire Connector</td>
<td>MCR125STR</td>
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<tr>
<td></td>
<td>250V Solid Wire Building Wire Connector</td>
<td>MCR250SOL</td>
</tr>
<tr>
<td></td>
<td>250V Stranded Wire Building Wire Connector</td>
<td>MCR250STR</td>
</tr>
</tbody>
</table>

### Icon Key

- **Build-To-Spec Customizable Devices**
- **NAFTA Compliant, see Arrow Hart Buyer's Guide pg D-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. E326989.
- 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 60°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.

**www.cooperwiringdevices.com**
## Modular Receptacles
### Specification & Performance Data

#### Specification Grade
- **Ground Fault Circuit Interrupter Receptacles**
  - 2-Pole, 3-Wire Grounding
  - 15A, 125V/AC; 20A, 125V/AC
  - NEMA 5-15, 5-20

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Base Device</td>
<td>Back &amp; side wire</td>
<td>Back &amp; side wire</td>
</tr>
<tr>
<td>ArrowLink</td>
<td>Integrated wire leads, crimped &amp; resistance welded</td>
<td>Integrated wire leads, crimped &amp; resistance welded</td>
</tr>
<tr>
<td>ArrowLink SPD</td>
<td>Backwire feed through</td>
<td>Backwire feed through</td>
</tr>
<tr>
<td>Testing &amp; Code Compliance</td>
<td>cULus Listed to UL 498 and UL 943, file no. E60120</td>
<td>cULus Listed to UL 498 and UL 943, file no. E60120</td>
</tr>
<tr>
<td>Base Device</td>
<td>Meets all UL 943 (GFCl), UL 498 (Receptacles) and applicable CSA requirements</td>
<td>Meets all UL 943 (GFCl), UL 498 (Receptacles) and applicable CSA requirements</td>
</tr>
<tr>
<td>ArrowLink</td>
<td>Plug &amp; connector cULus Listed to UL 2459, file no. E325188</td>
<td>Plug &amp; connector cULus Listed to UL 2459, file no. E325188</td>
</tr>
<tr>
<td>ArrowLink SPD</td>
<td>cULus Listed wiring assembly, file no. E326691</td>
<td>cULus Listed wiring assembly, file no. E326691</td>
</tr>
<tr>
<td>Flammability</td>
<td>Meets UL 94 requirements; V2 rated</td>
<td>Meets UL 94 requirements; V2 rated</td>
</tr>
<tr>
<td>Temperature Rating</td>
<td>-35°C to 66°C (31°F to 150.8°F)</td>
<td>-35°C to 66°C (31°F to 150.8°F)</td>
</tr>
<tr>
<td>Flammability</td>
<td>Meets UL 94 requirements; V2 rated</td>
<td>Meets UL 94 requirements; V2 rated</td>
</tr>
<tr>
<td>Temperature Rating</td>
<td>-35°C to 66°C (31°F to 150.8°F)</td>
<td>-35°C to 66°C (31°F to 150.8°F)</td>
</tr>
<tr>
<td>Dielectric Voltage</td>
<td>Withstands 2000V per UL 498</td>
<td>Voltage: withstands 2000V per UL 498</td>
</tr>
<tr>
<td>Current Interrupting</td>
<td>Yes, at full-rated current</td>
<td>Yes, at full-rated current</td>
</tr>
<tr>
<td>Temperature Rise</td>
<td>Temperature Rise: Max. 30°C (86°F) after 100 cycles of overload @ 150% of rated current (DC)</td>
<td>Max. 30°C (86°F) after 100 cycles of overload @ 150% of rated current (DC)</td>
</tr>
<tr>
<td>Trip Time</td>
<td>0.025 seconds (Class A)</td>
<td>0.025 seconds (Class A)</td>
</tr>
<tr>
<td>Frequency</td>
<td>60 Hz; Voltage: 125V; Amperage: 15A/20A 20A Feed Through</td>
<td>60 Hz; Voltage: 125V; Amperage: 15A/20A 20A Feed Through</td>
</tr>
<tr>
<td>Short Circuit Testing</td>
<td>Meets and exceeds 10 kA</td>
<td>Meets and exceeds 10 kA</td>
</tr>
<tr>
<td>Maximum Interrupting Capacity</td>
<td>20 Amps</td>
<td>20 Amps</td>
</tr>
<tr>
<td>Max. Working Voltage</td>
<td>300V/AC</td>
<td>300V/AC</td>
</tr>
<tr>
<td>Max. Continuous Current</td>
<td>20A</td>
<td>20A</td>
</tr>
<tr>
<td>ArrowLink</td>
<td>52.5A/AC for 10 cycles</td>
<td>52.5A/AC for 10 cycles</td>
</tr>
<tr>
<td>Dielectric Voltage</td>
<td>Withstands 1600V per UL 2459</td>
<td>Withstands 1600V per UL 2459</td>
</tr>
<tr>
<td>Current Interrupting</td>
<td>Limited cycles at full-rated current</td>
<td>Limited cycles at full-rated current</td>
</tr>
<tr>
<td>Temperature Rise</td>
<td>Temperature Rise: Max. 50°C (122°F) while conducting 35A after 10 cycles of overload @ 52.5A/AC</td>
<td>Max. 50°C (122°F) while conducting 35A after 10 cycles of overload @ 52.5A/AC</td>
</tr>
<tr>
<td>Base Device Terminal Accommodation</td>
<td>#14 - #10 AWG</td>
<td>#14 - #10 AWG</td>
</tr>
<tr>
<td>ArrowLink Wire Leads</td>
<td>#12 AWG</td>
<td>#12 AWG</td>
</tr>
<tr>
<td>ArrowLink SPD Screw Terminals</td>
<td>Accepts #12-#14 stranded and solid wire</td>
<td>Accepts #12-#14 stranded and solid wire</td>
</tr>
<tr>
<td>ArrowLink SPD Ground</td>
<td>Integral THHN #12 AWG 6” lead with ring terminal and #10 ground screw</td>
<td>Integral THHN #12 AWG 6” lead with ring terminal and #10 ground screw</td>
</tr>
<tr>
<td>Voltage Ratings</td>
<td>Permanently marked on device</td>
<td>Permanently marked on device</td>
</tr>
<tr>
<td>Specifications: Screened Conductors</td>
<td>Material: UL recognized insulating material</td>
<td>Material: UL recognized insulating material</td>
</tr>
<tr>
<td>ArrowLink Models Only</td>
<td>Dielectric Strength: 2,000V min</td>
<td>Dielectric Strength: 2,000V min</td>
</tr>
<tr>
<td></td>
<td>HWI Rating: 4 min</td>
<td>HWI Rating: 4 min</td>
</tr>
<tr>
<td></td>
<td>Relative temperature index, electrical: 80°C (176°F)</td>
<td>Relative temperature index, electrical: 80°C (176°F)</td>
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<tr>
<td></td>
<td>Flammability: V0 (UL 94)</td>
<td>Flammability: V0 (UL 94)</td>
</tr>
<tr>
<td>Top Housing</td>
<td>Thermoplastic, nylon</td>
<td>Thermoplastic, nylon</td>
</tr>
<tr>
<td>Bottom Housing</td>
<td>PVC</td>
<td>PVC</td>
</tr>
<tr>
<td>Strap</td>
<td>0.047” thick steel, zinc plated</td>
<td>0.047” thick steel, zinc plated</td>
</tr>
<tr>
<td>Line Contacts</td>
<td>0.030” thick brass</td>
<td>0.030” thick brass</td>
</tr>
<tr>
<td>Terminal &amp; Ground Screws</td>
<td>#8-32 steel, brass plated; neutral screw nickel plated, ground screw green</td>
<td>Terminal: Brass-nickel-plated steel; WR &amp; TWR brass/nickel-plated stainless steel; Ground: ground screw green on all models, WR &amp; TWR stainless steel</td>
</tr>
<tr>
<td>Terminal Clamps</td>
<td>0.070” thick steel</td>
<td>Brass-plated steel; WR &amp; TWR nickel-plated steel</td>
</tr>
<tr>
<td>Housing</td>
<td>Polycarbonate</td>
<td>Polycarbonate</td>
</tr>
<tr>
<td>Contacts</td>
<td>Copper alloy</td>
<td>Copper alloy</td>
</tr>
<tr>
<td>Wire Leads</td>
<td>Solid or stranded THHN #12 AWG</td>
<td>Solid or stranded THHN #12 AWG</td>
</tr>
<tr>
<td>ArrowLink SPD</td>
<td>Polycarbonate</td>
<td>Polycarbonate</td>
</tr>
</tbody>
</table>

Specifications subject to change without notice.

2-ALMSPSB8-0311 www.cooperwiringdevices.com
COOPER TOGGLE LIGHTED SWITCH

Model: 1301-7W-L or equal
Color: White
Electrical:
  Current: 15 A
  Voltage: 120V
Available: Cooper Wiring Devices
Toggle Lighted Switches - 1301-7, 1303-7, 1301-7LT, 1303-7LT

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.

<table>
<thead>
<tr>
<th>PRODUCT DETAILS</th>
<th>RESOURCES</th>
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<tbody>
<tr>
<td>Catalog Number</td>
<td>1301-7, 1303-7, 1301-7LT, 1303-7LT</td>
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<tr>
<td>Wiring Type</td>
<td>Single Pole, 3-Way</td>
</tr>
<tr>
<td>Rating</td>
<td>15A 120V</td>
</tr>
<tr>
<td>Product Colors</td>
<td>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)</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Rating A</th>
<th>V/AC</th>
<th>Description</th>
<th>Color</th>
<th>Single-Pole</th>
<th>3-Way</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>120</td>
<td>Framed Toggle</td>
<td>Brown</td>
<td>1301B†</td>
<td>1303B†</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Ivory</td>
<td>1301V†</td>
<td>1303V†</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>White</td>
<td>1301W†</td>
<td>1303W†</td>
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</tbody>
</table>

Grounding Switch – Side Wire and Push Wire

<table>
<thead>
<tr>
<th>Rating A</th>
<th>V/AC</th>
<th>Description</th>
<th>Color</th>
<th>Catalog No.</th>
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<th>4-Way</th>
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<tbody>
<tr>
<td>15</td>
<td>120</td>
<td>Framed Toggle</td>
<td>Almond</td>
<td>1301-7A†</td>
<td>1303-7A†</td>
<td>1242-7A†*</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Brown</td>
<td>1301-7B†</td>
<td>1303-7B†</td>
<td>1242-7B†*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Ivory</td>
<td>1301-7V†</td>
<td>1303-7V†</td>
<td>1242-7V†*</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Light Almond</td>
<td>1301-7LA†</td>
<td>1303-7LA†</td>
<td>1242-7LA†*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>White</td>
<td>1301-7W†</td>
<td>1303-7W†</td>
<td>1242-7W†*</td>
</tr>
<tr>
<td>15</td>
<td>120</td>
<td>Less Ears</td>
<td>Brown</td>
<td>1301-73B†</td>
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<td></td>
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<td>Ivory</td>
<td>1301-73V†</td>
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<td>White</td>
<td>1301-73W†</td>
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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

<table>
<thead>
<tr>
<th>Rating A</th>
<th>V/AC</th>
<th>Description</th>
<th>Color</th>
<th>Single-Pole</th>
<th>Catalog No.</th>
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<tr>
<td>15</td>
<td>120</td>
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<td>Almond</td>
<td>1301-7LTA</td>
<td>1303-7LTA</td>
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<td>Ivory</td>
<td>1301-7LTV</td>
<td>1303-7LTV</td>
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<td>Light Almond</td>
<td>1301-7LTLA</td>
<td>1303-7LTLA</td>
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<td></td>
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<td>1303-7LTLA</td>
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Horsepower Rated for Motor Loads per UL 20

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<tr>
<th>Rating</th>
<th>120V/AC</th>
<th>240V/AC</th>
<th>Max Amps</th>
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<tr>
<td>15A</td>
<td>1/2 HP</td>
<td>2 HP</td>
<td>12A</td>
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STANDARD SIZE DUPLEX RECEPTACLE WALLPLATES
NYLON

Model Number: 5132W-SP-L or equal
Color: White
Available: Cooper Wiring Devices
Standard Size Duplex Receptacle Wallplates Nylon - 5132, 5150

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 spot resistant. Nylon wallplates have a flush-fitting, warp resistant design. Matching mounting screws provided.

<table>
<thead>
<tr>
<th>PRODUCT DETAILS</th>
<th>RESOURCES</th>
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<tr>
<td><strong>Catalog Number</strong></td>
<td>5132, 5150</td>
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<tr>
<td><strong>Product Colors</strong></td>
<td>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), Y (Ivory), W (White).</td>
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## Wallplates

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<tr>
<th>Wallplate Type</th>
<th>Standard Size, Mid-Sized &amp; Oversize Wallplates</th>
<th>REPEL</th>
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<tbody>
<tr>
<td>Material Type</td>
<td>Thermoset, Nylon, Stainless Steel, Polycarbonate</td>
<td>REPEL Polycarbonate Mid-Sized Wallplates PJ_AM and PJS_AM Series, REPEL Stainless Steel Standard Size Wallplates 930070_AM, 930080_AM, 931000_AM, 933400_AM Series</td>
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<td>Manufacturing Process</td>
<td>Injection Molded, Injection Molded, Stamped, Injection Molded</td>
<td>Injection Molded, Stamped</td>
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<td>UL Listed to UL 514D, file no. E33216</td>
<td>UL Listed to UL 514D, file no. E33216, E392003</td>
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<tr>
<td>Flame Resistance</td>
<td>Meets UL 94 requirements; 5V rated</td>
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</tr>
<tr>
<td>Temperature Rating</td>
<td>-40°C to 90°C (-40°F to 194°F)</td>
<td>-40°C to 70°C (-40°F to 158°F)</td>
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<tr>
<td>Material</td>
<td>0.080&quot; thick thermoset or phenolic</td>
<td>0.080&quot; thick thermoplastic, 0.032&quot; thick stainless steel alloy, 18% chromium and 8% nickel for corrosion resistance, 0.08&quot; thick thermoplastic polycarbonate, 0.071&quot; thick polycarbonate with Agion® Antimicrobial Additive incorporated</td>
</tr>
<tr>
<td>Inner Wallplate</td>
<td>N/A</td>
<td>0.071&quot; thick polycarbonate, PJS_AM only: 0.071&quot; thick polycarbonate</td>
</tr>
</tbody>
</table>

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”
Cast Weatherproof Cover Duplex Receptacle Vertical, White

CA8WV

Weatherproof Cover 1 Gang Duplex Receptacle Vertical 1 Self Closing Lid, White

specifications

**GENERAL INFO**

- Color: White
- Type: Covers
- Special Features: Weatherproof

**TECHNICAL INFORMATION**

- Material: Cast

**BUY AMERICAN ACT COMPLIANCE**

- Country of Origin: INDIA
- Buy American Act Status: No

**LISTING AGENCIES/THIRD PARTY INFORMATION**

- CSA Listing Item No.
- CUL Listing No.
- cu Lus: No
- cu Rus: No
- Federal Spec: No
- UL Listing No.
- U N SPS C: 39121385
- U R: No

**DIMENSIONS**

- Height U S: 4.56"
- Width U S: 2.81"
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.
- Baked-on, electrostatic polyester powder coat for superior scratch- and corrosion-resistant finish.
- Stainless steel springs.
- No rough edges.

Field Uses/Vertical Markets

- Industrial
- Retail
- Health Care
- Office
- Education
- Hospitality/Lodging
- Institutional
- Multiple Dwelling

SF2303R1 — Updated January 2004 — For latest specs visit www.legrand.us/passandseymour
## Ordering Information

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<th>Catalog Number</th>
<th>Description</th>
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<tr>
<td><strong>One Gang</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CA1-G</td>
<td>Toggle Vertical – 1 Self-Closing Lid</td>
<td>Gray</td>
</tr>
<tr>
<td>CA8-GH</td>
<td>Duplex Receptacle Horizontal – 2 Self-Closing Lids</td>
<td>Gray</td>
</tr>
<tr>
<td>CA8-BRH</td>
<td></td>
<td>Bronze</td>
</tr>
<tr>
<td>CA8-WH</td>
<td></td>
<td>White</td>
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<tr>
<td>CA8-GV</td>
<td>Duplex Receptacle Vertical – 1 Self-Closing Lid</td>
<td>Gray</td>
</tr>
<tr>
<td>CA8-BRV</td>
<td></td>
<td>Bronze</td>
</tr>
<tr>
<td>CA8-WV</td>
<td></td>
<td>White</td>
</tr>
<tr>
<td>CA26-GH</td>
<td>Decorator or GFCI Horizontal – 1 Self-Closing Lid</td>
<td>Gray</td>
</tr>
<tr>
<td>CA26-BRH</td>
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<td>Bronze</td>
</tr>
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<td>CA26-WH</td>
<td></td>
<td>White</td>
</tr>
<tr>
<td>CA26-GV</td>
<td>Decorator or GFCI Vertical – 1 Self-Closing Lid</td>
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<tr>
<td>CA26-BRV</td>
<td></td>
<td>Bronze</td>
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<tr>
<td>CA26-WV</td>
<td></td>
<td>White</td>
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<tr>
<td>CA7-GV</td>
<td>Single Receptacle Vertical – 1 Self-Closing Lid</td>
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<td>CA7-BRV</td>
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<td>White</td>
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<tr>
<td>CA7-WV</td>
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<tr>
<td>CA721-G</td>
<td>Power Outlet – 1.625 Diameter Vertical – 1 Self-Closing Lid</td>
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<tr>
<td>CA725-G</td>
<td>Power Outlet – 1.750 Diameter Vertical – 1 Self-Closing Lid</td>
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<tr>
<td>CA723-G</td>
<td>Power Outlet – 2.125 Diameter Vertical – 1 Self-Closing Lid</td>
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<tr>
<td><strong>Two Gang</strong></td>
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<tr>
<td>CA2-G</td>
<td>2 Toggles 4 Screw Mounting</td>
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<td>CA2-BR</td>
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<td>Bronze</td>
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<td>CA2-W</td>
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<td>CA82-G</td>
<td>2 Duplex Receptacles</td>
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<td>CA82-BR</td>
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<td>CA262-G</td>
<td>2 Decorator or GFCI 4 Screw Mounting</td>
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<td>CA72-G</td>
<td>2 Single Receptacles</td>
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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

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

SF2303R1 — Updated January 2004 — For latest specs visit www.legrand.us/passandseymour
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

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Vaughan, ON, L4K 4B4
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Fax: 905.738.9721
www.legrand.ca

SF2303R1 — Updated January 2004 — For latest specs visit www.legrand.us/passandseymour
LEGRAND RECEPTACLE

Model Number: 0301L or equal
Location: Interior of house
Electrical:
   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 accessible 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.

specifications

<table>
<thead>
<tr>
<th>GENERAL INFO</th>
<th>TECHNICAL INFORMATION</th>
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<tbody>
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<td>Color: white</td>
<td>Amps: 15 Amp</td>
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<td>Type: Receptacle</td>
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<td>Duty: Heavy Duty</td>
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<td>Special Features: Back, Side Wire</td>
<td>Capacity: Duplex</td>
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<td>Grade Type: Specification</td>
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<table>
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<th>LISTING AGENCY/S/THIRD PARTY INFORMATION</th>
<th>BUY AMERICAN ACT COMPLIANCE</th>
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<td>UL Standard: Yes</td>
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<td>UN SPS C: 39121400</td>
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<td>UR: No</td>
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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
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.


Aesthetically pleasing contour design.

Pre-installed mounting screws on single gang toggle, duplex receptacle and decorator openings.

Field Uses/Vertical Markets

- Health Care
- Office
- Education
- Hospitality/Lodging
- Institutional
- Multiple Dwelling
- Retail

SF2501R1 — Updated January 2004 — For latest specs visit www.legrand.us/passandseymour
## Wall Plates

### TradeMaster® Thermoplastic Nylon
### One & Two Gang

#### Ordering Information

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalog Number</th>
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<tbody>
<tr>
<td><strong>TradeMaster Toggle Switch Openings</strong></td>
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<tr>
<td>One Gang</td>
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<td><strong>TradeMaster Duplex Receptacle Openings</strong></td>
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### TradeMaster Blank Plates — Box Mounted

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### TradeMaster Single Receptacle Openings

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</tr>
<tr>
<td>One Gang</td>
<td>TP7-W</td>
<td>Red</td>
</tr>
<tr>
<td>One Gang</td>
<td>TP7-W</td>
<td>Light Almond</td>
</tr>
<tr>
<td>One Gang</td>
<td>TP7-W</td>
<td>Orange</td>
</tr>
<tr>
<td>One Gang</td>
<td>TP7-W</td>
<td>Orange</td>
</tr>
</tbody>
</table>

### TradeMaster Power Outlet Receptacle Openings

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalog Number</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>One Gang</td>
<td>TP720-W</td>
<td>Ivory</td>
</tr>
<tr>
<td>One Gang</td>
<td>TP720-W</td>
<td>White</td>
</tr>
<tr>
<td>One Gang</td>
<td>TP720-W</td>
<td>Brown</td>
</tr>
<tr>
<td>One Gang</td>
<td>TP720-W</td>
<td>Gray</td>
</tr>
<tr>
<td>One Gang</td>
<td>TP720-W</td>
<td>Black</td>
</tr>
<tr>
<td>One Gang</td>
<td>TP720-W</td>
<td>Red</td>
</tr>
<tr>
<td>One Gang</td>
<td>TP720-W</td>
<td>Light Almond</td>
</tr>
<tr>
<td>One Gang</td>
<td>TP720-W</td>
<td>Orange</td>
</tr>
</tbody>
</table>

---

For more information on these and other P&S products refer to our Product Guide or visit our web site.

SF2501R1 — Updated January 2004 — For latest specs visit www.legrand.us/passandseymour
# TradeMaster® Thermoplastic Nylon Wall Plates

## 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 One Gang](image)

**Dimensions for TradeMaster Two Gang**

![Dimensions for TradeMaster Two Gang](image)
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

Legrand®
Legrand/Pass & Seymour
P.O. Box 4822
Syracuse, NY 13221-4822
800-223-4185

North America Headquarters
60 Woodlawn Street
West Hartford, CT 06110
Phone: 1.877.BY.LEGRAND (295.3472)
Fax: 1.860.222.2062
www.legrand.us

Legrand Canada
570 Applewood Crescent
Vaughan, ON, L4K 4B4
Phone: 905.738.9195
Fax: 905.738.9721
www.legrand.ca

SF2501R1 — Updated January 2004 — For latest specs visit www.legrand.us/passandseymour
LEGRAND SWITCH

Model Number: 660-WG or equal
Location: Interior of house
Electrical:
  Voltage: 120 V
  Current: 15 A
Available: Legrand/ Pass & Seymour
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.
### Features & Benefits

- Extra-long strap.
- Side wire #12 and #14 AWG.
- Push wire #14 AWG.
- Tri-drive ground, terminal, and mounting screws.

### Specifications

<table>
<thead>
<tr>
<th>General Info</th>
<th>Technical Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color: White</td>
<td>Volts A C: 120</td>
</tr>
<tr>
<td>Product Series: TradeMaster</td>
<td></td>
</tr>
<tr>
<td>Type: Toggle</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Listing Agencies/Third Party Information</th>
<th>Buy American Act Compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSA Listing Info: No</td>
<td>Country of Origin: CHINA</td>
</tr>
<tr>
<td>CUL Listing No: No</td>
<td>Buy American Act Status: No</td>
</tr>
<tr>
<td>cU Lus: Yes</td>
<td></td>
</tr>
<tr>
<td>cU Rus: No</td>
<td></td>
</tr>
<tr>
<td>Federal Spec: No</td>
<td></td>
</tr>
<tr>
<td>UL Listing No: No</td>
<td></td>
</tr>
<tr>
<td>U N SPS C: 39121406</td>
<td></td>
</tr>
<tr>
<td>U R: No</td>
<td></td>
</tr>
</tbody>
</table>

### Dimensions

- Depth (U S): 1.090"
- Height U S: 4.195"
- Width U S: 1.25"
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
Product Data Sheet

QO200TR
AC Disconnect Switch Non Fusible - Molded Case Switch, 60A, NEMA 3R, 2-Pole

List Price $161.00 USD
Availability Stock Item: This item is normally stocked in our distribution facility.

Technical Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ampere Rating</td>
<td>60A</td>
</tr>
<tr>
<td>Application</td>
<td>Residential and light commercial applications</td>
</tr>
<tr>
<td>Approvals</td>
<td>UL Listed</td>
</tr>
<tr>
<td>Disconnect Type</td>
<td>Non Fusible - Molded Case Switch</td>
</tr>
<tr>
<td>Enclosure Type</td>
<td>Metallic - Rain proof and Ice proof (Indoor/Outdoor)</td>
</tr>
<tr>
<td>Enclosure Rating</td>
<td>NEMA 3R</td>
</tr>
<tr>
<td>For Use With</td>
<td>Air Conditioner</td>
</tr>
<tr>
<td>Receptacles</td>
<td>None</td>
</tr>
<tr>
<td>Mounting Type</td>
<td>Panel/Surface</td>
</tr>
<tr>
<td>Number of Poles</td>
<td>2-Pole</td>
</tr>
<tr>
<td>Terminal Type</td>
<td>Screw</td>
</tr>
<tr>
<td>Voltage Rating</td>
<td>240VAC</td>
</tr>
<tr>
<td>Wiring Configuration</td>
<td>2-Wire</td>
</tr>
<tr>
<td>Depth</td>
<td>3.88 Inches</td>
</tr>
<tr>
<td>Height</td>
<td>6.50 Inches</td>
</tr>
<tr>
<td>Width</td>
<td>4.63 Inches</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Category</th>
<th>00044 - Disconnects, Air Conditioner</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discount Schedule</td>
<td>DE2A</td>
</tr>
<tr>
<td>GTIN</td>
<td>00785901535966</td>
</tr>
<tr>
<td>Package Quantity</td>
<td>1</td>
</tr>
<tr>
<td>Weight</td>
<td>3.03 lbs.</td>
</tr>
<tr>
<td>Availability Code</td>
<td>Stock Item: This item is normally stocked in our distribution facility.</td>
</tr>
<tr>
<td>Returnability</td>
<td>Y</td>
</tr>
<tr>
<td>Country of Origin</td>
<td>MX</td>
</tr>
</tbody>
</table>

As standards, specifications, and designs change from time to time, please ask for confirmation of the information given in this document.

Generated: 11/01/2012 06:48:24

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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.

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

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 galvanneal 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 QQ200TR. This bracket is installed directly to the stud. After the siding goes up, mount the QQ200TR air conditioning disconnect to the bracket with screws (not provided).
Air Conditioning Disconnects Molded Case Switch
Product Information

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

<table>
<thead>
<tr>
<th>Service</th>
<th>Ampere Rating</th>
<th>Catalog Number</th>
<th>Metallic Enclosure</th>
<th>Non-Metallic Enclosure</th>
<th>Maximum hp</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Wire (Molded Case Switch Included)—240 Vac Maximum</td>
<td>60</td>
<td>QO200TR</td>
<td>QO200TRNM</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

* 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

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalog Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bracket used with QO200TR for stucco, aluminum and vinyl siding. Order quantity multiples of 10.</td>
<td>PKHB</td>
</tr>
</tbody>
</table>
Air Conditioning Disconnects Molded Case Switch

Table 1: Dimensions

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>H (IN)</th>
<th>W (IN)</th>
<th>D (IN)</th>
<th>Figure</th>
</tr>
</thead>
<tbody>
<tr>
<td>QO200TR</td>
<td>6.50</td>
<td>4.63</td>
<td>3.88</td>
<td>99</td>
</tr>
<tr>
<td>QO200TRNM</td>
<td>8.75</td>
<td>6.50</td>
<td>3.88</td>
<td>99</td>
</tr>
<tr>
<td>PKH2</td>
<td>5.06</td>
<td>4.00</td>
<td>0.94</td>
<td>24</td>
</tr>
</tbody>
</table>

Figure 1:

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

**Manual, Not Fusible - Quick-Break/Quick-Make**

METER-RITE® Switches listed below are rated 100% capacity, continuous duty.

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Approx. Weight (Lbs)</th>
<th>DPDT - Double Pole-Double Throw</th>
<th>TPDT - Triple Pole-Double Throw</th>
</tr>
</thead>
<tbody>
<tr>
<td>7103</td>
<td>13</td>
<td>Single Phase (240 Vac) UL Listed</td>
<td></td>
</tr>
<tr>
<td>7205A</td>
<td>35</td>
<td>DPDT with 100 amp main contacts, 100 amp aux contacts</td>
<td></td>
</tr>
<tr>
<td>7406</td>
<td>48</td>
<td>DPDT with 200 amp main contacts, 200 amp aux contacts</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>DPDT with 400 amp main contacts, 400 amp aux contacts</td>
<td></td>
</tr>
<tr>
<td>7215</td>
<td>48</td>
<td>Single Phase (240 Vac) with “Center-Off” Position UL Listed &amp; SUSE Rated</td>
<td></td>
</tr>
<tr>
<td>7416</td>
<td>48</td>
<td>DPDT with 200 amp main contacts, 200 amp aux contacts</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>DPDT with 400 amp main contacts, 400 amp aux contacts</td>
<td></td>
</tr>
<tr>
<td>7805</td>
<td>56</td>
<td>Three Phase (240 Vac) UL Listed</td>
<td></td>
</tr>
<tr>
<td>7806</td>
<td>56</td>
<td>TPDT with 200 amp main contacts, 200 amp aux contacts</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>TPDT with 400 amp main contacts, 400 amp aux contacts</td>
<td></td>
</tr>
<tr>
<td>7815</td>
<td>56</td>
<td>Three Phase (240 Vac) with “Center-Off” Position UL Listed &amp; SUSE Rated</td>
<td></td>
</tr>
<tr>
<td>7816</td>
<td>56</td>
<td>TPDT with 200 amp main contacts, 200 amp aux contacts</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>TPDT with 400 amp main contacts, 400 amp aux contacts</td>
<td></td>
</tr>
<tr>
<td>T-5233-6</td>
<td>184</td>
<td>Single Phase (600 Vac) Non-UL &amp; Not-SUSE</td>
<td></td>
</tr>
<tr>
<td>7800-6</td>
<td>56</td>
<td>DPDT with 800 amp main contacts, 600 amp aux contacts</td>
<td></td>
</tr>
<tr>
<td>7808-6</td>
<td>56</td>
<td>Three Phase (600 Vac) Non-UL &amp; Not-SUSE</td>
<td></td>
</tr>
<tr>
<td>T-6233-6</td>
<td>197</td>
<td>TPDT with 200 amp main contacts, 200 amp aux contacts</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>TPDT with 400 amp main contacts, 400 amp aux contacts</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>TPDT with 800 amp main contacts, 600 amp aux contacts</td>
<td></td>
</tr>
</tbody>
</table>

METER-RITE® Switches are not HP rated and should not be switched under load. SUSE - Suitable for Use as Service Equipment

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Conduit Knockout Sizes and Hub Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>7103</td>
<td>(3) 1 to 1-1/4, (1) 1/2</td>
</tr>
<tr>
<td>7205A</td>
<td>(3) 1-1/2 to 2, (1) 1/2</td>
</tr>
<tr>
<td>7406</td>
<td>(2) 2-1/2 to 3, (1) 1-1/2 to 2, (1) 1/2</td>
</tr>
<tr>
<td>7215</td>
<td>(3) 1-1/2 to 2, (1) 1/2</td>
</tr>
<tr>
<td>7416</td>
<td>(2) 2-1/2 to 3, (1) 1-1/2 to 2, (1) 1/2</td>
</tr>
<tr>
<td>7805</td>
<td>(4) 2 to 2-1/2, (1) 1/2</td>
</tr>
<tr>
<td>7806</td>
<td>(3) 3 to 3-1/2, (1) 2 to 2-1/2, (1) 1/2</td>
</tr>
<tr>
<td>7815</td>
<td>(4) 2 to 2-1/2, (1) 1/2</td>
</tr>
<tr>
<td>7816</td>
<td>(3) 3 to 3-1/2, (1) 2 to 2-1/2, (1) 1/2</td>
</tr>
<tr>
<td>T-5233-6</td>
<td>NO KNOCKOUTS IN ENCLOSURE</td>
</tr>
<tr>
<td>7800-6</td>
<td>(4) 2 to 2-1/2, (1) 1/2</td>
</tr>
<tr>
<td>7808-6</td>
<td>(3) 3 to 3-1/2, (1) 2 to 2-1/2, (1) 1/2</td>
</tr>
<tr>
<td>T-6233-6</td>
<td>NO KNOCKOUTS IN ENCLOSURE</td>
</tr>
</tbody>
</table>

All knockouts are on bottom of switches. Hubs are top mounted for overhead wiring unless noted above.
**Meter-Rite® Grade Level Double Throw Switches**

**Dimensions of NEMA 3R Enclosures**

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Wire Range</th>
<th>Figure#</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>7103</td>
<td>J</td>
<td>1</td>
<td>12</td>
<td>6-1/2</td>
<td>12-1/8</td>
<td>11-3/8</td>
<td>6-1/4</td>
<td>17-5/8</td>
</tr>
<tr>
<td>7095A</td>
<td>A</td>
<td>1</td>
<td>16-3/4</td>
<td>8-9/16</td>
<td>24-1/4</td>
<td>15-1/2</td>
<td>8-5/16</td>
<td>29</td>
</tr>
<tr>
<td>7215</td>
<td>A</td>
<td>2</td>
<td>19-3/4</td>
<td>8-9/16</td>
<td>26-1/4</td>
<td>18-1/2</td>
<td>8-5/16</td>
<td>31</td>
</tr>
<tr>
<td>7406</td>
<td>C</td>
<td>2</td>
<td>19-3/4</td>
<td>8-9/16</td>
<td>26-1/4</td>
<td>18-1/2</td>
<td>8-5/16</td>
<td>31</td>
</tr>
<tr>
<td>7416</td>
<td>C</td>
<td>1</td>
<td>19-3/4</td>
<td>8-9/16</td>
<td>26-1/4</td>
<td>18-1/2</td>
<td>8-5/16</td>
<td>31</td>
</tr>
<tr>
<td>7805</td>
<td>B</td>
<td>1</td>
<td>25-3/4</td>
<td>8-9/16</td>
<td>26-1/4</td>
<td>18-1/2</td>
<td>8-5/16</td>
<td>31</td>
</tr>
<tr>
<td>7800-6</td>
<td>F</td>
<td>1</td>
<td>25-3/4</td>
<td>8-9/16</td>
<td>26-1/4</td>
<td>18-1/2</td>
<td>8-5/16</td>
<td>31</td>
</tr>
<tr>
<td>7806</td>
<td>D</td>
<td>1</td>
<td>25-3/4</td>
<td>8-9/16</td>
<td>26-1/4</td>
<td>18-1/2</td>
<td>8-5/16</td>
<td>31</td>
</tr>
<tr>
<td>7808-6</td>
<td>H</td>
<td>1</td>
<td>25-3/4</td>
<td>8-9/16</td>
<td>26-1/4</td>
<td>18-1/2</td>
<td>8-5/16</td>
<td>31</td>
</tr>
<tr>
<td>7816</td>
<td>D</td>
<td>2</td>
<td>25-3/4</td>
<td>8-9/16</td>
<td>26-1/4</td>
<td>18-1/2</td>
<td>8-5/16</td>
<td>31</td>
</tr>
</tbody>
</table>

**Wire Range**

**Line/Auxiliary Lugs**

<table>
<thead>
<tr>
<th>A &amp; B</th>
<th>C &amp; D</th>
<th>F</th>
<th>H</th>
<th>J</th>
</tr>
</thead>
<tbody>
<tr>
<td>250 MCM - #6 CU-AL (1-HOLE LUG)</td>
<td>250 MCM - #6 CU-AL (1-HOLE LUG)</td>
<td>250 MCM - #6 CU-AL (1-HOLE LUG)</td>
<td>250 MCM - #6 CU-AL (1-HOLE LUG)</td>
<td>1/0 - #14 CU-AL (1-HOLE LUG)</td>
</tr>
</tbody>
</table>

**Load Lugs**

| 250 MCM - #6 CU-AL (4-HOLE LUG) | 250 MCM - #6 CU-AL (4-HOLE LUG) | 250 MCM - #6 CU-AL (4-HOLE LUG) | 250 MCM - #6 CU-AL (4-HOLE LUG) | 250 MCM - #6 CU-AL (1-HOLE LUG) |

**Neutral Bar**

| 350 MCM - #6 CU-AL (4-HOLE BAR) | 350 MCM - #6 CU-AL (4-HOLE BAR) | 350 MCM - #6 CU-AL (4-HOLE BAR) | 350 MCM - #6 CU-AL (6-HOLE BAR) | 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

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
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**Wire Range**

**Line Lugs**

| 750 MCM - 500 MCM CU-AL (2-HOLE LUG) | 400 MCM - #2 CU-AL (3-HOLE LUG) |

**Auxiliary Lugs**

| 350 MCM - #4 CU-AL (2-HOLE LUG) | 600 MCM - #2 CU-AL (4-HOLE LUG) |

**Neutral Lug**

| 350 MCM - #6 CU-AL (4-HOLE BAR) | 350 MCM - #6 CU-AL (4-HOLE BAR) |

---

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.
- Brodest 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 ELETRICAL SAFETY AND SECURITY
ROMEX SIMPULL NMD90 THREE WIRE CONDUCTOR

Model: CU-NMD90
Size (AWG): 12
Insulation Thickness: 0.004”
Available: SIMpull
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
<table>
<thead>
<tr>
<th>Size (AWG)</th>
<th>Number</th>
<th>No. of Strands</th>
<th>Insulation Thickness</th>
<th>Size (AWG)</th>
<th>No. of Strands</th>
<th>Approx. Jacket Thickness</th>
<th>Approx. Cable Dimensions</th>
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**TWO CONDUCTOR**

**THREE CONDUCTOR**

*Allowable amperages 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 WIGRD (UL) LEAD FREE MM/DD/YYYY/ MADE IN U.S.A.
**Characteristics**

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<th>Characteristics</th>
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<tr>
<td>Lead free</td>
<td>Yes</td>
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<td>Electrical characteristics</td>
<td></td>
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<tr>
<td>Maximum operating voltage</td>
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<tr>
<td>Usage characteristics</td>
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<tr>
<td>Maximum operating temperature</td>
<td>90 °C</td>
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# ENERGEX® NM-B Copper

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<th>Conductor Size</th>
<th># Conductors</th>
<th>PVC Insulation Thickness</th>
<th>Ground Wire Size</th>
<th>Nylon Thickness</th>
<th>Nominal Cable Dimensions</th>
<th>Approximate Net Cable Weight</th>
<th>Ampacity (Amps)</th>
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<td>4 0.10</td>
<td>0.38 9.7</td>
<td>132 196</td>
<td>20</td>
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</tbody>
</table>

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 Red 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

---

[Contact information]

LV Building Wire & Equipment Cables
Phone: 845-469-2141
USA.Sales@nexans.com

Version V3 Generated 11/1/12 - http://www.nexans.us
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

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.

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
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

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<th>Part Number: 900-0120</th>
<th>Model: KN-COB-IC</th>
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<td>UPC: 0-47871-00120-0</td>
<td>Power Source: 120VAC, 60HZ, 9V battery back-up</td>
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<td>Sensor: Electrochemical</td>
<td>Audio Alarm: 85dB at 10ft</td>
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<tr>
<td>Temperature Range: 40ºF (4ºC) to 100ºF (38ºC)</td>
<td>Humidity Range: 5%-95% relative humidity (RH)</td>
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<td>Size: 5.75” diameter x 1.8” depth</td>
<td>Weight: 1lb</td>
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<td>Interconnects: Up to 24 Kidde devices</td>
<td>Warranty: 5 year limited</td>
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Ordering Information

Gift Box UPC: 0-47871-00120-0

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<th>Case/ Skid</th>
<th>Layers/ Skid</th>
<th>Skid Weight</th>
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<td>N/A</td>
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**Not for sale by individual unit
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 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.

<table>
<thead>
<tr>
<th>MATERIAL OR INGREDIENT</th>
<th>PEL (OSHA)</th>
<th>TLV (ACGIH)</th>
<th>%/w.t.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetylene Black</td>
<td>3.5 mg/m³ TWA (as carbon black)</td>
<td>3.5 mg/m³ TWA (as carbon black)</td>
<td>3-7</td>
</tr>
<tr>
<td>Ammonium Chloride</td>
<td>None established</td>
<td>10 mg/m³ TWA (fume)</td>
<td>0-10</td>
</tr>
<tr>
<td>Manganese Dioxide</td>
<td>5 mg/m³ CEILING (as Mn)</td>
<td>0.2 mg/m³ TWA (as Mn)</td>
<td>15-31</td>
</tr>
<tr>
<td>Zinc</td>
<td>15 mg/m³ TWA PNOR* (total dust)</td>
<td>10 mg/m³ TWA PNOC** (inhalable particulate)</td>
<td>7-42</td>
</tr>
<tr>
<td></td>
<td>5 mg/m³ TWA PNOR* (respirable fraction)</td>
<td>3 mg/m³ TWA PNOC** (respirable particulate)</td>
<td></td>
</tr>
<tr>
<td>Zinc Chloride</td>
<td>1 mg/m³ TWA (fume)</td>
<td>1 mg/m³ TWA (fume)</td>
<td>2-10</td>
</tr>
</tbody>
</table>
**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

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boiling Point @ 760 mm Hg (°C)</td>
<td>Not applicable for an Article</td>
</tr>
<tr>
<td>Vapor Pressure (mm Hg @ 25°C)</td>
<td>Not applicable for an Article</td>
</tr>
<tr>
<td>Vapor Density (Air = 1)</td>
<td>Not applicable for an Article</td>
</tr>
<tr>
<td>Density (g/cm³)</td>
<td>2.0 – 3.0</td>
</tr>
<tr>
<td>Percent Volatile by Volume (%)</td>
<td>Not applicable for an Article</td>
</tr>
<tr>
<td>Evaporation Rate (Butyl Acetate = 1)</td>
<td>Not applicable for an Article</td>
</tr>
<tr>
<td>Physical State</td>
<td>Solid</td>
</tr>
<tr>
<td>Solubility in Water (% by weight)</td>
<td>Not applicable for an Article</td>
</tr>
<tr>
<td>pH</td>
<td>Not applicable for an Article</td>
</tr>
<tr>
<td>Appearance and Odor</td>
<td>Solid object / no odor</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Regulatory Body</th>
<th>Special Provisions</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADR</td>
<td>295 - 304, 598</td>
</tr>
<tr>
<td>IMDG</td>
<td>UN 3028 Provisions 295 - 304</td>
</tr>
<tr>
<td>UN</td>
<td>UN 3028 Provisions 295 - 304</td>
</tr>
<tr>
<td>US DOT</td>
<td>49 CFR 172.102 Provision 130</td>
</tr>
<tr>
<td>IATA</td>
<td>A123</td>
</tr>
<tr>
<td>ICAO</td>
<td>UN 3028 Provisions 295 - 304</td>
</tr>
</tbody>
</table>

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”
The SASH series is a multitone strobe/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-120**
- Strobe/Horn Powered by Same Circuit
- Switches 7 & 8 On
- Strobe/Horn - Off

**SASH-24**
- Strobe/Horn Powered by Separate Controls
- Switches 7 & 8 On
- Strobe/Horn - On

**SASH-120**
- Strobe/Horn Powered by Separate Controls
- Switches 7 & 8 On
- Strobe/Horn - On

---

**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 V AC)
- **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
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
Warms 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

<table>
<thead>
<tr>
<th>Part Number</th>
<th>21006377</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>KN-COSM-IB</td>
</tr>
<tr>
<td>Power Source</td>
<td>120VAC, 60Hz 25mA max per alarm 9V battery backup</td>
</tr>
<tr>
<td>Smoke Sensor</td>
<td>Ionization</td>
</tr>
<tr>
<td>CO Sensor</td>
<td>Electrochemical</td>
</tr>
<tr>
<td>Audio Alarm</td>
<td>85dB at 10ft</td>
</tr>
<tr>
<td>Temperature Range</td>
<td>40°F (4.4˚C) to 100°F (37.8˚C)</td>
</tr>
<tr>
<td>Humidity Range</td>
<td>5%-95% relative humidity</td>
</tr>
<tr>
<td>Size</td>
<td>5.75” in diameter x 1.7” depth</td>
</tr>
<tr>
<td>Weight</td>
<td>1lb</td>
</tr>
<tr>
<td>Wiring</td>
<td>Quick connect plug with 8” pigtails</td>
</tr>
<tr>
<td>Interconnects</td>
<td>Up to 24 Kidde devices (of which 18 can be initiating)</td>
</tr>
<tr>
<td>Warranty</td>
<td>5 year limited</td>
</tr>
</tbody>
</table>

Ordering Information

UPC: 0-47871-00114-9

<table>
<thead>
<tr>
<th>Part Number</th>
<th>I 2 of 5</th>
<th>Pack Quantity</th>
<th>Dimensions (w x d x h inches)</th>
<th>Weight</th>
<th>Case/ Skid</th>
<th>Layers/ Skid</th>
<th>Skid Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>900-0114**</td>
<td>N/A</td>
<td>Individual</td>
<td>5.8 x 2 x 6.2</td>
<td>1lb</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>900-0114-02</td>
<td>200</td>
<td>Master Pack (6 units)</td>
<td>7 x 13 x 7</td>
<td>7.65lbs</td>
<td>100</td>
<td>5</td>
<td>765lbs</td>
</tr>
</tbody>
</table>

**Not for sale by individual unit**

Distributed by:

Kidde
1016 Corporate Park Drive
Mebane NC 27302
1-800-880-6788 www.Kidde.com
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

$3.97 /EA-Each

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

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Bag Capacity/Dry Volume (cu. ft.)</th>
<th>1 ft³</th>
<th>Fertilizer Enriched</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturer Warranty</td>
<td>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.</td>
<td>Moisture Control</td>
<td>No</td>
</tr>
<tr>
<td>Mulch and Soil Council Certified</td>
<td>Yes</td>
<td>Organic</td>
<td>No</td>
</tr>
<tr>
<td>Package Quantity</td>
<td>1</td>
<td>Product Type</td>
<td>Soil</td>
</tr>
<tr>
<td>Soil Type</td>
<td>Garden</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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

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

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Assembled Depth (in.)</th>
<th>4 in</th>
<th>Assembled Height (in.)</th>
<th>18 in</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assembled Width (in.)</td>
<td>15 in</td>
<td>Bag Capacity/Dry Volume (cu. ft.)</td>
<td>.5 ft³</td>
</tr>
<tr>
<td>Bag Weight (lb.)</td>
<td>48</td>
<td>Color</td>
<td>Grey</td>
</tr>
<tr>
<td>Color Family</td>
<td>Grays</td>
<td>Coverage Area (sq. ft.)</td>
<td>1 ft²</td>
</tr>
<tr>
<td>Manufacturer Warranty</td>
<td>No</td>
<td>Product Type</td>
<td>Soil/Mulch/SoilAmendment Accessory</td>
</tr>
</tbody>
</table>
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

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

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Assembled Depth (in.)</th>
<th>Assembled Height (in.)</th>
<th>Bag Capacity/Dry Volume (cu. ft.)</th>
<th>Color Family</th>
<th>Color</th>
<th>Manufacturer Warranty</th>
<th>Coverage Area (sq. ft.)</th>
<th>Product Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>48 in</td>
<td>36 in</td>
<td>.5 ft³</td>
<td>Browns / Tans</td>
<td>multicolored</td>
<td>30 days</td>
<td>6 ft²</td>
<td>Landscape Rock</td>
</tr>
</tbody>
</table>

Return To Top
SCOTT’S EARTHGROW BROWN MULCH

Location: Planter Boxes
Available: Home Depot
Scotts Earthgro 2 cu. ft. Brown Mulch

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

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Assembled Depth (in.)</th>
<th>Assembled Height (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 in</td>
<td>0 in</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Assembled Width (in.)</th>
<th>Bag Capacity/Dry Volume (cu. ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 in</td>
<td>2 ft³</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Color</th>
<th>Color Family</th>
<th>Browns / Tans</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown</td>
<td></td>
<td>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.</td>
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</table>

<table>
<thead>
<tr>
<th>Coverage Area at 3 In. (sq. ft.)</th>
<th>Manufacturer Warranty</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td></td>
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<table>
<thead>
<tr>
<th>Material</th>
<th>Mulch Type</th>
<th>Shredded</th>
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<tbody>
<tr>
<td>Wood</td>
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</table>

<table>
<thead>
<tr>
<th>Mulch and Soil Council Certified</th>
<th>Package Quantity</th>
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</table>

<table>
<thead>
<tr>
<th>Percentage of Product Made From Wood (%)</th>
<th>Product Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>Mulch</td>
</tr>
</tbody>
</table>
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
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
Ingersoll Rand 3 HP Stationary Compressor

Model # SS3L3  Internet # 202889695

★★★★★ (1)  Write a Review

$748.33 /EA-Each

This item does not qualify for free shipping.

This item cannot be shipped to the following state(s): AK, GU, HI, PR, VI
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

<table>
<thead>
<tr>
<th>SoloPower SP1</th>
<th>75</th>
<th>80</th>
<th>85</th>
<th>90</th>
<th>95</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated Power (Pmax)²</td>
<td>W</td>
<td>75</td>
<td>80</td>
<td>85</td>
<td>90</td>
</tr>
<tr>
<td>Voltage at Pmax (Vmp)</td>
<td>V</td>
<td>21.8</td>
<td>22.7</td>
<td>23.3</td>
<td>24.7</td>
</tr>
<tr>
<td>Current at Pmax (Imp)</td>
<td>A</td>
<td>3.4</td>
<td>3.5</td>
<td>3.6</td>
<td>3.6</td>
</tr>
<tr>
<td>Short-circuit current (Isc)</td>
<td>A</td>
<td>4.3</td>
<td>4.3</td>
<td>4.4</td>
<td>4.3</td>
</tr>
<tr>
<td>Open-circuit Voltage (Voc)</td>
<td>V</td>
<td>30.6</td>
<td>31.8</td>
<td>32.4</td>
<td>33.6</td>
</tr>
<tr>
<td>Efficiency⁴</td>
<td>%</td>
<td>9.9</td>
<td>10.5</td>
<td>11.2</td>
<td>11.9</td>
</tr>
</tbody>
</table>

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. Stabilised Power.

3. Aperture Efficiency.

SoloPower SP1
- Temp. Co-efficient of Isc %/°C: -0.01
- Temp. Co-efficient of Voc %/°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/ft² / 2.4 kg/m²

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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SoldPower, the SoloPower™, and Solo Panel™ are trademarks of Solana, Inc. in the US and/or other countries.

Product Specifications Sheet SoloPanel® Model SP1
Updated March 7, 2013
5081 Optical Court, San Jose, CA, USA 95138 +1 408-280-1582 www.solopower.com
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

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.
<table>
<thead>
<tr>
<th>SPECIFICATIONS</th>
<th>PVI 3000 PVI 3000S</th>
<th>PVI 4000 PVI 4000S</th>
<th>PVI 5000 PVI 5000S</th>
<th>PVI 5300</th>
<th>PVI 6500</th>
<th>PVI 7500</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DC Input</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absolute Maximum Input Voltage</td>
<td>600 VDC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MPPT Input Voltage Range</td>
<td>200-550 VDC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum Operating Input Current</td>
<td>16 A</td>
<td>21 A</td>
<td>25 A</td>
<td>25 A</td>
<td>35 A</td>
<td>35 A</td>
</tr>
<tr>
<td><strong>AC Output</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nominal Output Voltage</td>
<td>208 or 240 VAC</td>
<td>208, 240 or 277 VAC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AC Voltage Range (Standard)</td>
<td>-12%/+10%</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Continuous Output Power</td>
<td>208 VAC</td>
<td>2700 W</td>
<td>3400 W</td>
<td>4300 W</td>
<td>4600 W</td>
<td>6500 W</td>
</tr>
<tr>
<td>Continuous Output Current</td>
<td>208 VAC</td>
<td>2800 W</td>
<td>3500 W</td>
<td>4400 W</td>
<td>5000 W</td>
<td>6500 W</td>
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<tr>
<td>240 VAC</td>
<td>2900 W</td>
<td>3900 W</td>
<td>4900 W</td>
<td>5300 W</td>
<td>6500 W</td>
<td>7500 W</td>
</tr>
<tr>
<td>277 VAC</td>
<td>3000 W</td>
<td>4000 W</td>
<td>5000 W</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Continuous Output Power</td>
<td>208 VAC</td>
<td>13 A</td>
<td>16.3 A</td>
<td>20.7 A</td>
<td>22.1 A</td>
<td>31.3 A</td>
</tr>
<tr>
<td>Continuous Output Current</td>
<td>208 VAC</td>
<td>13.5 A</td>
<td>16.8 A</td>
<td>21.1 A</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>240 VAC</td>
<td>13 A</td>
<td>16.3 A</td>
<td>20.7 A</td>
<td>22.1 A</td>
<td>27.1 A</td>
<td>31.3 A</td>
</tr>
<tr>
<td>240 VAC</td>
<td>13.5 A</td>
<td>16.8 A</td>
<td>21.1 A</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>277 VAC</td>
<td>-</td>
<td>23.5 A</td>
<td>27.1 A</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Maximum Backfeed Current</td>
<td>0 A</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Nominal Output Frequency</td>
<td>60 Hz</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Output Frequency Range</td>
<td>59.3-60.5 Hz</td>
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<td></td>
<td></td>
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<tr>
<td>Power Factor</td>
<td>Unity, 0.99</td>
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<tr>
<td>Total Harmonic Distortion (THD)</td>
<td>&lt;3%</td>
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<tr>
<td><strong>Efficiency</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peak Efficiency</td>
<td>208 VAC</td>
<td>96.4%</td>
<td>96.5%</td>
<td>96.4%</td>
<td>96.2%</td>
<td>96.0%</td>
</tr>
<tr>
<td>240 VAC</td>
<td>96.7%</td>
<td>96.7%</td>
<td>96.2%</td>
<td>96.5%</td>
<td>96.5%</td>
<td>96.5%</td>
</tr>
<tr>
<td>277 VAC</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>CEC Efficiency</td>
<td>208 VAC</td>
<td>95.5%</td>
<td>95.5%</td>
<td>95.0%</td>
<td>95.5%</td>
<td>95.5%</td>
</tr>
<tr>
<td>240 VAC</td>
<td>96.0%</td>
<td>96.0%</td>
<td>96.0%</td>
<td>96.0%</td>
<td>96.0%</td>
<td>96.0%</td>
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<tr>
<td>277 VAC</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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</tr>
<tr>
<td>Tare Loss</td>
<td>0.5 W</td>
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<tr>
<td><strong>Integrated String Combiner</strong></td>
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<tr>
<td>Fused String Inputs</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>5</td>
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<tr>
<td><strong>Temperature</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Ambient Temperature Range (Full power)</td>
<td>-13°F to +131°F (-25°C to +55°C)</td>
<td>-13°F to +122°F (-25°C to +50°C)</td>
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<td></td>
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<tr>
<td>Storage Temperature Range</td>
<td>-13°F to +131°F (-25°C to +55°C)</td>
<td>-13°F to +149°F (-25°C to +65°C)</td>
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<td></td>
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<tr>
<td>Relative Humidity (non-condensing)</td>
<td>5-95%</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Monitoring Options</strong></td>
<td></td>
<td></td>
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<tr>
<td>Web-based Monitoring (Inverter Direct)</td>
<td>SolenView</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Revenue Grade Monitoring</td>
<td>External</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Third Party Compatibility</td>
<td>RS485</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Testing &amp; Certifications</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Safety Listings &amp; Certifications</td>
<td>UL 1741/IEEE 1547, IEEE 1547.1, CSA C22.2#107.1, FCC part 15 B</td>
<td></td>
<td></td>
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<tr>
<td>Testing Agency</td>
<td>ETL</td>
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<tr>
<td><strong>Warranty</strong></td>
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<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Standard</td>
<td>10 year</td>
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<tr>
<td><strong>Enclosure</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AC/DC Disconnects</td>
<td>Standard, fully-integrated (internal)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimensions (H x W x D)</td>
<td>28.8 in x 17.9 in x 6.9 in (732 mm x 454 mm x 175 mm)</td>
<td>28.8 in x 17.9 in x 7 in (732 mm x 454 mm x 187 mm)</td>
<td>28.8 in x 17.3 in x 8.2 in (732 mm x 438 mm x 208 mm)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>48.8 lbs (22.2 kg)</td>
<td>59.8 lbs (27.2 kg)</td>
<td>88.9 lbs (40.4 kg)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enclosure Rating</td>
<td>NEMA 3R</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enclosure Finish</td>
<td>Painted aluminum</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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
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.

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.
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.

<table>
<thead>
<tr>
<th>Number of Input Circuits</th>
<th>4 to 12</th>
<th>14 to 18</th>
<th>20 to 24</th>
<th>26 to 36</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Conductor Size Range (AWG)</td>
<td>#16 to 4</td>
<td>#16 to 4</td>
<td>#16 to 4</td>
<td>#16 to 4</td>
</tr>
<tr>
<td>Max Fuse Size (Amps)</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Max Rated Current (ADC Continuous)</td>
<td>310</td>
<td>400</td>
<td>400</td>
<td>400</td>
</tr>
<tr>
<td>Number of Output Conductors</td>
<td>1</td>
<td>1 or 2</td>
<td>1 or 2</td>
<td>1 or 2</td>
</tr>
<tr>
<td>Output Conductor Size Range (AWG)</td>
<td>#6 to 350 kcmil *</td>
<td>#6 to 350 kcmil *</td>
<td>#6 to 350 kcmil *</td>
<td>#6 to 350 kcmil *</td>
</tr>
<tr>
<td>Steel Enclosure Dimensions (inches)</td>
<td>16x12x6</td>
<td>20x20x6</td>
<td>20x20x6</td>
<td>24x24x6</td>
</tr>
<tr>
<td>Approx. Weight (Powder Coated or Stainless Steel)</td>
<td>30 lbs</td>
<td>36 lbs</td>
<td>45 lbs</td>
<td>60 lbs</td>
</tr>
<tr>
<td>Fiberglass Enclosure Dimensions (inches)</td>
<td>18x16x8</td>
<td>18x16x8</td>
<td>24x20x8</td>
<td>24x24x8</td>
</tr>
<tr>
<td>Approx. Weight (Fiberglass)</td>
<td>18 lbs</td>
<td>22 lbs</td>
<td>29 lbs</td>
<td>45 lbs</td>
</tr>
</tbody>
</table>

* 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:
**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 70006551080

A modified acrylic adhesive on the back of a black polypropylene reclosable fastener. 250 stems per square inch. 0.24 inch engaged thickness. Closing 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 (MRIO)

(No reviews) Be the first to Write a Review

Like Be the first of your friends to like this.
For indoor/outdoor use. Medium temperature performance, temperature resistance 180 F. For use with many plastics (polyethylene, polycarbonate, ABS), powder coated paints and medium to low surface energy materials.

### Specifications

<table>
<thead>
<tr>
<th><strong>Adhesive Type</strong></th>
<th>Modified Acrylic Adhesive</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Brand</strong></td>
<td>Dual Lock</td>
</tr>
<tr>
<td><strong>Closure Life</strong></td>
<td>1000</td>
</tr>
<tr>
<td><strong>Color</strong></td>
<td>Black</td>
</tr>
<tr>
<td><strong>Engaged Thickness</strong></td>
<td>0.24 Inch</td>
</tr>
<tr>
<td><strong>Flame Retardant</strong></td>
<td>No</td>
</tr>
<tr>
<td><strong>Indoor/Outdoor</strong></td>
<td>Both</td>
</tr>
<tr>
<td><strong>Industry - Use</strong></td>
<td>Construction, Electronics, Furniture, General Industrial, Medical, Military &amp; Government, MRO, Packaging, Retail, Specialty Vehicle, Transportation</td>
</tr>
<tr>
<td><strong>Length</strong></td>
<td>45 Linear Yard</td>
</tr>
<tr>
<td><strong>Length (metric)</strong></td>
<td>41.14 Linear Metre</td>
</tr>
<tr>
<td><strong>Liner Thickness</strong></td>
<td>5 Milli-inch (mil)</td>
</tr>
<tr>
<td><strong>Liner Type</strong></td>
<td>Red Polyethylene</td>
</tr>
<tr>
<td><strong>Low Profile</strong></td>
<td>No</td>
</tr>
<tr>
<td><strong>Maximum Operating Temperature (Fahrenheit)</strong></td>
<td>180 Degree Fahrenheit</td>
</tr>
<tr>
<td><strong>Product Form</strong></td>
<td>Roll</td>
</tr>
<tr>
<td><strong>Stem Density</strong></td>
<td>250</td>
</tr>
<tr>
<td><strong>Units per Case</strong></td>
<td>4</td>
</tr>
<tr>
<td><strong>Width</strong></td>
<td>0.50 Inch</td>
</tr>
<tr>
<td><strong>Width (metric)</strong></td>
<td>12.70 Millimetre</td>
</tr>
</tbody>
</table>
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

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.

<table>
<thead>
<tr>
<th>Product Number</th>
<th>3M™ Dual Lock™ Reclosable Fastener</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type: Approx. Stems/in² (Stems/cm²)</td>
<td>SJ3872</td>
</tr>
<tr>
<td>----------------</td>
<td>-------</td>
</tr>
<tr>
<td>170 (26)</td>
<td>250 (39)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Material of Construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stem/Heads Backing Adhesive</td>
</tr>
<tr>
<td>Black Polypropylene Black Polypropylene Black 3M™ Modified Acrylic Foam Adhesive</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Thickness without liner</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unmated ± 10% Engaged Liner</td>
</tr>
<tr>
<td>0.145 inch (3.7 mm) 0.240 inch (6.1 mm) 5.0 mil (0.13 mm) thick red silicone treated polyolefin</td>
</tr>
</tbody>
</table>

| Weight grams/in² without liner | 0.85 | 0.89 | 0.98 |

| Closure Cycle Life | 1,000 |

| Shelf Life | 24 months from date of manufacture when stored at 72°F (22°C) with 50% RH. |
### 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.

<table>
<thead>
<tr>
<th>Fastener Combination:</th>
<th>3M™ Dual Lock™ Reclosable</th>
<th>SJ3872 / SJ3870 Type 170 / 250</th>
<th>SJ3872 / SJ3871 Type 170 / 400</th>
<th>SJ3870 / SJ3870 Type 250 / 250</th>
<th>SJ3870 / SJ3871 Type 250 / 400</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INITIAL TENSILE (Rigid to Rigid Substrates)</strong></td>
<td>Pounds/sq inch (Newton/cm²)</td>
<td>13 (9)</td>
<td>21 (14.5)</td>
<td>22 (15)</td>
<td>31 (22)</td>
</tr>
<tr>
<td>Dynamic Tensile Engagement Force</td>
<td></td>
<td>10,000 minutes</td>
<td>10,000 minutes</td>
<td>10,000 minutes</td>
<td>10,000 minutes</td>
</tr>
<tr>
<td>Dynamic Tensile Disengagement Force</td>
<td></td>
<td>10,000 minutes</td>
<td>10,000 minutes</td>
<td>10,000 minutes</td>
<td>10,000 minutes</td>
</tr>
<tr>
<td>Static Tensile Holding Power</td>
<td></td>
<td>72°F (22°C)</td>
<td>100°F (38°C)/100% RH</td>
<td>180°F (82°C)</td>
<td>Holds minimum 1000 grams/in² for indicated time and temperature</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10,000 minutes</td>
<td>10,000 minutes</td>
<td>10,000 minutes</td>
<td>10,000 minutes</td>
</tr>
<tr>
<td><strong>INITIAL SHEAR (Rigid to Rigid Substrates)</strong></td>
<td>Pounds/sq inch (Newton/cm²)</td>
<td>14 (9.8)</td>
<td>21 (14.5)</td>
<td>22 (15)</td>
<td>59 (41.3)</td>
</tr>
<tr>
<td>Dynamic Shear (1&quot; x 1&quot; overlap)</td>
<td></td>
<td>10,000 minutes</td>
<td>10,000 minutes</td>
<td>10,000 minutes</td>
<td>10,000 minutes</td>
</tr>
<tr>
<td>Static Shear Holding Power</td>
<td></td>
<td>72°F (22°C)</td>
<td>100°F (38°C)/100% RH</td>
<td>180°F (82°C)</td>
<td>Holds minimum 750 grams/in² for indicated time and temperature</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10,000 minutes</td>
<td>10,000 minutes</td>
<td>10,000 minutes</td>
<td>10,000 minutes</td>
</tr>
<tr>
<td><strong>PEEL AND CLEAVAGE</strong></td>
<td>Pounds/inch width</td>
<td>12</td>
<td>24</td>
<td>24</td>
<td>35</td>
</tr>
<tr>
<td>Cleavage Strength (Rigid to Rigid) - 2.25&quot; long</td>
<td></td>
<td>10,000 minutes</td>
<td>10,000 minutes</td>
<td>10,000 minutes</td>
<td>10,000 minutes</td>
</tr>
<tr>
<td>Peel Strength (&quot;I&quot; Peel, Flexible to Flexible)</td>
<td></td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.5</td>
</tr>
<tr>
<td>Peel Strength (90° Peel, Flexible to Rigid)</td>
<td></td>
<td>3.0</td>
<td>3.0</td>
<td>3.0</td>
<td>3.5</td>
</tr>
</tbody>
</table>

### Typical Adhesive Performance

90 degree peel adhesion runs at 12 inches per minute

4.5 lb rolled twice

<table>
<thead>
<tr>
<th>Pounds per inch width</th>
<th>Stainless Steel</th>
<th>Polycarbonate</th>
<th>ABS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial (15 minutes)</td>
<td>20</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>72 hour dwell at 72°F (22°C)</td>
<td>25</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>72 hour dwell at 158°F (70°C)</td>
<td>30</td>
<td>20</td>
<td>25</td>
</tr>
</tbody>
</table>

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
Unless an additional warranty is specifically stated on the applicable 3M product packaging or product literature, 3M warrants that each 3M product meets the applicable 3M product specification at the time 3M ships the product. 3M MAKES NO OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY IMPLIED WARRANTY OR CONDITION ARISING OUT OF A COURSE OF DEALING, CUSTOM OR USAGE OF TRADE. If the 3M product does not conform to this warranty, then the sole and exclusive remedy is, at 3M’s option, replacement of the 3M product or refund of the purchase price.

#### Limitation of Liability
Except where prohibited by law, 3M will not be liable for any loss or damage arising from the 3M product, whether direct, indirect, special, incidental or consequential, regardless of the legal theory asserted, including warranty, contract, negligence or strict liability.

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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.
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.

Physical Properties

<table>
<thead>
<tr>
<th>Typical Values</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color</td>
<td>Black</td>
</tr>
<tr>
<td>Brittleness Temperature</td>
<td>-50º F</td>
</tr>
<tr>
<td>Elongation (tape)</td>
<td>&gt;1000%</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>0.97</td>
</tr>
</tbody>
</table>

Application Properties

<table>
<thead>
<tr>
<th>Service Temperature</th>
<th>ASTM D3359</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application Temperature</td>
<td>ASTM C603</td>
</tr>
<tr>
<td>Minimum Shelf Life</td>
<td>ASTM D1337</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Features</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proven performance in the field</td>
<td>20+ years in the field with exemplary performance</td>
</tr>
<tr>
<td>Integrated single roofing and PV module “peel and stick” bonding solution</td>
<td>Supply chain simplicity using material for complete integration of roof material to sub structure and PV module to roofing material</td>
</tr>
<tr>
<td>“peel and stick” installation concept</td>
<td>Provides for lower labor costs, faster installation times</td>
</tr>
<tr>
<td>ADCO experience with established installation procedures</td>
<td>Eliminates the second guessing and provides step by step inspection, installation and maintenance guidelines</td>
</tr>
<tr>
<td>“Best in Class” environmentally resistant adhesive</td>
<td>Impervious to water, humidity, sunshine, snow, hail, UV</td>
</tr>
<tr>
<td>Environmentally safe installation</td>
<td>No primers needed, no VOC’s, simple safe installation method not using torches or solvents</td>
</tr>
<tr>
<td>Simple and easy release liner removal</td>
<td>Installations are a simple and quick under rooftop conditions</td>
</tr>
<tr>
<td>Excellent tack and adhesion under outside conditions</td>
<td>Quick stick with proven long term adhesion performance</td>
</tr>
</tbody>
</table>

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 40º F (4º 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 75º F (24º 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.

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 BUYER'S 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
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

**TECHNICAL SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Cover</th>
<th>Outside Dimension</th>
<th>In.</th>
<th>Millimeter</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Width</td>
<td>3.44</td>
<td>87.37</td>
</tr>
<tr>
<td>B</td>
<td>Height</td>
<td>1.78</td>
<td>45.21</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tray</th>
<th>Inside Dimension</th>
<th>In.</th>
<th>Millimeter</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Width</td>
<td>2.90</td>
<td>73.66</td>
</tr>
<tr>
<td>B</td>
<td>Width</td>
<td>2.50</td>
<td>63.50</td>
</tr>
<tr>
<td>C</td>
<td>Height</td>
<td>1.78</td>
<td>45.21</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Wing</th>
<th>Inside Dimension</th>
<th>In.</th>
<th>Millimeter</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Width</td>
<td>4.03</td>
<td>102.36</td>
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<tr>
<td>B</td>
<td>Width</td>
<td>2.80</td>
<td>71.12</td>
</tr>
<tr>
<td>C</td>
<td>Width</td>
<td>4.15</td>
<td>105.41</td>
</tr>
<tr>
<td>D</td>
<td>Width</td>
<td>11.11</td>
<td>282.19</td>
</tr>
<tr>
<td>E</td>
<td>Height</td>
<td>2.33</td>
<td>59.18</td>
</tr>
</tbody>
</table>
TECHNICAL SPECIFICATIONS

WM18-PVC

PHYSICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Test Method</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile strength (psi)</td>
<td>d-638</td>
<td>6200.00</td>
</tr>
<tr>
<td>Flexural strength (psi)</td>
<td>d-790</td>
<td>10,500.00</td>
</tr>
<tr>
<td>Flexural modulus (psi)</td>
<td>d-790</td>
<td>380,000.00</td>
</tr>
<tr>
<td>Noched izod impact 1/8”</td>
<td>d-256</td>
<td>8.00</td>
</tr>
<tr>
<td>Specific gravity</td>
<td>d-792</td>
<td>1.43</td>
</tr>
<tr>
<td>Heat deflection @ 264 psi</td>
<td>d-648</td>
<td>167.00</td>
</tr>
<tr>
<td>Recommended melt temp.</td>
<td></td>
<td>360°</td>
</tr>
</tbody>
</table>

COMPONENTS

<table>
<thead>
<tr>
<th>Component</th>
<th>wt % or VOL%</th>
<th>ACGIH TL V</th>
<th>OSHA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acrylic polymers established</td>
<td>&lt;15%</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>Calcium carbonate</td>
<td>&lt;10%</td>
<td>10mg/m³</td>
<td>15mg/m³</td>
</tr>
<tr>
<td>Titanium dioxide</td>
<td>&lt;10%</td>
<td>10mg/m³</td>
<td>10mg/m³</td>
</tr>
<tr>
<td>Organo tin complex</td>
<td>&lt;5%</td>
<td>0.1mg/m³</td>
<td>0.1mg/m³</td>
</tr>
<tr>
<td>Vinyl chloride</td>
<td>&lt;0.00%</td>
<td>5ppm</td>
<td>1ppm</td>
</tr>
</tbody>
</table>