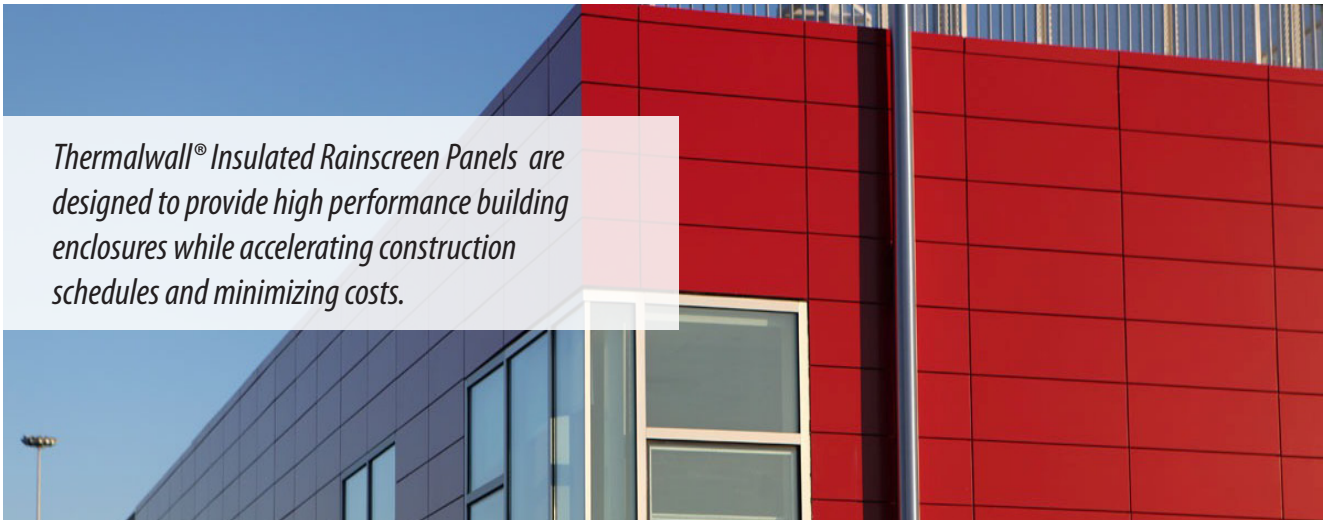
Thermalwall® Insulated Rainscreen Panels by EAST COAST



Thermalwall®: Insulated Prefab Rainscreen Panel System

Thermalwall® Insulated Rainscreen Panels offer optimized design in energy efficiency and durability, providing a complete thermal, air, water, and fire solution in an innovative prefabricated system. Manufactured in a state-of-the-art facility providing excellence in craftsmanship and materials. Thermalwall® is designed to accelerate construction schedules while minimizing costs.

FEATURES AND BENEFITS

- Factory quality is systematically and strictly monitored, under favorable interior conditions, by experienced tradesman.
- Energy efficient 25psi closed cell polyisocyanurate foam core bonded to 12mil glass fiber reinforced aluminum facers.
- Integrated furred rainscreen assembly for optimized water/vapor control
- CFC-, HCFC- and HFC- free blowing agent that has zero Ozone Depletion Potential (ODP) and negligible Global Warming Potential (GWP)
- Reduced labor costs and accelerated project completion
- “Best in Class” Principals of Building Science
- LEED Credit Contribution
- Optimized Enclosure for Net Zero Ready Homes(NZERH)
- Improved Indoor Air Quality (IAQ)
- Prescriptive Envelope Compliance - Energy Star V3.1
- Exceeds 2015 IECC Envelope Requirements
- Multiple Exterior Cladding Options

ZERO ENERGY READY HOME U.S. DEPARTMENT OF ENERGY

U.S. GREEN BUILDING COUNCIL LEED SILVER USGBC

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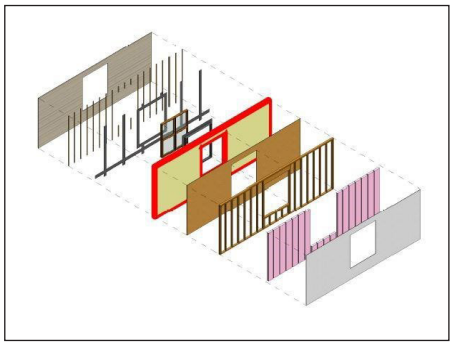
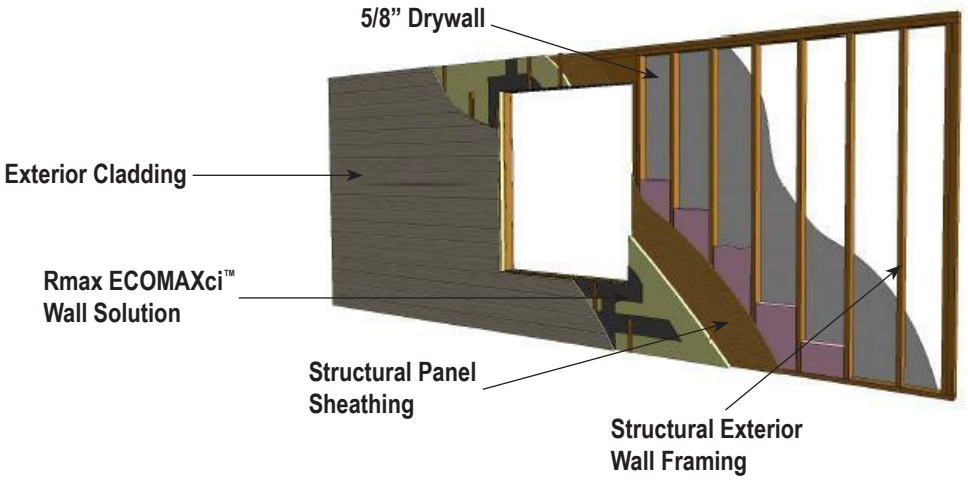
Delivering Superior Performance

Thermalwall® Rainscreen Panels utilize Rmax ECOMAXci™ Wall Solution, which provides continuous insulation for optimal energy-efficiency and maximized performance.



Thermalwall® Rainscreen Panels:

- Available up to R-31 (4.5" thick ECOMAXci™)
- Maunfactured in a controlled environment ensuring quality and accuracy
- Installed on-site by trained and certified industry professionals
- Fabricated in lengths up to 40' to increase productivity and minimize the number of joints in exterior walls
- Combines the process of wall framing, rainscreen and air/vapor barrier assemblies to reduce on-site construction time



COMPLIANCES AND TESTING

Continuous Insulation Code References

- International Building Code (IBC)
- International Energy Conservation Code (IECC)
- International Green Construction Code (IGCC)
- ASHRAE 90.1
- ASHRAE 189

Air Barrier

- ASTM E2357
- CAN/ULC-S742 (A1)

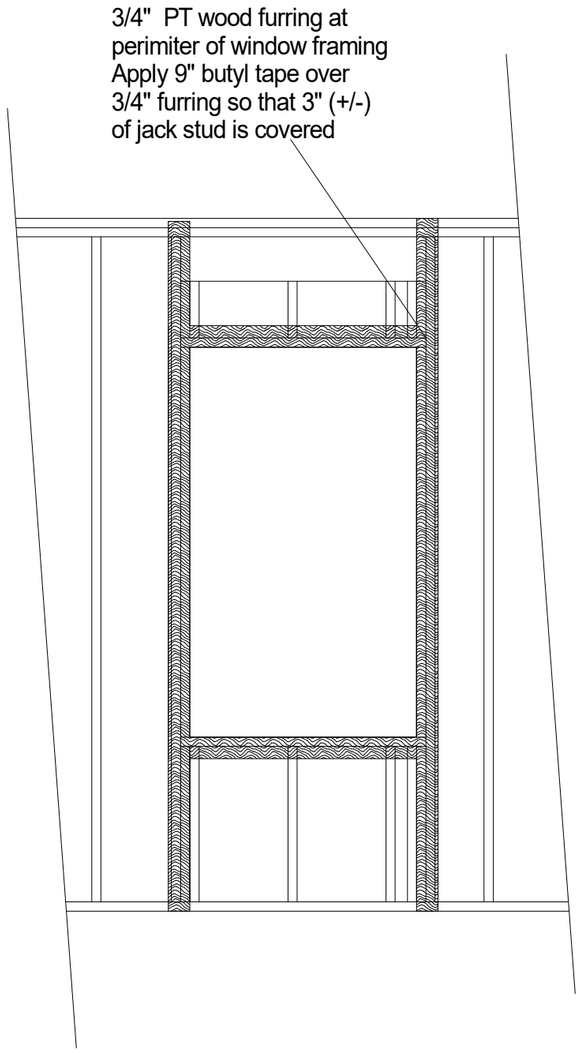
Fire Performance

- ASTM E84 Class A
- NFPA 285
- 1, 2, 3 or 4 hour Fire Rated Assemblies as shown in the UL Fire Resistance Directory.
  - Design No.: U026, U326, U330, U354, U424, U460, U902, U904, U905, U906, U907, V454, V499

Water-Resistive Barrier

- AATCC Test Method 127
- ASTM E331

For inquiries, please contact Patrick Caldwell at 401-519-1409.



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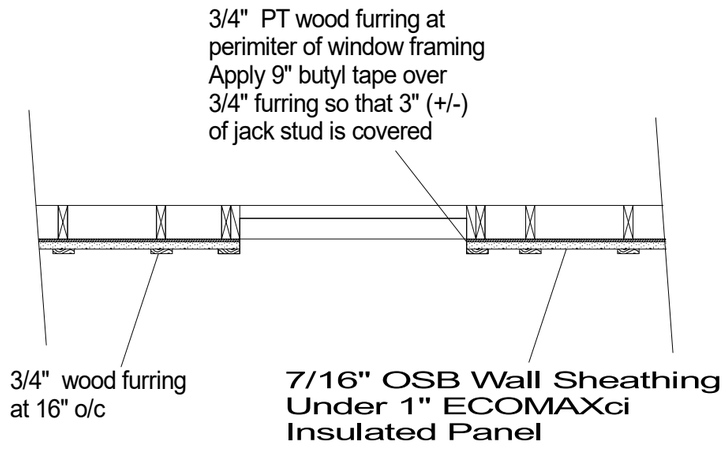

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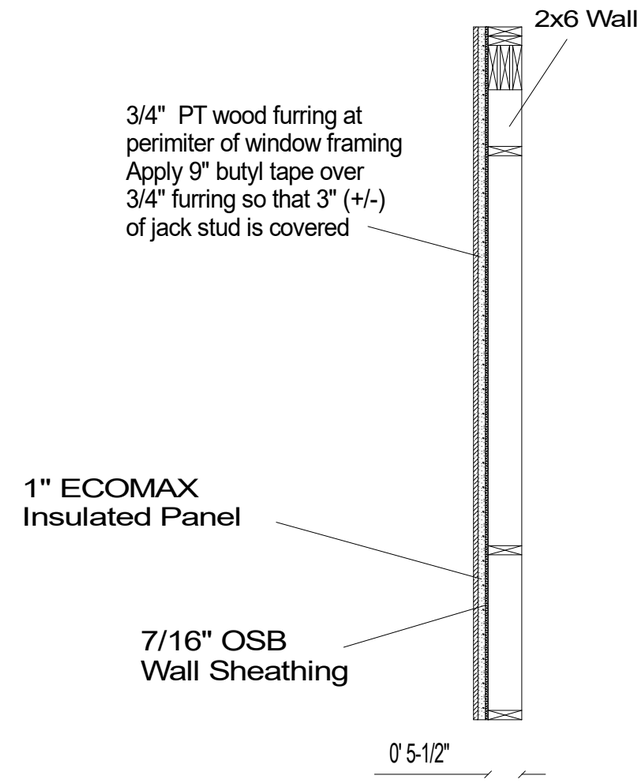
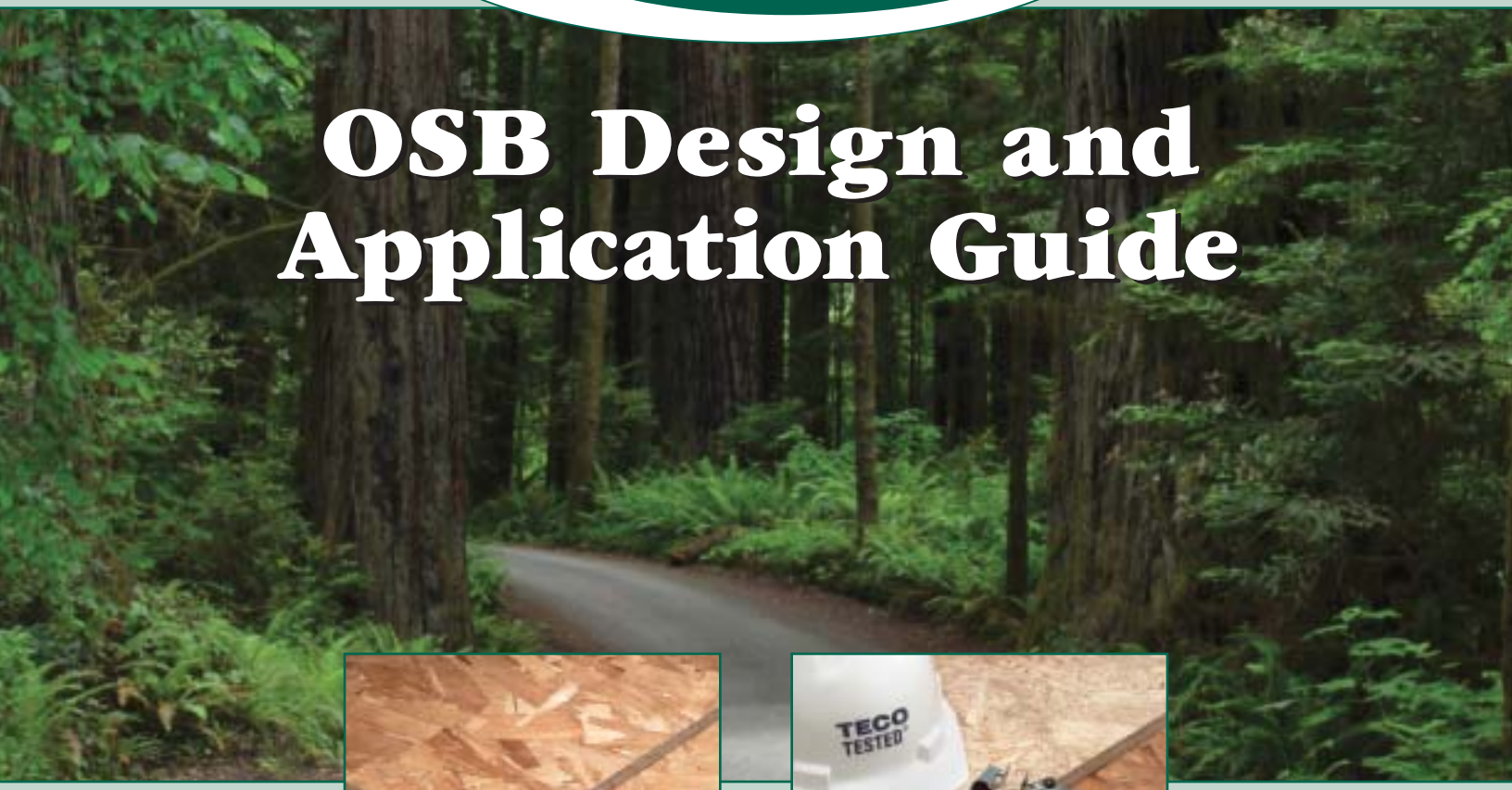


Section

Commons at Providence / Wall Section

TECO®

OSB Design and Application Guide



OSB

Design and Application Guide

INTRODUCTION

Oriented strand board (OSB) is commonly used as the primary structural sheathing component in residential construction and low rise commercial applications. OSB panel products give engineers, designers, specifiers and builders a broad array of choices for use as subfloors, combination floors, wall and roof sheathing. Besides the very important function of supporting and transferring loads to the building foundation, OSB panels provide an excellent base for many types of finished flooring and provide a flat, solid base upon which the exterior wall cladding and roofing can be applied.

Performance criteria for specific construction applications for panels used in the United States, including OSB panels, are set out in the U.S. Department of Commerce/National Institute of Standards and Technology Voluntary Product Standard PS 2, *Performance Standard for Wood-Based Structural-Use Panels*. Panels conforming to this standard are identified with a gradestamp that includes the grade, recommended span rating(s) and bond classification for the panel, as well as the trademark of the third-party certification and testing agency with whom the panel was qualified. Once qualified, it is the manufacturer's responsibility to maintain a quality control system that will assure that the gradestamp is applied only to those panels that meet the requirements of PS 2.

This TECO Design and Application Guide is divided into four sections. Section 1 identifies some of the basics in selecting, handling, and storing OSB. Section 2 provides specific details regarding the application of OSB in single or multilayer floor systems, while Section 3 provides similar information for OSB used as wall and roof sheathing. Section 4 provides information on various performance issues concerning OSB.

The information provided in this guide is based on standard industry practice. Users of structural-use panels should always consult the local building code and information provided by the panel manufacturer for more specific requirements and recommendations.

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Panel Selection, Handling and Storage

PANEL SELECTION

PANEL GRADES

OSB panels are available in three grades, identified by a designation of the intended end-use. Sheathing (SHEATHING SPAN®) is intended for use as covering material for roofs, subfloors, and walls. Structural I sheathing (Structural I SHEATHING SPAN) meets additional requirements for cross-panel strength and stiffness, as well as requirements for racking shear; it serves in panelized roof systems, diaphragms, and shearwalls. Single-floor (FLOOR SPAN®) is used as a combination subfloor and underlayment and may be used under several different types of finish flooring as well as subflooring in a two-layer floor system with underlayment. SPCL-PNL® meets HUD requirements for floors designed in manufactured home construction. Table 1 contains application recommendations for each of these panel grades.

BOND CLASSIFICATION

Bond classification is related to the moisture resistance of the glue bond under intended end-use conditions and does not relate to the physical (e.g. erosion, ultraviolet, etc.) or biological (i.e. mold, fungal decay, insect, etc.) resistance of the panel*. OSB panels in conformance with PS 2 must meet the bond classification requirements for Exposure 1.

Note: An Exterior bond classification is not available with OSB products.

Exposure 1 is defined in PS 2 as a bond classification for panels that are 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 due to construction delays or other conditions of similar severity*.

* *U.S. Department of Commerce, National Institute of Standards and Technology, Voluntary Product Standard PS 2 — Performance Standard for Wood-Based Structural-Use Panels*

Table 1. Guide to Performance Rated Panels

Panel Gradestamps - Information and Application Recommendations

SHEATHING SPAN®

Appropriate for a broad range of construction and industrial applications, but specifically designed for wall and roof sheathing and subfloor. Available in thicknesses of 1/4, 5/16, 11/32, 3/8, 25/64, 7/16, 29/64, 15/32, 1/2, 19/32, 5/8, 11/16, 23/32, 3/4, 7/8, 1, and 1-1/8 inch.

FLOOR SPAN®

Designed for use as combination subfloor/ underlayment. Provides high concentrated and impact load resistance and smooth surface for application under several types of finish flooring. Available in square edge or T&G, in thicknesses of 19/32, 5/8, 23/32, 3/4, 7/8, 1, 1-1/8, and 1-1/4 inch.

SPCL-PNL®

Designed for use in manufactured home construction. This product meets the HUD-3280 requirements for floors. Available in square edge or T&G in thicknesses of 19/32, 5/8, 23/32 and 3/4 inch.

VIP+® PROGRAM

The VIP+® (Voluntary Inspection Program) on a gradestamp identifies panels from mills that elect to publish higher design capacities under the supervision of TECO. Methods used to assure that panels meet these higher design capacities are based on a two stage process — verification testing and voluntary inspection. The verification testing is conducted according to ASTM standard procedures and expands upon the requirements of PS 2. Manufacturers participating in this program also obtain a code evaluation report that lists the specific design capacities for that product.

Panel Selection, Handling and Storage

SPAN RATING

Span rating numbers for SHEATHING SPAN and FLOOR SPAN indicate the maximum spacing of supports over which the panels should be placed.

The span rating on SHEATHING SPAN panels appears as two numbers separated by a slash (e.g., 32/16 or 48/24). The first number is the maximum on center (o.c.) support spacing in inches for roof sheathing. The second number is the maximum o.c. support spacing when the panel is used for subflooring. A panel marked 32/16 may be used for roof sheathing over supports spaced up to 32 inches o.c. or for floor sheathing over supports spaced up to 16 inches o.c.

The span rating on FLOOR SPAN panels appears as a single number (e.g., 20 o.c.). FLOOR SPAN panels are designed for single-floor applications and are manufactured with span ratings of 16, 20, 24, 32, and 48 inches o.c.

OSB used in structural sheathing applications in the U.S. must meet the requirements contained in the Department of Commerce's Voluntary Product Standard PS 2 "Performance Standard for Wood-Based Structural-Use Panels." In Canada, panels must comply with the Canadian Standards Association's CAN/CSA O325 "Construction Sheathing" or CSA O437 "OSB and Waferboard." Please refer to CSA-O325 for a description of span ratings used in Canada.

SIZES AND AVAILABILITY

Grademark-specified OSB panel thicknesses range from 1/4 inch to 1-1/4 inch. Not all thickness are readily available. Check with suppliers to determine availability. Standard dimensions are nominal 4 feet by 8 feet. Because OSB is made with wood, which will expand or contract when subjected to changes in temperature and relative humidity, a plus 0/minus 1/8-inch tolerance on width and length is permitted for panels manufactured in conformance with PS 2 to allow for possible expansion after installation. In addition, a tolerance of ±1/32-inch is allowed on the grademark-specified thickness of 13/16-inch and less and ±5% of the grademark-specified thickness for panels thicker than 13/16-inch. Some mills also produce specialty sizes (e.g., smaller panels for the Japanese market or longer panels for vertical applications on walls, such as panels 4 feet wide by 9 or 10 feet long) and “jumbo” panels, such as required as skins for structural insulated panels. Panels 19/32-inch thick and thicker are manufactured with a square edge or tongue-and-groove (T&G) edge.

Table 2. Metric Equivalents of Panel Dimensions

PANEL WIDTH AND LENGTH	
English (foot)	**S.I.** (mm)
4 x 8	1220 x 2440
4 x 9	1220 x 2745
4 x 10	1220 x 3050
PANEL THICKNESS	
English (in.)	**S.I.** (mm)
1/4	6.5
5/16	8.0
11/32	9.0
3/8	9.5
7/16	11.0
15/32	12.0
1/2	12.5
19/32	15.0
5/8	16.0
23/32	18.5
3/4	19.0
25/32	20.0
7/8	22.0
1	25.5
1-1/8	28.5

Note: S.I. thicknesses are metric conversions derived from English measurements and are rounded to the nearest 0.5 mm. Refer to Canadian Standard CSA O325 for nominal thickness tolerances.

Panel Selection, Handling and Storage

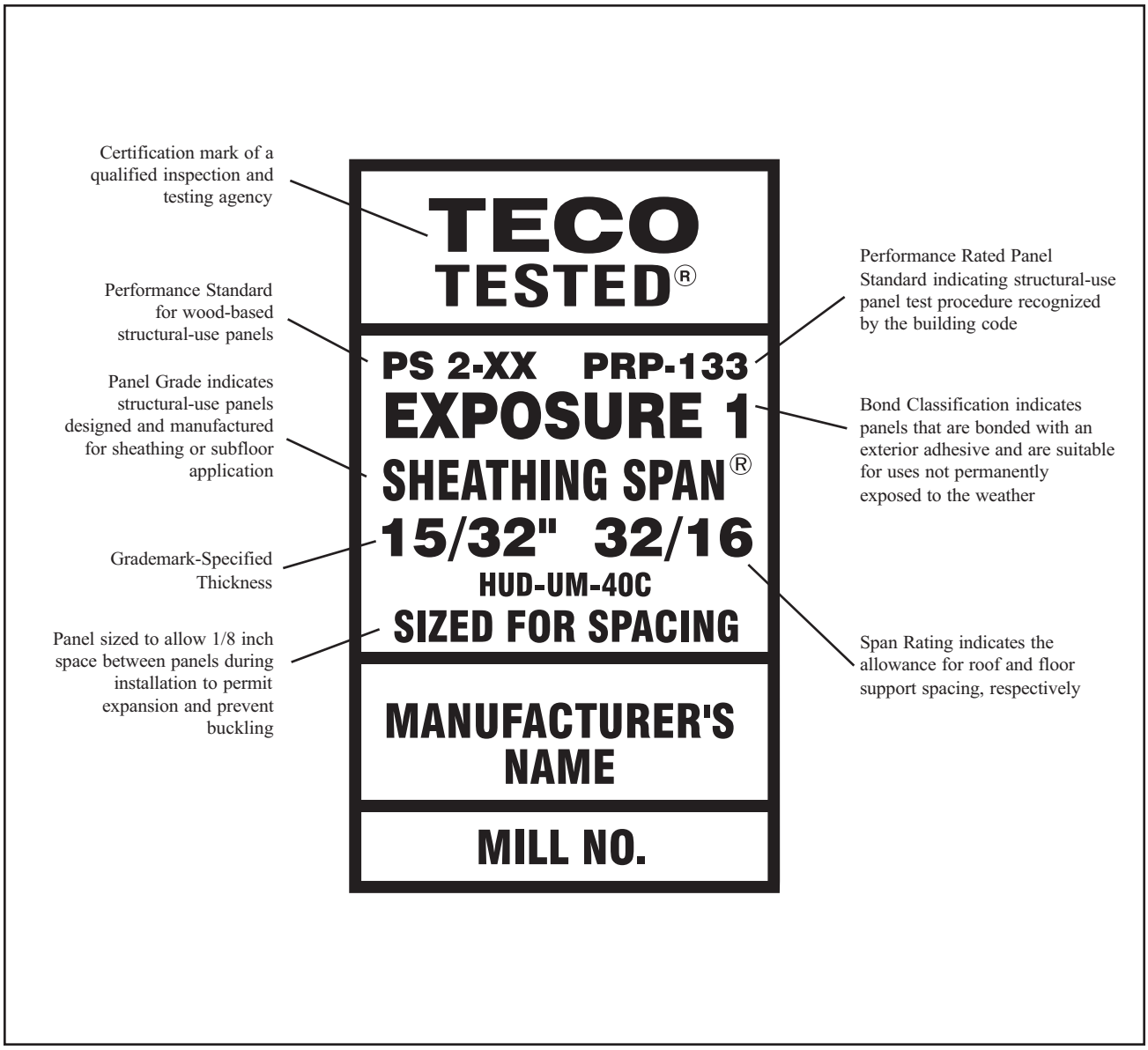


Fig. 1. Typical gradestamp on a certified panel

Unlike plywood, most OSB T&G panels are manufactured to give a full 48-inch face. However, due to manufacturing limitations, some T&G panels have a 47-1/2-inch net face width.

In some areas, certain panel thicknesses or span ratings may be difficult to obtain. OSB suppliers can verify the availability and details of the products they carry. To order OSB panels, the specifier should designate thickness, grade, span rating, bond classification, dimensions, "square edge" or "T&G" (as desired for thicker floor panels), and number of pieces. For example:

7/16-inch SHEATHING SPAN, 24/16
Exposure 1, 48 x 96 inches, square-edge, 200 pcs.

The specifier is wise to identify an alternate panel in the specifications in the event that a certain dimension is not readily available. Fig. 1 illustrates a typical gradestamp that is applied to a certified panel, while Table 2 contains metric equivalents for panel thicknesses.

Panel Selection, Handling and Storage

BASIC SPECIFICATIONS

The use of OSB-panels is governed by several basic guidelines. Details regarding application are presented in later sections of this Guide.

GENERAL PROVISIONS

1. When used structurally, each panel shall conform to the requirements of the appropriate standard as referenced in the building code. Each panel shall be identified by the trademarks of an approved testing and grading agency.

2. OSB panels with an Exposure 1 bond classification are not to be used where they will be permanently exposed to outdoor applications, except where roof sheathing is exposed on the underside such as with open soffits.

3. Panel applications shall meet the minimum requirements of the applicable building code and comply with the manufacturer's recommendations.

ROOF SHEATHING

Panel roof sheathing shall be one of the following grades/ bond classification:

SHEATHING SPAN Exposure 1
Structural I SHEATHING SPAN Exposure 1

In constructing pitched roofs, all panel ends must be joined over framing. Suitable edge support must be provided where indicated on drawings or in recommendations by the manufacturer or TECO through use of panel clips, T&G edges, or lumber blocking between joists. Spacing of 1/8 inch is recommended between all panel ends and edges, although occasionally the panel manufacturer may recommend an alternative*.

For safety reasons, most mills produce panels with textured surface treatments for improved traction on sloped roofs.

FLOORING

Subflooring is applied directly to the floor framing and under an additional layer of structural material such as underlayment, hardwood flooring or concrete topping. Panel subflooring shall be one of the following grades/ bond classification:

SHEATHING SPAN Exposure 1
Structural I SHEATHING SPAN Exposure 1

Spacing of 1/8 inch is recommended at panel ends and edges, though a panel manufacturer might recommend an alternative*. Before underlayment or finish flooring is installed, subfloor joints should be sanded to a smooth surface.

Combined subfloor/underlayment panels shall be of the following grade/bond classification:

FLOOR SPAN Exposure 1

Panel edges should be tongue-and-groove edged or supported on 2-inch lumber blocking between joists. The tongue-and-groove edges must be protected against damage until the finish floor is installed. Panel ends should meet over framing and joints should be staggered. Spacing of 1/8 inch is recommended at panel ends and edges during installation, although the panel manufacturer might recommend an alternative*.

All edge joints must be thoroughly filled and sanded. The manufacturer of the finish flooring may recommend light sanding of any surface roughness, particularly around fasteners.

* Under in-plant construction conditions, such as manufactured housing, a spacing of 1/16-inch between the edges and ends of panels is acceptable.

Panel Selection, Handling and Storage

PANEL HANDLING AND STORAGE

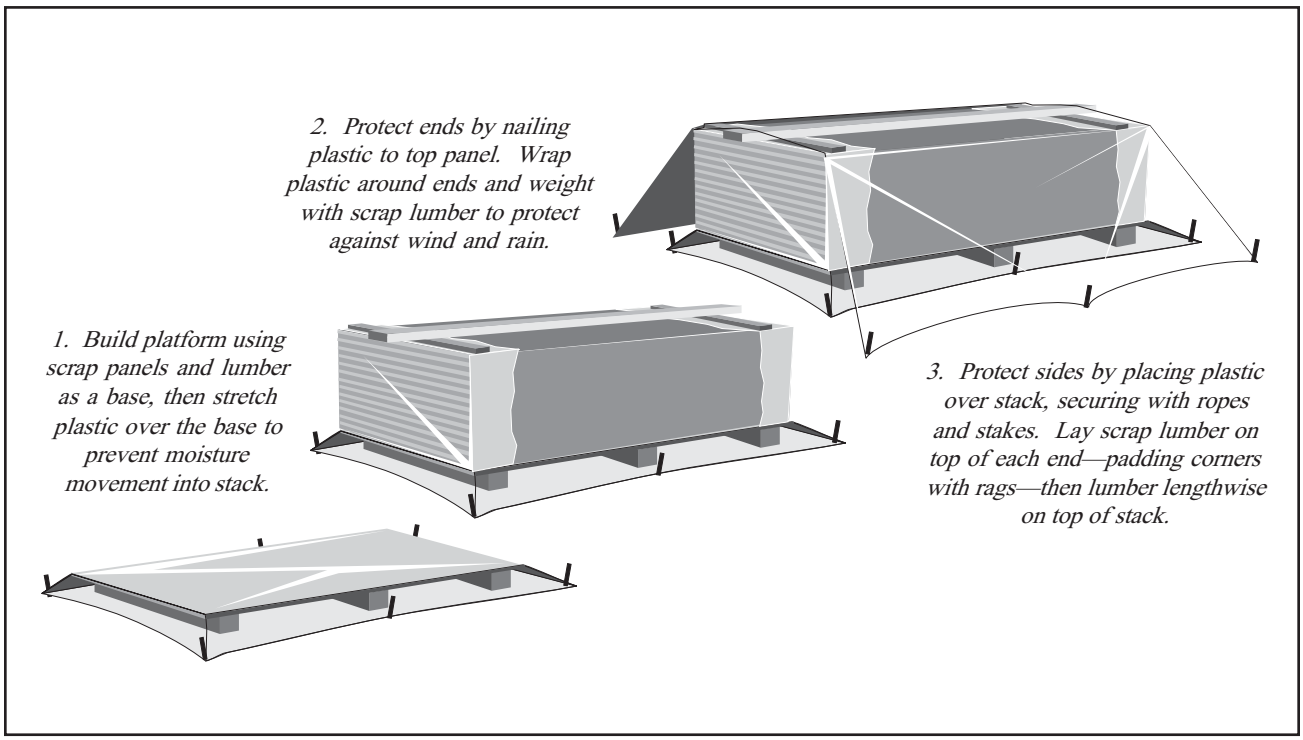


Fig. 2. Panel storage recommendations

Like all building materials, OSB panels should be properly stored and handled carefully to prevent damage and assure reliable performance.

Edges and ends of all panels must be protected. Panels to be moved by a forklift should be placed on pallets or lumber stringers when received to avoid damage by fork tines. When stacking units of panels, ensure that stringers are aligned vertically. Panels to be transported on open truck beds should be covered for protection from weather exposure.

OSB panels should preferably be stored under a roof. The top panel in a stack should be weighted down to minimize warpage from uneven moisture absorption. If moisture absorption is expected, the steel banding on panel bundles should be cut to prevent edge damage.

As illustrated in Fig. 2, panels to be stored outside should be stacked on a level surface supported by lumber stringers or blocking. Panels should never be in direct contact with the ground. At least three full-width supports should be placed along the 8 foot length of the bundle — one centered and the others 12 to 16 inches from each end. The stack should be covered loosely with plastic sheets or tarps. The covering should be anchored at the top of the stack, but kept open and away from the sides and bottom to allow ventilation.

Walls and Roofs

DIAPHRAGMS AND SHEAR WALLS

Wind and seismic forces are the primary lateral forces that structural building systems must resist and transfer to the building foundation. Structural-use panels such as OSB serve as a principal component of the diaphragms and shear walls that comprise the building system. Diaphragms are horizontal or slanted planes that can be designed to act as deep beams that carry lateral forces applied to walls between floors and roofs. When the building walls are parallel to an applied lateral force, they act as shear walls to transfer the force down to the foundation (see Fig. 9). Specific design and construction requirements are often necessary in order for a wall system to be designed and behave as a shear wall, while the same is true for a roof or floor system designed as a diaphragm. Basic design and construction methods and recommendations for each of these two systems follow.

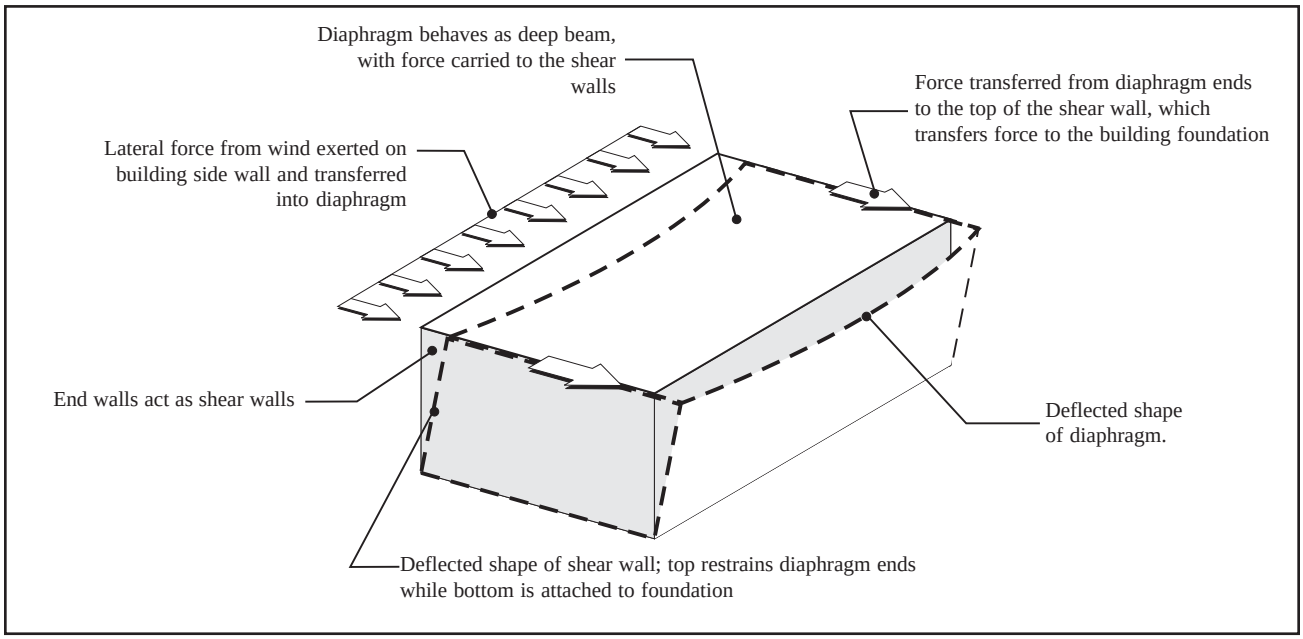


Fig. 9. Illustration of diaphragm and shear wall interaction

WALL SHEATHING

PS 2 certified OSB panels that are used for wall sheathing are permitted to be installed with the strength axis either perpendicular or parallel to the studs. Panels rated for wall spans, such as Wall-16, must be installed over studs spaced no farther apart than the span rating. When panels rated for roof spans are used for wall sheathing, the maximum stud spacing is 16 inches for panels with span ratings of 16 and 20 inches, and 24 inches for 24 inch and greater span ratings. For example, an OSB panel with a 20/0 span rating could be applied as wall sheathing when studs are spaced at 12 or 16 inches, but not 24 inches.

Building codes often require that wall sheathing be at least 1/2 inch thick when stucco is to be applied (unless the lathe is fastened directly to the wall studs). Sheathing rated as Structural I has greater cross-panel load carrying capacity and is ideal in shear wall and diaphragm applications.

Most OSB panels are manufactured with one side rough and the opposite side smooth. If wetted during construction, the smooth side can become slippery. For the safety of construction workers installing these panels in roof or subfloor applications, panel manufacturers stamp the smooth side with a "THIS SIDE DOWN" (or similar) warning. When used in wall applications, this warning has no significance and can be disregarded; that

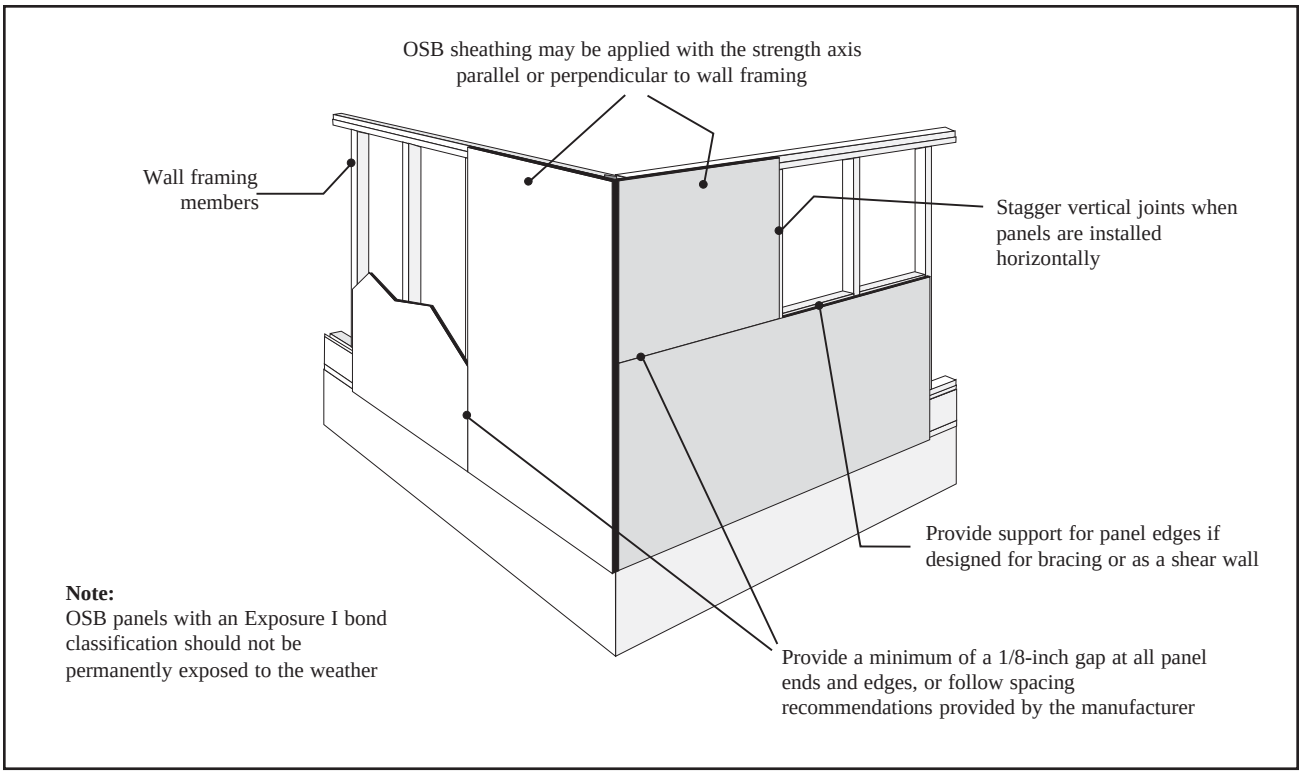


Fig 10. Wall sheathing installation recommendations

is, either face of an OSB panel can be applied outward when used in a wall application. OSB panels used for wall sheathing are an alternative to the plywood sheathing sometimes specified in building codes for wall bracing. Span rated OSB panels meet or exceed corner bracing requirements of bending and racking strength and do not require additional let-in bracing (see Fig. 10).

To prevent problems associated with expansion of panels due to an increase in moisture content, wall sheathing should be installed with 1/8-inch gaps at panel ends and edges and around window and door openings, unless specific spacing recommendations are provided by the panel manufacturer.

OSB panels identified with an Exposure 1 bond classification are not intended for permanent exposure to the weather and need to be covered by an exterior wall covering complying with the applicable code. It is also recommended to apply a weather-resistant sheathing paper to the outside surface of the OSB panels whenever the exterior wall covering is not moisture impermeable.

FASTENING WALL SHEATHING

Field investigations conducted after several hurricanes in the past two decades have confirmed that improper fastening of sheathing, siding, shingles, and other wall and roof covering has been a primary source of failure and damage resulting from the high winds of hurricanes. Using the correct fastener, whether nail, screw, staple or others, and applying them where and as often as required is the first step in preventing and limiting damage from high-wind events.

Wall sheathing panels 1/2 inch thick or less should be fastened with 6d common nails or deformed shank nails. Panels greater than 1/2 inch but less than 7/8 inch thick should be fastened with 6d deformed shank or 8d common nails. Eight penny common or deformed shank nails should be used to attach panels 7/8 inch to 1 inch thick. Panels 1-1/8 inch thick and greater should be attached with 8d deformed shank or 10d common nails. In all cases, other nails, staples, or screws can be substituted for common nails when their capacity is sufficient for the intended purpose and local code allows such substitution. Several OSB manufacturers mark lines on each panel corresponding to support spacing of 12, 16 or 24 inches as guides for workers fastening the panels.

ROOF SHEATHING

SHEATHING SPAN panels are the primary structural sheathing component of roof systems and are effective under a variety of roof coverings including wood, asphalt, or fiberglass shingles, tiles, wood shakes, or built-up roofing. Fig. 11 illustrates a typical roof system with recommendations that will enhance performance of the entire roof structure. Additionally, the surface of the roof sheathing should be dry prior to installing any portion of the roof covering

Follow these steps when installing the roof:

Step 1 Install the roof framing and ensure that it provides a level surface; add blocking if needed to fix any twisted areas of framing.

Step 2 Ensure proper ventilation that meets or exceeds all applicable building codes.

Step 3 Space and fasten panels; place panel ends over supports; space panels 1/8 inch (the diameter of a 10d box nail) apart to allow for possible moisture expansion; install fasteners 3/8 inch from the edge of the panel at the appropriate on-center spacing. Install panel clips when required*.

Step 4 Install shingle underlayment or No. 15 roofing felt to minimize exposure to weather prior to applying shingles (use No. 30 roofing felt if prolonged exposure is expected); apply evenly, leaving a smooth surface.

Step 5 Install shingles or other roof covering according to the manufacturer's recommendations; heavyweight, laminated and textured shingles create the best appearance.

FASTENING ROOF SHEATHING

It is recommended that roof sheathing less than 1-1/8 inch thick be fastened with a minimum of 8d common or deformed shank nails (although some code jurisdictions allow the use of 6d common or deformed shank nails); for panels that are 1-1/8 inch thick or greater, use 10d common nails.

Fastener spacing requirements may vary with building codes that recognize the potential for high-wind and seismic forces. Consult with your local code authority for these requirements. In all cases, other nail types, staples, or screws can be substituted for common nails when their capacity is sufficient for the intended purpose and local codes allow such substitution.

** Refer to footnote 3 of Table 10 for edge support requirements for panels used as roof sheathing.*

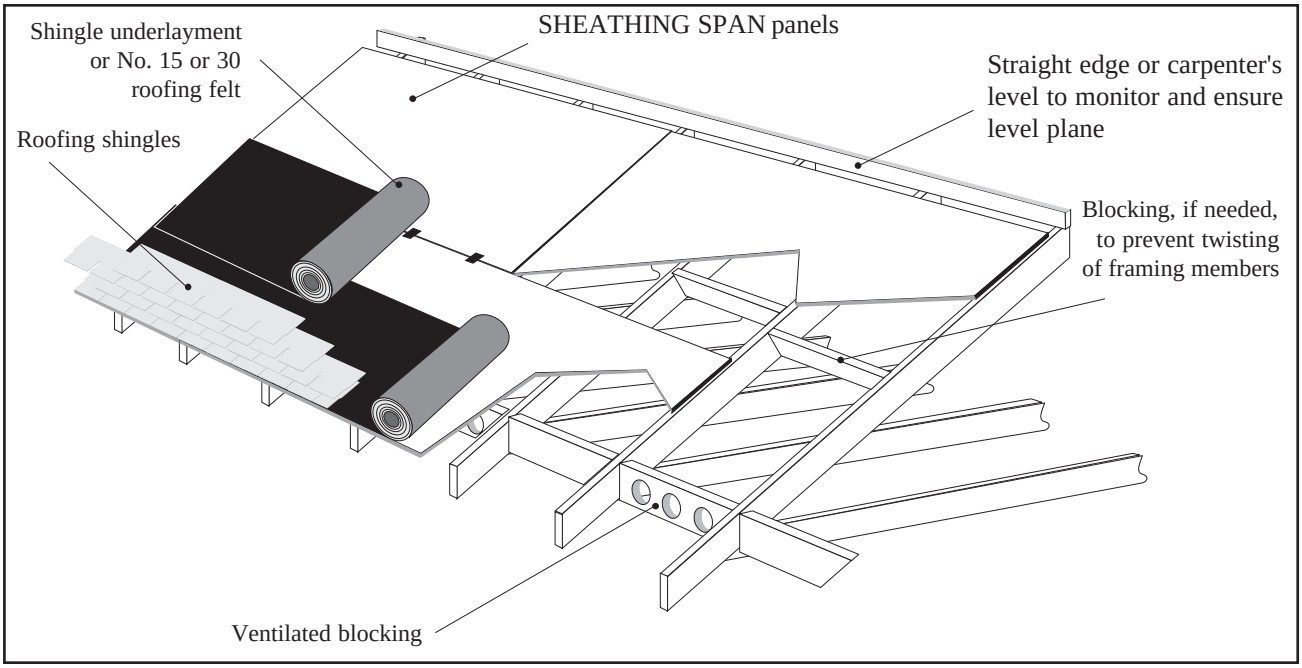


Fig.11. Installation of roof sheathing with felt and shingles

Walls and Roofs

DESIGN CONSIDERATIONS

Tables 10, 11, 12, 13, and 14 are taken from either TECO's Evaluation Report ER-5637 or the 2003 International Building Code® and contain information for SHEATHING SPAN and FLOOR SPAN panels when used as roof or wall sheathing. Table 10 contains allowable roof live loads when panels are oriented with their strength axis perpendicular to supports, as is typically the case. Table 11 lists similar load information when the strength axis is parallel to supports. Tables 12 and 13 provide allowable shear values when panels are used in diaphragm applications, while shear wall allowable loads are provided in Table 14. The values in these tables are applicable to panels that comply with the requirements of PRP-133 or PS 2.

The allowable loads listed in Tables 10 and 11 are derived assuming a dead load of 10 psf. Applications with heavier dead loads must be considered appropriately.

As an example, let's assume that an architect is designing a roof system for a commercial structure. They determine that the sheathing panels must support 60 psf of live load and 15 psf of dead load, i.e., a total load of 75 psf. What are the choices if they want to specify a panel with supports spaced no more than 32 inches on center?

Since the allowable roof live loads in Table 10 assume a dead load of 10 psf, and the design requires a 15 psf dead load, the architect must increase the design live load by an equal amount, (specifically 5 psf), to 65 psf. Doing so will ensure that the chosen panel is capable of carrying a total load of 75 psf.

Entering the table, our architect has the following choices:

- 7/16" 24/16 rated panels with supports at 19.2" o.c.
- 15/32" 32/16 rated panels with supports at 24" o.c.
- 23/32" 48/24 rated panels with supports at 32" o.c.

Notice that the first of these choices is the most efficient since the panels are rated for 65 psf and therefore utilize their entire structural capacity. Still, other considerations, like the choice of the supporting trusses or joists (due to cost or appearance, for instance), may lead to one of the other options.

Notice also that if the architect had not made the adjustment for excess dead load, he or she may have chosen 19/32-inch panels rated at 40/20, which have a tabular live load capacity of 60 psf. This choice would have resulted in panels that exceeded their capacity by 5 psf, or more than 8 percent.

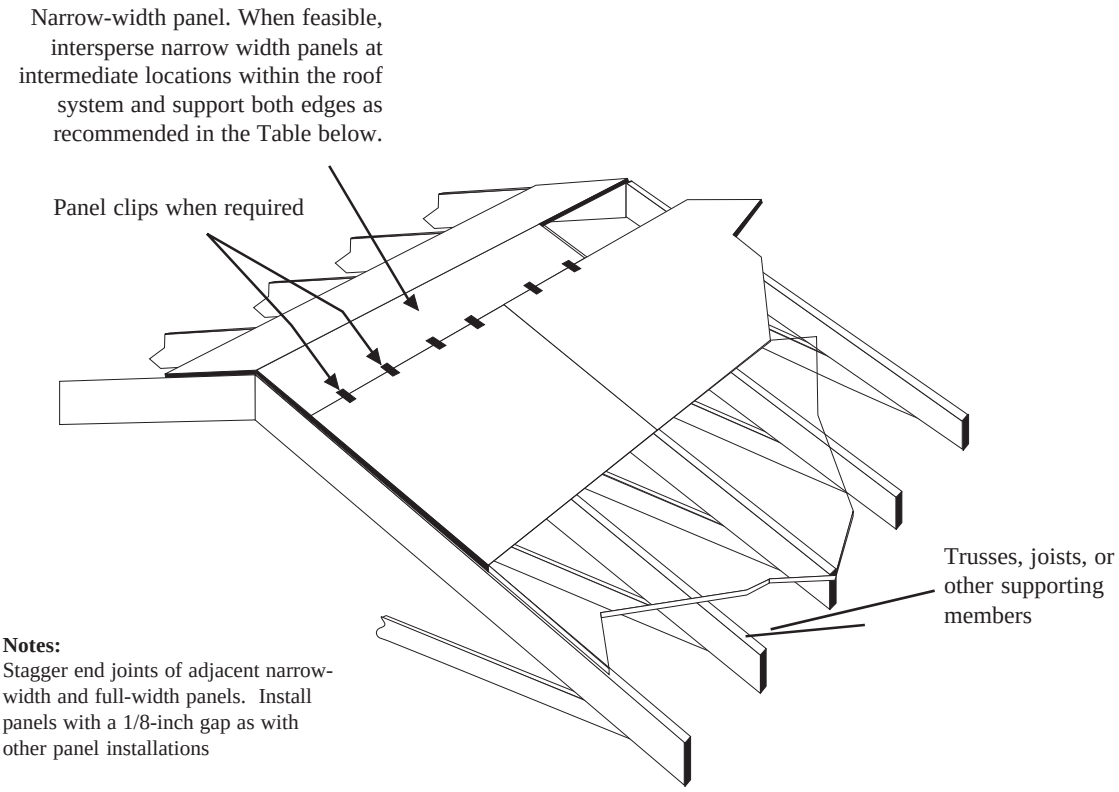
Looking at the diaphragm and shear wall tables (Tables 12, 13 and 14 respectively), notice that the top section of each table applies to Structural I SHEATHING SPAN, while the lower section applies to regular sheathing (and FLOOR SPAN in Tables 12 and 13). Notice too that when framing species such as Spruce-Pine-Fir are used, shear values must be adjusted to account for the difference in density between that species and Douglas Fir-Larch or Southern Pine.

NARROW-WIDTH ROOF PANELS

The overwhelming majority of structural-use panels used in construction today are four feet wide. Yet OSB panels must often be cut to a width less than four feet to accommodate the size and shape of the roof system. Fig. 12 illustrates this situation, where full-width panels are installed beginning at the soffit, continuing up the roof and creating the need for a run of narrow-width panels at the ridge. It is not uncommon, especially in specialized industrial construction, for these narrow-width panels to be less than 12 inches in width.

Allowable uniform roof live loads in Table 10 apply to panels that are at least 24 inches wide. Whenever possible, panels should be laid out so that the minimum panel is 24 inches, even if it creates two panels less than full width. It is further recommended to install the narrow-width panels away from the ridge at intermediate locations within the roof system, with both edges supported as recommended in the table in Fig. 12.

However, if panels must be cut to less than 24 inches in width, the recommendations in Fig. 12 are suggested to provide sufficient edge support to ensure adequate panel performance. These recommendations apply to panels installed over two or more spans (i.e., three or more supports) with the strength axis of the panel perpendicular to the supports. When panel clips are recommended, one clip should be centered between supports for support spacing 16 inches on center or less; use at least two clips, equally spaced, when support spacing is greater than 16 inches on center. If lumber blocking is recommended, a 2x4 or greater (any grade except Utility) may be installed edge- or flat-wise, adequately attached to supporting members.



Panel Width, PW	Support Recommendations
16”≤ PW < 24”	Panel clips or lumber blocking as described above. If the edge adjacent to a full-width panel is supported as recommended, the edge adjacent to a ridge or valley need not be supported, unless specifically required by code.
12” ≤ PW < 16”	Lumber blocking as described above on edge adjacent to full-width panel; support opposite edge if required by code.
PW < 12”	Lumber blocking as described above on both edges, even if one is adjacent to a ridge or valley. Both edges are considered blocked by a single piece of lumber when each edge is no further than 1-1/2” from the lumber edge (e.g., a single nominal 2x4 lumber block on edge centered under a 4-1/2-inch-wide panel is considered sufficient for support).

Note: Panel section widths are nominal and may be 1/8 inch less than specified to allow for saw kerf.

Fig.12. Illustration of narrow-width roof panels with recommendations for support

Table 10. Allowable Uniform Roof Live Load for SHEATHING SPAN and FLOOR SPAN Panels with Strength Axis Perpendicular to Supports[1]

SHEATHING SPAN

SPAN RATING	NOMINAL PANEL THICKNESS (inch)	MAXIMUM SPAN (inches)		ALLOWABLE LIVE LOAD[2] (psf)								
		With edge support[3]	Without edge support	Spacing of supports center-to-center (inches)								
				12	16	19.2	24	32	40	48	54	60
20/0	5/16, 11/32	20	20	120	50	30						
24/0	3/8	24	20	190	100	60	30					
24/16	7/16	24	24	190	100	65	40					
32/16	15/32, 1/2	32	28		180	120	70	30				
40/20	19/32, 5/8	40	32			205	130	60	30			
48/24	23/32, 3/4	48	36				175	95	45	35		
54/32	7/8, 1	54	40					130	75	50	35	
60/32	7/8, 1	60	40					165	100	70	50	35
60/48	7/8, 1, 1-1/8	60	48					165	100	70	50	35

FLOOR SPAN

SPAN RATING	NOMINAL PANEL THICKNESS (inch)	MAXIMUM SPAN (inches)		ALLOWABLE LIVE LOAD[2] (psf)								
		With edge support[3]	Without edge support	Spacing of supports center-to-center (inches)								
				12	16	19.2	24	32	40	48	54	60
16 oc	19/32, 5/8	24	24	185	100	65	40					
20 oc	19/32, 5/8, 3/4	32	32	270	150	100	60	30				
24 oc	23/32, 3/4	48	36		240	160	100	50	30	25		
32 oc	7/8, 1	48	40			295	185	100	60	40		
48 oc	1-1/8, 1-1/4	60	48				290	1 60	100	65	50	40

SI units: 1 inch = 25.4 mm; 1 psf = 47.9 Pa

1. Panels shall be a minimum of 24 inches wide.
2. The allowable spans were determined using a dead load of 10 psf. If the dead load exceeds 10 psf then the live load shall be reduced accordingly.
3. Tongue-and-groove edges, panel edge clips (one between each support, except two between supports 48 inches on center), lumber blocking or other. Only lumber blocking will satisfy blocked diaphragm requirements of ER-5637 or IBC 2003 Tables 2306.3.1 and 2306.3.2.

Table 11. Allowable Uniform Roof Live Loads for SHEATHING SPAN Panels with Primary Axis Parallel to Supports[1]

SPAN RATING	NOMINAL PANEL THICKNESS (inch)	STRUCTURAL I [2] SHEATHING SPAN		SHEATHING SPAN	
		Maximum span with edge support [3] (inches)	Live load [4] (psf)	Maximum span with edge support [3] (inches)	Live load [4] (psf)
24/16	7/16	24	20	16	40
32/16	15/32	24	20	24	20 [5]
32/16	1/2	24	25	24	25 [5]
40/20	19/32	24	70	24	25
	5/8				30
48/24	23/32, 3/4	24	90	24	45 [5]

* Values per 2003 International Building Code®

SI units: 1 inch = 25.4 mm; 1 psf = 47.9 Pa

1. Panels shall be continuous over two or more spans.
2. Structural I rated panels have greater stiffness in the cross panel direction than sheathing panels.
3. Tongue-and-groove edges, panel edge clips (one between each support, except two between supports 48 inches on center), lumber blocking or other.
4. The allowable spans were determined using a dead load of 10 psf. If the dead load exceeds 10 psf then the live load shall be reduced accordingly.
5. The allowable spans were determined using a dead load of 5 psf. If the dead load exceeds 5 psf then the live load shall be reduced accordingly.

Table 12. Allowable Shear (pounds per foot) for OSB Panel Diaphragms with Framing of Douglas Fir-Larch or Southern Pine[1] for Wind or Seismic Loading

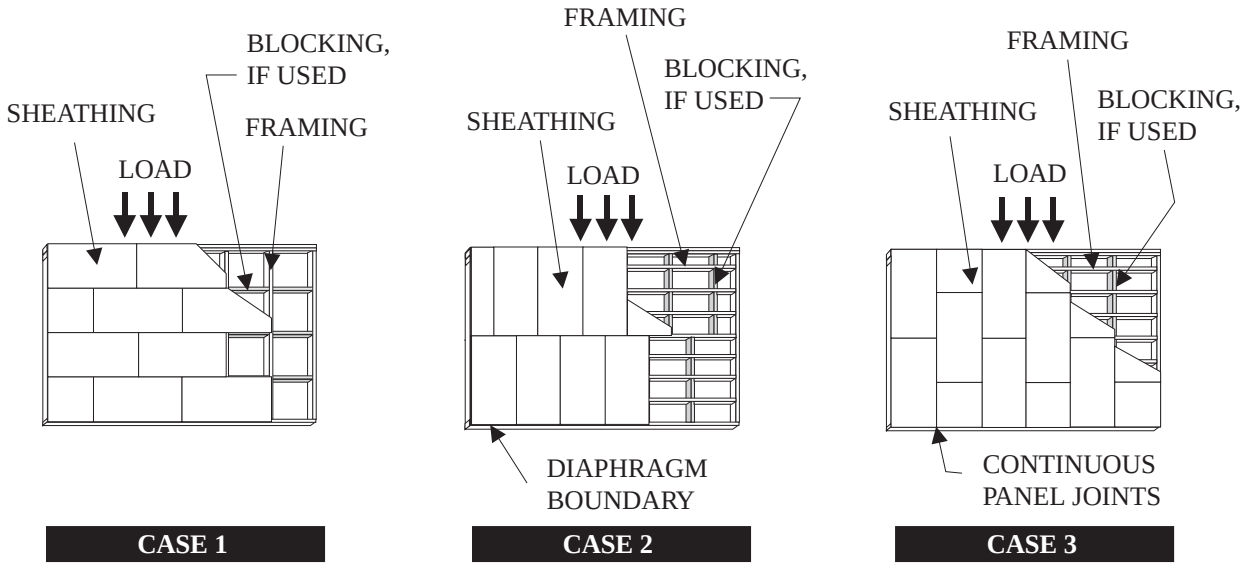
PANEL GRADE	COMMON NAIL SIZE OR STAPLE[7] LENGTH AND GAGE	MINIMUM FASTENER PENETRATION IN FRAMING (inches)	MINIMUM NOMINAL PANEL THICKNESS (inch)	MINIMUM NOMINAL WIDTH OF FRAMING MEMBER (inches)	BLOCKED DIAPHRAGMS				UNBLOCKED DIAPHRAGMS	
					Fastener spacing (in.) at diaphragm boundaries (all Cases) at continuous panel edges parallel to load (Cases 3 and 4) and at all panel edges (Cases 5 and 6)[2]				Fasteners spaced 6 inches maximum at supported edges[2]	
					6	4	2½[3]	2[3]	Case 1[4]	Cases 2, 3, 4, 5 and 6
					Fastener spacing (inches) at other panel edges (Cases 1, 2, 3 and 4)[2]					
					6	6	4	3		
Structural I SHEATHING SPAN® (Exposure 1)	6d[6]	1-1/4	5/16	2 3	185 210	250 280	375 420	420 475	165 185	125 140
	1-1/2 16 Gage	1		2 3	155 175	205 230	310 345	350 390	135 155	105 115
	8d	1-3/8	3/8	2 3	270 300	360 400	530 600	600 675	240 265	180 200
	1-1/2 16 Gage	1		2 3	175 200	235 265	350 395	400 450	155 175	115 130
	10d[5]	1-1/2	15/32	2 3	320 360	425 480	640 720	730 820	285 320	215 240
	1-1/2 16 Gage	1		2 3	175 200	235 265	350 395	400 450	155 175	120 130
SHEATHING SPAN®, FLOOR SPAN® (Exposure 1)	6d[6]	1-1/4	5/16	2 3	170 190	225 250	335 380	380 430	150 170	110 125
	1-1/2 16 Gage	1		2 3	140 155	185 205	275 310	315 350	125 140	90 105
	6d[6]	1-1/4	3/8	2 3	185 210	250 280	375 420	420 475	165 185	125 140
	8d	1-3/8		2 3	240 270	320 360	480 540	545 610	215 240	160 180
	1-1/2 16 Gage	1		2 3	160 180	210 235	315 355	360 400	140 160	105 120
	8d	1-3/8	7/16	2 3	255 285	340 380	505 570	575 645	230 255	170 190
	1-1/2 16 Gage	1		2 3	165 190	225 250	335 375	380 425	150 165	110 125
	8d	1-3/8	15/32	2 3	270 300	360 400	530 600	600 675	240 265	180 200
	10d[5]	1-1/2		2 3	290 325	385 430	575 650	655 735	255 290	190 215
	1-1/2 16 Gage	1		2 3	160 180	210 235	315 355	360 405	140 160	105 120
	10d[5]	1-1/2	19/32	2 3	320 360	425 480	640 720	730 820	285 320	215 240
	1-3/4 16 Gage	1		2 3	175 200	235 265	350 395	400 450	155 175	115 130

* Values per 2003 International Building Code®

Table 12. (continued)

For SI: 1 inch = 25.4 mm, 1 pound = 14.5939 N/m

1. For framing of other species: (a) find specific gravity for the species of lumber in the AF&PA National Design Specification; (b) For staples find shear value from above table for Structural I panels (regardless of actual grade) and multiply value by 0.82 for species with specific gravity of 0.42 or greater, or multiply by 0.65 for all other species; (c) for nails find shear value from above table for nail size for actual grade and multiply value by the following factor: Specific Gravity Adjustment Factor = [1-(0.5 - SG)], where SG = Specific Gravity of the framing lumber. This adjustment factor shall not be greater than 1.
2. Space fasteners maximum 12 inches o.c. along intermediate framing members (6 inches o.c. when supports are spaced 48 inches o.c.).
3. Framing at adjoining panel edges shall be 3-inches nominal or wider and nails shall be staggered where nails are spaced 2 inches o.c. or 2-1/2 inches o.c.
4. No unblocked edges or continuous joints parallel to load.
5. Framing at adjoining panel edges shall be 3-inches nominal or wider and nails shall be staggered where both of the following conditions are met: (a) 10d nails having a penetration into framing of more than 1-1/2 inches and (b) nails are spaced 3 inches o.c. or less.
6. 8d is recommended minimum for roofs due to negative pressures of high winds.
7. Staples shall have a minimum crown width of 7/16-inch.



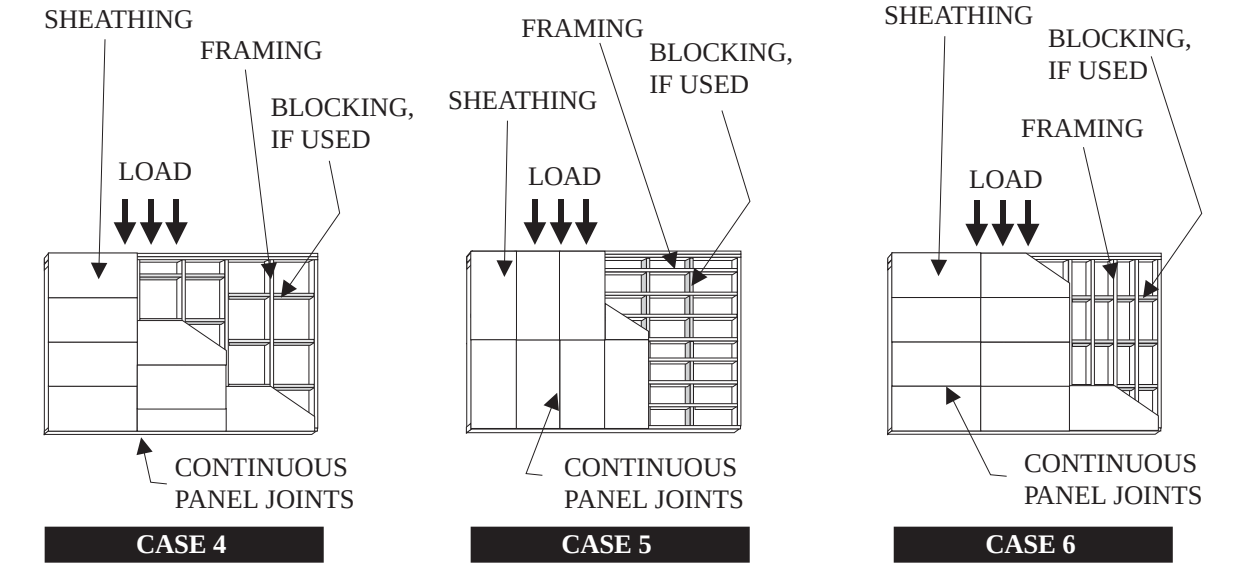


Table 13. Allowable Shear in pounds per foot for Horizontal Blocked Diaphragms Utilizing Multiple Rows of Fasteners (High Load Diaphragms) with Framing of Douglas Fir-Larch or Southern Pine[1] for Wind or Seismic Loading[2]

PANEL GRADE[3]	FASTENER AND SIZE	MINIMUM NAIL PENETRATION IN FRAMING (inches)	MINIMUM NOMINAL PANEL THICKNESS (inch)	MINIMUM NOMINAL WIDTH OF FRAMING MEMBER[5] (inches)	LINES OF FASTENERS	BLOCKED DIAPHRAGMS					
						Cases 1 and 2[4]					
						Fastener spacing per line at boundaries (inches)					
						4		2½		2	
						Fastener spacing per line at other panel edges (inches)					
						6	4	4	3	3	2
Structural I **SHEATHING SPAN®** (Exposure 1)	10d common nails	1-1/2	15/32	3	2	605	815	875	1150	—	—
				4	2	700	915	1005	1290	—	—
				4	3	875	1220	1285	1395	—	—
			19/32	3	2	670	880	965	1255	—	—
				4	2	780	990	1110	1440	—	—
				4	3	965	1320	1405	1790	—	—
			23/32	3	2	730	955	1050	1365	—	—
				4	2	855	1070	1210	1565	—	—
				4	3	1050	1430	1525	1800	—	—
	14 gage staples	2	15/32	3	2	600	600	860	960	1060	1200
				4	3	860	900	1160	1295	1295	1400
			19/32	3	2	600	600	875	960	1075	1200
				4	3	875	900	1175	1440	1475	1795
SHEATHING SPAN®, FLOOR SPAN® (Exposure 1)	10d common nails	1-1/2	15/32	3	2	525	725	765	1010	—	—
				4	2	605	815	875	1105	—	—
				4	3	765	1085	1130	1195	—	—
			19/32	3	2	650	860	935	1225	—	—
				4	2	755	965	1080	1370	—	—
				4	3	935	1290	1365	1485	—	—
			23/32	3	2	710	935	1020	1335	—	—
				4	2	825	1050	1175	1445	—	—
				4	3	1020	1400	1480	1565	—	—
	14 gage staples	2	15/32	3	2	540	540	735	865	915	1080
				4	3	735	810	1005	1105	1105	1195
			19/32	3	2	600	600	865	960	1065	1200
				4	3	865	900	1130	1430	1370	1485
			23/32	4	3	865	900	1130	1490	1430	1545

* Values per 2003 International Building Code®

For SI: 1 inch = 25.4 mm

1. For framing of other species: (a) find specific gravity for the species of lumber in the AF&PA National Design Specification, (b) Find shear value from table above for nail size of actual grade, and (c) Multiply value by the following adjustment factor = [1-(0.5 - SG)], where SG = Specific Gravity of the framing lumber. This adjustment factor shall not be greater than 1.
2. Fastening along intermediate framing members: Space fasteners 12 inches on center, except 6 inches on center for spans greater than 32 inches.
3. Panels conforming to PS 2.
4. This table gives shear values for Cases 1 and 2 as shown in Table 12. The values shown are applicable to Cases 3,4, 5 and 6 as shown in Table 12, providing fasteners at all continuous panel edges are spaced in accordance with the boundary fastener spacing.
5. The minimum depth of framing members shall be 3 inches.

Table 14. Allowable Shear (pounds per foot) for OSB Panel Shear Walls with Framing of Douglas Fir-Larch or Southern Pine[1] for Wind or Seismic Loading[2,6,7,8]

PANEL GRADE	MINIMUM NOMINAL PANEL THICKNESS (inch)	MINIMUM FASTENER PENETRATION IN FRAMING (inches)	PANELS APPLIED DIRECT TO FRAMING					PANELS APPLIED OVER 1/2 or 5/8 -INCH GYPSUM SHEATHING				
			Nail (Common, galvanized box) or (Staple size[9])	Fastener Spacing at Panel Edges (inches)				Nail (Common, galvanized box) or (Staple size[9])	Fastener Spacing at Panel Edges (inches)			
				6	4	3	2[4]		6	4	3	2[4]
Structural I SHEATHING SPAN® (Exposure 1)	5/16	1-1/4	6d	200	300	390	510	8d	200	300	390	510
		1	1-1/2 16 Gage	165	245	325	415	2 16 Gage	125	185	245	315
	3/8	1-3/8	8d	230[3]	360[3]	460[3]	610[3]	10d	280	430	550[5]	730
		1	1-1/2 16 Gage	155	235	315	400	2 16 Gage	155	235	310	400
	7/16	1-3/8	8d	255[3]	395[3]	505[3]	670[3]	10d	280	430	550[5]	730
		1	1-1/2 16 Gage	170	260	345	440	2 16 Gage	155	235	310	400
	15/32	1-3/8	8d	280	430	550	730	10d	280	430	550[5]	730
		1	1-1/2 16 Gage	185	280	375	475	2 16 Gage	155	235	300	400
		1-1/2	10d	340	510	665[5]	870	10d	-	-	-	-
SHEATHING SPAN® (Exposure 1)	5/16 or 1/4	1-1/4	6d	180	270	350	450	8d	180	270	350	450
		1	1-1/2 16 Gage	145	220	295	375	2 16 Gage	110	165	220	285
	3/8	1-1/4	6d	200	300	390	510	8d	200	300	390	510
		1-3/8	8d	220[3]	320[3]	410[3]	530[3]	10d	260	380	490[5]	640
		1	1-1/2 16 Gage	140	210	280	360	2 16 Gage	140	210	280	360
	7/16	1-3/8	8d	240[3]	350[3]	450[3]	585[3]	10d	260	380	490[5]	640
		1	1-1/2 16 Gage	155	230	310	395	2 16 Gage	140	210	280	360
	15/32	1-3/8	8d	260	380	490	640	10d	260	380	490[5]	640
		1-1/2	10d	310	460	600[5]	770	-	-	-	-	-
		1	1-1/2 16 Gage	170	255	335	430	2 16 Gage	140	210	280	360
	19/32	1-1/2	10d	340	510	665[5]	870	-	-	-	-	-
		1	1-3/4 16 Gage	185	280	375	475	-	-	-	-	-
			Nail Size (Galvanized Casing)					Nail Size (Galvanized Casing)				
	5/16	1-1/4	6d	140	210	275	360	8d	140	210	275	360
	3/8	1-3/8	8d	160	240	310	410	10d	160	240	310[5]	410

* Values per 2003 International Building Code®

For SI: 1 inch = 25.4 mm, 1 pound = 14.5939 N/m

1. For framing of other species: (a) find specific gravity for the species of lumber in the AF&PA National Design Specification; (b) For staples find shear value from above tables for Structural I panels (regardless of actual grade) and multiply value by 0.82 for species with specific gravity of 0.42 or greater, or multiply by 0.65 for all other species; (c) for nails find shear value from above table for nail size for actual grade and multiply value by the following factor: Specific Gravity Adjustment Factor = [1-(0.5 - SG)], where SG = Specific Gravity of the framing lumber. This adjustment factor shall not be greater than 1.
2. Panel edges backed with 2-inch nominal or wider framing. Install panels either horizontally or vertically. Space fasteners a maximum of 6 inches o.c. along intermediate framing members for 3/8- and 7/16-inch panels installed on studs spaced 24 inches o.c. For other conditions and panel thicknesses, space fasteners a maximum of 12 inches o.c. on intermediate supports.
3. Shears may be increased to values shown for 15/32-inch sheathing with same nailing, provided (1) studs are spaced a maximum of 16 inches o.c. or (2) if panels are applied with long dimension across studs.
4. Framing at adjoining panel edges shall be 3-inch nominal or wider and nails shall be staggered where nails are spaced 2 inches o.c.
5. Framing at adjoining panel edges shall be 3-inch nominal or wider, and nails shall be staggered where both of the following conditions are met: (a) 10d nails having penetration into framing of more than 1-1/2 inches and (b) nails are spaced 3 inches o.c.
6. Where panels are applied on both faces of a wall and nail spacing is less than 6 inches o.c. on either side, panel joints shall be offset to fall on different framing members or framing shall be 3-inch nominal or thicker and nails on each side shall be staggered.
7. In seismic Design Category D, E, or F where shear design values exceed 490 plf (LRFD) or 350 plf (ASD) all framing members receiving edge nailing from abutting panels shall not be less than a single 3-inch nominal member. Panel joint and sill plate nailing shall be staggered in all cases. Refer to building code for sill plate size and anchorage requirements.
8. Galvanized nails shall be hot-dipped or tumbled.
9. Staples shall have a minimum crown width of 7/16-inch.

Other Performance Issues

FLAME SPREAD AND "SMOKE DEVELOPED" RATING FOR OSB

ASTM E84 is used to determine a product's tendency to permit the travel of a flame along its surface as well as provide a measure of how much smoke is developed when it burns. A gas flame is applied to the underside of products at one end of a 25-foot-long tunnel. The rate of flame spread and the amount of smoke developed are measured. Each is given a separate rating, with the following standardized scale being used for both. The higher the flame spread rating, the higher the tendency for the material being tested to spread flames during a fire. Similarly, a higher smoke developed rating means that a material tends to generate more smoke when subject to fire. Inorganic reinforced cement board is assigned a flame spread and smoke developed rating of zero, while red oak is rated a 100 for both.

Rating classes:

0 to 25 - Class I (or A)
26 to 75 - Class II (or B)
76 to 200 - Class III (or C)
201 to 500 - Class IV (or D)

Test results for OSB panels, both uncoated and coated with one coat of acrylic latex interior household paint, indicate that OSB falls into the Class III (or C) rating for both flame spread and smoke developed*. A Class III (or C) rating is typical for most untreated wood products. Fire-retardant coating that can be applied to the surface of the panels are also available from various coating manufacturers that reduce the flame spread and smoke development characteristics of the panels, thereby improving the rating class to Class I or II.

** Refer to "Design for Code Acceptance No. 1 - Flame Spread Performance of Wood Products" - published by the American Forest and Paper Association, 1111 Nineteenth Street, NW, Suite 800, Washington DC 20036. (202) 463-2766, web site: www.awc.org and "Technical Bulletin No. 100 - Surface Flammability of OSB (Flame Spread Study)" - published by the Structural Board Association, 25 Valleywood Drive, Unit 27, Markham, Ontario, Canada L3R 5L9, (905) 475-1101, web site: www.osbguide.com.*

OSB IN FIRE-RATED ASSEMBLIES

Architects and engineers specify fire-rated wall, floor and roof assemblies extensively in structures where one- and two-hour fire protection is required. Many fire-rated assemblies specified and built today were originally tested and approved with plywood as the covering. In 2000, engineers at Underwriters Laboratories (UL) of Northbrook, IL., determined that OSB of an equivalent thickness could be substituted for plywood in these designs. Going one step further, UL revised its UL fire-rated assemblies to no longer limit use of structural panels to those of a single certification agency. While never intending to restrict panel use to a single agency, UL recognized this language as exclusionary and modified the assembly designs to include the use of all panels meeting PS 1 and PS 2 standards.

The new, revised language is included in the 2000 edition of the *UL Fire Resistance Directory**. A subsection 13 has been added to the General section at the beginning of Volume I and includes the following:

"Wood Structural Panel is a structural panel product composed primarily of wood and meeting the requirements of the U.S. Department of Commerce Voluntary Standard PS 1, *Construction and Industrial Plywood* or the U.S. Department of Commerce Voluntary Product Standard PS 2, *Performance Standard for Wood-Based Structural-Use Panels*. Wood structural panels include all-veneer plywood, composite panels containing a combination of veneer and wood-based material, and mat-formed panels such as oriented strand board and waferboard. The panels are to bear the label of a code-recognized certification organization with a specific reference to the PS 1 or PS 2 standard. The panels shall also be marked Exposure 1 or Exterior. Some individual designs may limit the type of panel that can be used.

As an alternate, wood structural panels evaluated in accordance with APA - The Engineered Wood Association Standard PRP-108, *Performance Standards and Policies for Structural-Use Panels*, or PFS Research Foundation Standard PRP-133, *Performance Standards and Policies for Wood-Based Structural-Use Panels*, and meeting the description for the panel type in the individual designs, may be used."

Other Performance Issues

In addition, all references to trade names have been removed from the individual design assembly descriptions and replaced with more generic terminology. Examples include:

"19/32 in. thick wood structural panels, min. grade "C-D" or "Sheathing". Face grain of plywood or strength axis of panels...."

"23/32 in. thick wood structural panels, min. grade "Underlayment" or "Single-Floor". Face grain ...."

** The UL Fire Resistance Directory is available from Underwriters Laboratories by calling (847) 272-8800. The complete UL Fire Resistance Directory is also available on the Internet at UL's website (www.ul.com).*

FORMALDEHYDE EMISSIONS FROM OSB PANELS

Structural panels, such as OSB, manufactured with exterior type phenol formaldehyde and isocyanate adhesives do not "off gas" like other types of wood-based panels and therefore do not require certification for formaldehyde emissions. Phenolic-based adhesives are specifically exempted in Section II.C.3 of HUD Rule 24 CFR 3280 (of the August 9, 1984 Federal Register), which states that HUD "has decided to exempt products that are formulated exclusively with phenol-formaldehyde resins and surface finishes from the testing and certification provision of the rule." The amount of formaldehyde emitted from panels using phenolic-based adhesives is considered too small to be significant and has therefore been exempted. Isocyanate resin panels do not contain formaldehyde so no risk of formaldehyde emissions exists.

THERMAL RESISTANCE AND PERMEABILITY OF OSB PANELS

The thermal resistance, or R-value, and the vapor permeance (perms) of OSB panels are listed in Table 15. Both properties are proportional to the density and thickness of the panels; therefore, thicker panels tend to have more insulating value and a greater resistance to moisture vapor passage.

Table 15. Thermal Resistance and Vapor Permeance of OSB[1]

OSB thickness (inch)	**R-value** (in ft^2-hr-°F/BTU)	**Vapor Permeance** (perms)
3/8	0.45	2.55
7/16	0.51	1.95
1/2	0.62	1.55
5/8	0.74	1.1
3/4	0.91	1.1[2]

1. Values per Structural Board Association *OSB in Wood Frame Construction* (U.S. Edition 1996/97).
2. Values for panels up to 5/8-inch are based on test. Panels thicker than 5/8-inch can be assumed to provide equal or better permeability resistance.

Certification and Testing Division
5650 Terra Court
Sun Prairie WI 53590
(608) 837-2790
(608) 837-2830 (F)

■

Eugene Test Laboratory
86305 College View Road
Eugene OR 97405
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(541) 747-1630 (F)

■

Shreveport Test Laboratory
9015 Newcastle Drive
Shreveport LA 71129
(318) 227-0140
(318) 227-0265 (F)

www.tecotested.com

ECOMAXci™

SOLUTIONS

Wall Insulation

Continuous Insulation for Exterior Walls

PRODUCT DESCRIPTION

Rmax ECOMAXci is an energy-efficient thermal insulation board composed of a closed-cell polyisocyanurate (polyiso) foam core bonded to glass fiber reinforced aluminum foil facers on both sides. Glass fiber reinforcement on both faces of the board offer enhanced durability, dimensional stability and fire performance. The printed side, exposed to the exterior, has a robust 12mil facer with an aluminum reflective surface ensuring jobsite security and enhanced radiant heat protection. ECOMAXci utilizes a CFC, HCFC and HFC free blowing agent that has zero Ozone Depletion Potential (ODP) and negligible Global Warming Potential (GWP). This insulation has been tested in multiple NFPA 285 assemblies and is approved for use in exterior walls of buildings of any height, as described within the data sheet for ECOMAXci Wall Solution. ECOMAXci allows for optimum efficiency through multiple design options, ease of construction, a better building envelope and reduced energy usage. Providing a direct impact on the savings throughout the life of the building, ECOMAXci is an excellent choice for exterior commercial wall design.

PRODUCT BENEFITS

- Part of the overall design solution
- Installed continuously to reduce thermal bridging
- Meets R-value requirements with a thinner profile
- Blocks air and moisture
- Mold resistant per ASTM D3273 (no defacement)
- Reduces energy costs
- Reflective facer acts as a radiant barrier
- Lightweight and easy to install
- Reduces material and labor costs
- Tested per NFPA 285 without requiring exterior gypsum board or fire-stops around header openings
- Contributes toward LEED credits in the following categories:
  - Energy & Atmosphere
  - Materials & Resources

COMPLIANCES

- ASTM C1289 Type I, Class 1
- ASHRAE 90.1
- International Energy Conservation Code (IECC)
- International Building Code (IBC) Section 2603, Foam Plastic
- DrJ TER 1212-03
- California Code of Regulations, Title 24
- Tested per NFPA 285 to comply with Section 2603.5.5 of the IBC
- Class A Flame Spread and Smoke Developed Indices per IBC Chapter 8, Interior Finishes
- Approved component for use within the ECOMAXci Wall Solution
  - Water-Resistive Barrier Component
    AC71: ASTM E331, AATCC Test Method 127
  - Air Barrier System Component
    ASTM E2357, CAN/ULC-S742 (A1)
- High Velocity Hurricane Zone system, R-Trac (HVHZ)
  - Florida Building Code Approval #FL16406
  - Tested per TAS 201,202 and 203
  - Tested per ASTM E1886 and E1996
  - Minimum thickness is 2.0 inches
- 1, 2, 3 or 4 hour Fire Rated Assemblies as shown in the UL Fire Resistance Directory
  - Design No.: U026, U326, U330, U354, U424, U460, U902, U904, U905, U906, U907, V454, V499

ECOMAXci

THERMAL PROPERTIES/PRODUCT DATA

"R" means resistance to heat flow. The higher the R-value, the greater the insulating power.

Nominal Thickness	Thermal R-Value[1]
Inches	°F•ft²•hr/Btu
1.00	6.5
1.20	7.9
1.50	10.0
2.00	13.1
2.50	16.7
3.00	20.3
3.50	23.9
4.00	27.4
4.50	31.0

[1]Thermal values are determined by using ASTM C518 test method at 75°F mean temperature on material conditioned according to PIMA Technical Bulletin No. 101. NOTE: ECOMAXci is shipped in bundles that are approximately 48 inches high and wrapped in plastic for easy handling.

Visit www.rmax.com for a complete list of thicknesses and packaging information.

TYPICAL PHYSICAL PROPERTIES

Physical properties shown are based on data obtained under controlled conditions and are subject to normal manufacturing tolerances.

Property	Test Method	Results
Density, Overall, Nominal	ASTM D1622	2.0 pcf
Compressive Strength	ASTM D1621	25 psi
Flame Spread, Faced[1]	ASTM E84	25 or Less
Smoke Developed, Faced[1]	ASTM E84	< 450
Water Vapor Transmission	ASTM E96	< 0.03 perm
Water Absorption	ASTM C209	< 0.2% Vol.
Dimensional Stability	ASTM D2126, 7 days, 158°F, 98% RH	< 2% Linear Change
Reflectance Emittance	ASTM E408	0.96 0.04
Air Permeance	ASTM E2178	< 0.02 L/(s.m²)
Service Temperatures		-40°F to +250°F

[1]Flame spread and smoke numbers are shown for comparison purposes only and are not intended to represent the performance of ECOMAXci and related components under actual fire conditions.

LIMITATIONS

ECOMAXci is not intended for use on surfaces subject to continuous or intermittent immersion in water. ECOMAXci is not a structural panel. It must not be used as a nailing base for any other building products. Furthermore, stud walls insulated with ECOMAXci must be properly braced for lateral loads according to the requirements of local Building Codes.

WARNING

Polyiso foam is an organic material which will burn when exposed to an ignition source of sufficient heat and intensity and may contribute to flames spreading.

WARRANTY

See Rmax "Sales Policy", "Fifteen Year Limited Thermal Warranty" and "ECOMAXci Wall Solution Limited Warranties" for specific terms and conditions. Rmax does not assume any responsibility or liability for the performance of any products other than those sold by Rmax. **NOTE: All Rmax products must be tarped, placed on skids and kept dry before and throughout construction.**

Proudly Made and Engineered in the U.S.A.

Corporate & Technical Location
Rmax Operating, LLC
Dallas, Texas
972.387.4500
www.rmax.com

Customer Service & Plant Locations
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Dallas, Texas
800.527.0890 Ext.102

Eastern Region
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800.845.4455 Ext. 156

Western Region
Fernley, Nevada
800.762.9462 Ext. 156

Member of: PIMA POLYISOCYANURATE INSULATION MANUFACTURERS ASSOCIATION

Improving Your Design.

For warranties, limitations and conditions refer to Rmax Sales Policy and applicable warranties. All documents are located at www.rmax.com. For technical and sales support, email rmax@rmax.com or call (800) 527-0890.

Proudly Made and Engineered in the U.S.A.

Rmax Sales Offices and Plant Locations

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E-mail us at rmax@rmax.com or visit our website www.rmax.com

PIMA
POLYISOCYANURATE INSULATION MANUFACTURERS ASSOCIATION

Technical Evaluation Report

TO ASSIST WITH CODE COMPLIANCE

Rmax ECOMAXci™ Wall Solution and EVOMAXci™ **TER No. 1212-03**

Issue Date: July 2, 2013
Updated: January 20, 2016
Subject to Renewal: October 1, 2016

Rmax Operating, LLC
13524 Welch Road
Dallas, TX 75244
972-850-3652
Rmax.com

DIVISION: 06 00 00 – WOOD, PLASTICS AND COMPOSITES
Section: 06 16 00 – Sheathing
Section: 06 16 13 – Insulating Sheathing
Section: 06 16 53 – Moisture-Resistant Sheathing Board

DIVISION: 07 00 00 – THERMAL AND MOISTURE PROTECTION
Section: 07 20 00 – Thermal Protection
Section: 07 21 00 – Thermal Insulation
Section: 07 25 00 – Water-Resistive Barriers/Weather Barriers
Section: 07 27 00 – Air Barriers

5/25/2016

1. Product Evaluated:

1.1. Rmax ECOMAXci™ Wall Solution

1.2. Rmax EVOMAXci™

1.3. For the most recent version of this report, visit drjengineering.org. For more detailed state professional engineering and code compliance legal requirements and references, visit drjengineering.org/statelaw. DrJ is fully compliant with all state professional engineering and code compliance laws.

2. Applicable Codes and Standards:[1]

2.1. *2009*, *2012* and *2015 International Building Code* (*IBC*)

[1] Unless otherwise noted, all references in this code compliant research report (TER) are from the 2012 version of the codes and the standards referenced therein, including, but not limited to, *ASCE 7*, *SDPWS* and *WFCM*. This product also complies with the 2000-2009 and 2015 versions of the *IBC* and *IRC* and the standards referenced therein. As required by law, where this research report is not approved, the building official shall respond in writing, stating the reasons this research report was not approved. For variations in state and local codes, if any, see Section 8.

This research report is reviewed and sealed by Ryan Dexter, P.E. of DrJ Engineering, LLC, as a specialty engineer.

Given that DrJ is both ISO/IEC 17065 accredited and a professional engineering company, DrJ's certification is comprehensive and fully compliant with *IBC* Section 1703. A seal by a professional engineer is typically sufficient for approval, as regulated by the state Board of Professional Engineers. As stated in the building code, where this report is not approved, the building official shall respond in writing, stating the reasons the alternative was not approved. This allows DrJ to understand the code section in question and provide a timely code compliance cure.

For more information, contact DrJ at 608-310-6748 or drjengineering.org/our-team.

2.2. *2009, 2012* and *2015 International Residential Code* (*IRC)*

2.3. *2009*, *2012* and *2015 International Energy Conservation Code* (*IECC*)

2.4. *2010 and 2013 California Building Code Title 24 Part 2*

2.5. *2010 and 2013 California Residential Code Title 24 Part 2.5*

2.6. *2010 and 2014 Florida Building Code – Building*

2.7. *2010 and 2014 Florida Building Code – Residential*

2.8. *AATCC 127 – Water Resistance: Hydrostatic Pressure Test*

2.9. *ASTM C209 – Standard Test Methods for Cellulosic Fiber Insulating Board*

2.10. *ASTM C518 – Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus*

2.11. *ASTM C1289 – Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board*

2.12. *ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials*

2.13. *ASTM E96 – Standard Test Methods for Water Vapor Transmission of Materials*

2.14. *ASTM E331 – Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference*

2.15. *ASTM E1354 – Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter*

2.16. *ASTM E2178 – Standard Test Method for Air Permeance of Building Materials*

2.17. *ASTM E2357 – Standard Test Method for Determining Air Leakage of Air Barrier Assemblies*

2.18. *CAN/ULC-S742 – Standard for Air Barrier Assemblies – Specification*

2.19. *NFPA 285 – Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components*

2.20. *UL 263 – Standard for Fire Tests of Building Construction and Materials*

3. Performance Evaluation:

3.1. ECOMAXci™ Wall Solution and EVOMAXci™ were evaluated to determine:

3.1.1. Thermal resistance for use as insulating sheathing in accordance with *IECC* Section C402.

3.1.2. Performance for use as a water-resistive barrier (WRB) in accordance with *IBC* Section 1404.2.

3.1.3. Performance for use as an air barrier in accordance with *IECC* Section C402.

3.1.4. Performance for use in buildings of Type I-IV construction in accordance with *IBC* Section 2603.5.

3.1.4.1. Performance in accordance with *ASTM E84* for flame spread and smoke development ratings in accordance with *IBC* Section 2603.3 and 2603.5.4.

3.1.4.2. Performance with regard to vertical and lateral fire propagation in accordance with *IBC* Section 2603.5.5.

3.1.4.3. Performance for use in a fire resistance rated assembly in accordance with *IBC* 2603.5.1.

3.2. Any code compliance issues not specifically addressed in this section are outside the scope of this evaluation.

4. Product Description and Materials:

4.1. ECOMAXci™ Wall Solution and EVOMAXci™ are proprietary foam plastic insulating sheathing (FPIS) systems.

4.1.1. ECOMAXci™ and EVOMAXci™ are proprietary polyisocyanurate insulation board that includes a glass fiber reinforced aluminum foil facer material on both sides.

4.1.2. R-SEAL 3000 is a joint sealing tape with a nominal 2 mil aluminum foil backing and acrylic pressure-sensitive adhesive.

4.1.3. R-SEAL 6000 is self-sealing, through-wall flashing tape with a nominal 35 mil black woven polyethylene membrane backing and butyl rubber adhesive.

Figure 1: ECOMAXci™ Wall Solution and EVOMAXci™ / R-SEAL 3000 and R-SEAL 6000

4.2. Material Availability

4.2.1. Thickness: ¾" (19 mm) through 4 ½" (76 mm)

4.2.2. Standard product width: 48" (1219 mm)

4.2.3. Standard lengths: 96" (2438 mm) and 144" (3658 mm)

5. Applications:

5.1. General

5.1.1. ECOMAXci™ Wall Solution and EVOMAXci™ are FPIS complying with *IBC* Section 2603.

5.1.2. ECOMAXci™ Wall Solution and EVOMAXci™ shall not be used as a nail base for other building products.

5.1.3. Stud walls insulated with ECOMAXci™ Wall Solution and EVOMAXci™ must be properly braced for lateral loads according to the requirements of local building codes.

5.1.4. The system must be designed to handle cladding load and wind load per the applicable code.

5.1.5. Where the application exceeds the limitations set forth herein, design shall be permitted in accordance with accepted engineering procedures, experience, and good technical judgment.

5.2. Thermal Resistance (R-Value)

5.2.1. ECOMAXci™ and EVOMAXci™ meet the continuous insulated sheathing requirements complying with the provisions of *IECC* Section C402.

5.2.2. ECOMAXci™ and EVOMAXci™ have the following R-Values:

ECOMAXci™ and EVOMAXci™ R-Values	
Nominal Thickness	**Thermal R-Value[1]**
0.75"	5.0
1.0"	6.5
1.15"	7.6
1.5"	10.0
2.0"	13.1
2.5"	16.7
3.0"	20.3

1. Thermal values are determined using the *ASTM C518* test method at 75° mean temperature on material conditioned according to *ASTM C1289* Section 11.1.

Table 1: ECOMAXci™ and EVOMAXci™ R-Values

5.3. Water-Resistive Barrier

5.3.1. ECOMAXci™ Wall Solution and EVOMAXci™ may be used as a WRB as prescribed in *IBC* Section 1404.2 when installed on exterior walls as described in this section and the manufacturer's installation instructions.

5.3.2. ECOMAXci™ Wall Solution and EVOMAXci™ shall be installed with vertical board joints placed directly over exterior framing spaced a maximum of 24" (610 mm) o.c. The fasteners used to attach the board shall be installed in accordance with Section 6.

5.3.3. All seams and joints between boards shall be covered by R-SEAL 3000 tape per the manufacturer's installation instructions.

5.3.4. All corners, ceiling and floor transitions, windows, doors and other large through-wall penetrations shall be sealed with R-SEAL 6000 flashing per the manufacturer's installation instructions.

5.3.5. Small through-wall penetrations shall be sealed using a one-part moisture cure sealant.

5.3.6. ECOMAXci™ and EVOMAXci™ have the following water-resistive properties:

ECOMAXci™ and EVOMAXci™ Water-Resistance Properties		
Water Vapor Transmission	*ASTM E96*	< 0.03 Perm
Water Absorption	*ASTM C209*	< 0.2% Volume
1. 1 perm is defined as 1 grain of water vapor per hour, per square foot, per inch of mercury.		

Table 2: ECOMAXci™ and EVOMAXci™ Water-Resistance Properties

5.4. Air Barrier

5.4.1. ECOMAXci™ and EVOMAXci™ meet the requirements of *IECC* Section C402 for use as a component of the air barrier, when installed in accordance with the manufacturer's installation instructions and this TER with all seams, including the top and bottom edges, taped.

ECOMAXci™ and EVOMAXci™ Air Barrier Properties	
ASTM E2178	< 0.005 L/(s.m^2) [1]
1. Liter per second per square meter	

Table 3: ECOMAXci™ and EVOMAXci™ Air Barrier Properties

5.4.2. The air permeance of an air barrier material is defined by the *IECC* and the and Air Barrier Association of America (ABAA) as being no greater than 0.02 liter per second per square meter (L/(s.m^2)) at 75 Pa pressure difference when tested in accordance with *ASTM E2178 – Standard Test Method for Air Permeance of Building Materials*.

5.4.3. ECOMAXci™ Wall Solution and EVOMAXci™ meet the requirements of *IECC* Section C402 for use as an air barrier assembly, when installed in accordance with the manufacturer's installation instructions and this TER with all seams, including the top and bottom edges, taped.

ECOMAXci™ and EVOMAXci™ Wall Solution Air Barrier Properties	
ASTM E2357 and CAN/ULC-S742	< 0.05 L/(s.m^2)

Table 4: ECOMAXci™ and EVOMAXci™ Wall Solution Air Barrier System Properties

5.4.3.1. The air permeance of an air barrier assembly is defined by the *IECC* and ABAA as being no greater than 0. 2 L/(s.m^2) at 75 Pa pressure difference when tested in accordance with *ASTM E2357 – Standard Test Method for Determining Air Leakage of Air Barrier Assemblies*.

5.4.3.2. ECOMAXci™ Wall Solution and EVOMAXci™ are classified as an A1air barrier assembly per *CAN/ULC*-S742.

5.4.3.3. ECOMAXci™ Wall Solution and EVOMAXci™ shall be installed with vertical board joints placed directly over exterior framing spaced a maximum of 24" (610 mm) o.c. The fasteners used to attach the board shall be installed in accordance with Section 6.

5.4.3.4. All seams and joints between boards shall be covered by R-SEAL 3000 tape per the manufacturer's installation instructions.

5.4.3.5. All corners, ceiling and floor transitions, windows, doors and other large through-wall penetrations shall be sealed with R-SEAL 6000 flashing per the manufacturer's installation instructions.

5.4.3.6. Small through-wall penetrations shall be sealed using a one-part moisture cure sealant.

5.5. Fire Safety Performance

5.5.1. Thermal Barrier

5.5.1.1. ECOMAXci™ and EVOMAXci™ shall be separated from the building interior by a thermal barrier meeting the provisions of *IBC* Section 2603.4, except in one-story buildings, in a thickness of not more than 4", when the building is equipped throughout with an automatic sprinkler system and the foam sheathing is covered by one of the following:

5.5.1.1.1. Minimum 0.032"-thick aluminum

5.5.1.1.2. Minimum 0.016"-thick corrosion resistance steel

5.5.2. Surface Burning Characteristics

Fire Performance of ECOMAXci™ Wall Solution and EVOMAXci™ [1]		
	Flame Spread	**Smoke Developed**
ECOMAXci™ and EVOMAXci™[1]	< 25	< 450

1. Tested in accordance with *ASTM E84*. Flame spread and smoke developed numbers are shown for comparison purposes only and are not intended to represent the performance of ECOMAXci™ Wall Solution and EVOMAXci™ and related components under actual fire conditions.

Table 5: Fire Performance of ECOMAXci™ Wall Solution and EVOMAXci™

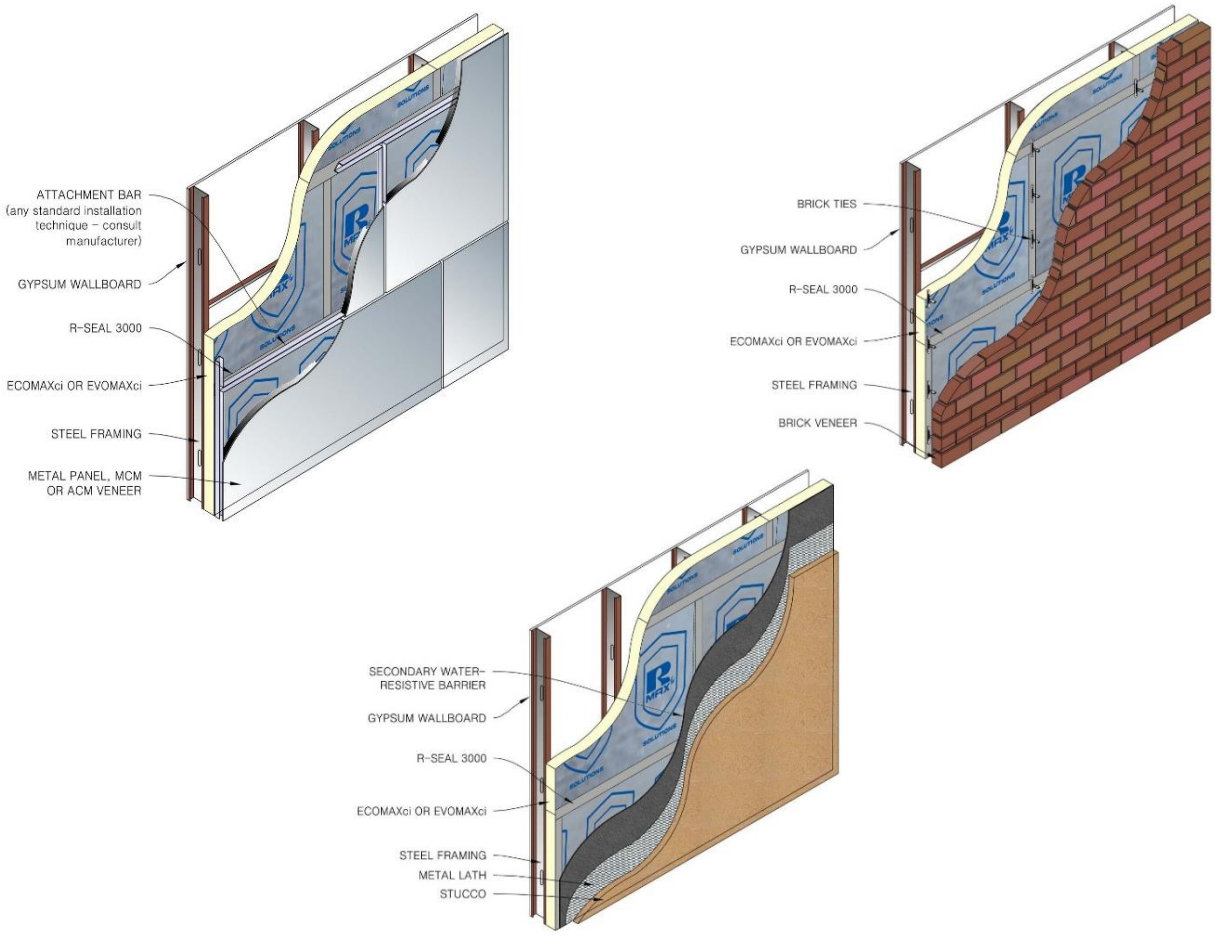

Figure 2: Three examples of Approved *NFPA 285* Tested Assemblies

5.5.3. NFPA 285 Applications

5.5.3.1. ECOMAXci™ and EVOMAXci™ were tested to assess their performance with regard to vertical and lateral fire propagation in accordance with *NFPA 285* and *IBC* Section 2603.5.5.

5.5.3.2. Engineering analysis has also been conducted to assess substitution of other products within the approved wall assemblies.

5.5.3.3. The wall assemblies listed in Table 6 are approved for use in buildings of Type I-IV construction.

Fire Performance – Vertical & Lateral Fire Propagation[1]	
Wall Component	**Materials**
Base Wall System Select option 1, 2 3 or 4 (option) Note: May use 4 optionally when FRTW framing is allowed by code.	1. Cast concrete walls 2. CMU Concrete walls 3. 20 gauge (min) 3 5/8 in. (min.) steel studs space 24" o.c. (max.) ½ in. (min.) type X Special Fire Resistant Gypsum Wallboard Interior 4. Where allowed in Types I, II, III or IV construction, FRTW (fire-retardant-treated wood) studs complying with *IBC* Section 2303.2, min. nominal 2x4 dimension, spaced 24” o.c. (max.) a. 5/8 in. type X Gypsum Wallboard Interior b. Bracing as required by code
Floorline Firestopping As an option, use 2 with FRTW framing	1. 4 pcf mineral wool installed with Z-clips 2. FRTW fire blocking at floor line in accordance with applicable code requirements

Fire Performance – Vertical & Lateral Fire Propagation[1]	
Wall Component	**Materials**
Continued on next page	
Cavity Insulation Select option 1, 2, 3 or 4, 5, 6, 7, 8, 9, 11 12, 13, 14 or 15 Note: Items 5-15 are SPF Foam Type	1. None 2. Any noncombustible insulation per *ASTM E136* 3. Any Mineral Fiber (board type Class A, *ASTM E84* faced or un-faced) 4. Any Fiberglass (batt type Class A *ASTM E84* faced or unfaced) 5. 5 ½ inch (max.) Icynene LD-C-50 spray foam in 6 inch deep studs (max.). Use with 5/8 inch exterior sheathing. 6. 5 ½ inch (max.) Icynene MD-C-200 2 pcf spray foam in 6 inch deep studs (max.) full fill without an air gap. Use with 5/8 inch exterior sheathing. 7. 5 ½ inch (max.) Icynene MD-R-210 2 pcf spray foam in 6 inch deep studs (max.) full fill without an air gap. Use with 5/8 inch exterior sheathing 8. SWD Urethane QS 112 2 pcf spray foam in 6 inch deep studs (max.) partial fill with a maximum 2 ½ inch air gap or full fill. Use with 5/8 inch exterior sheathing. 9. Gaco Western 83M (3 ½ inch max). Use with 5/8 inch exterior sheathing. 10. Gaco Western F 1850 (3 ½ inch max.). Use with 5/8 inch exterior sheathing. 11. Demilec SEALECTiON 500 (3 5/8 inch max). Use with 5/8 inch exterior sheathing. 12. Deilec HeatLok Soy 200 Plus (3.4 inch max). Use with 5/8 inch exterior sheathing. 13. Bayer Bayseal (3 inch max). Use with 5/8 inch exterior sheathing. 14. Lapolla FoamLok FL 2000 (3 inch max). Use with 5/8 inch exterior sheathing. 15. BASF SprayTite 81206 or WallTite (US & US-N) (3 5/8 inch max). Use with 5/8 inch exterior sheathing.
Exterior Sheathing Select option 1, 2 or 3 Note: exterior FRTW sheathing or gypsum board is optional for Base Walls 1 and 2. When SPF is used, 5/8 inch exterior gypsum sheathing must be used.	1. ½"-thick or thicker, exterior gypsum board sheathing 2. None (for 3 in. max. exterior insulation with claddings 7-12 or 4 ½ in. max. exterior insulation with claddings 1-6) 3. ½" (min.) FRTW structural panels complying with *IBC* Section 2303.2 and installed in accordance with code allowances for Types I, II, III or IV construction.
Continued on next page	

Fire Performance – Vertical & Lateral Fire Propagation[1]	
Wall Component	**Materials**
Weather-Resistive Barrier Applied to Exterior Sheathing Select option 1 or 2 installed per manufacturer's installation instructions. Note 1: when using exterior sheathing, option 2 (no exterior sheathing) items 2 a-d may be applied directly to studs. NLA = No Longer Available. Replace with Spraywrap MVP.	1. None 2. Any WRB tested in accordance with *ASTM E1354* (at a minimum of 20 kW/m^2 heat flux) and shown by analysis to be less flammable (improved T_{ign}, Pk. HRR) than the baseline WRB or exterior insulation foam core. The following WRB products are allowed (item t. based on *NFPA 285*): a. Pactiv Green Guard®Max Building Wrap b. Dupont Tyvek® (Various per ESR 2375) c. DOW WeatherMate™ d. DOW WeatherMate™ Plus e. Carlisle (CCW) Fire Resist 705FR-A f. Carlisle CCW Fire Resist Barritech NP g. Carlisle CCW Fire Resist Barritech VP h. BASF Enershield HP i. BASF Enershield I j. Henry Air Bloc 31MR k. Henry EnviroCap l. Henry Air Bloc 33MR m. Henry Air Bloc 21 FR n. Henry VP 160 o. Henry Air Bloc 17 p. Henry BlueSkin SA q. Henry FoilSkin r. Henry MetalClad s. Henry 32MR t. Soprema Stick VP or Soprasolin HD u. Soprema 1100T or Sopraseal Xpress G v. Prosoco R-Guard Spray Wrap (NLA) w. Prosoco R-Guard MVP (NLA) x. Prosoco Spraywrap MVP y. Prosoco R-Guard VB z. Prosoco R-Guard Cat 5 aa. Vaproshield Revealshield SA bb. Vaproshield Wrapshield SA cc. Pecora XL-PermULTRA VP (10 mil DFT) dd. W.R. Grace PAB NPL 10 ee. W.R. Grace PAB VPL ff. W.R. Grace PAB VPL LT gg. W.R. Grace PAB VPS hh. W.R. Grace PAB AWM ii. W.R. Grace PAB VPL 50 jj. Dryvit Backstop NT
Exterior Insulation Use either 1, 2, or 3 Note: See Exterior sheathing options for thickness limitations when no exterior sheathing is used.	4 ½ in. (max. consisting of a single panel or multiple thinner panels) Rmax ECOMAXci™ or EVOMAXci™ (for Claddings 1-12)
FRTW Structural Panels over Exterior Insulation (Optional)	For use with cladding options 1-12, installed in accordance with applicable code requirements. Must be applied with joints staggered. Fasteners used for securing FRTW panels must penetrate through the foam plastic into FRTW or steel framing. The system must be designed to handle the cladding load and wind load per the applicable code.
Continued on next page	

Fire Performance – Vertical & Lateral Fire Propagation[1]	
Wall Component	**Materials**
Weather-Resistive Barrier Applied over Exterior Insulation (or FRTW) Use any item 1) a-ff for claddings 1-6 with non-open joint installation technique. Or any item 2) a-h for all approved claddings 1-12 below. Note: Exterior WRB items 1 b-d and 2 b-d are not traditional WRB products but are insulation panel joint tapes. The insulation panel joints shall be staggered. These tapes are listed to allow use in both categories 1-6 OR 1-12. NLA = No longer available. Replaced with Spraywrap MVP	1. For use with cladding options 1-6 (Brick Equivalent) with non-open joint installation techniques (ex. shiplap, etc.) a. None b. 6 in. (max.) Venture Tape CW over insulation joints c. 6 in. (max.) Rmax R-SEAL 3000 over insulation joints d. 6 in. (max.) asphalt or butyl based tape, or liquid flashing over insulation joints e. Pactiv Green Guard®Max Building Wrap f. Dupont Tyvek® (Various per 2375) g. Dow Weathermate™ h. Dow Weathermate™ Plus i. Soprema Stick VP or Soprasolin HD j. Carlisle (CCW) Fire Resist 705FR-A k. Carlisle (CCW) Fire Resist Barritech NP l. Carlisle (CCW) Fire Resist Barritech VP m. Henry Air Bloc 31MR n. Henry Envirocap o. Henry Air Bloc 33MR p. Henry Air Bloc 21 FR q. Henry Air Bloc 17 r. Henry FoilSkin s. Henry MetalClad t. Prosoco R-Guard Spray Wrap (NLA) u. Prosoco R-Guard MVP (NLA) v. Prosoco Spraywrap MVP w. Prosoco R-Guard VB x. Prosoco R-Guard Cat 5 y. Vaproshield Revealshield SA z. Vaproshield Wrapshield SA aa. Pecora XL-PermULTRA VP (10 mil DFT) bb. W.R. Grace PAB VPL cc. W.R. Grace PAB VPL LT dd. W.R. Grace PAB VPS ee. W.R. Grace PAB AWM ff. Dryvit Backstop NT 2. For use with all approved claddings 1-12 as listed below: a. None b. 6 in. (max.) Venture Tape CW over insulation joints c. 6 in. (max.) Rmax R-Seal 3000 over insulation joints d. 6 in. (max.) asphalt or butyl based tape, or liquid flashing over insulation joints e. Henry FoilSkin f. Henry MetalClad g. Carlisle (CCW) Fire Resist 705FR-A h. W.R. Grace PAB AWM i. Soprema Soprasolin HD
Continued on next page	

Fire Performance – Vertical & Lateral Fire Propagation[1]	
Wall Component	**Materials**
Exterior Cladding Select option 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 or 12 Note: For WRB over exterior insulation options 1) a-ee above, claddings 1-6 shall incorporate non-open joints. Note: WRB over exterior insulation items 1) b-d and 2) b-d are panel joint tapes allowed for all claddings. The panel joints shall be staggered.	1. Brick - nominal 4" clay brick or veneer with a maximum 2 in. air gap behind brick. Brick ties/anchors –24" o.c. (max.) 2. Stucco – Minimum ¾"-thick, exterior cement plaster and lath with an optional secondary water resistive barrier between the exterior insulation and lath. The secondary barrier shall not be full-coverage asphalt or butyl-based self-adhered membranes. 3. Limestone - minimum 2" thick any using standard installation technique. 4. Natural Stone Veneer – Minimum 2 in. thick using any standard installation technique. 5. Cast Artificial Stone -- Minimum 1 ½ in. thick complying with ICC-ES AC 51 using any standards installation technique. 6. Terra Cotta Cladding – Minimum 1 ¼ in. thick using any standard installation technique. 7. Any MCM or ACM (aluminum, steel, copper, zinc) (w/11/8 in. ± ½ in. air gap) that has successfully passed *NFPA 285* using any standard installation technique, such as • Carter Companies EVO Architectural Panel Systems for use with any FR ACM/MCM *NFPA 285* material 8. Uninsulated sheet metal building panels including aluminum, steel or copper using any standard installation technique. 9. Uninsulated fiber-cement board siding using any standard installation technique. 10. Stone/Aluminum honeycomb composite building panels that have passed *NFPA 285* or equivalent. • Stone Panels Inc. Stone Lite Panel system has been analyzed using manufacturer's standard installation technique 11. Autoclaved-aerated- concrete (AAC) panels that have successfully passed *NFPA 285* using any standard installation technique. 12. Thin Set Brick • Glen-Gary Thin Tech™ Elite Series has been analyzed using manufacturer's standard installation technique.
1. All WRBs shall be installed at recommended application rates and per the manufacturer's installation instructions. 2. Window headers for all wall assemblies shall incorporate minimum 0.08" aluminum flashing to cover air gaps between the exterior sheathing or exterior insulation and the exterior veneer. All fenestrations and penetrations shall be flashed in accordance with the applicable code using asphalt, acrylic or butyl based flashing tape, liquid flashing or R-SEAL 6000 polyethylene tape up to 12" maximum width.	

Table 6: Fire Performance – Vertical & Lateral Fire Propagation

5.5.4. Fire Resistance Ratings

5.5.4.1. ECOMAXci™ and EVOMAXci™ have been tested and meets the requirements of *UL 263* in accordance with *IBC* 2603.5.1 for use in the following assembly designs when installed in accordance with the manufacturer's installation instructions and this TER:

5.5.4.1.1. 1-hour: U026, U326, U330, U354, U424, U460, V454

5.5.4.1.2. 2-hour: U905, U906, V499

5.5.4.1.3. 3-hour: U904

5.5.4.1.4. 4-hour: U902, U907

6. Installation:

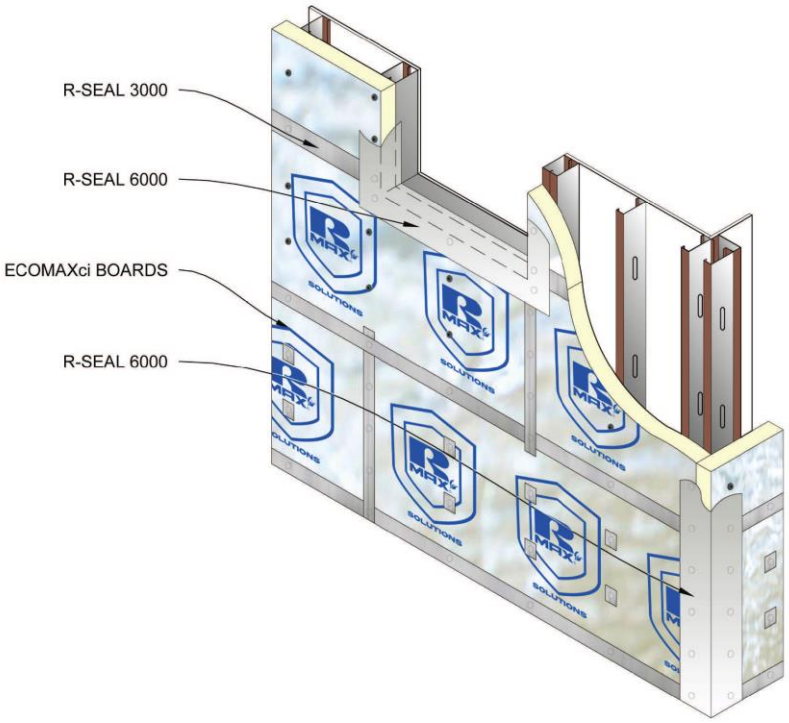

Figure 3: Installation of the ECOMAXci™ Wall System and EVOMAXci™
Note: Install R-SEAL 3000 Tape & R-SEAL 6000 Flashing as Shown to Form Water Shedding Laps

6.1. Refer to the manufacturer's installation instructions, in addition to this TER, for complete details and requirements.

6.2. ECOMAXci™ and EVOMAXci™ shall be applied to wall framing in accordance with Figure 3 as follows:

6.2.1. The insulation boards shall be oriented with the Rmax Solutions shield facing the exterior side of the building.

6.2.2. Each row of insulation shall be staggered a minimum of one stud spacing to the row below. All boards must be tightly abutted together.

6.2.3. At changes in wall directions (corners), the boards shall fit snugly in an overlap.

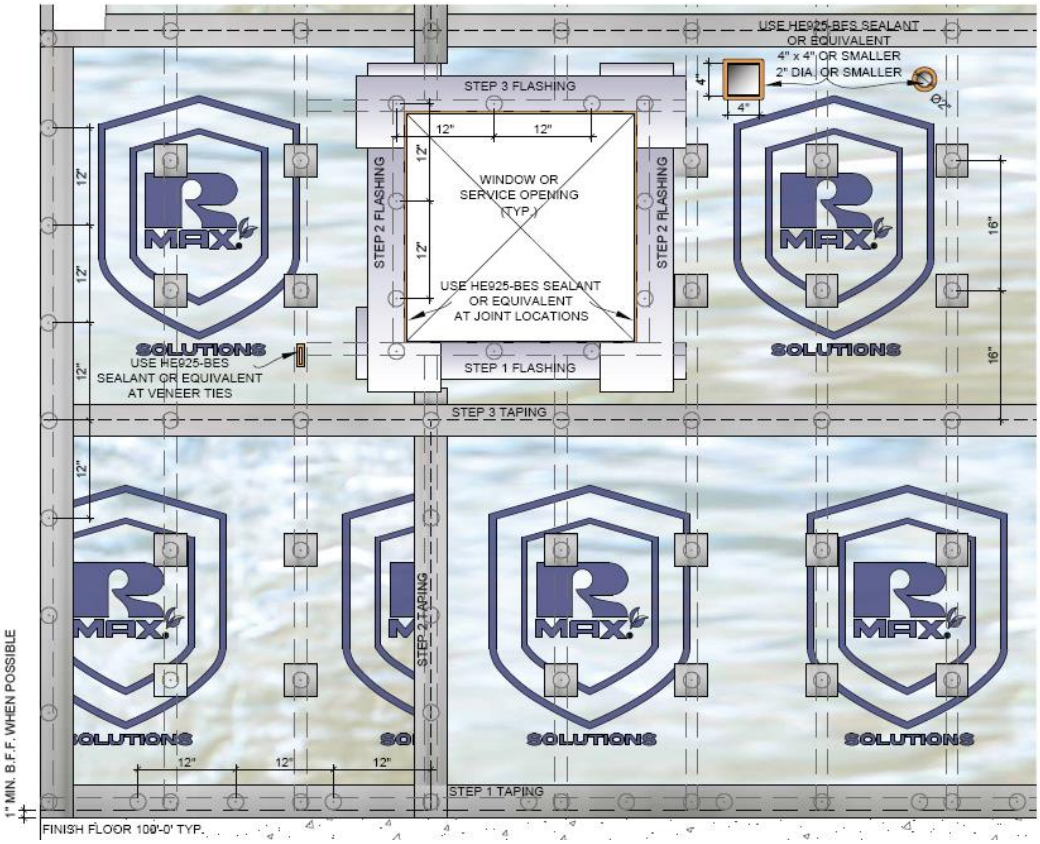

Figure 4: ECOMAXci™ and EVOMAXci™ Fastener & Flashing Application

6.3. ECOMAXci™ and EVOMAXci™ fastener application shall be in accordance with Figure 4 as follows:

6.3.1. Insulation fastener components shall include a minimum 2"-diameter plastic plate/washer and self-taping steel screw.

6.3.2. Plates/washers shall be snug and flush with the board surface. Plates/washers should never break the foil facing of the boards, nor should the plate/washer crown be counter sunk.

6.3.3. Each insulation board shall be secured with a fastening pattern of 12" o.c. along the edge of each exterior wall facade and at the perimeter of each board where backed by framing. The pattern shall be 16" o.c. in the field along framing.

6.4. R-SEAL 3000 application shall be in accordance with Figure 4 and Figure 5 as follows:

6.4.1. 4"-wide R-SEAL 3000 shall be used to seal all joints of adjacent insulation boards, as well as cover all insulation fasteners. It can also be used to repair minor damages to the foil facer of the ECOMAXci™ Wall Solution and EVOMAXci™.

6.5. R-SEAL 6000 application shall be as follows:

6.5.1. 9"- or 12"-wide R-SEAL 6000 must be used to seal at corners, ceiling and floor transitions, windows, doors and other large through-wall penetrations. Refer to the R-SEAL 6000 data sheet for specific details on appropriate installation conditions.

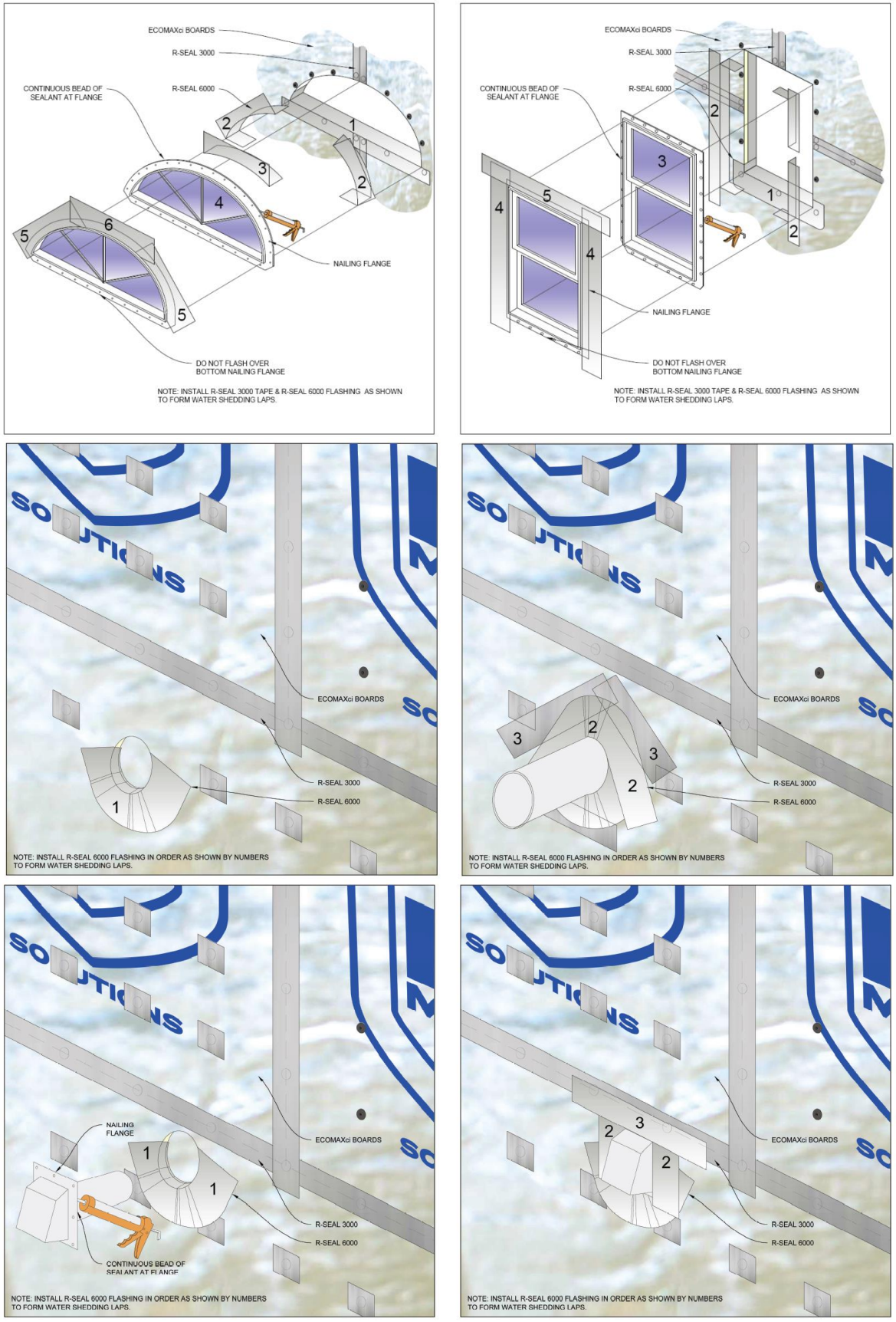

Figure 5: Applicaton of R-SEAL 3000 & R-SEAL 6000 Wall Asembly Penetrations

7. Test and Engineering Substantiating Data:

7.1. Test reports and data supporting the following material and structural properties:

7.1.1. Material properties in accordance with *ASTM C1289*, performed by Exova.

7.1.2. Flame spread and smoke developed ratings in accordance with *ASTM E84*, performed by Intertek.

7.1.3. Fire performance criteria in accordance with *NFPA 285*, performed by Intertek.

7.1.4. Water-resistance properties in accordance with *ASTM E331*, performed by ATI.

7.1.5. Water permeance in accordance with *ASTM E96*, performed by Exova.

7.1.6. Water absorption in accordance with *ASTM C209*, performed by Radco.

7.1.7. Water-resistance properties in accordance with *AATCC 127*, performed by ATI.

7.1.8. Air barrier criteria for air barrier materials and air barrier assembly in accordance with ABAA.

7.1.9. Air permeance in accordance with *ASTM E2178*, performed by Exova.

7.1.10. Air leakage in accordance with *ASTM E2357 and CAN/ULC-S742*, performed by Exova.

7.1.11. Thermal resistance properties in accordance with *ASTM C518*, performed by Exova.

7.1.12. Underwriters Laboratories Fire-Resistance Directory Listing

7.2. Manufacturer installation instructions.

7.3. Test reports and data for determining comparative equivalency for use as an alternative material in accordance with *IBC* Section 104.11.

7.4. The product(s) evaluated by this TER falls within the scope of one or more of the model, state or local building codes for building construction. The testing and/or substantiating data used in this TER is limited to buildings, structures, building elements, construction materials and civil engineering related specifically to buildings.

7.5. The provisions of model, state or local building codes for building construction do not intend to prevent the installation of any material or to prohibit any design or method of construction. Alternatives shall use consensus standards, performance-based design methods or other engineered alternative means of compliance. This TER assesses compliance with defined standards, generally accepted engineering analysis, performance-based design methods, etc. in the context of the pertinent building code requirements.

7.6. Some information contained herein is the result of testing and/or data analysis by other sources, which DrJ relies on to be accurate as it undertakes its engineering analysis.

7.7. DrJ has reviewed and found the data provided by other professional sources are credible. This information has been approved in accordance with DrJ's procedure for acceptance of data from approved sources.

7.8. DrJ's responsibility for data provided by approved sources is in accordance with professional engineering law.

7.9. Where appropriate, DrJ relies on the derivation of design values, which have been codified into law through codes and standards (e.g., *IRC*, *WFCM*, *IBC*, *SDPWS*, etc.). This includes review of code provisions and any related test data that helps with comparative analysis or provides support for equivalency to an intended end-use application.

8. Findings:

8.1. ECOMAXci™ Wall Solution and EVOMAXci™ described in this TER comply with, or is a suitable alternative to, the applicable sections of the codes listed in Section 2.

8.2. *IBC* Section 104.11 and *IRC* Section R104.11 (*IFC* Section 104.9 is similar) state:

> **104.11 Alternative materials, design and methods of construction and equipment.** The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *building official* finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, at

> least the equivalent of that prescribed in this code. … Where the alternative material, design or method of construction is not *approved*, the *building official* shall respond in writing, stating the reasons the alternative was not *approved*.[2]

8.3. This product has been evaluated with the codes listed in Section 2, and is compliant with all known state and local building codes. Where there are known variations in state or local codes that are applicable to this evaluation, they are listed here:

8.3.1. No known variations.

8.4. This TER uses professional engineering law, the building code, *ANSI/ASTM* consensus standards and generally accepted engineering practice as its criteria for all testing and engineering analysis. DrJ's professional engineering work falls under the jurisdiction of each state Board of Professional Engineers, when signed and sealed.

9. Conditions of Use:

9.1. Where required by the authority having jurisdiction (AHJ) in which the project is to be constructed, this report and the installation instructions shall be submitted at the time of permit application.

9.2. Any generally accepted engineering calculations needed to show compliance with this TER shall be submitted to the code official for review and approval.

9.3. Design loads shall be determined in accordance with the building code adopted by the jurisdiction in which the project is to be constructed.

9.4. ECOMAXci™ and EVOMAXci™ are subject to the following conditions:

9.4.1. This TER and the installation instructions, when required by a code official, shall be submitted at the time of permit application.

9.4.2. When the insulation boards are used on exterior walls of buildings of Type I, II, III or IV, construction must be as described in Section 5.5.3.

9.4.3. The product shall be fully protected from the interior of the building by an approved thermal barrier or ignition barrier as required by the applicable code.

9.4.4. In areas where the probability of termite infestation is very heavy, in accordance with *IBC* Section 2603.8, the product must not be placed on exterior walls located within 6" (152 mm) of the ground.

9.4.5. This product is not to be used as a structural nailing base for claddings.

9.4.6. Use of the insulation boards to resist structural loads is outside the scope of this TER. Walls shall be braced by other materials in accordance with the applicable code, and the exterior wall covering shall be capable of resisting the full design wind pressure.

9.4.7. ECOMAXci™ Wall Solution and EVOMAXci™ are manufactured in Dallas, TX; Fernley, NV; and Greer, SC, under a quality control program with quality control inspections in accordance with *IBC* Section 110.3.8 and 110.3.9.

9.5. Design

9.5.1. Building Designer Responsibility

9.5.1.1. Unless the AHJ allows otherwise, the Construction Documents shall be prepared by a Building Designer (e.g., Owner, Registered Design Professional, etc.) for the Building and shall be in accordance with *IRC* Section R106 and *IBC* Section 107.

9.5.1.2. The Construction Documents shall be accurate and reliable and shall provide the location, direction and magnitude of all applied loads and shall be in accordance with *IRC* Section R301 and *IBC* Section 1603.

9.5.2. Construction Documents

9.5.2.1. Construction Documents shall be submitted to the Building Official for approval and shall contain the plans, specifications and details needed for the Building Official to approve such documents.

[2] The last sentence is adopted language in the 2015 codes.

9.6. Responsibilities

9.6.1. The information contained herein is a product, engineering or building code compliance research report performed in accordance with the referenced building codes, testing and/or analysis through the use of accepted engineering procedures, experience and good technical judgment.

9.6.2. DrJ research reports provide an assessment of only those attributes specifically addressed in the Products Evaluated or Code Compliance Process Evaluated section.

9.6.3. The engineering evaluation was performed on the dates provided in this TER, within DrJ's professional scope of work.

9.6.4. This product is manufactured under a third-party quality control program in accordance with *IRC* Section R104.4 and R109.2, and *IBC* Section 104.4 and 110.4.

9.6.5. The actual design, suitability and use of this research report for any particular building is the responsibility of the Owner or the Owner's authorized agent, and the report shall be reviewed for code compliance by the Building Official.

9.6.6. The use of this TER is dependent on the manufacturer's in-plant QC, the ISO/IEC 17020 third-party inspection process, proper installation per the manufacturer's instructions, the Building Official's inspection and any other code requirements that may apply to assure accurate compliance with the applicable building code.

10. Identification:

10.1. ECOMAXci™ and EVOMAXci™ described in this TER are identified by a label on the board or packaging material bearing the manufacturer's name, product name, label of the third-party inspection agency, and other information to confirm code compliance.

10.2. Additional technical information can be found at Rmax.com.

11. Review Schedule:

11.1. This TER is subject to periodic review and revision. For the most recent version of this report, visit drjengineering.org.

11.2. For information on the current status of this report, contact DrJ Engineering.

- Mission and Professional Responsibilities
- Product Evaluation Policies
- Product Approval – Building Code, Administrative Law and P.E. Law

SOUTHERN FOREST PRODUCTS ASSOCIATION®

NEWS

FOR IMMEDIATE RELEASE

July 25, 2012

Contact: Richard Wallace
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rwallace@sfpa.org
@Southern_Pine

Comprehensive Testing of Southern Pine Lumber Completed

Preliminary Analysis Suggests Smaller Reductions than Originally Projected

The latest full In-Grade Testing matrix for visually graded Southern Pine dimension lumber has been completed by the Southern Pine Inspection Bureau (SPIB) in cooperation with Timber Products Inspection and others. In a two-step process, more than 7,400 full-size samples of commercially-produced Southern Pine were destructively tested. As the first step, No.2 2x4s were tested which resulted in new design values for Southern Pine sized 2" to 4" wide and 2" to 4" thick in No.2 Dense and lower grades on an interim basis; new design values for **only** those sizes and grades became effective June 1, 2012, pending the potential for slight adjustments based on results from additional testing in step two.

As the second step, Select Structural (SS) 2x4s, No.2 and SS 2x8s, and No.2 and SS 2x10s were tested to complete the full In-Grade Testing matrix. SPIB and Timber Products collected the test specimens according to a sampling plan approved by the American Lumber Standard Committee Board of Review (ALSC BOR). Destructive tests in bending, tension and compression were then conducted while gathering stiffness and other property data, all in accordance with ASTM International standards. Throughout the entire process, technical oversight was provided by the USDA Forest Products Laboratory.

As a rules-writing agency, SPIB must also follow a rigorous approval process to establish new design values for all sizes and grades of visually graded Southern Pine dimension lumber. SPIB began the approval process by performing a preliminary analysis of the complete In-Grade Testing data in conformance with consensus standard ASTM D1990, *Standard Practice for Establishing Allowable Properties for Visually-Graded Dimension Lumber from In-Grade Tests of Full-Size Specimens*.

The SPIB Technical Committee met on July 18-19, 2012 to review the test data and the preliminary data analysis of the full In-Grade Testing matrix. This committee includes technical representatives of lumber producers, general interest and key user groups, such as home builders and component manufacturers. The preliminary data analysis suggests smaller reductions for the wider widths and higher grades as compared to the No.2 2x4s, and even some small increases as compared to current design values. While it is too early in the approval process to make any business decisions, SPIB has posted proposed design values here; these values are subject to change during the ongoing analysis and approval process. Some generalized ranges of potential changes and adjustments have been summarized in Table 1.

Table 1 – Approximate Design Value Changes* for Southern Pine 2x6s through 2x12s (all visual grades) and 2x4s (SS and No.1)

Property	Approximate Design Value Changes*
Bending	-15% to -25%
Tension	-150 psi to +50 psi
Compression Parallel	-10%
Modulus of Elasticity	-100,000 psi to No change
Shear	No change
Compression Perpendicular	No change

* Compared to current design values that were not changed based only on No.2 2x4 tests.
Subject to adjustment during the ongoing analysis and approval process.

The preliminary data analysis of the full In-Grade Testing matrix combines all data from steps one and two to provide the best estimates of design values. This analysis suggests upward revisions to some of the design values that became effective June 1, 2012 based only on No.2 2x4 test data. Table 2 provides potential adjustments to the June 1 design values for Southern Pine sized 2" to 4" wide and 2" to 4" thick in No.2 Dense and lower grades.

Table 2 – Approximate Design Value Adjustments* for Southern Pine 2x4s (No.2 and lower grades)

Property	Approximate Design Value Adjustments*
Bending	+25 psi to +50 psi
Tension	No change
Compression Parallel	+40%
Modulus of Elasticity	No change to +100,000 psi

*Compared to design values effective June 1, 2012 based only on No.2 2x4 tests.
Subject to change during the ongoing analysis and approval process.

The SPIB Technical Committee made the following recommendations to the SPIB Board of Governors, the next step in the approval process, based on the preliminary data analysis following ASTM D1990:

- Approval of all new design values for visually graded Southern Pine lumber, including Dense and NonDense grades
- No change in the current Southern Pine specific gravity value of 0.55
- Prime grades (No.1 Prime and No.2 Prime) continue to have the same design values as their corresponding dimension lumber grades

Potential Timeline for Next Steps:

1) **August, 2012** – SPIB Board of Governors meeting to approve proposed design values. The SPIB Board of Governors considers recommendations from the SPIB Technical Committee and other pertinent information before making a final determination.
2) **September, 2012** – SPIB submittal of proposed design values to the ALSC BOR. The Forest Products Laboratory will review the data, calculations, and resulting proposed design values to ensure conformance with ASTM D1990.
3) **October 18, 2012** – ALSC BOR meeting to hear testimony from interested parties. The ALSC BOR considers all input before making a final decision.
4) **Date To Be Determined** – Effective date for new design values for all grades and sizes of visually graded Southern Pine dimension lumber. The ALSC BOR evaluates each case individually, so the exact recommended effective data is unknown at this time. In the case of the proposed Southern Pine design values based on only No.2 2x4 tests, the ALSC BOR ruled in January 2012 with a recommended effective date of June 1, 2012, providing six months for an orderly transition.

Transition

The intent of the six-month transition period was to minimize project delays and supply chain disruptions by providing time to manage the design values changes for Southern Pine 2x2s thru 4x4s in No.2 Dense and lower grades. The June 1 effective date allowed producers and key customer groups time to evaluate and prepare for the potential impact on their businesses. Southern Pine users were encouraged to establish and begin implementing transition plans as soon as possible. As a result, most producers and customers have successfully transitioned to the June 1 design values with minimal disruptions to their operations.

New design values only apply to new construction, not existing construction. Building codes reference design values certified by the ALSC BOR in accordance with *American Softwood Lumber Standard DOC PS 20*. The American Wood Council (AWC) publishes these design values in a supplement to the code-referenced *National Design Specification® (NDS®) for Wood Construction*, titled *Design Values for Wood Construction.* AWC developed addenda and other updates to use with new construction designed in accordance with its standards and

design tools. Building codes also include span tables and other prescriptive requirements that need to be amended to reflect new design values. Visit www.awc.org to download the AWC *Addendum to Design Values for Wood Construction*, revised prescriptive span tables and other updates to AWC's standards and design tools. Also visit www.southernpine.com to obtain easy-to-use span tables for specific grades and sizes of Southern Pine lumber.

Southern Pine remains strong, dependable

"This preliminary analysis delivers positive results for Southern Pine lumber producers and their customers," says Cathy Kaake, SFPA's vice president of technical marketing. "For example, with no change to its specific gravity, Southern Pine retains its superior fastener and connector-holding ability, and that's good news for component manufacturers and other users," Cathy adds.

SFPA continues to support an orderly transition to new design values. Since October of last year, SFPA has facilitated discussions among producers, component manufacturers, treaters, builders, dealers and other customer groups. Those efforts helped form a united consensus that a transition period would prove beneficial. By June 1, many businesses had transitioned to the new values with minimal disruptions to their operations. "Moving forward, SFPA and allied groups will encourage the ALSC Board of Review to once again recommend a six-month transition period after certification of new design values for all grades and sizes," says Cathy.

Southern Pine is the most-tested lumber species and will continue to be tested on an annual basis. The strength and stiffness of Southern Pine remains comparable to other softwood species used in residential and commercial construction. Southern Pine users have many available product options including visually graded dimension lumber and an increasing supply of mechanically graded lumber.

BACKGROUND: The last major change for visually graded dimension lumber occurred in 1991 when design values for Southern Pine and other North American species were published based on In-Grade testing of full-size samples of commercially produced lumber. Since 1994, SPIB has conducted an annual resource monitoring program developed in collaboration with the U.S. Forest Products Laboratory (FPL). SPIB is the first rules-writing agency to publish new design values. Rules-writing agencies responsible for other species are in different stages for evaluating design values.

SFPA does not test lumber or establish design values. SFPA's primary function is to market lumber products and to help users understand Southern Pine grading rules and design values.

More information about Southern Pine design values is available at www.southernpine.com. An in-depth webinar pertaining to the June 1 design values issued by SPIB can be viewed here.

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SFPA is a nonprofit trade association that has represented manufacturers of Southern Pine lumber since 1915. Today, SFPA is the leading source of information about Southern Pine products for design-build professionals and consumers.

www.southernpine.com **www.sfpa.org** **@Southern_Pine**

Supplement No. 9
to the Southern Pine Inspection Bureau 2002 Grading Rules
Effective June 1. 2012

This supplement makes no changes in the provisions of the 2002 SPIB Standard Grading Rules except the changes to the design values as listed in Tables 1.A, 3, 6, and 7.

TABLE 1.A - STRUCTURAL LIGHT FRAMING - 2" To 4" Thick

Grade	Extreme Fiber in Bending (psi) "F_b"	Tension Parallel To Grain (psi) "F_t"	Horizontal Shear (psi) "F_v"	Compression Perpendicular To Grain (psi) "$F_{c\perp}$"	Compression Parallel To Grain (psi) "$F_{c//}$"	Modulus of Elasticity (million psi) "E"
Kiln Dried or S-Dry, MC 15, MC 19						
APPLIES TO 2" - 4" THICK – 2" - 4" WIDE ONLY						
No. 2 Dense	1150	750	175	660	1250	1.5
No. 2	1050	650	175	565	1100	1.4
No. 2 N	975	575	175	480	1050	1.2
No. 3 & Stud	600	375	175	565	625	1.2

TABLE 3 - LIGHT FRAMING- 2" To 4" Thick

Grade	Extreme Fiber in Bending (psi) "F_b"	Tension Parallel To Grain (psi) "F_t"	Horizontal Shear (psi) "F_v"	Compression Perpendicular To Grain (psi) "$F_{c\perp}$"	Compression Parallel To Grain (psi) "$F_{c//}$"	Modulus of Elasticity (million psi) "E"
Kiln Dried or S-Dry, MC 15, MC 19						
APPLIES TO 2" - 4" THICK – 2" - 4" WIDE ONLY						
Construction	800	500	175	565	1150	1.3
Standard	450	275	175	565	950	1.2
Utility	200	125	175	565	625	1.1

TABLE 6 - MIXED SOUTHERN PINE (Virginia Pine and Pond Pine) - 2" To 4" Thick STRUCTURAL LIGHT FRAMING

Grade	Extreme Fiber in Bending (psi) "F_b"	Tension Parallel To Grain (psi) "F_t"	Horizontal Shear (psi) "F_v"	Compression Perpendicular To Grain (psi) "$F_{c\perp}$"	Compression Parallel To Grain (psi) "$F_{c//}$"	Modulus of Elasticity (million psi) "E"
Kiln Dried or S-Dry, MC 15, MC 19						
APPLIES TO 2" - 4" THICK – 2" - 4" WIDE ONLY						
No. 2	1050	650	175	565	1100	1.4
No. 3 & Stud	600	375	175	565	625	1.2

TABLE 7 - MIXED SOUTHERN PINE (Virginia Pine and Pond Pine) LIGHT FRAMING- 2" To 4" Thick

Grade	Extreme Fiber in Bending (psi) "F_b"	Tension Parallel To Grain (psi) "F_t"	Horizontal Shear (psi) "F_v"	Compression Perpendicular To Grain (psi) "$F_{c\perp}$"	Compression Parallel To Grain (psi) "$F_{c//}$"	Modulus of Elasticity (million psi) "E"
Kiln Dried or S-Dry, MC 15, MC 19						
APPLIES TO 2" - 4" THICK – 2" - 4" WIDE ONLY						
Construction	800	500	175	565	1150	1.3
Standard	450	275	175	565	950	1.2
Utility	200	125	175	565	625	1.1

Approved by the Board of Governors of the Southern Pine Inspection Bureau.
Approved by the Board of Review of the American Lumber Standard Committee.

SOUTHERN PINE REFERENCE DESIGN VALUES

Based on SPIB Grading Rules and AWC National Design Specification®
Values in pounds per square inch (psi)

Table 1 Dimension Lumber – 2″ to 4″ thick, 2″ and wider

New Design Values Effective June 1, 2012

Based on Normal Load Duration and Dry Service (MC≤ 19%) — See Tables A-1 thru A-4 for Adjustment Factors

Size	Grade	Bending F_b	Tension Parallel to Grain F_t	Shear Parallel to Grain F_v	Compression Perpendicular to Grain $F_{c\perp}$	Compression Parallel to Grain F_c	Modulus of Elasticity E	Modulus of Elasticity E_{min}
2″ to 4″ thick, 2″ to 4″ wide Includes: 2x2 2x3 2x4 3x3 3x4 4x4	Dense Select Structural	3050	1650	175	660	2250	1,900,000	690,000
	Select Structural	2850	1600	175	565	2100	1,800,000	660,000
	NonDense Select Struc	2650	1350	175	480	1950	1,700,000	620,000
	No.1 Dense	2000	1100	175	660	2000	1,800,000	660,000
	No.1	1850	1050	175	565	1850	1,700,000	620,000
	No.1 NonDense	1700	900	175	480	1700	1,600,000	580,000
	No.2 Dense	1150	750	175	660	1250	1,500,000	550,000
	No.2	1050	650	175	565	1100	1,400,000	510,000
	No.2 NonDense	975	575	175	480	1050	1,200,000	440,000
	No.3 and Stud	600	375	175	565	625	1,200,000	440,000
	Construction	800	500	175	565	1150	1,300,000	470,000
	Standard	450	275	175	565	950	1,200,000	440,000
	Utility[1]	200	125	175	565	625	1,100,000	400,000
2″ to 4″ thick, 5″ to 6″ wide Includes: 2x5 2x6 3x5 3x6 4x5 4x6	Dense Select Structural	2700	1500	175	660	2150	1,900,000	690,000
	Select Structural	2550	1400	175	565	2000	1,800,000	660,000
	NonDense Select Struc	2350	1200	175	480	1850	1,700,000	620,000
	No.1 Dense	1750	950	175	660	1900	1,800,000	660,000
	No.1	1650	900	175	565	1750	1,700,000	620,000
	No.1 NonDense	1500	800	175	480	1600	1,600,000	580,000
	No.2 Dense	1450	775	175	660	1750	1,700,000	620,000
	No.2	1250	725	175	565	1600	1,600,000	580,000
	No.2 NonDense	1150	675	175	480	1500	1,400,000	510,000
	No.3 and Stud	750	425	175	565	925	1,400,000	510,000
2″ to 4″ thick, 8″ wide Includes: 2x8 3x8 4x8[2]	Dense Select Structural	2450	1350	175	660	2050	1,900,000	690,000
	Select Structural	2300	1300	175	565	1900	1,800,000	660,000
	NonDense Select Struc	2100	1100	175	480	1750	1,700,000	620,000
	No.1 Dense	1650	875	175	660	1800	1,800,000	660,000
	No.1	1500	825	175	565	1650	1,700,000	620,000
	No.1 NonDense	1350	725	175	480	1550	1,600,000	580,000
	No.2 Dense	1400	675	175	660	1700	1,700,000	620,000
	No.2	1200	650	175	565	1550	1,600,000	580,000
	No.2 NonDense	1100	600	175	480	1450	1,400,000	510,000
	No.3 and Stud	700	400	175	565	875	1,400,000	510,000
2″ to 4″ thick, 10″ wide Includes: 2x10 3x10 4x10[2]	Dense Select Structural	2150	1200	175	660	2000	1,900,000	690,000
	Select Structural	2050	1100	175	565	1850	1,800,000	660,000
	NonDense Select Struc	1850	950	175	480	1750	1,700,000	620,000
	No.1 Dense	1450	775	175	660	1750	1,800,000	660,000
	No.1	1300	725	175	565	1600	1,700,000	620,000
	No.1 NonDense	1200	650	175	480	1500	1,600,000	580,000
	No.2 Dense	1200	625	175	660	1650	1,700,000	620,000
	No.2	1050	575	175	565	1500	1,600,000	580,000
	No.2 NonDense	950	550	175	480	1400	1,400,000	510,000
	No.3 and Stud	600	325	175	565	850	1,400,000	510,000
2″ to 4″ thick, 12″ wide[3] Includes: 2x12 3x12 4x12[2]	Dense Select Structural	2050	1100	175	660	1950	1,900,000	690,000
	Select Structural	1900	1050	175	565	1800	1,800,000	660,000
	NonDense Select Struc	1750	900	175	480	1700	1,700,000	620,000
	No.1 Dense	1350	725	175	660	1700	1,800,000	660,000
	No.1	1250	675	175	565	1600	1,700,000	620,000
	No.1 NonDense	1150	600	175	480	1500	1,600,000	580,000
	No.2 Dense	1150	575	175	660	1600	1,700,000	620,000
	No.2	975	550	175	565	1450	1,600,000	580,000
	No.2 NonDense	900	525	175	480	1350	1,400,000	510,000
	No.3 and Stud	575	325	175	565	825	1,400,000	510,000

NEW SOUTHERN PINE DESIGN VALUES

Effective June 1, 2012

(1) For Utility, the F_b, F_t and F_c values apply to 4″ wide lumber only.
(2) For lumber 4″ thick *and* 8″ or wider, multiply the F_b value by $C_F = 1.1$.
(3) For lumber wider than 12″, multiply these 12″ width values by $C_F = .90$ for F_b, F_t, and F_c values.

MATERIAL SAFETY DATA SHEET

UNIVERSAL FOREST PRODUCTS®, INC.
2801 East Beltline NE, Grand Rapids, Michigan 49525
(616) 364-6161
www.ufpi.com

SECTION 1 – PRODUCT IDENTIFICATION

PRODUCT NAME:	ProWood® MICRO
SYNONYMS:	Copper Quat treated wood Wood pressure treated with "micronized" copper and quaternary ammonium wood preservatives ProWood Micro with Microshades (a colorant) ProWood Micro treated wood products with water repellant ProWood Micro treated wood products with mold inhibitor ProWood Micro treated formaldehyde bonded products (plywood).
DESCRIPTION:	Wood, often green colored. May be dyed to various shades.
PURPOSE:	For use where wood is subject to decay or termite attack.
PREPARED BY:	Legal Compliance Department
EMERGENCY CONTACT:	Company: (800) 598-9663 Chemtrec: (800) 424-9300

SECTION 2 – HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

CAS #	Hazardous Component	Percent[1]
N/A	Wood/Wood dust	90-98.5
12069-69-1	Copper Carbonate expressed as Copper Oxides	0.3-1.0
Proprietary	Didecyl dimethyl ammonium carbonate and Didecyl dimethyl ammonium bicarbonate	0.1-0.5
1309-37-1	Red Iron Oxide[2]	<1.0
51274-00-1	Yellow Iron Oxide[2]	<1.0
50-00-0	Formaldehyde[3]	0-8

[1]The above values may vary due to the variability of treatment and the natural variability of wood
[2]Red and yellow iron oxide are present only in those products with added colorants (ProWood Micro with Microshades)
[3]Formaldehyde present only in those products bonded with formaldehyde based glues

This Product is considered hazardous under the criteria in 29 CFR 1910.1200 (Hazard Communication Standard) and the Canadian Workplace Hazardous Materials Information System.

SECTION 3 – PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Solid wood, appearance may vary	Specific Gravity:	Not Available
Odor:	Ammoniacal/wood odor	Vapor Pressure:	Not Available
Boiling Point:	Not Applicable	Vapor Density:	Not Applicable
Melting Point:	Not Applicable	Density:	Not Applicable
Freezing Point:	Not Applicable	% Volatile by Volume:	Not Applicable
Weight per Gallon:	Not Applicable	Solubility (H2O):	Not Applicable
Evaporation Rate:	Not Applicable	Reactivity (H2O):	Not Applicable

SECTION 4 – FIRE AND EXPLOSION HAZARD

Flash Point	Method	Upper/Lower Flammable Limit	Auto-ignition	Rate of Burn
Not Applicable	Not Applicable	Not Available	Not Available	Not Available

Unusual Fire and Explosion Hazards: Wood is combustible when exposed to heat or flames. Wood dusts may form explosive mixtures with air in the presence of an ignition source. Combustion products may yield irritating and toxic fumes and gasses including amines and other organic materials, copper compounds, oxides of carbon and nitrogen.

Fire Fighting Equipment and Extinguishing Media: Use water to wet down wood to reduce the likelihood of ignition. Fire fighters should use full protective clothing including self-contained breathing apparatus.

NFPA Codes:			HMIS Codes:		
	Health	1		Health	1
	Flammability	1		Flammability	1
	Reactivity	0		Reactivity	0
	Other	N/A		Protection	B

Reactivity Data: Product is stable under normal conditions. Keep away from excessive heat, sparks, and open flames. Keep away from incompatible materials including strong reducing and oxidizing agents. Hazardous polymerization is not likely to occur.

SECTION 5 – HEALTH HAZARDS AND FIRST AID

WARNING! Wood dust may form an explosive mixture with air. Use exhaust ventilation when cutting, sawing or grinding in an enclosed area. Wood dust may cause irritation to eyes, skin, and upper respiratory tract. When cutting, sanding, or grinding avoid inhalation and wear safety glasses. Handling may cause splinters, use puncture resistant gloves. Do not burn pressure-treated wood in open fire, stoves, fireplaces, or residential boilers. Observe good hygiene and safety practices when handling this product.

	Signs and symptoms of acute overexposure	First Aid Measures
Eyes:	Wood dust may cause irritation to the eyes. Symptoms can include irritation, redness, scratching of the cornea, and tearing	Immediately flush eyes with water for at least 15 minutes. Seek medical attention if symptoms persist
Skin:	Prolonged contact with treated wood and/or treated wood dust may cause irritation to the skin. Any wood dust may cause irritation to the skin. Mechanical rubbing may increase skin irritation. Some wood species and their dusts may contain natural toxins, which may cause dermatitis or allergic reactions in sensitized individuals.	For irritation from skin contact flush immediately with soap and water, continue at least 15 minutes. If irritation persists, get medical attention immediately. If wood splinters are injected under the skin, get medical attention.
Ingestion:	If ingestion does occur, slight gastrointestinal irritation may result. Certain species of wood and their dusts may contain natural toxins, which can have adverse effects on humans.	If the material is swallowed, get medical attention or advice. Do not induce vomiting.
Inhalation:	Wood dust is irritating to the nose throat and lungs. Symptoms may include nasal dryness, deposits or obstructions in the nasal passages, coughing, sneezing, dryness and soreness of the throat and sinuses, hoarseness, and wheezing. Prolonged or repeated inhalation of wood dusts may cause respiratory irritation, recurrent bronchitis, and prolonged colds. Some species may cause allergic respiratory reactions with asthma-like symptoms in sensitized individuals. Prolonged exposure to wood dust by inhalation has been reported to be associated with nasal and paranasal cancer.	If dusts are inhaled, remove person to fresh air. If symptoms persist, seek medical attention.

Note to Physician: Respiratory ailments and pre-existing skin conditions may be aggravated by exposure to wood dust. Medical conditions generally aggravated by exposure to wood dust include pre-existing eye, respiratory, and skin conditions.

Chronic Overexposure: Wood dusts may be irritating to the eyes, skin and respiratory tract. Prolonged or repeated inhalation of wood dust may cause respiratory irritation, recurrent bronchitis, and prolonged colds. Depending on the species of wood, recurrent exposure may cause allergic skin and respiratory reactions in some individuals.

Carcinogenicity: ProWood Micro treated wood and its components other than wood dust are not listed as carcinogens by ACGIH, NIOSH, of IARC. Wood dust is classified as a carcinogen by ACGIH, NIOSH, and IARC, which is based on an increased incidence of nasal and paranasal cancer in people exposed to wood dusts. Carcinogenicity of wood dust: ACGIH – A1 Confirmed Human Carcinogen (related to wood dusts-hard wood; NIOSH – Occupational carcinogen (related to wood dust); IARC -- Monograph 62, 1995 (related to wood dust)(Group 1 (carcinogenic to humans)). IARC has listed formaldehyde as a probable human carcinogen.

SECTION 6 – EXPOSURE CONTROL MEASURES/PERSONAL PROTECTION

Personal Protective Equipment

Eyes/Face: Wear safety glasses with side shields when handling, cutting, sanding, or grinding this material. Use a face shield for processes that may generate excessive dusts and splinters.

Skin: Wear puncture resistant work gloves, such as leather when handling. Wear chemical resistant rubber gloves when handling freshly treated lumber at the treating facility.

Respiratory: Respirators must be worn if the ambient concentration of airborne contaminants exceeds prescribed exposure limits. Dust masks may be worn to avoid inhalation of nuisance dust. Dust masks may not be adequate protection in environments above the occupational exposure limit.

Ventilation: Cutting, grinding or sanding should be done outdoors or in a well ventilated area.

Component Exposure Limits*

Component	OSHA		ACGIH	
	PEL	STEL	TLV	TLV STEL
**Wood/Wood dust	15 mg/m^3 total dust 5 mg/m^3 respirable fraction (as a nuisance dust)	N/A	1 mg/m^3 TWA	10 mg/m^3 TWA
Copper Carbonate expressed as Copper Oxides	0.1 mg/m^3 TWA (fume)	N/A	0.2 mg/m^3 TWA (fume)	N/A
Didecyl dimethyl ammonium carbonate and Didecyl dimethyl ammonium bicarbonate	N/A	N/A	N/A	N/A
Red and Yellow Iron Oxide	10 mg/m^3 (total dust)	N/A	10 mg/m^3 (total dust)	N/A
Formaldehyde	0.75 ppm	2 ppm	0.3 ppm	N/A

**A state run OSHA program may have more stringent limits for wood dust and/or PNOR.

SECTION 7 – SAFE HANDLING, STORAGE, DISPOSAL, AND ACCIDENTAL RELEASE MEASURES

Handling Procedures:

- Do not generate airborne dusts in the presence of an ignition source when sawing, cutting or grinding wood.
- Some preservative may migrate from the treated wood into soil/water or may dislodge from the wood upon contact with skin. Wash exposed areas thoroughly. Wash hands after handling and before eating.
- Avoid contact of wood dusts with skin and eyes. Avoid breathing wood dusts.
- Do not eat, drink, or smoke when handling this product or in areas where dusts of this product are present.

Storage Procedures

- Maintain good housekeeping procedures, such as sweeping regularly to avoid accumulation of dusts.
- Store away from excessive heat, sparks, and open flame.

Accidental Release and Disposal Procedures

- Do not burn pressure treated lumber in open fires, stoves, fireplaces, or residential boilers.
- Do not use as mulch.
- Dispose of waste material according to local, State, and Federal Regulations.
- No containment procedures are needed as this product cannot spill or leak the preservative.

SECTION 8 – HUMAN AND ECOLOGICAL TOXICITY

Ecotoxicity: The product is not expected to leach harmful amounts of preservative into the environment; however, some preservative may migrate into soil and water. The wood preservatives in this product contain insecticides and fungicides, which when released into the environment at high enough concentrations, are expected to adversely affect or destroy contaminated plants. They may be harmful or fatal to wildlife. Toxicological and ecotoxicity testing have not been performed on this product. Environmental fate information is not available.

SECTION 9 – REGULATORY INFORMATION

SARA Sec. 302 & 304: N/A

SARA Section 311/312: Acute Health: Yes Chronic Health: Yes Fire: Yes Pressure: No Reactive: No

SARA 313: Form R required for 1.0% de minimis concentration. (related to copper). Typical product retentions will be less than 1.0% copper.

FIFRA: This material contains the following chemical present on either the Listing of Pesticide Chemicals (40 CFR 180) or Pesticides Classified for Restricted Use as listed by FIFRA: Copper carbonate

DOT: Not Regulated

Marine Pollutant: This material contains copper complex, required by USDOT to be identified as a marine pollutant

State: California Proposition 65 Warning: This product contains a chemical (wood dust) known to the State of California to cause cancer.

NOTICE: THE INFORMATION AND RECOMMENDATIONS SET FORTH ARE BELIEVED TO BE ACCURATE. HOWEVER, UNIVERSAL FOREST PRODUCTS®, INC. MAKES NO WARRANTY WITH RESPECT TO AND DISCLAIMS ALL LIABILITY FROM RELIANCE ON THE INFORMATION.

HOJA DE DATOS DE SEGURIDAD DE MATERIALES

Universal Forest Products®, Inc.
2801 East Beltline NE, Grand Rapids, Michigan 49525
(616) 364-6161
www.ufpi.com

SECCIÓN 1– IDENTIFICACIÓN DEL PRODUCTO

NOMBRE DEL PRODUCTO:	ProWood® MICRO
SINÓNIMOS:	Madera tratada a presión con Cuaternario de Cobre Madera tratada a presión con componentes de preservativos para madera de Cobre micronizado "micronized" y quaternary ammonium ProWood Micro con Microshades (colorante). ProWood Micro productos de madera tratada con repelente de agua ProWood Micro productos de madera tratada con anti-moho. ProWood Micro productos tratados con enlaces de formaldehído (madera laminada).
DESCRIPCIÓN:	Madera, a menudo de color verde. Se puede teñir de varios tonos.
PROPÓSITO:	Usar donde la madera esté sujeta a descomponerse o a ser atacada por las termitas.
PREPARADO POR:	Departamento de Cumplimiento Legal
CONTACTO DE EMERGENCIA:	Compañía: (800) 598-9663 Chemtrec: (800) 424-9300

SECCIÓN 2 – INGREDIENTES PELIGROSOS / INFORMACIÓN DE IDENTIDAD

CAS #	Componentes Peligrosos	Percentaje[1]
N/A	Madera / Aserrín	90-98.5
12069-69-1	Complejo de cobre expresado como Óxidos de Cobre.	0.3-1.0
Propietario	Didecyl dimethyl ammonium carbonato y Didecyl dimethyl ammonium bicarbonato	0.1-0.5
1309-37-1	Óxido de hierro rojo[2]	<1.0
51274-00-1	Óxido de hierro amarrillo[2]	<1.0
50-00-0	Formaldehído[3]	0-8

[1]Los números en la parte de arriba pueden variar debido a la variedad del tratamiento y a la variedad natural de la madera
[2]Óxido de hierro rojo y amarrillo únicamente está presente en aquellos productos con colorante (ProWood Micro con Microshades)
[3]Formaldehído presente solo en aquellos productos que son pegados con pegamentos con base de formaldehído.

Este producto es considerado peligroso bajo el criterio en 29 CFR 1910.1200 (Estándar de Comunicación de Peligros) y el Sistema Canadiense de Información de Materiales Peligrosos en el Lugar de Trabajo.

SECCIÓN 3 – PROPIEDADES FÍSICAS Y QUÍMICAS

Apariencia:	Madera sólida, la apariencia puede variar	Gravedad Específica:	No está disponible
Olor:	Amoniaco / olor a madera	Presión del Vapor:	No está disponible
Punto de Ebullición:	No aplica	Densidad del Vapor:	No aplica
Punto de Fusión:	No aplica	Densidad:	No aplica
Punto de Congelación:	No aplica	% de Volatilidad por Volumen:	No aplica
Peso por Galón:	No aplica	Solubilidad (H2O):	No aplica
Tasa de Evaporación:	No aplica	Reactividad (H2O):	No aplica

SECCIÓN 4 – PELIGRO DE INCENDIO Y EXPLOSIÓN

Punto de Inflamación	Método	Límite Alto y Bajo de Inflamación	Auto ignición	Índice de Ignición
No aplica	No aplica	No está disponible	No está disponible	No está disponible

Fuego inusual y Peligro de Explosión: La madera es combustible cuando es expuesta a calor o flama. El aserrín podría formar una mezcla explosiva con el aire en la presencia de una fuente de ignición. Los productos de la combustión pueden crear vapores tóxicos e irritantes y gases incluyendo aminos y otros materiales orgánicos, compuestos de cobre, óxidos de nitrógeno y carbón.

Equipo para Combatir un Incendio y Medio de Extinguir: Use agua para mojar la madera y así reducir la posibilidad de un incendio. Los bomberos deben usar ropa de protección completa incluyendo un aparato de respiración autónoma.

Códigos de NFPA:		Códigos de HMIS:	
Salud	1	Salud	1
Inflamación	1	Inflamación	1
Reactividad	0	Reactividad	0
Otro	N/A	Protección	B

Información de Reactividad: El producto es estable bajo condiciones normales. Mantenga lejos de calor, chispas y llamas abiertas. Mantenga lejos de los materiales incompatibles incluyendo fuertes agentes de reducción y oxidación. No es probable que ocurra una peligrosa polimerización

SECCIÓN 5 - PELIGROS PARA LA SALUD Y PRIMEROS AUXILIOS

¡ADVERTENCIA! El aserrín puede formar una mezcla explosiva con el aire, use ventilación con escape cuando corte, trabaje en la sierra o pula la madera en un área cerrada. El aserrín puede causar irritación en los ojos, piel, y en las vías respiratorias. Cuando corte o pula la madera evite inhalar ese polvo y use lentes de seguridad. Manejar la madera puede causar cortaduras, use guantes que sean resistentes a las cortaduras. No queme la Madera Tratada a Presión en fuegos al aire libre, estufas, chimeneas, o calentadores residenciales. Mantenga buena higiene y prácticas de seguridad cuando maneje este producto.

	Señales y síntomas de una sobre exposición aguda.	**Medidas de Primeros Auxilios**
Ojos:	El aserrín puede causar irritación en los ojos. Los síntomas pueden incluir irritación, rojez, raspaduras en la cornea y desprendimiento.	Enjuague los ojos inmediatamente con agua por al menos 15 minutos. Busque ayuda profesional si los síntomas continúan.
Piel:	Contacto prolongado con madera tratada y/o aserrín de madera tratada puede causar irritación en la piel, y en las circunstancias extremas podría causar quemaduras químicas. Cualquier aserrín puede causar irritación en la piel. El roce mecánico puede aumentar la irritación en la piel. Algunas especies de madera y su aserrín pueden contener toxinas, lo cual puede causar dermatitis o reacciones alérgicas en individuos sensibles.	En caso de contacto con la piel enjuague inmediatamente con agua y jabón, continúe por al menos 15 minutos. Si la irritación persiste, busque atención médica inmediatamente. Si las cortaduras por la madera están infectadas debajo de la piel, busque ayuda médica inmediatamente.
Ingestión:	Si ocurre la ingestión esto puede resultar en una irritación gastrointestinal ligera. Algunas especies de madera y su aserrín pueden contener toxinas naturales, las cuales pueden tener efectos adversos en los humanos.	Si se ingiere el material, busque atención o consejo médico. No induzca el vómito.
Inhalación:	El aserrín irrita la nariz, garganta y plumones. Los síntomas pueden incluir resequedad, depósitos u obstrucciones en las vías nasales, tos, estornudes, resequedad y dolor en la garganta y en las vías nasales, un chiflido al respirar y dificultad al hablar. La inhalación de aserrín prolongada o repetida puede causar irritaciones respiratorias, bronquitis frecuentes, o resfriados prolongados. Algunas especies pueden causar reacciones alérgicas respiratorias con síntomas similares al asma en individuos sensibles. Se ha reportado que la exposición prolongada al aserrín por medio de la inhalación está asociada con el cáncer nasal y para-nasal.	Si se inhala el aserrín, lleve a la persona al aire fresco. Si los síntomas persisten, busque atención médica.

Nota para el Doctor: Las enfermedades respiratorias y condiciones pre-existentes de la piel pueden ser agravadas por la exposición al aserrín. Las condiciones médicas generalmente agravadas por la exposición al aserrín incluyen condiciones pre-existentes de los ojos, sistema respiratorio y piel.

Condiciones Médicas Generalmente Agravadas por la Exposición al Aserrín: Condiciones pre-existentes de los ojos, sistema respiratorio y piel.

Sobre-exposición Crónica: El aserrín puede ser irritante para los ojos, piel y tráquea respiratoria. La inhalación prolongada o repetida del aserrín puede causar irritación respiratoria, bronquitis frecuentes, y resfriados prolongados. Dependiendo de la especie de madera, la exposición repetida puede causar reacciones alérgicas en la piel y en el sistema respiratorio en algunos individuos.

Cancerígeno: La madera tratada con ProWood Micro y sus componentes, excepto el aserrín, no están listados como cancerígenos por el ACGIH, NIOSH, o IARC. El aserrín está clasificado como cancerígeno por ACGIH, NIOSH, e IARC que está basada en un aumento de cáncer nasal y para-nasal en las personas expuestas al aserrín. Cancerígenos del aserrín: ACGHI - A1 Cancerígenos Humano Confirmado (relacionado al aserrín- madera dura; NIOSH- Cancerígenos del Lugar de Trabajo (relacionado al aserrín); IARC -- Monograph 62, 1995 (relacionado al aserrín) (Grupo 1(cancerígenos para los humanos)). IARC ha listado el formaldehído como un posible cancerígeno humano.

SECCIÓN 6 - MEDIDAS DE CONTROL DE EXPOSICION / PROTECCION PERSONAL

Equipo de Protección Personal

Ojos / cara: Use Lentes de Seguridad con protectores laterales cuando maneje, corte o pula este material. Use un protector para la cara en los procesos que puedan generar aserrín o astillas en exceso.

Piel: Use guantes de trabajo resistentes a cortaduras, como guantes de piel cuando maneje este material.

Respiratorio: Los dispositivos respiradores se deben usar si la concentración ambiental de los contaminantes en el aire excede los límites de exposición aprobados. Las máscaras de polvo se pueden usar para evitar la inhalación de aserrín irritante. Las máscaras de polvo no proporcionan una protección adecuada en ambientes por encima del límite de exposición en el trabajo.

Ventilación: Los trabajos que requieran cortar, pulir, o fragmentar se deben realizar al aire libre o en un área bien ventilada.

Limites de Exposición a Componentes*

Componente	OSHA		ACGIH	
	PEL	STEL	TLV	TLV STEL
**Madera / aserrín	15 mg/m3 aserrín total 5 mg/m3 fracción respirable (como aserrín irritable)	N/A	1 mg/m^3 TWA	10 mg/m^3 TWA
Complejo de cobre expresado como Óxidos de Cobre	0.1 mg/m^3 TWA (fume)	N/A	0.2 mg/m^3 TWA (fume)	N/A
Didecyl dimethyl ammonium carbonate y Didecyl dimethyl ammonium bicarbonato	N/A	N/A	N/A	N/A
Óxido de hierro rojo y amarrillo	10 mg/m^3 (aserrín total)	N/A	10 mg/m^3 (aserrín total)	N/A
Formaldehído	0.75 ppm	2 ppm	0.3 ppm	N/A

** Un programa de OSHA dirigido por el estado puede tener límites más estrictos para el aserrín y/o PNOR.

SECCIÓN 7 - MEDIDAS PARA MANEJAR, ALMACENAR, DESECHAR, Y RESPONDER A UN ESCAPE ACCIDENTAL DE UNA FORMA SEGURA

Procedimientos para Manejar:

- No genere aserrín en el aire en la presencia de una fuente de inflamación cuando corte o pula la madera.
- Lávese las manos después de manejar el material y antes de comer
- Algunos preservativos pueden emigrar de la madera tratada en aceite/agua o pueden trasladarse de la madera por el contacto con la piel. Lava detalladamente las áreas expuestas. Lávese las manos después de manejarlos y antes de comer.
- Evite el contacto del aserrín con la piel y los ojos. Evite respirar el aserrín.
- No como, beba, o fume cuando maneje este producto o en áreas donde esté presente el aserrín de este producto.

Procedimientos para Almacenar

- Mantenga buenos procedimientos de orden y limpieza, como barrer regularmente para evitar la acumulación de aserrín.
- Almacene lejos del calor excesivo, chispas, y llamas abiertas.

Medidas a tomar en caso de un Escape Accidental y Procedimientos para Desechar:

- No queme la madera tratada a presión con ACQ en fuegos abiertos, estufas, chimeneas, o calentadores residenciales.
- No lo use como pajote.
- Deseche los materiales de acuerdo a las Regulaciones locales, Estatales y Federales.
- No se necesitan procedimientos para contener el material ya que este producto no puede derramar o filtrar el preservante.

SECCIÓN 8 - TOXICIDAD HUMANA Y ECOLÓGICA

Eco-toxicidad: No se espera que este producto libere cantidades peligrosas de conservadores al ambiente; sin embargo, algunos conservadores pueden salir de la madera tratada a la tierra y agua. Los preservativos de la madera en éste producto contienen insecticidas y fungicidas, los cuales, al estar liberados dentro de un ambiente, se espera que afecten negativamente y destruyan las plantas contaminadas. Ellas pueden ser perjudiciales o mortales para la fauna. No se han realizado pruebas toxicológicas ni de eco-toxicidad para este producto. Información ambiental no está disponible.

SECCIÓN 9 - INFORMACIÓN SOBRE REGULACIONES

SARA Sec. 302 & 304: N/A

SARA Sección 311/312: Salud (Aguda): Sí Salud (Crónica): Sí Incendio: Sí Presión: No Reactividad: No

SARA 313: Formulario R requerido para 1.0% de concentración mínima (relacionado al cobre). La retención normal de producto es menos de 1.0% cobre.

FIFRA: Este material contiene el siguiente químico presentado en el Listado de Químicos de Pesticida (40 CFR 180) o Pesticidas Clasificados para Uso Limitado según fue listado por FIFRA: Complejo del Cobre

DOT: No Regulado

Contaminado Marino: Este material contiene complejo del cobre, requerido por USDOT a ser identificado como un contaminando marino.

ESTADO: California, Proposición 65 Peligro: Este producto contiene un químico (aserrín) conocido en el Estado de California por causar cáncer.

AVISO: LA INFORMACIÓN Y LAS RECOMENDACIONES PRESENTADAS SE CREE QUE SON CORRECTAS. SIN EMBARGO, UNIVERSAL FOREST PRODUCTS®, INC NO DA GARANTÍA CON RESPECTO A Y NIEGA TODA RESPONSABILIDAD RESULTANTE DE LA CONFIANZA PUESTA EN DICHA INFORMACIÓN.

FICHE TECHNIQUE SANTÉ-SÉCURITÉ

UNIVERSAL FOREST PRODUCTS[MD], INC.
2801 East Beltline NE, Grand Rapids, Michigan 49525, É.-U.
616 364-6161
www.ufpi.com

SECTION 1 – IDENTIFICATION DU PRODUIT

NOM DU PRODUIT :	ProWood® MICRO
SYNONYMES :	Bois traité au cuivre quaternaire Bois traité sous pression avec cuivre « micronisé » et agents de préservation du bois à l'ammonium quaternaire ProWood Micro avec Microshades (un colorant) Produits de bois traités ProWood Micro avec hydrofuge Produits de bois traités ProWood Micro avec inhibiteur de moisissure Produits collés au formaldéhyde et traités ProWood Micro (contreplaqué)
DESCRIPTION :	Bois, présente souvent une coloration verte. Peut être teint de diverses couleurs.
BUT :	À être utilisé là où le bois est sujet à la pourriture ou aux attaques des termites.
PRÉPARÉ PAR :	Service de la conformité légale

SECTION 2 – INGRÉDIENTS DANGEREUX/INFORMATIONS D'IDENTITÉ

N° DE CAS	**Composant dangereux**	**Pourcentage**[1]
S. O.	Bois/Poussière de bois	90 à 98,5
12069-69-1	Carbonate de cuivre exprimé sous forme d'oxydes de cuivre	0,3 à 1,0
Exclusif	Carbonate de didécyldiméthylammonium et bicarbonate de didécyldiméthylammonium	0,1 à 0,05
1309-37-1	Oxyde de fer rouge[2]	< 1,0
51274-00-1	Oxyde de fer jaune[2]	< 1,0
50-00-0	Formaldéhyde[3]	0 à 8

[1] Les valeurs ci-dessus peuvent différer selon la variabilité du traitement et la variabilité naturelle du bois.

[2] Les oxydes de fer rouge et jaune ne sont présents que dans les produits auxquels des colorants ont été ajoutés (ProWood Micro avec Microshades).

[3] On retrouve du formaldéhyde seulement dans les produits collés avec des colles à base de formaldéhyde.

Ce produit est considéré comme étant dangereux selon les critères de la norme 29 CFR 1910.1200 (Norme de communication des dangers) et le SIMDUT (Système d'information sur les matières dangereuses utilisées au travail) canadien.

SECTION 3 - PROPRIÉTÉS PHYSIQUES ET CHIMIQUES

Aspect :	Bois massif, l'aspect peut varier	Gravité spécifique :	Non disponible
Odeur :	Odeur d'ammoniac/de bois	Pression de vapeur :	Non disponible
Point d'ébullition :	Sans objet	Densité de vapeur :	Sans objet
Point de fusion :	Sans objet	Densité :	Sans objet
Point de congélation :	Sans objet	% de substances volatiles par volume :	Sans objet
Poids par gallon :	Sans objet	Solubilité (H2O) :	Sans objet
Taux d'évaporation :	Sans objet	Réactivité (H2O) :	Sans objet

SECTION 4 – DANGER D'INCENDIE ET D'EXPLOSION

Point d'éclair	Méthode	Limite d'inflammabilité supérieure/inférieure	Auto-inflammation	Vitesse de combustion
Sans objet	Sans objet	Non disponible	Non disponible	Non disponible

Dangers inhabituels d'incendie et d'explosion : le bois est combustible exposé à la chaleur ou aux flammes. Les poussières de bois peuvent former des mélanges explosifs avec l'air en présence de sources d'inflammation. Les produits de combustion peuvent engendrer des vapeurs et gaz irritants et toxiques, notamment les amines et autres matières organiques, les composés de cuivre, les oxydes de carbone et l'azote.

Moyens d'extinction des incendies et matériel de lutte contre les incendies : utiliser de l'eau pour détremper le bois afin de réduire les probabilités d'inflammation. Les pompiers doivent employer des vêtements de protection complets, notamment un appareil respiratoire autonome.

Codes NFPA :	Santé	1	Codes SIMD :	Santé	1
	Inflammabilité	1		Inflammabilité	1
	Réactivité	0		Réactivité	0
	Autre	S. O.		Protection	B

Données de réactivité : le produit est stable dans des conditions normales. Conserver à l'écart de la chaleur excessive, des étincelles et des flammes nues. Conserver à l'écart des matériaux incompatibles, dont les agents oxydants et réducteurs forts. La polymérisation dangereuse est improbable.

SECTION 5 – RISQUES POUR LA SANTÉ ET PREMIERS SOINS

AVERTISSEMENT! La poussière de bois pourrait former un mélange explosif à l'air. Faire usage d'une ventilation aspirante lors de la coupe, du sciage ou du défibrage dans un endroit fermé. La poussière de bois peut irriter les yeux, la peau et les voies respiratoires supérieures. Lors de la coupe, du ponçage ou du défibrage, éviter l'inhalation et porter des lunettes de protection. La manipulation peut provoquer des échardes, employer des gants résistant à la perforation. Ne pas faire brûler un bois traité sous pression dans un feu ouvert, un poêle, un foyer ou une chaudière résidentielle. Observer de bonnes pratiques d'hygiène et de sécurité en manipulant ce produit.

	Signes et symptômes d'une surexposition aiguë	Mesures de premiers soins
Yeux :	La poussière de bois peut causer une irritation oculaire. Les symptômes peuvent comprendre l'irritation, la rougeur, les rayures de la cornée et le larmoiement.	Rincer immédiatement les yeux à l'eau courante pendant un minimum de 15 minutes. Si les symptômes persistent, consulter un médecin.
Peau :	Un contact prolongé avec le bois traité et/ou la poussière de bois traité peut causer une irritation de la peau. Toute poussière de bois peut causer une irritation cutanée. Une friction mécanique pourrait accroître l'irritation cutanée. Certaines essences de bois et leur poussière peuvent contenir des toxines naturelles susceptibles de causer une dermatite ou des réactions allergiques chez les personnes sensibilisées.	En cas d'irritation à la suite d'un contact cutané, rincer sans attendre à l'eau savonneuse, continuer pendant un minimum de 15 minutes. Si l'irritation persiste, consulter immédiatement un médecin. Si des échardes ont pénétré sous la peau, consulter un médecin.
Ingestion :	L'ingestion peut entraîner une légère irritation gastro-intestinale. Certaines essences de bois et leur poussière peuvent contenir des toxines naturelles, qui peuvent avoir des effets indésirables sur l'homme.	Si la matière est avalée, consulter un médecin ou obtenir des conseils médicaux. Ne pas provoquer le vomissement.
Inhalation :	La poussière de bois est irritante pour le nez, la gorge et les poumons. Les symptômes peuvent comprendre la sécheresse nasale, les dépôts ou obstructions des voies nasales, la toux, les éternuements, la sécheresse et les maux de gorge et de sinus, l'enrouement et le sifflement. Une inhalation prolongée ou répétée de la poussière de bois peut causer une irritation respiratoire, une bronchite récurrente et des rhumes prolongés. Certaines essences peuvent causer des réactions respiratoires allergiques accompagnées de symptômes similaires à ceux de l'asthme, chez les personnes sensibilisées. Des rapports ont indiqué qu'une exposition prolongée à la poussière de bois par inhalation est associée au cancer nasal et paranasal.	Si la poussière est inhalée, amener la personne au grand air. Si les symptômes persistent, consulter un médecin.

Remarque au médecin : les affections respiratoires et les problèmes cutanés préexistants peuvent être aggravés par l'exposition à la poussière de bois. Les problèmes médicaux généralement aggravés par l'exposition à la poussière de bois comprennent les problèmes oculaires, cutanés et respiratoires préexistants.

Surexposition chronique : la poussière de bois peut être irritante pour les yeux, la peau et les voies respiratoires. Une inhalation prolongée ou répétée de la poussière de bois peut causer une irritation respiratoire, une bronchite récurrente et des rhumes prolongés. Selon les essences de bois, une exposition récurrente peut causer des réactions cutanées et respiratoires allergiques chez certaines personnes.

Cancérogénicité : le bois traité ProWood Micro et ses composants autres que la poussière de bois ne font pas partie de la liste des cancérigènes établie par l'ACGIH, le NIOSH ou le CIRC. La poussière de bois est classée comme cancérigène par l'ACGIH, le NIOSH et le CIRC. Cette classification est basée sur une incidence accrue du cancer nasal et paranasal chez les personnes exposées à la poussière de bois. Cancérogénicité de la poussière de bois : ACGIH – A1 cancérigène humain confirmé (lié à la poussière de bois - bois durs; NIOSH – cancérigène professionnel (lié à la poussière de bois); CIRC -- Monographie 62, 1995 (lié à la poussière de bois) (Groupe 1 [cancérigène pour les humains]). Le CIRC a inscrit le formaldéhyde comme cancérigène humain probable.

SECTION 6 – MESURES DE CONTRÔLE DE L'EXPOSITION/PROTECTION PERSONNELLE

Équipement de protection personnelle

Yeux/Visage : Porter des lunettes de protection avec coques latérales lors de la manipulation, de la coupe, du ponçage ou du défibrage de ce matériau. Utiliser un masque facial pour les procédés qui pourraient générer une quantité excessive de poussière et d'échardes.

Peau : Porter des gants de travail résistant à la perforation, par exemple des gants de cuir lors de la manipulation. Porter des gants en caoutchouc résistant aux produits chimiques lors de la manipulation de bois fraîchement traité aux installations de traitement.

Voies respiratoires : Porter absolument un appareil respiratoire si la concentration ambiante de particules aériennes de contaminants est supérieure aux limites d'exposition prescrites. Un masque protecteur contre la poussière peut être porté pour éviter l'inhalation de poussière nuisible. Ce masque antipoussière peut ne pas être adéquat dans un environnement où la limite d'exposition professionnelle est dépassée.

Ventilation : La coupe, le défibrage ou le ponçage doit être effectué à l'extérieur ou dans un endroit bien aéré.

Limites d'exposition du composant*

Composant	OSHA	ACGIH		
	PEL	STEL	TLV	TLV STEL
**Bois/Poussière de bois	15 mg/m^3 poussière totale 5 mg/m^3 fraction respirable (à titre de poussière nuisible)	S. O.	1 mg/m^3 TWA	10 mg/m^3 TWA
Carbonate de cuivre exprimé sous forme d'oxydes de cuivre	0,1 mg/m^3 TWA (vapeur)	S. O.	0,2 mg/m^3 TWA (vapeur)	S. O.
Carbonate de didécyldiméthylammonium et bicarbonate de didécyldiméthylammonium	S. O.	S. O.	S. O.	S. O.
Oxyde de fer rouge et jaune	10 mg/m^3 poussière totale	S. O.	10 mg/m^3 poussière totale	S. O.
Formaldéhyde	0,75 ppm	2 ppm	0,3 ppm	S. O.

**Dans certains États, le programme OSHA pourrait présenter des limites plus rigoureuses pour la poussière de bois et/ou le PNOR (particules non autrement réglementées).

SECTION 7 – MESURES DE SÛRETÉ EN MATIÈRE DE MANIPULATION, DE STOCKAGE, DE MISE AU REBUT ET DE REJET ACCIDENTEL

Procédures de manipulation :

- Ne pas générer de poussières en suspension dans l'air en présence d'une source d'inflammation en sciant, coupant ou défibrant du bois.
- Certains agents de préservation pourraient migrer du bois traité vers le sol/l'eau ou se détacher du bois au contact avec la peau. Lavez soigneusement les zones exposées. Se laver les mains après avoir manipulé ce produit et avant de manger.
- Éviter tout contact de la poussière de bois avec la peau et les yeux. Éviter d'inhaler la poussière de bois.
- Ne pas manger, boire ni fumer en manipulant ce produit ou dans un endroit où de la poussière provenant de ce produit est présente.

Procédures de stockage

- Veiller à maintenir de bonnes procédures d'entretien, telles qu'un balayage régulier, de façon à éviter toute accumulation de poussière.
- Conserver à l'écart de la chaleur excessive, des étincelles et des flammes nues.

Rejet accidentel et procédures de mise au rebut

- Ne pas faire brûler un bois traité sous pression dans un feu ouvert, un poêle, un foyer ou une chaudière résidentielle.
- Ne pas utiliser comme paillis.
- Mettre au rebut conformément à la réglementation locale, provinciale et fédérale.
- Aucune procédure de confinement n'est requise, car ce produit ne peut ni se renverser ni présenter des fuites d'agents de préservation.

SECTION 8 – TOXICITÉ ÉCOLOGIQUE ET HUMAINE

Écotoxicité : le produit n'est pas censé libérer des quantités nocives d'agents de préservation dans l'environnement; toutefois, certains agents de préservation pourraient migrer dans le sol et dans l'eau. Les agents de préservation du bois contenus dans ce produit sont composés d'insecticides et de fongicides, lesquels, lorsqu'ils sont libérés dans l'environnement à des concentrations suffisamment élevées, peuvent affecter de façon négative ou détruire les plantes contaminées. Ils peuvent être dangereux ou mortels pour la faune. Aucun essai toxicologique et d'écotoxicité n'a été effectué sur ce produit. Aucune information sur les conséquences environnementales n'est disponible.

SECTION 9 – INFORMATION SUR LA RÉGLEMENTATION

SARA articles 302 et 304 : S. O.
SARA article 311/312 : Santé aiguë : oui Santé chronique : oui Incendie : oui Pression : non Réactif : non
SARA 313 : formulaire R requis pour une concentration minime de 1,0 %. (lié au cuivre). La rétention type du produit sera inférieure à 1,0 % de cuivre.
FIFRA : cette matière contient les produits chimiques suivants qui font partie de la liste des pesticides (40 CFR 180) ou des pesticides classés pour usage restreint par la FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) : carbonate de cuivre.
Ministère des Transports : non réglementé
Polluant marin : cette matière contient un complexe de cuivre que le Ministère des Transports des États-Unis oblige à identifier comme polluant marin.
ÉTAT : Proposition 65 de la Californie Avertissement : Ce produit contient un produit chimique(poussière de bois) qui de l'avis de l'État de la Californie cause du cancer.

AVIS : LES INFORMATIONS ET LES RECOMMANDATIONS CONTENUES DANS LE PRÉSENT DOCUMENT SONT JUGÉES EXACTES. CEPENDANT, UNIVERSAL FOREST PRODUCTSMD, INC., NE DONNE AUCUNE GARANTIE EN CETTE MATIÈRE ET REJETTE TOUTE RESPONSABILITÉ EN CE QUI CONCERNE LA FIABILITÉ DE L'INFORMATION.

R-SEAL 3000

SOLUTIONS

Tape

Tape for Insulation Joints

PRODUCT DESCRIPTION

R-SEAL 3000 is a nominal 2mil high strength dead soft aluminum foil coated with cold weather acrylic pressure sensitive adhesive.

The malleable foil conforms to irregular surfaces and applies easily to both fibrous and sheet metal ducts. R-SEAL 3000 excels in demanding temperature and humidity applications and provides superior performance and durability over a wide range of environmental conditions.

Item	Roll Width	Roll Length	Rolls/Case
R-SEAL 3000-4	4 inches	150 feet	12
R-SEAL 3000-5	5 inches	150 feet	8

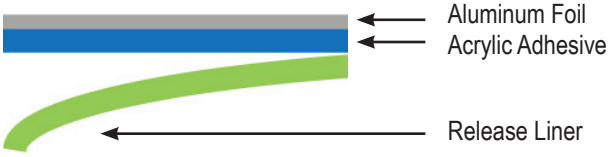
PRODUCT BENEFITS

- Specifically designed for cold weather conditions
- Approved component for use with TSX-8500 and Thermasheath-XP
- Resistant to humidity, moisture and mold
- Hand tearable allows for easy installation
- In stock product available for immediate delivery

COMPLIANCES

- UL723 (5/10 Flame Spread/Smoke Rating)
- DrJ TER 1212-03
- Specifically designed for cold weather conditions
- Approved component for use within the ECOMAXci Wall Solution
  - Water-Resistive Barrier Component AC71: ASTM E331, AATCC Test Method 127
  - Air Barrier System Component ASTM E2357, CAN/ULC-S742 (A1)
- Approved component of the High Velocity Hurricane Zone system, R-Trac (HVHZ)
  - Florida Building Code Approval #FL16406

PRODUCT CONSTRUCTION



PRODUCT INSTALLATION

- All surfaces to which the tape is to be applied should be free of moisture, oils, dust, dirt and other debris that could inhibit adhesion. Clean surfaces with a dry cloth as necessary.
- Center tape over surface to be sealed, e.g., board joint, fastener plate, etc.
- Do not allow the tape to form voids or buckle as it is applied.
- Wipe tape firmly from center out with feathering tool or hand roller to smooth out wrinkles. Applying more pressure yields more surface contact, and therefore, creates a greater bond.
- Do not tear tape, cut with scissors or knife.
- NOTE: For optimal performance, maintain a minimum of 3/4 inch coverage beyond the area to be sealed.

TYPICAL PHYSICAL PROPERTIES

Typical values shown in the chart below are not intended to be used for specification development. Technical data is believed to be true and accurate. Except when used within the ECOMAXci Wall Solution, Rmax recommends that the purchaser test for fitness of use in all applications.

Test	Typical Value	Typical Value (metric)	Test Method
Product Thickness Ω	3.4 mils	0.08 mm	PSTC- 133
Backing Thickness (mils)	1.75 mils	0.04 mm	PSTC- 133
Peel Adhesion Δ	45 oz/in	12.5 N/ 25 mm	PSTC- 101
Shear Adhesion	>24 hrs @ 2.2 psi	>24 hrs @ 15.2 kPa	PSTC-107
Tensile Strength	21 lb/in	94.9 N/ 25 mm	PSTC- 131
Elongation	4%	4%	PSTC- 131
Operating Temperature	-40 to 250°F	-40 to 121°C	
Ω - excluding liner		Δ - 20 minute dwell	

Corporate & Technical Location
Rmax Operating, LLC
Dallas, Texas
972.387.4500
www.rmax.com

Customer Service & Plant Locations
Central Region
Dallas, Texas
800.527.0890 Ext.102

Eastern Region
Greer, South Carolina
800.845.4455 Ext. 156

Western Region
Fernley, Nevada
800.762.9462 Ext. 156

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For warranties, limitations and conditions refer to Rmax Sales Policy and applicable warranties. All documents are located at www.rmax.com. For technical and sales support, email rmax@rmax.com or call (800) 527-0890.

R-SEAL 6000

SOLUTIONS

Flashing

Flashing for Windows, Doors & Penetrations

PRODUCT DESCRIPTION

R-SEAL 6000 is a nominal 35mil black woven polyethylene membrane with butyl rubber adhesive.

Item	Roll Width	Roll Length	Rolls/Case
R-SEAL 6000-9	9 inches	50 feet	2
R-SEAL 6000-12	12 inches	50 feet	4

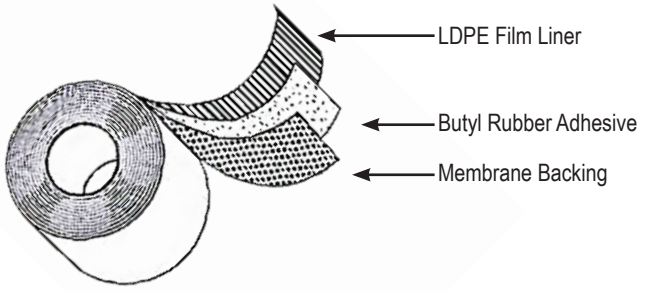
PRODUCT BENEFITS

- Self-Sealing
- Provides permanent weather-tight seal on most clean, dry building surfaces
- Conformable and durable
- Excellent all-temperature performance
- Compatible with sealants and caulking

COMPLIANCES

- Specification: AAMA-711
- DrJ TER 1212-03
- Approved component for use within the ECOMAXci Wall Solution
  - Water-Resistive Barrier Component AC71: ASTM E331, AATCC Test Method 127
  - Air Barrier System Component ASTM E2357, CAN/ULC-S742 (A1)
- Approved component of the High Velocity Hurricane Zone system, R-Trac (HVHZ)
  - Florida Building Code Approval #FL16406

PRODUCT CONSTRUCTION



PRODUCT INSTALLATION

- All surfaces to which the flashing is to be applied should be free of moisture, oils, dust, dirt and other debris that could inhibit adhesion. Clean surfaces with a dry cloth as necessary.
- Center flashing over transition to be sealed.
- Do not allow the flashing to form voids or buckle as it is applied.
- Apply pressure along the entire surface of the flashing to create a good bond using a J-roller or firm hand pressure. Remove all wrinkles and bubbles by smoothing surface and repositioning as necessary.
- NOTE: Flashing should always be installed in a shingle-like fashion, starting with the bottom and working up.

TYPICAL PHYSICAL PROPERTIES

Typical values shown in the chart below are not intended to be used for specification development. Technical data is believed to be true and accurate. Except when used within the ECOMAXci Wall Solution, Rmax recommends that the purchaser test for fitness of use in all applications.

Property	Standard UOM	Metric UOM	Test Method
Total Thickness	35 mils	889 mic	ASTM D-1000
Adhesion to:			
Steel	229 oz/in	25.06 N/cm	ASTM D903-93
Plywood	251 oz/in	27.47 N/cm	ASTM D903-93
OSB	232 oz/in	25.39 N/cm	ASTM D903-93
PVC	241 oz/in	26.38 N/cm	ASTM D903-93
Cement Brick	246 oz/in	26.93 N/cm	ASTM D903-93
Tensile Strength	59 lb/in	103.33 N/cm	ASTM D412-97
Installation Temp.	30 to 180°F	-1 to 82°C	
Operating Temp.	-30 to 200°F	-34 to 93°C	
Recommended Storage Conditions: 40-60% Humidity, 60-80°F Standard Shelf Life (at 77°F): 36 months from date of manufacture			

Corporate & Technical Location
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