

# INSTALLATION OF STUCCO EXTERIOR FINISH OVER WOOD STRUCTURAL PANEL WALL SHEATHING

Stucco exterior wall finish is popular as a low maintenance, fire-resistive finish for exterior walls of residential and commercial buildings in many parts of the world. This Data File from APA – *The Engineered Wood Association* describes why and how to apply APA Rated Sheathing as a substrate for stucco to assure a superior, long-lasting finish.

## Wall Sheathing Advantages

Wood structural panel wall sheathing is especially beneficial in high-wind regions such as the Gulf Coast and Atlantic Coast, and in earthquake-prone regions (such as the West Coast). Walls covered with wood structural panel sheathing create a strong, rigid, rack-resistant structure that minimizes building deformation under seismic or wind loading conditions. The increased rigidity of sheathing greatly decreases cracking of brittle exterior finishes such as stucco.

Wall sheathing also ties the roof, wall, floor and foundation together, increasing the strength of the structure. Figure 1 compares wall deformation and ultimate load capacities for typical construction methods. Wood structural panels reduce wall deformation and provide greater shear or racking load capacity than other sheathing products.

Wood-frame wall construction with wood structural panels can cut construction costs and save time. The lower mass of wood-frame walls allows for simpler, less massive foundations and reduced design shear loads for seismic-resistant engineered floor or roof diaphragms. Prefabricating large wall sections on site and using “tilt-up” wall erection procedures can also save money for both residential and commercial applications.

## Benefits of Wood Structural Panel Sheathing Under Stucco

**Improved appearance.** The Lath-Plaster-Drywall Information Bureau reports that application over wood structural panel sheathing improves the appearance of stucco exterior finish. The wall sheathing provides a strong, flat surface to which a uniform thickness of stucco exterior finish can be applied. This reduces the potential for wavy wall surfaces.

**Fire-safe and energy efficient.** A one-hour fire-rated, load-bearing exterior wall assembly using reinforced exterior cement plaster (stucco) as an exterior finish over plywood wall sheathing is recognized as a “generic” construction system under provisions in the Uniform Building Code (UBC). UBC provisions specify 7/8-inch exterior cement plaster

over plywood wall sheathing, with 2x wood studs spaced 16 inches on center. This construction eliminates the need for a separate layer of 5/8-inch Type X gypsum sheathing, thus cutting material and labor costs.

To add energy-saving thermal resistance to the wall assembly, add mineral fiber (rock or slag wool) or glass fiber insulation with a thickness that does not exceed the stud depth.

## Installing Wall Sheathing as a Substrate for Stucco

To insure that the stucco exterior finish will be uniform and monolithic in appearance, specify wood structural panels that are stiff and dimensionally stable. Avoid warped studs or thin sheathing which could create a wavy wall surface or crack the brittle stucco finish.

Before framing the wall, sight along the length of studs and cull any studs with excessive bowing or warping. Use these as blocking or for other noncritical applications. Assemble the remaining studs so that the “crown” is always oriented in the same direction (i.e. outward), to provide the most uniform nailing surface possible for the wall sheathing.

When specifying wood structural panel wall sheathing as a substrate for stucco, upgrade the usual specification to

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provide improved performance under the stucco exterior finish. Wall sheathing panels may be all-veneer plywood, oriented strand board (OSB), or composite (COM-PLY®). For sheathing selection recommendations, see Table 1. General construction recommendations are shown in Figure 2.

For studs spaced 16 inches o.c., use APA Rated Sheathing 24/0, Exposure 1, or thicker panels with a higher Span Rating (or panels marked with a Span Rating of 20/0 or Wall-24 oc). Install the panels horizontally with the long dimension perpendicular to studs. For studs spaced 24 inches o.c., use 7/16-inch APA Rated Sheathing 24/16, Exposure 1, or preferably thicker panels with a higher Span Rating, also installed horizontally across studs.

When sheathing is installed horizontally, APA recommends blocking between studs along horizontal panel joints, or fastening a plywood cleat to the back side of the wall sheathing with screws, for extra support. When using 2x6 studs, a continuous 2x lumber “belt-line” (installed flatwise) might be dadoed into the exterior edge of the studs. This will serve as blocking at the horizontal joints in the wall sheathing. Blocking is required for shear wall applications. Although blocking is not always necessary to meet wall bracing requirements, it is recommended for best performance, and to eliminate the potential for cracking of the stucco exterior finish along the horizontal joint in the wall sheathing.

If wall sheathing panels are applied vertically, thicker panels or special panel constructions are recommended to

provide the necessary cross-panel stiffness as a substrate for stucco. For vertical application, use minimum 15/32-inch APA Rated Sheathing 32/16, Exposure 1, for studs spaced 16 inches o.c., or 19/32-inch APA Rated Sheathing 40/20, Exposure 1, for studs spaced 24 inches o.c. When panels are applied vertically, OSB or 5-ply, 5-layer plywood is recommended.

APA recommends leaving a 1/8-inch space at panel edge and end joints, unless otherwise recommended by the panel manufacturer. This allows panels to expand if they are subjected to higher moisture levels during construction or after installation. Use 6d nails to fasten panels that are 1/2 inch thick or less, and 8d nails for panels over 1/2 inch thick. Space nails 6 inches o.c. at panel edges and 12 inches o.c. at intermediate studs. Closer spacing of fasteners or other nail sizes may be necessary for engineered shear wall applications.

When installing wall sheathing along the band joist between floors in multistory construction, leave space at edges or ends of the panels which are applied over the band joist. This allows the lumber to shrink, regardless of whether the wall sheathing panels are installed vertically or horizontally. For best results, use dry lumber or engineered wood framing products for band joists, to minimize cross-grain shrinkage which could cause buckling of wall sheathing or stucco cracking. Figure 3 shows wall sheathing used as a filler along the band joist. When required by model building codes for high-wind or seismic areas, install approved framing connectors to provide shear and uplift connections for wall framing and floor framing above and below the band joist.

When using steel studs and runners for wall framing, fasten wood structural panel wall sheathing to load-bearing steel studs with self-tapping screws (see Figure 4). Other types of code-approved fasteners such as pneumatically-driven steel pins or screw-shank nails may also be used.

Since threads of self-drilling, self-tapping screws and screw-shank nails extend along only a portion of the shank, it is important to specify a fastener length that will insure that the threads engage the flange of the steel stud (see Figure 4). Space fasteners at least as close as conventional nails. For more information on recommended fasteners and allowable lateral loads for fasteners in engineered shear wall applications, contact steel framing manufacturers or gypsum wallboard manufacturers who also produce and distribute steel framing components.

Install building paper over wood structural panel wall sheathing when applying stucco as an exterior finish. This will help protect the sheathing from moisture permeation through the stucco. Lap building paper (flashing) over top nailing flanges of window and door components, and behind side and bottom flanges as applicable, to protect these locations against water penetration which could lead to subsequent deterioration of wall sheathing. Generally, a vapor permeable kraft waterproof building paper is specified (per Federal Specification UU-B-790 Type 1, Grade D). Note that where the UBC is enforced, two layers of building paper are required (Section 4706 [d] in 1991 UBC; Section 2506.4 in 1994 UBC).

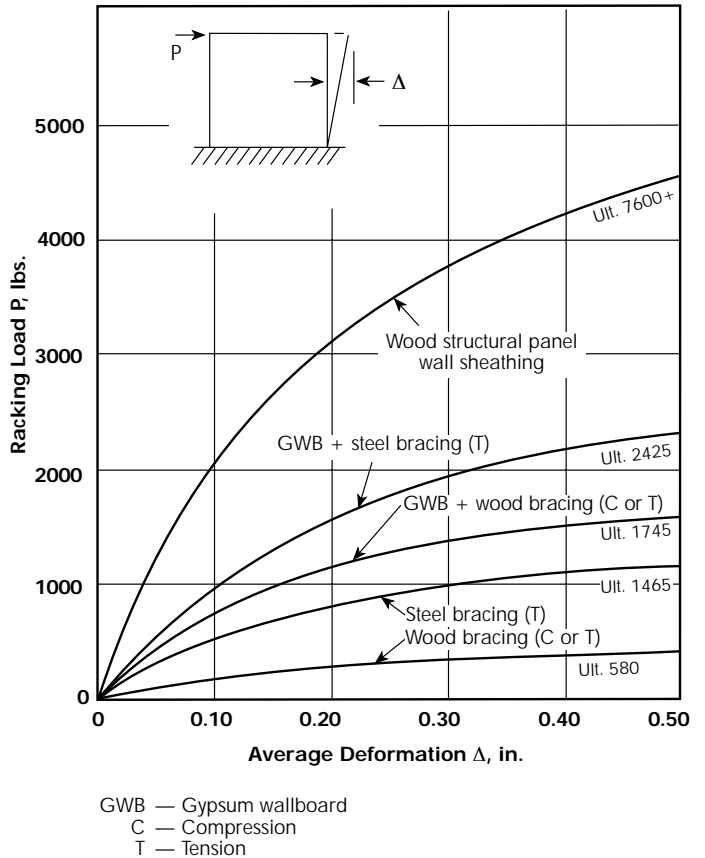
**TABLE 1 Recommended Thickness and Span Rating for APA Rated Sheathing for Stucco Exterior Finish**

Stud Spacing (in.)	Panel Orientation <sup>(a)</sup>	APA Rated Sheathing <sup>(b)</sup>	
		Minimum Nominal Thickness (in.)	Minimum Span Rating
16	Horizontal <sup>(c)</sup>	5/16 <sup>(d)</sup> 5/16 <sup>(e)</sup> 3/8	20/0 Wall-24 oc 24/0
	Vertical	15/32 <sup>(f)</sup>	32/16
24	Horizontal	7/16	24/16
	Vertical	19/32 <sup>(f)</sup>	40/20

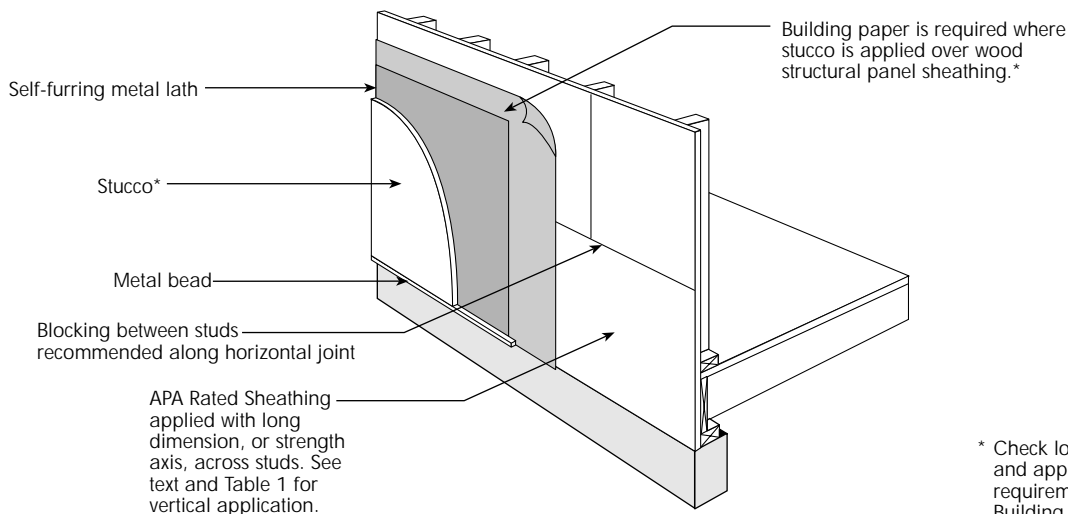
- (a) Strength axis (long panel dimension) perpendicular to studs for horizontal application, or parallel to studs for vertical application.
- (b) Recommendations apply to all-veneer plywood, oriented strand board (OSB) or composite (APA COM-PLY) panels except as noted.
- (c) Blocking recommended between studs along horizontal panel joints.
- (d) Plywood panels only.
- (e) OSB panels only.
- (f) OSB or 5-ply/5-layer plywood panels.

**FIGURE 1 Average Deformation and Strength of 8-ft x 8-ft Wall Assemblies When Subjected to Racking Loads**

(Based on results of wall racking tests conducted on 8-ft x 8-ft wall sections by the Forest Products Laboratory of the USDA Forest Service and by APA.)



**FIGURE 2 Stucco Over APA Rated Sheathing<sup>(a)</sup>**

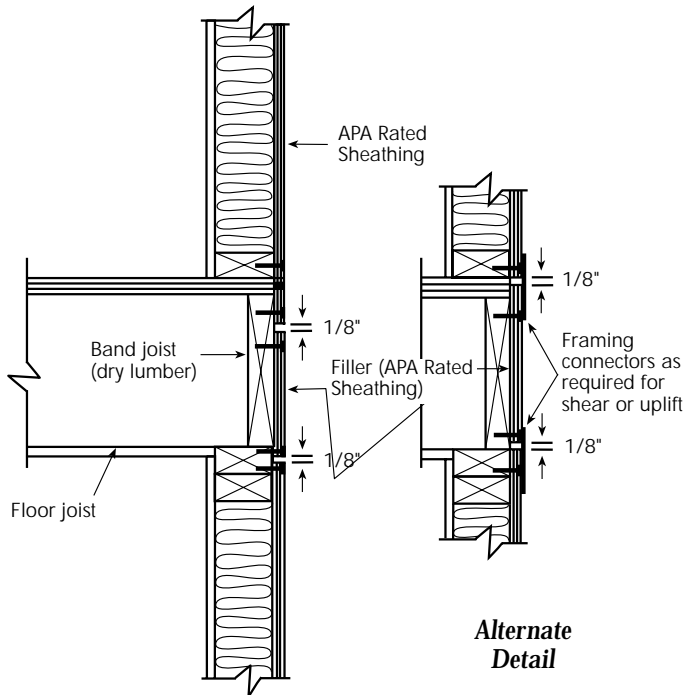


\* Check local building code and applicator for specific requirements. **Note:** Uniform Building Code requires two layers of kraft waterproof building paper (Federal Specification UU-B-790 Type 1, Grade D) over wood-based sheathing.

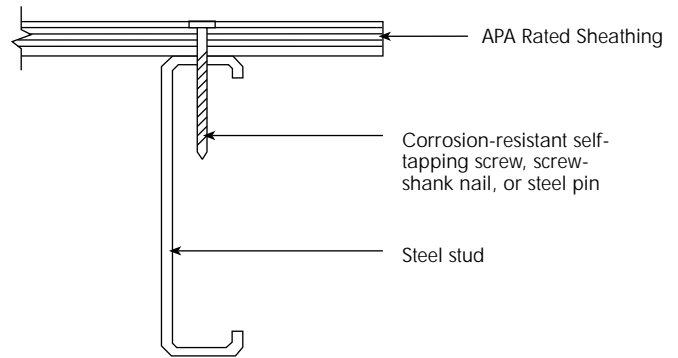
- (a) For one-hour fire-rated, load-bearing exterior wall construction permitted in the Uniform Building Code, use minimum 2x4 studs spaced 16" o.c. and 5/8" Type X fire-resistant gypsum wallboard for the interior wall finish; insulation optional. (Generic, nonproprietary assembly based on combining Item Nos. 17-1.2 and 17-1.3 and Footnote 11 of Table No. 43-B in 1991 UBC; Item Nos. 18-1.2 and 18-1.3 and Footnote 14 of Table 7-B in 1994 UBC.)

**FIGURE 3 Horizontal Joints in Wood Structural Panel Sheathing at Band Joist**

(For multistory buildings, provide spacing at horizontal joints for shrinkage of framing.)



**FIGURE 4 Wood Structural Panel Wall Sheathing Attached Directly to Steel Studs**



**Stucco Application**

Specifications and recommendations for application of exterior Portland cement-based plaster (stucco), metal lath, and control and expansion joints should conform to applicable building code requirements. For further information, contact the Association of the Wall and Ceiling Industries - International, 307 E. Annandale Road, Suite 200, Falls Church, VA 22042-2433; or the Lath, Plaster and Drywall Information Bureau, 3127 Los Feliz Blvd., Los Angeles, CA 90039.

Other sources of information include CSI Sections 09205 and 09220, available from the Construction

Specifications Institute, 601 Madison St., Alexandria, VA 22314-1791; and ASTM Standards C1063 “Standard Specification for Installation of Lathing and Furring for Portland Cement-Based Plaster” and C926 “Standard Specification for Application of Portland Cement-Based Plaster,” available from the American Society for Testing and Materials, 100 Barr Harbor Dr., West Conshohocken, PA 19428-2959.

**Selling High-Quality Construction**

By following these simple guidelines, you can improve the appearance and

performance of stucco exterior finish over wood structural panel wall sheathing, reducing the potential for call-backs and enhancing client satisfaction. The advantages and benefits are sales tools that can be used with prospective clients or home buyers.

APA’s Code Plus program provides builders with sales and advertising tools to promote their use of high quality construction systems featuring APA Rated wood structural panels for wall, floor and roof sheathing. For more information about Code Plus, contact one of the offices listed on the back page.



### **APA: The Mark of Quality**

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and a 37,000 square foot research center at Association headquarters in Tacoma, Washington.

APA's services go far beyond quality inspection and testing, however. APA's research and promotion programs play important roles in developing and improving wood structural panels and other engineered wood construction systems and in helping users and specifiers better understand and use these products.

Information in this and all APA publications is based on the use of panel products of known quality. Always insist on panels bearing the **mark of quality** – the APA trademark.

For more information on recommendations and installation of wood structural panels for wall sheathing, engineered shear walls or other applications, including APA's Code Plus program, contact APA, P.O. Box 11700, Tacoma, Washington 98411-0700, or your nearest APA regional field office. For a complete list of APA publications, ask for the **Publications Index**, Form B300.

We have field representatives in most major U.S. cities and in Canada who can help answer questions involving APA trademarked products. For additional assistance in specifying APA engineered wood products, get in touch with your nearest APA regional office. Call or write:

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(Offices: Antwerp, Belgium; Bournemouth, United Kingdom; Hamburg, Germany; Mexico City, Mexico; Tokyo, Japan.) For Caribbean/Latin America, contact headquarters in Tacoma.

*The product use recommendations in this publication are based on APA – The Engineered Wood Association's continuing programs of laboratory testing, product research, and comprehensive field experience. However, because the Association has no control over quality of workmanship or the conditions under which engineered wood products are used, it cannot accept responsibility for product performance or designs as actually constructed. Because engineered wood product performance requirements vary geographically, consult your local architect, engineer or design professional to assure compliance with code, construction, and performance requirements.*

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