

JUMBO PANELS FOR NONRESIDENTIAL ROOFS

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Structural wood panels have been used in nonresidential roof construction in the Western U.S. for more than 30 years. Millions of square feet of panelized wood roofs have been specified and constructed because of efficiencies in construction speed, excellent diaphragm performance, improved jobsite safety, and low installed cost. Panelized wood roof construction involves the pre-assembly on the ground of large roof units ranging in size from 8' x 24' to as large as 8' x 72'. The panelized units are lifted into place using specially equipped forklifts. Panelized construction has traditionally used 4' x 8' wood structural panels installed with the panel's strength axis parallel to sawn lumber subpurlins, stringers, or stiffeners. These stiffeners are 2x4 or 2x6 dimension lumber spaced 16" or 24" o.c.

The option of larger dimension wood structural panels, now available in many regions, provides several additional advantages and are changing the way these large roofs are being built. These large size OSB panels are available in 8' x 8' dimensions or greater from several APA producers that take advantage of the large presses and cut-up flexibility of their OSB mills. 'Jumbo panels,' as they are often referred to, provide the following advantages:

- The 8' x 8' panel size means fewer pieces to handle and speeds the fabrication of the larger pre-framed roof sections.

- The square jumbo panel can be installed with the strength axis across supports. This provides superior bending resistance and increases resistance to buckling from moisture exposure.

- Longer roof life and lower maintenance costs may be achieved since the roof deck is stiffer with fewer panel seams.

- These panels reduce the ratio of panel edge dimension to square foot of area. Thus, the amount of nails required to produce comparable diaphragm action is reduced since fewer edge nails are needed.

Fabrication Details

As shown in the figure below, installation of 'jumbo panels' is similar to traditional panelized roof framing. The main cantilevered glulam beam system, the 8' o.c. purlin and the 2x_ stiffener layout are unchanged from traditional panelized construction. There are, however, several special installation considerations. The following installation recommendations are based on the experience of several

roof erectors who have used 8' x 8' jumbo panels on large projects.

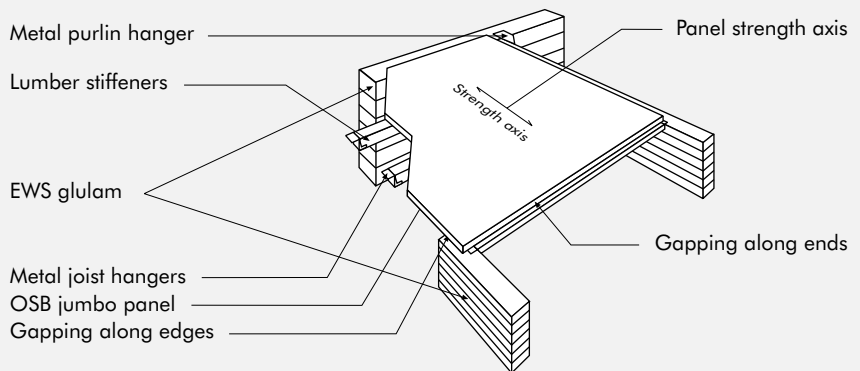
Installation. For best performance, install jumbo panels with strength axis oriented across the stiffeners. This increases the structural performance of the roof system when compared to use of panels with the strength axis parallel to subpurlins. It also permits greater stiffener spacing when such spacing provides construction economies. Table 1 compares the allowable uniform live loads for panels when installed with the panel along supports or across supports.

Panel Gapping. As with other panel installations, APA recommends a 1/8" or greater gap along edges and ends. This gap helps reduce axial stresses that result from panel expansion which naturally occurs when panels absorb moisture.

Gapping with jumbo panels is important because of their greater size. Some roof erectors have increased the edge gapping to 1/4". This can be accomplished by

FIGURE 1

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either increasing the framing module, or by specifying a special size cut from the OSB manufacturer. Such special size is denoted on the panel.

APA's recommendations for gapping are designed to mitigate panel buckling. Panel buckling is an aesthetic distortion that may affect serviceability, but does not affect structural performance. After panel installation, the panel gap will naturally close as a result of panel expansion from moisture absorption. The absence of a gap during later inspection may be indicative of gap closure, rather than absence at time of installation. Whether or not gapping is present immediately prior to roofing, if deck flatness is acceptable, APA recommends that roofing proceed.

The effectiveness of gapping may be diminished in the case where all the following circumstances occur: heavy diaphragm nailing and very dry panels during installation with subsequent exposure to high moisture conditions. When the above conditions may be expected, the following nailing recommendations should be considered.

Panel Nailing. To accommodate expansion of these large panels if subjected to jobsite wetting, the following nailing sequence has been used successfully by roof erectors:

- Temporarily nail panels with a nail spacing of 12" o.c. at ends, edges and intermediate supports (rather than at specified diaphragm schedule) during the roof framing phase of construction. For temporary nailing, use nail size specified in the diaphragm schedule. With this lighter nailing schedule, resultant panel expansion is more readily absorbed by the panel expansion gaps.

- Complete final diaphragm nailing prior to roofing or after panels have been acclimated to job-site moisture conditions.

Specification. To order jumbo OSB panels for nonresidential roof applications, specify as follows:

- APA RATED SHEATHING (or Rated Sheathing Structural I) OSB with a specified thickness and Span Rating (see Table 1 for thickness/span rating combinations).

- Panel size 8' x 8' (or as specified).
- Specify "SIZED for SPACING" or "SIZED for 1/4" EDGE SPACING" which has a panel width of 95-3/4" (\pm 1/16") when manufactured in order to accommodate 1/4" edge spacing for jumbo panels.
- Contact APA for a list of manufacturers of large size OSB panels.

TABLE 1

RECOMMENDED UNIFORM ROOF LIVE LOADS FOR APA TRADEMARKED OSB⁽¹⁾

	Panel Span Rating	Panel Thickness (in.)	Allowable Live Loads (psf)			
			Spacing of Supports Center-to-Center (in.)			
			16	19.2	24	32
PANEL STRENGTH AXIS APPLIED PARALLEL TO SUPPORTS						
APA	24/16	7/16	40	–	–	–
Rated	32/16	15/32	55	–	20	–
Sheathing	32/16	1/2	60	–	25	–
	40/20	19/32, 5/8	105	–	40	–
APA	24/16	7/16	60	–	20	–
Structural I	32/16	15/32	90	–	35	–
Rated Sheathing	32/16	1/2	100	–	40	–
	40/20	19/32, 5/8	170	–	70	–
PANEL STRENGTH AXIS APPLIED PERPENDICULAR TO SUPPORTS						
APA Rated	24/16	7/16	100	65	40	–
Sheathing, or	32/16	15/32, 1/2	180	120	70	30
Structural I	40/20	19/32, 5/8	305	205	130	60

(1) See APA literature for other thicknesses/spans.

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