



# Engineered Wood Floor Systems

**CONSTRUCTION GUIDE**



# Engineered Wood Builds Dependable Floors

Plywood, oriented strand board (OSB) and other engineered wood products offer dependable performance and design flexibility in a variety of structural floor systems. When choosing the products and design for floor construction, it is important to 1) define the predicted loads and the structural requirements for the floor and 2) select a substructure that is appropriate for installing the chosen finish floor.

This guide from APA – *The Engineered Wood Association* provides specification recommendations for plywood and OSB floor systems under carpet and pad, hardwood flooring, lightweight concrete, vinyl, and ceramic tile. It also includes options for floor systems with thicker sheathing panels and describes the APA Glued Floor System. Installation recommendations for panel subflooring and underlayment are also covered.

## METRIC CONVERSIONS

Panel thicknesses indicated in this document are in metric as the primary units and represent the nominal panel thickness. Support and fastener spacing in this document follows common construction practice in Canada and is based on Imperial measurements. “Nominal” or rounded values have been used to indicate the metric equivalents for support and fastener spacing. Actual measurements for support spacing are listed below. The nominal metric equivalents of the Imperial measurements are shown in text, figures and tables in this document.

### METRIC CONVERSIONS

Nominal Support Spacing, mm	Actual Support Spacing, mm (inches)
400	406 (16)
500	488 (19.2)
600	610 (24)
800	813 (32)
1200	1219 (48)

### PANEL PERFORMANCE CATEGORIES

English	Metric (mm) Nominal	Span Rating (CSA O325)
5/16	7.5	2R20, W16
3/8	9.5	2R24, W24
7/16	11	1R24/2F16
15/32	12	2R32/2F16
1/2	12.5	
19/32	15	2R40/2F20, 1F16, 1F20
5/8	15.5	
23/32	18	2R48/2F24, 1F24
3/4	18.5	
13/16	20.5	
7/8	22	1F32
1	25	
1 1/8	28.5	1F48
1 1/4	31.5	



Engineered wood floor systems give builders and designers strength, dependable performance and design flexibility. A variety of floor framing and wood structural panel products can be used in floor construction. To select the appropriate products and floor design, it is essential to define the predicted loads and to consider both the structural requirements and compatibility with the finish floor requirements. Table 1 shows the most common finish floor products and the underlying structural floor systems that are typically recommended for each.

TABLE 1

**TYPICAL FLOOR PANEL SPECIFICATIONS BASED ON FINISH FLOOR INSTALLATIONS**  
**(All must meet minimum structural requirements<sup>a</sup> of the National Building Code of Canada)**

Finish Floor	Typical Panel Installation <sup>b</sup>	Example Specification <sup>b</sup>	
Carpet and pad (see page 5)	Single layer of combined subfloor-underlayment panel with T&G edges	OSB	APA OSB, T&G, CSA O325 rated 1F24 <sup>h</sup>
		Plywood <sup>l</sup>	APA plywood, 18.5 mm, T&G, CSA O151, select grade <sup>h</sup>
Hardwood flooring (see page 12)	Single layer of combined subfloor-underlayment panel with T&G edges <sup>i,j</sup>	OSB	APA OSB, T&G, CSA O325 rated 1F20 <sup>d,i,k</sup>
		Plywood <sup>l</sup>	APA plywood, 15.5 mm, T&G, CSA O121, select grade <sup>d,j,k</sup>
Lightweight concrete with finish floor on top <sup>c</sup> (see page 13)	Subfloor panel with or without T&G edges installed on joists. Asphalt paper covers subfloor. Lightweight concrete poured on top.	OSB	APA OSB, CSA O325 rated 2F24 <sup>h</sup>
		Plywood <sup>l</sup>	APA plywood, 18.5 mm, T&G, CSA O151, sheathing grade <sup>h</sup>
Vinyl (or other thin resilient floor covering) or glued-down carpet (see page 13)	Combined subfloor-underlayment panel with T&G edges <sup>i,j</sup> plus top layer of custom grade plywood Underlayment <sup>f</sup>	OSB	APA OSB, T&G, CSA O325 rated 1F20 <sup>i,k</sup> cover with APA Plywood, CSA O121, 8.5 mm, custom grade Underlayment panel <sup>f</sup>
		Plywood <sup>l</sup>	APA plywood, 15.5 mm, T&G, CSA O151, select grade <sup>j,k</sup> cover with APA plywood, CSA O121, 8.5 mm, custom grade Underlayment panel <sup>f</sup>
Ceramic Tile <sup>e</sup> (see page 16)	Combined subfloor-underlayment panel with T&G edges <sup>i,j</sup> plus top layer of plywood underlayment	OSB	APA OSB, T&G, CSA O325 rated 1F20 <sup>g,i</sup> cover with APA plywood, CSA O121, 15.5 mm, T&G, select grade <sup>j</sup>
		Plywood <sup>l</sup>	Two layers of APA plywood, 15.5 mm, T&G, CSA O121, select grade <sup>g,j</sup>

- a. See Table 2 for joist spacing requirements.
- b. Refer to [www.apawood.org](http://www.apawood.org) for installation specifics and alternate installation combinations.
- c. For gypsum concrete recommendations, contact manufacturer of floor topping.
- d. See *APA Technical Note: APA Performance Rated Panel Subfloors Under Hardwood Flooring, Form R280*.
- e. For other specialty flooring products, including marble and slate, refer to the finish floor manufacturer's recommendations. Enhanced structural performance may be required for ceramic and natural stone floor products. See Tile Council of North America (TCNA) Handbook for *Ceramic, Glass and Stone Tile Installation* ([www.tileusa.com](http://www.tileusa.com)).
- f. Custom grade Underlayment designed for use under resilient flooring and glued-on carpet is produced to proprietary grades by many APA member-manufacturers for added smoothness, panel thickness uniformity, and puncture resistance.
- g. For joists spaced 400 mm (16 inches) o.c. or less.
- h. For joists spaced 600 mm (24 inches) o.c. or less.
- i. "2F" rated OSB with square edge or T&G edges is permissible.
- j. "Sheathing grade" plywood with square edge or T&G edges is permissible.
- k. Although permissible for joists spaced 500 mm (19.2 inches) o.c., recommended to be installed over joists spaced 400 mm (16 inches) o.c.
- l. Plywood certified to CSA O121, CSA O151 or CSA O153.

## COMBINED SUBFLOOR-UNDERLAYMENT SINGLE-LAYER FLOORING

APA-trademarked OSB is manufactured in conformance with CSA O325 and is easy to use and specify because the maximum recommended spacing of floor joists, or “Span Rating,” is stamped on each panel. Combined Subfloor-Underlayment single-layer panels carry a “1F” designation in front of the Span Rating, indicating a tongue-and-groove (T&G) has been machined on the long edges of the panel, and it may be used at its maximum rated span without requiring edge support or a layer of underlayment. Span Ratings only apply when the panel is used continuous over two or more spans with the long panel dimension or strength axis across the supports. Table 2 shows the maximum joist support spacing and corresponding Span Rating, as found in Part 9 in the National Building Code of Canada (NBCC).

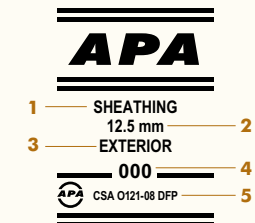
APA-trademarked plywood combined subfloor-underlayment panels are commonly manufactured in a Select or Select Tight-Face grade with a T&G machined into the long edges of the panel. These panels have the structural performance of a subfloor with the surface finish of an underlayment. Panels are certified to CSA O151, *Canadian Softwood Plywood*; CSA O121, *Douglas-Fir Plywood*; or CSA O153, *Aspen/Poplar Plywood*. Part 9 of the NBCC specifies minimum panel thicknesses for these products at common joist spacings (see Table 2), which are based on a long proven history of satisfactory floor performance.

Note that Table 2 contains the minimum floor performance permitted by the NBCC. Greater Span Ratings and/or panel thicknesses are commonly specified in residential flooring construction to improve performance of the floor system. Part 9 of the NBCC is limited to live loads up to 2.4 kPa (50 psf) and supports spaced up to 600 mm (24 inches). Greater spacing between joists and/or higher live loads must be designed by a qualified design professional under Part 4 of the NBCC. Table 3 contains recommendations on maximum specified live loads and concentrated loads for higher loading conditions and greater support spacings. For nonresidential floors such as warehouses and storage areas, see “Heavy Duty Plywood Floors” section.

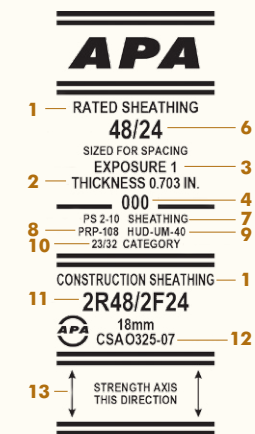
It is important to note that some structural panel applications are not controlled by uniform loads. For example, the maximum specified uniform floor load on panels applied at maximum span according to Table 3 recommendations is greatly in excess of the residential floor live load prescribed in Part 9 of the NBCC. This excess does not mean that floor spans for structural panels can be increased, but only that there is considerable reserved strength and stiffness for uniform loads. The recommendations for panel floors are based on performance under concentrated loads, how the floor “feels” to passing foot traffic, and other subjective factors that relate to public acceptance. Always check the maximum floor spans for structural panels in Table 2 before making a final panel selection.

### TYPICAL APA PANEL TRADEMARKS

#### PLYWOOD TRADEMARK



#### OSB TRADEMARK



1. Panel Grade
2. Nominal Panel Thickness (Optional for standard panel thicknesses)
3. Bond Classification
4. Mill Number
5. Canadian Plywood Standard
6. Span Rating (U.S. Format)
7. Product Standard and Grade
8. APA's Performance Rated Panel Standard
9. HUD Recognition
10. Performance Category
11. Panel Mark — Rating and End-Use Designation in Accordance with CSA O325
12. Canadian OSB Standard
13. Panel Face Orientation Indicator

TABLE 2

**MINIMUM PANEL THICKNESS OR PANEL MARK FOR FLOORS<sup>a</sup>**

Maximum Joist Spacing, mm (inches)	CSA O325 OSB Span Rating <sup>f</sup>		CSA O121, CSA O151 and CSA O153 Plywood <sup>f,g</sup>	Minimum Fastener Length, mm (inches) <sup>d</sup>		Maximum Fastener Spacing, mm (inches) <sup>c</sup>	
	Subfloor Panel	Subfloor Panel Used with Panel-Type Underlay		Common Spiral Nails <sup>b</sup>	Ring-Thread Nails or Screws	Supported Panel Edges <sup>e</sup>	Intermediate Supports
300 (12)	1F16	2F16	15.5	51 (2)	45 (1-3/4)	150 (6)	300 (12)
400 (16)	1F16	2F16	15.5	51 (2)	45 (1-3/4)	150 (6)	300 (12)
500 (20)	1F20	2F20	15.5	51 (2)	45 (1-3/4)	150 (6)	300 (12)
600 (24)	1F24	2F24	18.5	51 (2)	45 (1-3/4)	150 (6)	300 (12)

- a. Based on Part 9 of the NBCC, which assumes a maximum specified live load of 2.4 kPa (50 psf) and panels installed with face grain or strong axis perpendicular to supports. Spans greater than 600 mm (24 inches) or live loads greater than 2.4 kPa (50 psf) are outside the scope of Part 9, and must be calculated by a qualified design professional (see Table 3). Also see “Heavy Duty Plywood Floors” section for nonresidential floors with high loads (e.g., warehouses and stacked storage). For subfloor recommendations under ceramic tile, refer to Table 5. For subfloor recommendations under gypsum concrete, contact manufacturer of floor topping.
- b. Spiral nails may be replaced with common round nails 2.84 mm (0.112 inch) in diameter, in which case glue-nailing is recommended. Glue-nailing of fasteners is recommended for a firmer floor and reduced squeaks. Use only adhesives conforming to ASTM D3498 or APA Specification AFG-01, applied in accordance with the adhesive manufacturer’s recommendations. If OSB panels with sealed surfaces and edges are to be used, use only solvent-based glues; check with panel manufacturer. See “The APA Glued Floor System” section in this publication for more information.
- c. Reduced fastener spacing may be required where floor is engineered as a diaphragm.
- d. All nails must conform to CSA B111, *Wire Nails, Spikes and Staples*. Fasteners listed apply to panels 20 mm thick or less. Spiral and ring-thread nails are 3.05 mm (0.120 inch) in diameter. Wood screws shall be a minimum 3.2 mm (0.125 inch) in diameter and conform to ASME B18.6.1, *Wood Screws (Inch Series)*. For panels greater than 20 mm and less than 25 mm thick, use common spiral nails 57 mm (2-1/4 inches) or ring-thread nails or screws 51 mm (2 inches) long. Other code-approved fasteners of equivalent capacity are permitted.
- e. Supported panel joints shall occur approximately along the centreline of framing with a minimum bearing of 12 mm (1/2 inch). Fasten panels 9 mm (3/8 inch) from panel edges.
- f. The requirement for edge support and the need for a separate underlayment panel are addressed within each section of this document, according to finish flooring type.
- g. Applies to all regular grades of plywood, including sheathing, Select, Select Tight-Face, and Good-One-Side.

## COMBINED SUBFLOOR-UNDERLAYMENT PANEL UNDER CARPET AND PAD

APA-trademarked OSB (1F span-rated) and plywood (Select or Select Tight-Face grade) are available as tongue-and-groove panels and are ideal for use in single-layer floor construction beneath carpet and pad. They provide all of the proven cost-saving and performance benefits of combined subfloor-underlayment construction.

Glue-nailing is recommended for single-layer flooring panels, though panels may be nailed only. Recommendations for both methods are given in Table 2 (see “The APA Glued Floor System” for more detailed gluing recommendations). Always protect smooth panel faces and tongue-and-groove edges from damage prior to and during application. Install with smooth side up. Recommended maximum specified live loads are given in Table 3.

Although tongue-and-groove plywood (Select or Select Tight-Face) or OSB (with a “1F” designation) is suitable for direct application of carpet and pad, an additional thin layer of underlayment is recommended under fully adhered carpet and resilient flooring such as vinyl sheet and vinyl tile flooring. Underlayment is required under ceramic tile applied with adhesive (see “Plywood Underlayment Under Resilient Flooring, Glued-On Carpet, and Ceramic Tile” section). This added layer restores a smooth surface over panels that may have been scuffed or roughened during construction. It also serves to compensate for differences between thinner finish floors (such as vinyl sheets) and thicker finish floors (such as hardwood), making for a more level transition between different floor finishes. The touch-sanded surface of

Select or Select Tight-Face grade of T&G plywood is also suitable for direct application of resilient floor covering. If a sanded face panel is to be used, however, care must be taken during construction to prevent damage or roughening of the sanded face. Tongue-and-groove edges are recommended to be glued under thin floor coverings to assure snug joints.

If the floor has become wet during construction, it should be allowed to dry before application of finish floor, including carpet, underlayment, hardwood flooring, ceramic tile, and others. After it is dry, the floor should be checked for flatness, especially at joints.

When floor members are dry, make sure fasteners are flush with or slightly below the surface of the panel just prior to installation of thin floor coverings. Fasteners should be set if green framing will present nail-popping problems upon drying. Do not fill nail holes. To minimize the chance of floor squeaks, installers should press panels tightly onto joists by standing on the panel over the joist next to the nailing point. Fill and thoroughly sand edge joints (this step may not be necessary under some carpet and structural flooring products; check recommendations from flooring manufacturer). Fill any other damaged or open areas, such as splits, and sand all surface roughness. Ensure fill compound is fully cured before sanding, because it may continue to expand as it cures.

TABLE 3

**RECOMMENDED UNIFORM LIVE LOAD AND CONCENTRATED LOAD FOR APA RATED OSB AND PLYWOOD<sup>a,b</sup>**

Panel Mark	CSA O325 OSB Minimum Nominal Panel Thickness (mm)	CSA O121 or CSA O151 Plywood <sup>c</sup> Maximum Rated Floor Joist Spacing, mm (in.)	Maximum Specified Live Load (kPa)						
			Support Spacing						
			300 mm (12 in.)	400 mm (16 in.)	500 mm (19.2 in.)	600 mm (24 in.)	800 mm (32 in.)	1200 mm (48 in.)	
1R24/2F16	11	—	400 (16)	15.8 <sup>e</sup>	5.8	NA	NA	NA	NA
2R32/2F16	12	12.5	400 (16)	18.1 <sup>e</sup>	8.9	NA	NA	NA	NA
1F16	15	—	400 (16)	20.3 <sup>e</sup>	11.4 <sup>e</sup>	NA	NA	NA	NA
1F20 or 2R40/2F20	15	15.5	500 (20)	23.9 <sup>e</sup>	13.6 <sup>e</sup>	8.8	NA	NA	NA
1F24 or 2R48/2F24	18	18.5	600 (24)	30.6 <sup>e</sup>	18.2 <sup>e</sup>	12.4 <sup>e</sup>	5.9	NA	NA
1F32 <sup>c</sup>	22 <sup>d</sup>	20.5 <sup>d</sup>	800 (32) <sup>f</sup>	—	23.6 <sup>e</sup>	16.8 <sup>e</sup>	9.8 <sup>e</sup>	5.1 (OSB Only)	NA
—	—	22.5 <sup>d</sup>	800 (32)	—	—	20.9 <sup>e</sup>	12.0 <sup>e</sup>	4.6 <sup>e</sup>	NA
—	—	25.5 <sup>d</sup>	800 (32)	—	—	23.2 <sup>e</sup>	17.1 <sup>e</sup>	6.7	NA
1F48 <sup>c</sup>	28.5 <sup>d</sup>	28.5 <sup>d</sup>	1,200 (48)	—	—	—	20.0 <sup>e</sup>	8.5	3.2
—	—	31.5 <sup>d</sup>	1,200 (48)	—	—	—	21.9 <sup>e</sup>	12.0 <sup>e</sup>	4.5

a. Assumptions:

1. Panels installed with face grain or major strength axis perpendicular to supports.
2. 38 mm (1-1/2 inches) of support width, except for 1,200 mm (48 inches) of span, which assumes a double-nailed joist with support width of 76 mm (3 inches).
3. Panels 610 mm (24 inches) or wider installed over three or more spans, fully loaded.
4. Dry service condition and standard-term duration of load.

b. 0.3 kPa (6.3 psf) dead load assumed. Deflection limit is span/360.

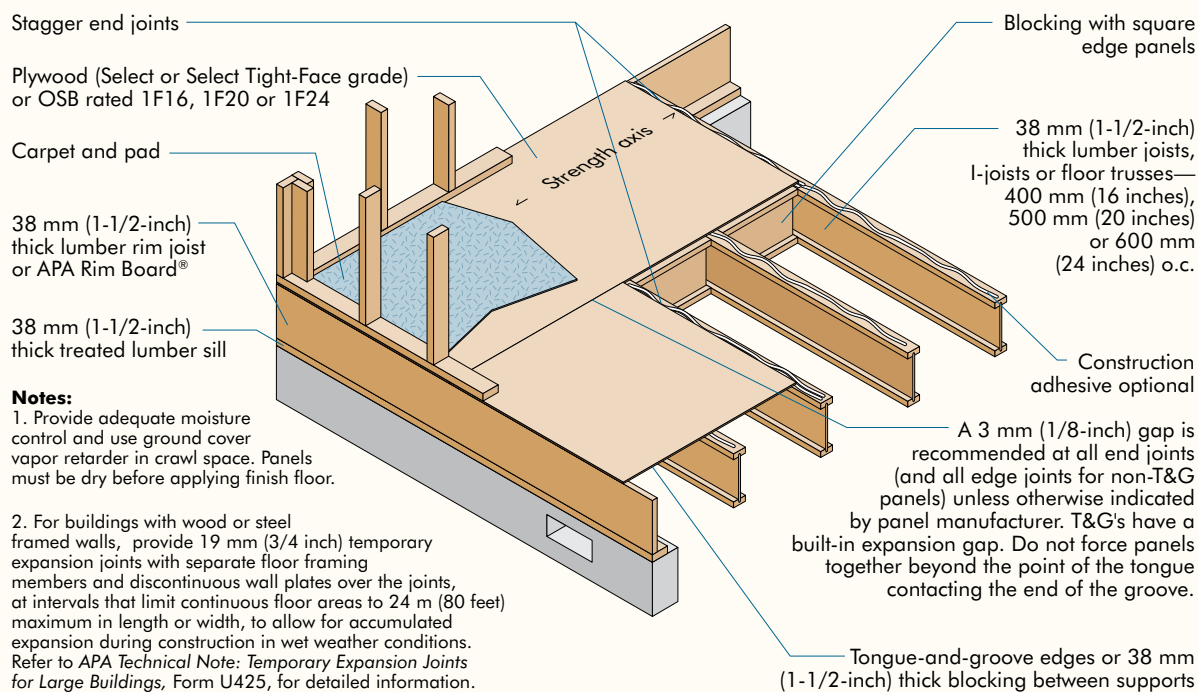
c. Optimized maximum specified live load pressures may be calculated using plywood design properties listed in CSA O86.

d. Check with supplier for availability.

e. Capable of resisting a specified concentrated load of 9 kN (2,000 lbf) applied over an area of 750 mm x 750 mm (30 inches x 30 inches) area in accordance with Section 4.1.5.9 of the NBCC.

f. Maximum recommended span for 20.5 mm plywood is 600 mm (24 inches).

FIGURE 1

**OSB AND PLYWOOD OVER SUPPORTS 400, 500, AND 600 mm****THICK FLOORING PANELS**

Part 9 of the NBCC contains prescriptive subfloor requirements for joists spaced up to 600 mm (24 inches) o.c. A qualified design professional, following the performance requirements of Part 4 of the NBCC, is required to design subfloors at spans greater than 600 mm (24 inches). Table 3 includes maximum specified live and concentrated loads for OSB and plywood at these spans, which may be used for design considerations.

Install tongue-and-groove plywood (sheathing, Select or Select Tight-Face grade) or OSB (rated “1F”) spaced 800 mm (32 inches) on centre over 38 mm (1-1/2-inch) wide joists or I-joists (Figure 2). Install panels spaced 1200 mm (48 inches) on centre over 89 mm (3-1/2-inch) thick girders (Figure 3). For the 1200 mm (48 inches) on centre method, supports may be 38 mm (1-1/2-inch) wide joists spiked together, 89 mm (3-1/2-inch) thick lumber, glued laminated timber (glulams), structural composite lumber (SCL), lightweight steel beams, or wood I-joists or floor trusses. Girders of doubled 38 mm (1-1/2-inch) members should have top edges flush to permit smooth panel end joints.

For a low profile with supports 1200 mm (48 inches) on centre, beams can be set in foundation pockets or on posts supported by footings so that panels bear directly on the sill. If 89 mm (3-1/2-inch) wide lumber girders are used, they should be air-dried and/or set higher than the sill to allow for shrinkage. Note that the lumber floor joist systems are incompatible with SCL or I-joist floor systems in the joist depth, and they should not be mixed in the same floor systems.

In some applications, particularly in hallways and other heavy traffic areas, greater stiffness in the floor may be desirable. Modifications to the 1200 mm (48 inches) framing system, such as addition of straight or diagonal blocking, will increase stiffness considerably.



FIGURE 2

**OSB OR PLYWOOD THICK FLOORS OVER SUPPORTS 800 mm (32 INCHES) o.c.**

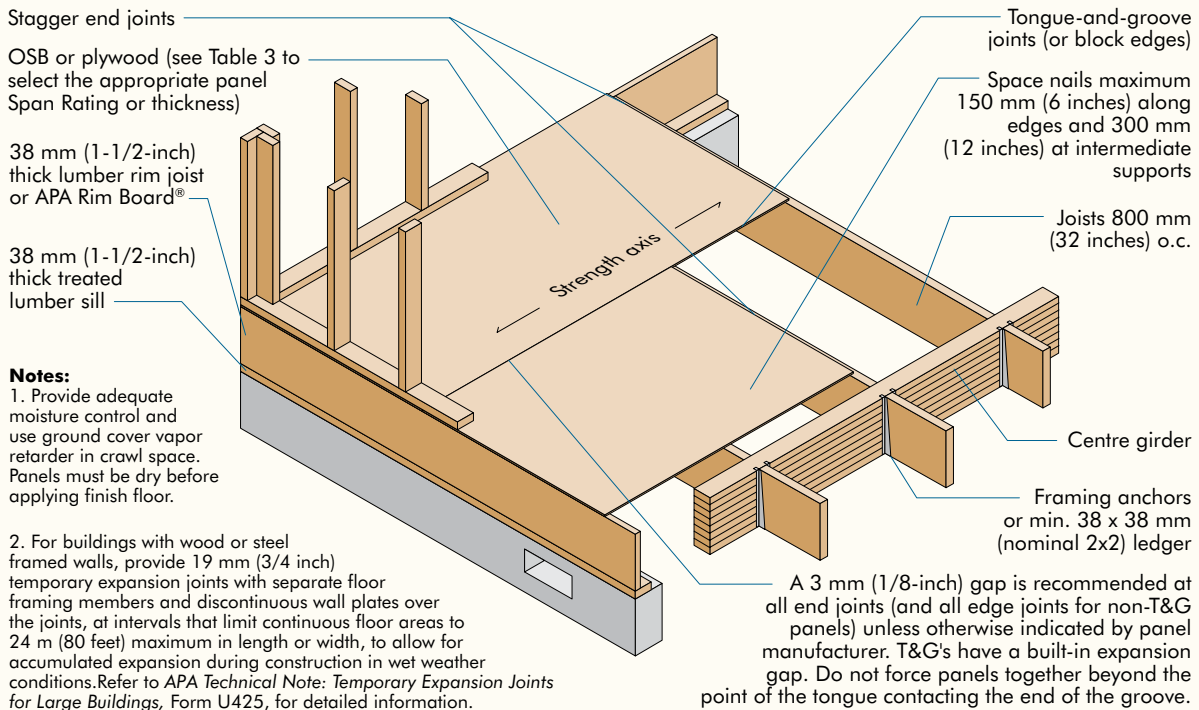
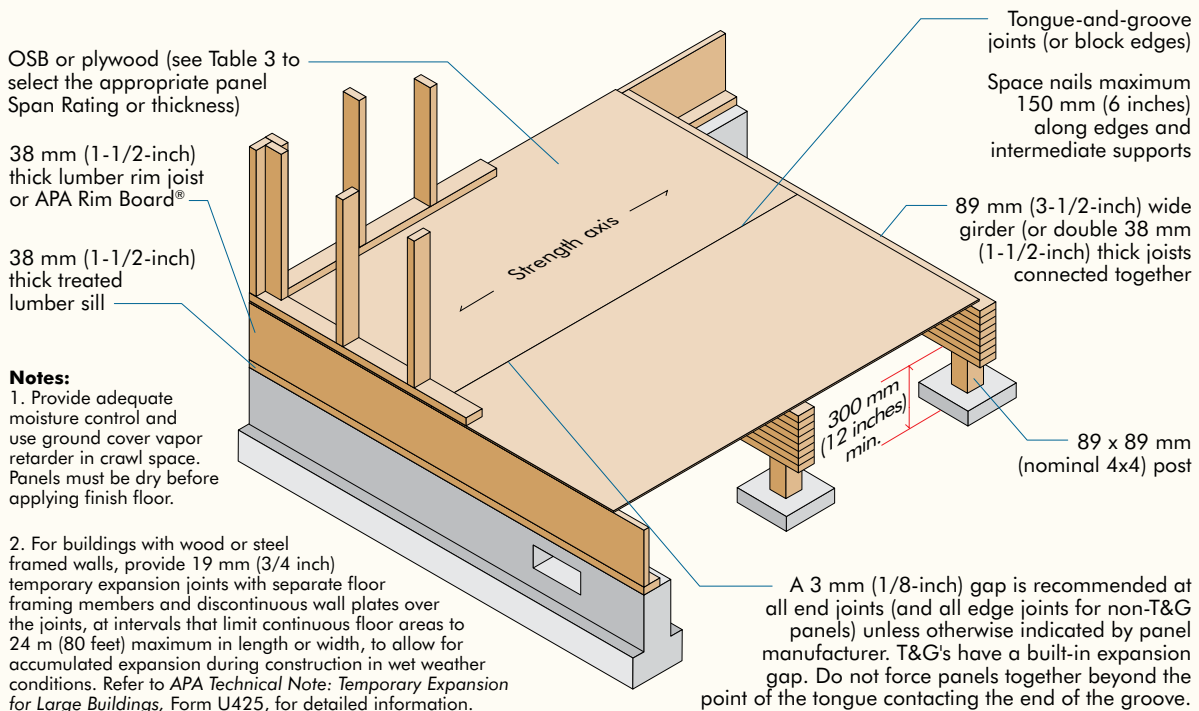


FIGURE 3

**OSB OR PLYWOOD THICK FLOORS OVER SUPPORTS 1200 mm (48 INCHES) o.c.**





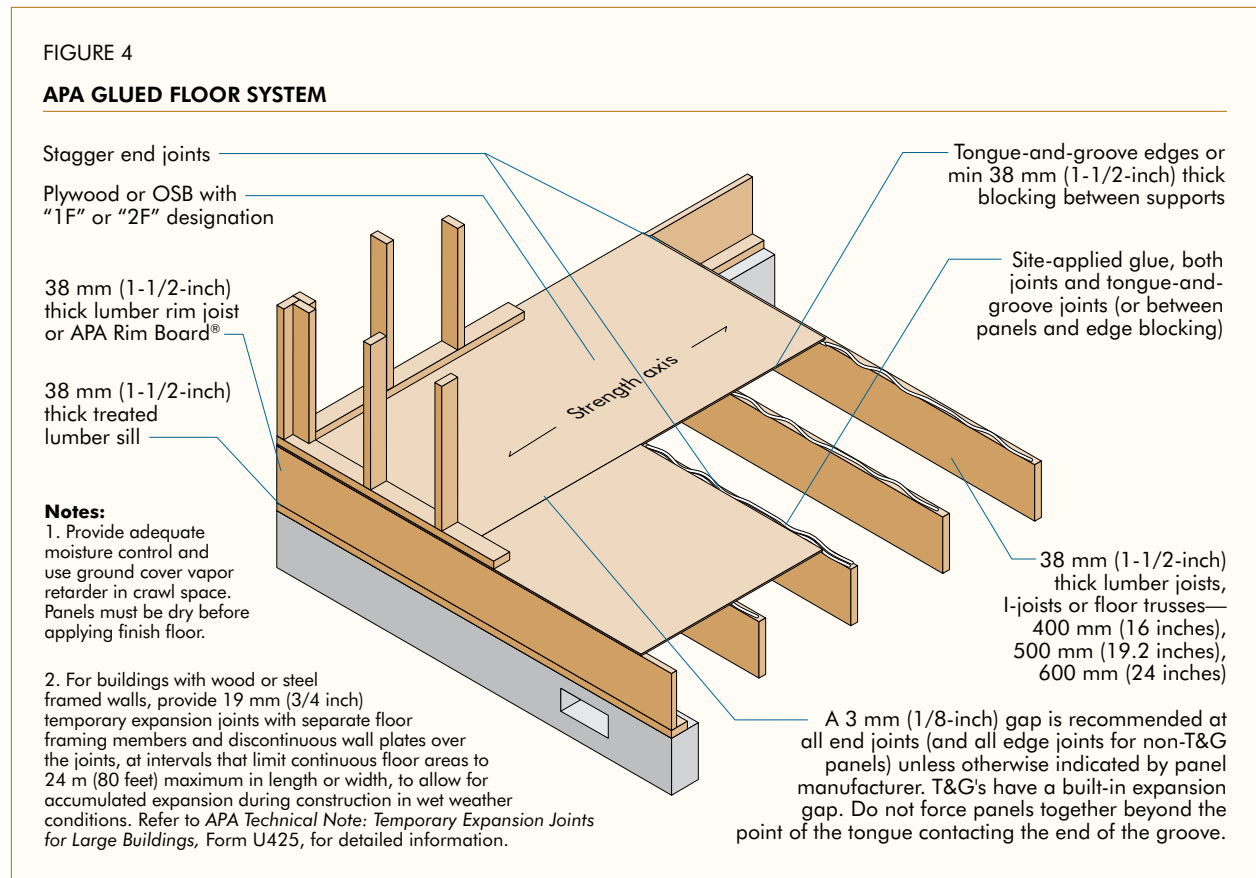
## THE APA GLUED FLOOR SYSTEM

The APA Glued Floor System is based on thoroughly tested gluing techniques and field-applied construction adhesives that firmly and permanently secure a layer of wood structural panels to wood joists. The glue bond is so strong that floor and joists behave like integral T-beam units. Floor stiffness is increased appreciably over conventional construction, particularly when tongue-and-groove joints are glued. Gluing also helps eliminate squeaks, floor vibration, bounce and nail-popping.



Field-glued floors go down quickly, even in cold weather, using ordinary construction materials and techniques. And like many other panel assemblies that provide excellent sound control, the APA Glued Floor System is ideal for multifamily construction. The large panels with glued tongue-and-groove joints reduce the number of cracks that can “leak” airborne noise.

Panels recommended for glued floor construction are tongue-and-groove APA plywood (Select or Select Tight-Face grade) or OSB with a “1F” designation for single-floor construction. APA plywood (sheathing grade with square edge) or OSB with a “2F” designation for the subfloor may be used for a glued floor construction if used with a separate underlayment layer or



with structural finish flooring. In both cases, subfloor panels should be installed continuous over two or more spans with the long dimension or strength axis across supports.

A single layer of tongue-and-groove plywood (Select or Select Tight-Face grade) is allowed under areas to be finished with resilient floor coverings, such as tile, linoleum, vinyl or fully adhered carpet, although an additional layer of plywood underlayment is recommended. Care must be taken during construction to prevent damage or roughening of the sanded face that will receive the finish flooring. Both OSB (for subflooring) and plywood (for subflooring and underlayment) have suitable bond performance for applications subject to moisture during or after construction, as in bathrooms and utility rooms.

Tongue-and-groove panels are recommended for single-floor construction. Before each panel is placed, a line of glue is applied to the joists with a caulking gun. The panel tongue-and-groove joint should also be glued, although less heavily, to avoid squeeze-out. If square-edge panels are used, edges must be supported with a minimum 38 mm (1-1/2-inch) thick blocking securely nailed between framing members. Glue panels to blocking to minimize squeaks. Blocking is not required under structural finish flooring, such as wood strip flooring, or if a separate underlayment layer is installed.

Only adhesives conforming to ASTM D3498 or APA AFG-01 are recommended for use with the APA Glued Floor System. A number of brands meeting this specification are available from building supply dealers. If OSB panels with sealed surfaces and edges are to be used, use only solvent-based glues; check with panel manufacturer. Always follow the specific application recommendations of the glue manufacturer.



## APA GLUED FLOOR SYSTEM APPLICATION

For best results, follow these application procedures:

1. Snap a chalk line across joists 1.2 m (4 feet) in from wall for panel edge alignment and as a boundary for spreading glue.
2. Spread only enough glue to lay one or two panels at a time, or follow specific recommendations of glue manufacturer. Wipe any mud, dirt or water from joists before gluing.
3. Lay first panel with tongue side to wall and nail in place. This protects the tongue of next panel from damage when tapped into place with block and hammer. T&G's have a built-in expansion gap. Do not force panels together beyond the point of the tongue contacting the end of the groove.
4. Apply a continuous line of glue of about 6 mm (1/4 inch) diameter to framing members. Apply glue in a serpentine pattern on wide areas.
5. Apply two lines of glue on joists where panel ends butt to assure proper gluing of each end.
6. After first row of panels is in place, spread glue in groove of one or two panels at a time before laying next row. Glue line may be continuous or spaced, but avoid squeeze-out by applying a thinner line than on joists, about 3 mm (1/8 inch) in diameter.
7. Tap second-row panels into place, using a block to protect groove edges.
8. Stagger end joints in each succeeding row, where possible. A 3 mm (1/8 inch) space is recommended between panels at end joints and along edge joints of non-T&G panels. Use a spacer tool to assure accurate and consistent spacing.
9. Complete all nailing of each panel before glue sets by standing on the panel over the joist next to the nailing point to press the panel tightly onto joists. Check the glue manufacturer's recommendations for allowable time. Warm weather accelerates glue setting. Select fasteners and spacing per Table 2. Closer nail spacing may be required for diaphragm construction. Finished deck can be walked on and will carry construction loads without damage to glue bond.

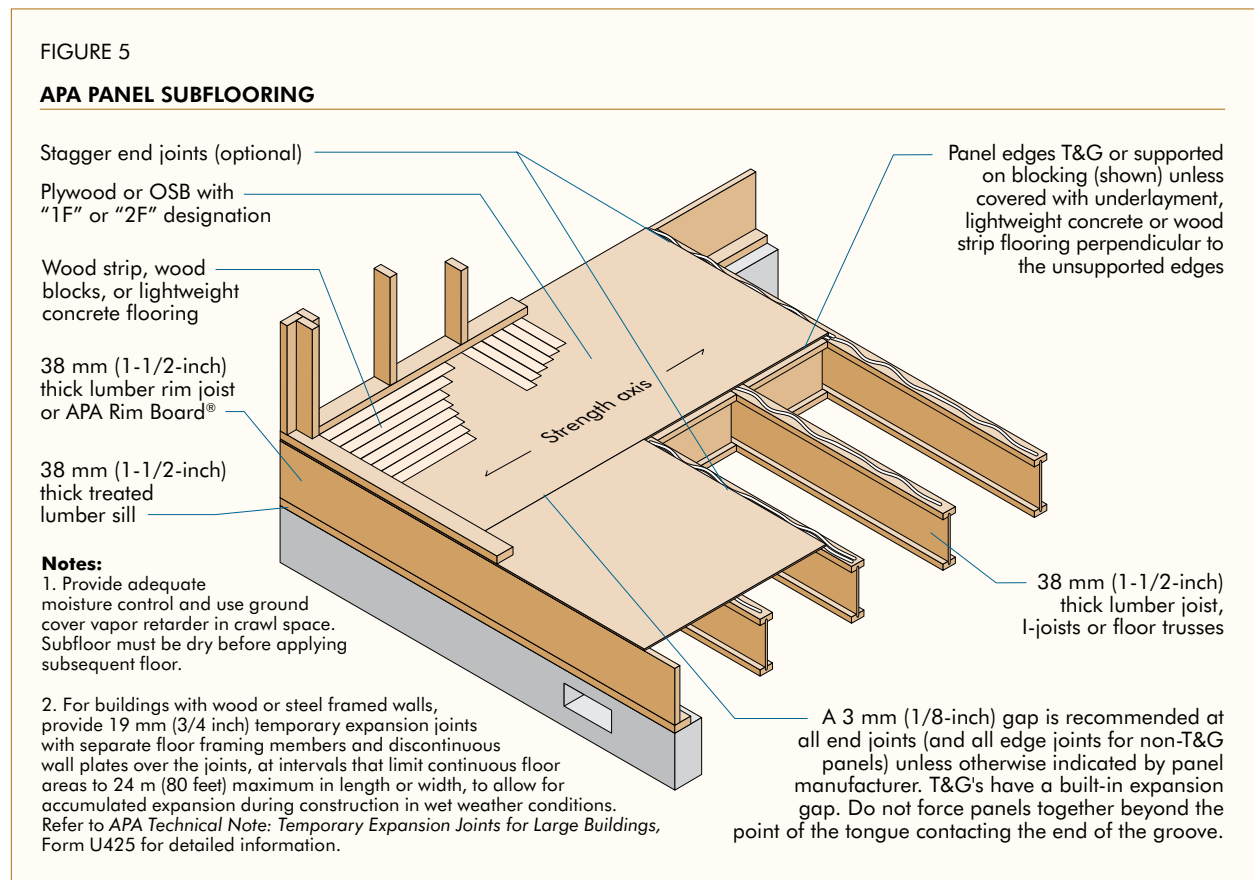
## PANEL SUBFLOORING

APA-trademarked OSB is manufactured in conformance with CSA O325 and is easy to use and specify because the maximum recommended spacing of floor joists, or “Span Rating,” is stamped on each panel. Subfloor panels carry a “2F” designation in front of the Span Rating, indicating an additional underlayment panel must be installed on top, or by itself under certain robust flooring finishes that do not require an underlayment (e.g., hardwood flooring). These Span Ratings in the trademark indicate the maximum spacing of supports and only apply when the panel is used continuous over two or more spans with the long panel dimension or strength axis across the supports (unless otherwise indicated by the manufacturer).

Plywood certified to CSA O121 DFP, CSA O151 CSP or CSA O153 Poplar in the grades of sheathing, Select or Select Tight-Face is commonly used as subflooring.

Table 2 shows the maximum joist spacing and corresponding subfloor Span Rating for OSB panels and minimum panel thickness for plywood panels, in accordance with Part 9 of the NBCC. Nailing recommendations are given in Table 2. Other code-approved fasteners may be used. APA panel subflooring may also be glued for added stiffness and to reduce squeaks.

Part 9 of the NBCC (and Table 2) limits joist spacing to 600 mm (24 inches) and live loads to 2.4 kPa (50 psf). A qualified design professional is required to specify floors beyond these limits. Table 3 contains recommended live and concentrated loads for OSB and plywood at greater joist spacing and live loads. Spans are limited to the values shown because of the possible effect of concentrated loads.



Long edges should be tongue-and-groove or supported with blocking unless:

1. A separate underlayment layer is installed with its joints offset from those in the subfloor. Minimum underlayment thickness should be 6 mm for subfloors on spans up to 600 mm (24 inches). Underlayment of 8 mm or thicker is recommended on spans greater than 600 mm (24 inches).
2. A minimum of 38 mm (1-1/2 inches) of lightweight concrete is applied over the panels.
3. 19 mm (3/4 inch) matched hardwood or softwood strip flooring is installed over the subfloor perpendicular to the unsupported edge. For enhanced performance, see *APA Technical Note: Performance Rated Panel Subfloors under Hardwood Flooring*, Form R280.

If the floor becomes wet during construction, it should be allowed to dry before application of finish floor, including but not limited to underlayment, hardwood flooring, and ceramic tile. After it is dry, the floor should be checked for flatness, especially at joints.

OSB or plywood stamped as “Exposure 1” meets the “Exterior Type” requirements of the NBCC, Clause 9.3.2.4, where temporary exposure to moisture or weather is permitted during construction. Plywood certified as “Exterior” have bonds capable of withstanding repeated wetting and redrying or long-term exposure to weather or other conditions of similar severity. Note that plywood subject to attack from mould, decay or insects must be pressure-preservative treated to the appropriate requirements per CSA O80.

In some nonresidential buildings, greater traffic and heavier concentrated loads may require construction in excess of the minimums given in Table 2. Where joists are 400 mm (16 inches) on centre, for example, OSB with a Span Rating of 2F24 or plywood 18.5 mm thick will give additional stiffness and strength. For beams or joists 600 mm (24 inches) or 800 mm (32 inches) on centre, thicker panels such as 31.5 mm or rated 1F48 will provide additional stiffness and strength. Before specifying thick panels, check with supplier for availability.

## PANEL SUBFLOORS UNDER HARDWOOD FLOORING

Panel subfloor spans for 19 mm (3/4 inch) hardwood strip flooring are limited to maximum spacing of floor framing listed in Table 2. For improved stiffness, and to help eliminate floor squeaks when hardwood flooring is installed, spans reduced from the maximum are recommended by the National Wood Floor Association (NWFA)<sup>a</sup>. See *APA Technical Note: Performance Rated Panel Subfloors under Hardwood Flooring*, Form R280.

Because hardwood flooring is sensitive to moisture, make sure subflooring panels are dry before hardwood is installed. Do not install hardwood unless subfloor moisture level is within a range consistent with the hardwood manufacturer’s recommendations. If the home is built over a crawl space, make sure the crawl space is dry and well-drained. A 6-mil polyethylene vapour retarder should be installed on the ground in the crawl space.



Follow the recommendations of the flooring manufacturer or the NWFA for the hardwood flooring product being used and its storage and handling, and for acclimatizing the hardwood prior to installation on the subflooring. Also see *APA Technical Note: Performance Rated Panel Subfloors under Hardwood Flooring*, Form R280.

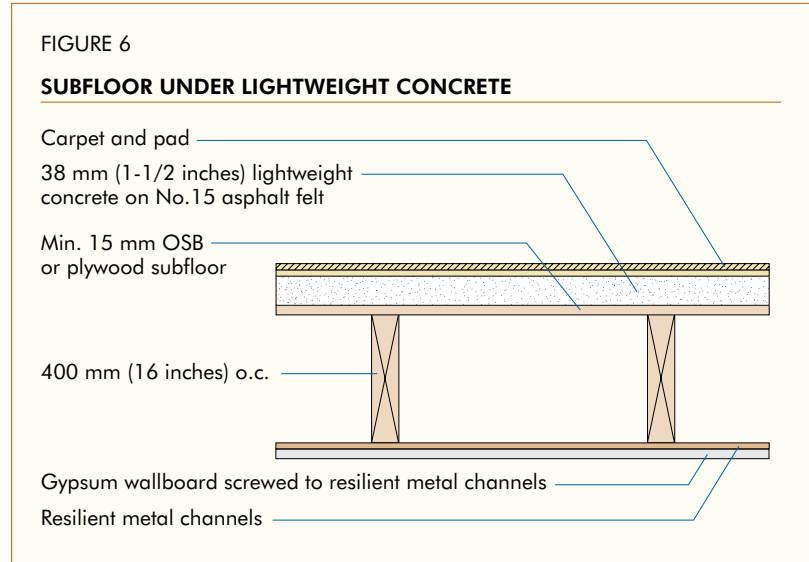
a. National Wood Flooring Association, 111 Chesterfield Industrial Boulevard, Chesterfield, Missouri 63005; Phone (800) 422-4556 (USA), (636) 519-9663 (Local and International)



## SUBFLOOR UNDER LIGHTWEIGHT CONCRETE

OSB and plywood are an excellent base for lightweight concrete floors. See “Combined Subflooring-Underlayment Single-Layer Flooring” or “Panel Subflooring” sections for application recommendations. For gypsum concrete recommendations, contact manufacturer of floor topping.

Install panels continuous over two or more spans with the strength axis across supports. Use a moisture barrier when recommended by concrete manufacturer. See Figure 6 for a typical floor assembly.



## PLYWOOD UNDERLAYMENT UNDER RESILIENT FLOORING, GLUED-ON CARPET AND CERAMIC TILE

Some types of finish flooring require two layers of panels beneath them for added stiffness and serviceability requirements. This usually consists of a bottom subfloor layer topped with an underlayment panel. The type of underlayment panel product will depend on the finish flooring. For example, vinyl sheet flooring requires a smooth and solid substrate able to withstand concentrated loads that could lead to puncture—contrasted with ceramic tile flooring, which requires a thicker and stiffer underlayment panel able to resist flexing under load to prevent tile cracking (see “Subfloor and Underlayment Under Ceramic Tile Floors” section).

Applied as recommended, plywood underlayment is dimensionally stable and eliminates excessive swelling and subsequent buckling or humps around nails. Underlayment panels may be used to raise up thinner finish floors to make a level transition to thicker finish floors.

There are generally two types of plywood suitable as underlayment: 1) sanded/touch-sanded plywood manufactured to the regular grade standards found in CSA O121, O151 or O153, and 2) mill-specific custom Underlayment grades with enhanced performance properties. Both types are recognized under the NBCC, but the choice between these products depends on how demanding the end application and how sensitive the finish flooring is to the subfloor/underlayment below it.

## REGULAR GRADES

Regular grades of plywood that have been sanded or touch-sanded (Good-One-Side, Select Tight-Face and Select) may be suitable as underlayment panels under ceramic tile, hardwood flooring and some resilient flooring types. These grades may provide the necessary smoothness but are only suitable where the finish flooring does not rely on the underlayment for puncture resistance. Refer to the finish flooring manufacturer’s recommendations. Regular grades are available in a number of thicknesses and typically range from 6 to 18.5 mm. See Table 4 and Figure 7 for installation recommendations.

## CUSTOM GRADE UNDERLAYMENT

Custom grade Underlayment is commonly used under vinyl, rubber and synthetic sheets or tiles and glued-on carpets. These panels are certified to CSA O121 or CSA O151 standards and are manufactured to proprietary grades unique to each plywood manufacturer. Although unique, custom grade Underlayment panels across the industry share a number of common traits and installation recommendations.

These panels are fully sanded for enhanced smoothness and sized to a finer thickness tolerance than required by the manufacturing standard (CSA O121 or CSA O151). The face veneer resists dents and punctures from concentrated loads by placing special limitations on the face veneer thickness and voids beneath the face veneer. Custom grade Underlayment panels are specially manufactured, avoiding chemicals that can discolour or bleed-through to the finish flooring.

These panels are typically manufactured at thicknesses of 8.0 to 8.5 mm and are identified by the manufacturer as an Underlayment panel, often found in the trademark. Refer to the manufacturer's recommendations for detailed installation recommendations.

Always protect all types of plywood underlayment against physical damage or water prior to application. Panels should, however, be allowed to equalize to atmospheric conditions by standing individual panels on edge for at least 48 hours before installation. Crawl spaces must have cross-flow ventilation and must be equipped with a vapour barrier having a minimum clearance of 460 mm (18 inches) from the crawl space floor. Floor covering manufacturers do not recommend the installation of resilient flooring over wood panels attached directly to on grade or below grade concrete subfloors, or over sleeper constructed subfloors on or below grade concrete slabs.

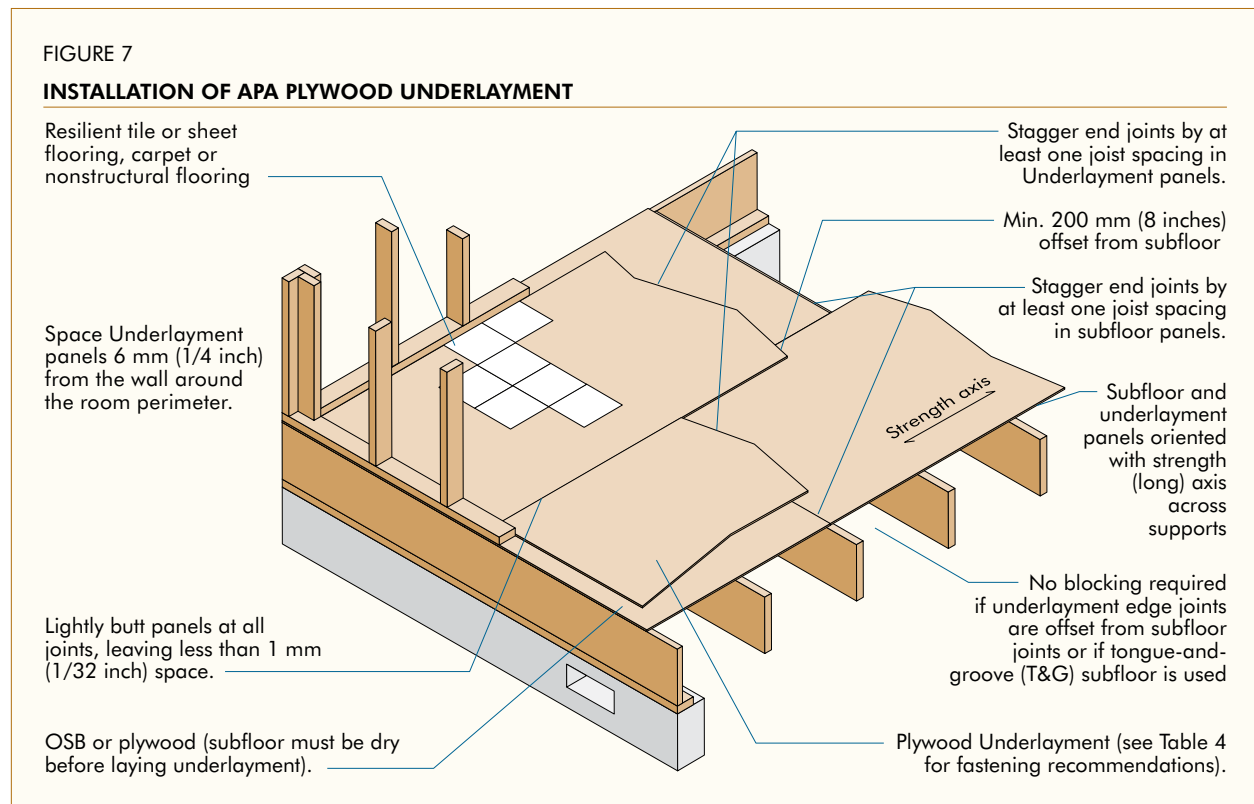


TABLE 4

APA PLYWOOD UNDERLAYMENT<sup>a</sup>

Subfloor	Underlayment Type	Minimum Underlayment Thicknesses (mm)	Recommended Fasteners	Maximum Fastener Spacing	
				Panel Edges <sup>c</sup>	Intermediate
APA-Certified OSB or Plywood (see Table 2 for joist spacing and min. panel thickness)	Custom Grade Plywood Underlayment	8	32 mm (1-1/4-inch) ring-grooved underlay flooring nails min. 12-1/2 gage (0.099 inch) shank dia. or narrow crown staples 28 mm (1-1/8-inch) long x 6 mm (1/4-inch) wide, 1.6 mm (1/16-inch) dia. <sup>g</sup>	75 mm (3 inches) <sup>b,d</sup>	100 mm (4 inches) <sup>b</sup> each way
	Select, Select Tight-Face, Good-One-Side <sup>f</sup> Plywood Underlayment	6	19 mm (3/4-inch) spiral or ring-grooved underlay flooring nails or staples 22 mm (7/8-inch) long x 4.7 mm (3/16-inch) wide x 1.2 mm (0.047 inch) dia. <sup>e</sup>	150 mm (6 inches)	200 mm (8 inches) each way
		8	22 mm (7/8-inch) spiral or ring-grooved underlay flooring nails or staples 28 mm (1-1/8-inch) long x 4.7 mm (3/16-inch) wide x 1.2 mm (0.047 inch) dia. <sup>e</sup>		

a. For underlayment recommendations under ceramic tile, refer to Table 5.

b. Custom grade plywood Underlayments are proprietary products and have manufacturer-specific installation requirements. The indicated maximum fastener spacing is common to most manufacturers. Refer to manufacturer's literature for additional installation requirements.

c. Fasten panels 9.5 mm (3/8 inch) from panel edges.

d. Some manufacturers recommend a spacing of 50 mm (2 inches).

e. Use 38 mm (1-1/2 inches) ring-grooved or spiral nails, minimum 12-1/2 gage (0.099 inch) shank diameter, for underlayment panels 14–18.5 mm thick.

f. Not recommended under glue-on carpet, vinyl tile or vinyl sheet.

g. Screws not recommended.

Follow the finish floor manufacturer's installation specifications. Install plywood underlayment, smooth side up, immediately before laying the finish floor. For maximum stiffness, place face grain across supports. All joints of underlayment panels should be offset by at least 200 mm (8 inches) from joints of subfloor panels. Offset underlayment panel end joints from floor joists and avoid fastening into joists (to minimize the chance of nail pops). Always offset underlayment joints so that four corners do not meet.

Nailing or stapling should begin at one corner of the underlayment panel and should progress diagonally across the panel. To prevent splintering, ensure staples are applied parallel to the grain. If power-driven fasteners are used, foot pressure should be applied near the fastener to ensure firm contact between the underlayment and subfloor. Make sure fasteners are flush with, or just slightly below, surface of underlayment just prior to installation of resilient floor coverings such as tile, or sheet vinyl. (See Table 4 for underlayment recommendations for thin flooring products.)

Preparation of underlayment for floor covering applications must be done as recommended by the floor covering manufacturer. Such a recommendation should include sanding of uneven surface and panel joints to level and completing the floor covering manufacturer's procedure for filling surface voids. When required by the manufacturer, a procedure for filling of joint seams should also include a specification for a suitable filler.

The plywood underlayment needed to bridge an uneven floor will depend on roughness, loads applied and the finish flooring type. Although 8 mm minimum thickness is recommended, 6 mm plywood underlayment may also be acceptable over smooth subfloors, especially in remodeling work.

## SUBFLOOR AND UNDERLAYMENT UNDER CERAMIC TILE FLOORS

Recommendations for several plywood floor systems suitable for application of ceramic tile are given in Table 5, based on specifications of the Tile Council of North America (TCNA)<sup>a</sup>. In designing such a floor system, expected live loads, concentrated loads, impact loads and dead loads, including weight of the tile and setting bed, need to be considered. For additional details and assemblies, see *Technical Topic: Ceramic Tile Over Wood Structural Panel Floors*, Form TT-006, at [www.apawood.org](http://www.apawood.org).

TABLE 5

### APA FLOOR SYSTEMS FOR CERAMIC TILE FLOORING BASED ON THE TILE COUNCIL OF NORTH AMERICA HANDBOOK FOR CERAMIC TILE INSTALLATION

TCNA No.	Service Classification <sup>a,b</sup>	Max. Joist Spacing o.c., mm (inches)	Underlayment Layer	Subfloor Layer	Comment
F141	Light Commercial	400 (16)	32 mm minimum mortar bed	15.5 mm T&G plywood <sup>e</sup>	Cleavage membrane
F142	Residential	400 (16)	15.5 mm plywood <sup>e</sup>	15.5 mm T&G plywood <sup>e</sup>	—
F143	Residential or Light Commercial or (with special tile), Heavy	400 (16)	15.5 mm plywood <sup>e</sup>	15.5 mm T&G plywood <sup>e</sup>	12.5 mm plywood <sup>e</sup> underlayment layer gives "Residential" performance
F144	Residential or Light Commercial	400 (16)	Cementitious backer units or fiber cement underlayment	18.5 mm T&G plywood <sup>e</sup>	15.5 mm plywood <sup>e</sup> subfloor gives "Residential" performance
F145	Residential or Light Commercial	400 (16)	19 mm minimum mortar bed	18.5 mm plywood <sup>e</sup>	Cleavage membrane + metal lath
F146	Light Commercial	400 (16)	Coated glass-mat backer board	15.5 mm plywood <sup>e</sup>	—
F147	Residential	600 (24) <sup>c</sup>	9.5 mm plywood <sup>e</sup> plus uncoupling membrane	18.5 mm T&G plywood <sup>e</sup>	100 mm x 100 mm or larger tile only
F148	Residential	500 (19.2)	Uncoupling membrane	18.5 mm T&G plywood <sup>e</sup>	75 mm x 75 mm or larger tile only
F149	Residential	600 (24)	15.5 mm plywood <sup>e</sup>	18.5 mm T&G plywood <sup>e</sup>	200 mm x 200 mm or larger tile only
F150	Residential or Light Commercial	400 (16)	15.5 mm plywood <sup>e</sup>	15.5 mm plywood <sup>e</sup>	Use of 12.5 mm plywood <sup>e</sup> underlayment layer gives "Residential" performance
F151	Residential	600 (24)	Coated glass mat backer board	22.5 mm T&G plywood <sup>e</sup>	200 mm x 200 mm or larger tile only

Continued on next page

a. Tile Council of North America, Inc., 100 Clemson Research Blvd., Anderson, South Carolina 29625; phone (864) 646-8453.



TABLE 5 (Continued)

**APA FLOOR SYSTEMS FOR CERAMIC TILE FLOORING BASED ON THE TILE COUNCIL OF NORTH AMERICA HANDBOOK FOR CERAMIC TILE INSTALLATION**

TCNA No.	Service Classification <sup>a,b</sup>	Max. Joist Spacing o.c., mm (inches)	Underlayment Layer	Subfloor Layer	Comment
F152	Residential	600 (24) <sup>c</sup>	9.5 mm plywood <sup>e</sup>	18.5 mm T&G plywood <sup>e</sup>	100 mm x 100 mm or larger tile only
F155	Residential <sup>d</sup>	600 (24)	15.5 mm plywood <sup>e</sup>	18.5 mm T&G OSB or plywood <sup>e</sup>	OSB subfloor OK
F160	Light Commercial	600 (24)	9.5 mm plywood <sup>e</sup>	18.5 mm T&G plywood <sup>e</sup>	200 mm x 200 mm or larger tile only
F170	Residential or Light Commercial	400 (16)	Fiber-reinforced gypsum panel	15.5 mm T&G plywood <sup>e</sup>	—
F175	Residential or Light Commercial	400 (16)	Cementitious-coated foam backerboard	15.5 mm T&G plywood <sup>e</sup>	200 mm x 200 mm or larger tile only
F180	Residential or Light Commercial	400 (16)	Poured gypsum minimum 19 mm	18.5 mm T&G plywood <sup>e</sup>	—
F185	Residential	500 (19.2)	Cementitious self-leveling	18.5 mm T&G plywood <sup>e</sup>	—
RH122	Residential	400 (16)	Poured gypsum minimum 19 mm	18.5 mm T&G plywood <sup>e</sup>	—
RH123	Residential	400 (16)	Cementitious self-leveling minimum 12.5 mm	18.5 mm T&G plywood <sup>e</sup>	—
RH130	Residential or Light Commercial	400 (16)	Light Commercial-15.5 mm plywood <sup>e</sup>	15.5 mm T&G plywood <sup>e</sup>	Use of 12.5 mm plywood underlayment layer gives "Residential" performance
RH135	Residential or Light Commercial	400 (16)	Light Commercial 18.5 mm plywood <sup>e</sup>	18.5 mm T&G plywood <sup>e</sup>	Use of 15.5 mm plywood subfloor gives "Residential" performance
RH140	Residential	500 (19.2)	Cementitious self-leveling	18.5 mm T&G plywood <sup>e</sup>	—
RH141	Light Commercial	400 (16)	Reinforced 32 mm minimum mortar bed	15.5 mm T&G plywood <sup>e</sup>	Use of glass tile may lower service classification

a. Order of increasing serviceability: Residential, Light Commercial, Moderate and Heavy.

b. As typically performed, the ASTM C627 Robinson-Type Floor Tester delivers three simultaneous dynamic 1.33 kN (300-pound) concentrated wheel loads moving in a 0.76 m (30-inch) diameter circle over the surface of test assembly. The number of cycles the system withstands without failure determines its service classification. One criterion used to determine failure is a maximum deflection of L/360 under the three concentrated loads.

c. 38 mm (1-1/2 inches) net support width permitted with 200 mm x 200 mm (8 inches x 8 inches) or larger tile—otherwise 57 mm (2-1/4 inches) net support width is required.

d. Passed ASTM C627 tests with a "Light Commercial" rating using plywood as the subfloor and then again with OSB as the subfloor.

e. APA Exterior-rated plywood certified to CSA O121 DFP, CSA O151 CSP, or CSA O153 Poplar.

## PANEL STAIR TREADS AND RISERS

A growing number of builders and manufacturers are using plywood or OSB panels for treads and risers of both site-fabricated and prefabricated stairs in closed-riser stairways. Risers may support the front of the tread. Risers that support both the front and back of the tread create a very short effective span for the tread. Panels may also be used for treads with open risers (see Table 6 and NBCC Sections 9.8.9.4 and 9.8.9.5).

Rounded nosing may be machined into the tread, but should be covered by a finish flooring material such as carpet and pad in order to prevent excessive wear or damage to veneers exposed by rounding.

Glue is recommended to improve stiffness of connections and to eliminate squeaks. Apply

construction adhesive meeting ASTM D3498 or APA AFG-01 to all joints, with particular attention to the connection at the back riser. Regardless of where glue is used, nail all edges of treads as indicated in Figure 8. Detail A is the simplest system, but Detail B is preferred since it eliminates end-grain nailing at the back riser.

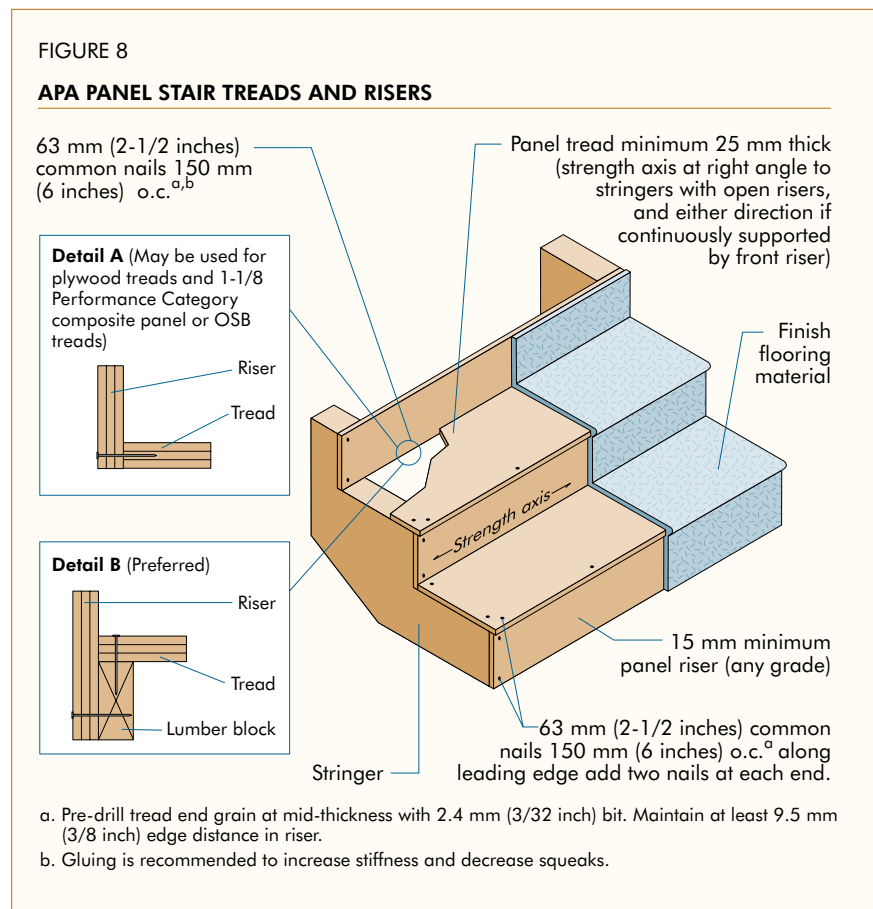


TABLE 6

**APA PANEL STAIR TREADS**

Stair tread	Maximum Span Between Stringers for Stair Treads <sup>a</sup>	
	Stair tread supported by front riser	Stair tread not continuously supported by front riser
OSB or plywood minimum 25 mm thick	1200 mm (48 inches)	750 mm (30 inches) <sup>b</sup>

a. Table indicates the maximum span between stringers for treads. Building code may require closer stringer spacing depending on occupancy type.

b. Face grain or orientation of strength axis must be at right angles to the stringers.

## APA PERFORMANCE RATED RIM BOARD®

A Rim Board is the wood component that fills the space between the sill plate and bottom plate of a wall or, in second floor construction, between the top plate and bottom plate of two wall sections. The Rim Board must match the depth of the framing members between floors or between the floor and foundation to function properly. In addition to supporting the wall loads, the Rim Board ties the floor joists together. It is an integral component in an engineered wood system because it transfers both vertical bearing and lateral forces.



While lumber has been the traditional product used for Rim Boards, it is generally not compatible with the depth of the new generation of wood I-joists used in floor construction. With the increasing use of wood I-joists, a demand for compatible engineered wood Rim Boards has resulted. As glued engineered wood products, APA Rim Boards have greater dimensional stability, higher strength, increased structural reliability, more consistent quality and a lower tendency to check or split than sawn lumber.

APA Performance Rated Rim Boards can be manufactured using plywood, oriented strand board (OSB), glulam, or structural composite lumber (SCL). These engineered wood Rim Boards have less shrinkage than lumber and match the depth of wood I-joists and other engineered wood framing products. They are available in lengths up to 7.3 m (24 feet), depending on the product used.

Most APA Performance Rated Rim Boards are structural-use panels that are manufactured in accordance with *Voluntary Product Standard PS 1 or PS 2, APA Standard PRP-108, or CSA O325 Construction Sheathing*. Glulam Rim Boards are a resawn grade of glued laminated timber manufactured in accordance with ANSI A190.1. SCL Rim Boards are manufactured in accordance with ASTM D5456. The APA Rim Boards meet the requirements of *ANSI/APA PRR 410 Standard for Performance-Rated Engineered Wood Rim Boards* or *APA PRR-401 Performance Standard for APA EWS Rim Boards*. *ANSI/APA PRR 410 or APA PRR 401* standards meet or exceed the requirements given in the ICC-ES Acceptance Criteria for Wood-Based Rim Board Products, AC124. *ANSI/APA PRR 410* is also compatible with the requirements of the *CCMC Technical Guide for Wood-Based Rim Boards for Floors*. APA Performance Rated Rim Boards may also carry a CCMC registration number and product evaluation report in addition to the ANSI/APA 410 certification for wider acceptance by Canadian local authorities.



## HEAVY DUTY PLYWOOD FLOORS

Above-grade plywood floors may be designed to support heavy loading or to support relatively high loads imposed by warehouse shelving or stacked storage. Heavy-duty plywood floors also make excellent mezzanine decks and vibration-resistant surfaces for mounting computer equipment. Table 7 gives plywood recommendations for uniform loads. These assume the use of plywood continuous over two or more spans with face grain across supports.

For heavy duty plywood floors carrying fork-truck traffic, refer to *APA Engineered Wood Construction Guide*, Form E30.



TABLE 7

**APA PLYWOOD RECOMMENDATIONS FOR UNIFORMLY LOADED HEAVY DUTY FLOORS,<sup>a,c</sup>**  
**(Deflection limited to 1/240 of span)**

Specified Uniform Live Load (kPa)	Minimum Thickness of APA Douglas-Fir Plywood Sheathing Grade or Canadian Softwood Plywood (mm) <sup>b</sup>					
	Centre-to-Centre Support Spacing					
	300 mm (12 inches)	400 mm (16 inches)	500 mm (19.2 inches)	600 mm (24 inches)	800 mm (32 inches)	1200 mm (48 inches)
2.4	12.5	12.5	15.5	18.5	18.5	28.5
4.8	12.5	12.5	15.5	18.5	22.5	
7.2	12.5	12.5	15.5	18.5	25.5	
9.6	12.5	12.5	15.5	20.5	28.5	
12.0	12.5	12.5	15.5	22.5	31.5	
14.4	12.5	15.5	18.5	25.5		
16.8	12.5	15.5	20.5	25.5		
19.2	12.5	18.5	22.5	28.5		
21.6	15.5	18.5	25.5			
24.0	15.5	22.5	28.5			
26.4	18.5	25.5	31.5			

a. Use plywood with T&G edges, provide structural blocking at panel edges or apply a separate underlayment. Install panels with face grain or major strength axis perpendicular to supports. Supports must be a minimum 38 mm (1-1/2-inch) wide, except at the 1200 mm (48-inch) span, install on a minimum support width of 76 mm (3 inches) (double nailed joists).

b. Douglas-fir plywood is APA-certified to CSA O121. Canadian softwood plywood is APA-certified to CSA O151. Check with supplier for availability for thicknesses over 18.5 mm.

c. Table Assumes:

1. Panels 610 mm (24 inches) or wider installed over two or more spans, either fully or partially loaded.
2. Dry service condition and normal duration of load.
3. 0.3 kPa (6.3 psf) dead load.



# About APA

APA – The Engineered Wood Association represents North American manufacturers of plywood, OSB, glulam, I-joists, and structural composite lumber. Since its inception in 1933, APA has led the industry as an innovator in technical research and as the provider of the most rigorous product testing and quality auditing program in the field.

Currently representing 84 percent of structural wood panel producers in North America, APA is known for a well-demonstrated commitment to rigorous quality assurance, technical research and testing, national and international standards development, and a highly regarded safety and health program that fosters industry-wide excellence in safety.



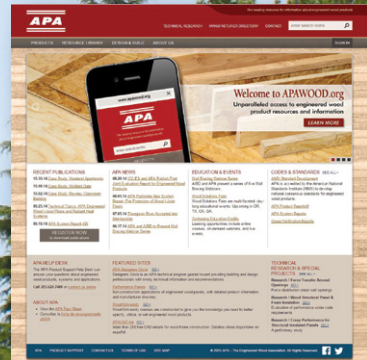
**APA**

**RATED SHEATHING**  
**32/16**  
 SIZED FOR SPACING  
 EXPOSURE 1  
 THICKNESS 0.451 IN.  
**000**  
 PS 1-09 SHEATHING  
 PRP-108 HUD-UM-40  
 15/32 CATEGORY

**CONSTRUCTION SHEATHING**  
**2R32/2F16**  
 12mm  
 CSA O325-16

STRENGTH AXIS  
 THIS DIRECTION

APA is committed to the needs of its Canadian members, maintaining a close working relationship with the Canadian Standards Association (CSA) in the development and maintenance of Canada's national consensus standards for wood-based panels and other engineered wood products. APA staff actively participates in CSA A369 Technical Committee on Wood-Based Panels, CSA A370 Technical Committee on Solid and Engineered Wood Products, and CSA O86 Engineering Design in Wood, as well as ASTM, ANSI, CIB, and ISO committees.



## Engineered Wood Floor Systems

We have field representatives in many major U.S. cities and in Canada who can help answer questions involving APA trademarked products. For additional assistance in specifying engineered wood products, contact us:

### **APA HEADQUARTERS**

7011 So. 19th St. ■ Tacoma, Washington 98466  
(253) 565-6600 ■ Fax: (253) 565-7265

### **PRODUCT SUPPORT HELP DESK**

(253) 620-7400 ■ [help@apawood.org](mailto:help@apawood.org)

### **DISCLAIMER**

*The information contained herein is based on APA – The Engineered Wood Association’s continuing programs of laboratory testing, product research, and comprehensive field experience. Neither APA, nor its members make any warranty, expressed or implied, or assume any legal liability or responsibility for the use, application of, and/or reference to opinions, findings, conclusions, or recommendations included in this publication. Consult your local jurisdiction or design professional to assure compliance with code, construction, and performance requirements. Because APA has no control over quality of workmanship or the conditions under which engineered wood products are used, it cannot accept responsibility for product performance or designs as actually constructed.*

Form No. R300/Issued December 2016



REPRESENTING THE ENGINEERED WOOD INDUSTRY