City of Republic

Roof and Subfloor Sheathing Spans

Revision Date: November 2015

Table R503.2.1.1(1) – Allowable Spans and Loads for Wood Structural Panels for Roof and Subfloor Sheathing and Combination Subfloor Underlayment [a, b, c]

Span Rating	Minimum Nominal Panel Thickness (inch)	Allowable Live Load (psf) [h,i]		Maximum Span (inches)		Load (pounds per square foot, at maximum span)		Maximum Span (inches)
		Span @ 16"o.c.	Span @ 24" o.c.	With Edge Support [d]	Without Edge Support	Total Load	Live Load	
Sheathing [e]				Roof [f]				Subfloor [j]
16/0	3/8	30	---	16	16	40	30	0
20/0	3/8	50	---	20	20	40	30	0
24/0	3/8	100	30	24	20 [g]	40	30	0
24/16	7/16	100	40	24	24	50	40	16
32/16	15/32, 1/2	180	70	32	28	40	30	16 [h]
40/20	19/32, 5/8	305	130	40	32	40	30	20 [h,i]
48/24	23/32, 3/4	---	175	48	36	45	35	24
60/32	7/8	---	305	60	48	45	35	32
Underlayment, C-C plugged, Single Floor [e]		Span @ 16"o.c.	Span @ 24" o.c.	Roof [f]				Combination sub-floor underlayment [k]
16 o.c.	19/32, 5/8	100	40	24	24	50	40	16 [i]
20 o.c.	19/32, 5/8	150	60	32	32	40	30	20 [i, j]
24 o.c.	23/32, 3/4	240	100	48	36	35	25	24
32 o.c.	7/8	---	185	48	48	50	40	32
48 o.c.	1 3/32, 1 1/8	---	290	60	60	50	40	48

a. The allowable total loads were determined using a dead load of 10 psf. If the dead load exceeds 10 psf, then the live load shall be reduced accordingly.
b. Panels continuous over two or more spans with long dimension (strength axis) perpendicular to supports. Spans shall be limited to values shown because of possible effect of concentrated loads.
c. Applies to panels 24 inches or wider.
d. Lumber blocking, panel edge clips (one midway between each support, except two equally spaced between supports when span is 48 inches), tongue-and groove panel edges, or other approved type of edge support.
e. Includes Structural 1 panels in these grades.
f. Uniform load deflection limitation: 1/180 of span under live load plus dead load, 1/240 of span under live load only.
g. Maximum span 24 inches for 15/32-and 1/2-inch panels.
h. Maximum span 24 inches where 3/4-inch wood finish flooring is installed at right angles to joists.
i. Maximum span 24 inches where 1.5 inches of lightweight concrete or approved cellular concrete is placed over the subfloor.
j. Unsupported edges shall have tongue-and-groove joints or shall be supported with blocking unless minimum nominal 1/4-inch thick underlayment with end and edge joints offset at least 2 inches or 1.5 inches of lightweight concrete or approved cellular concrete is placed over the subfloor, or 3/4-inch wood finish flooring is installed at right angles to the supports. Allowable uniform live load at maximum span, based on deflection of 1/360 of span, is 100 psf.
k. Unsupported edges shall have tongue-and-groove joints or shall be supported by blocking unless nominal 1/4-inch-thick underlayment with end and edge joints offset at least 2 inches or 3/4-inch wood finish flooring is installed at right angles to the supports. Allowable uniform live load at maximum span, based on deflection of 1/360 of span, is 100 psf, except panels with a span rating of 48 on center are limited to 65 psf total uniform load at maximum span.
l. Allowable live load values at spans of 16" o.c. and 24" o.c taken from reference standard APA E30, APA Engineered Wood Construction Guide. Refer to reference standard for allowable spans not listed in the table.

Commentary: The maximum spans for wood structural panel floor and roof sheathing are limited by the stresses and deflection imposed by the design live loads. For convenience, the trademarks of the inspection agencies include a span rating, which appears as two numbers separated by a slash (32/16 or 48/24 for example). The first number represents the maximum recommended span for roof sheathing when the panels are applied with the long dimension (strength axis) across three or more supports and the edges are blocked or when other support required by the table is provided. The second number indicates the maximum recommended span when the panel is used for structural floor sheathing with the panels applied with the long dimension (strength axis) across three or more supports. Single panels intended for single floor application will be marked with a single number representing this span. The edges of the wood structural panels between floor supports are prevented from moving relative to each other by tongue and groove panel edges, by the addition of wood blocking or by the use of an approved underlayment or structural finished floor system.

Identification and grade (R503.2.1): Wood structural panel sheathing used for structural purposes shall conform to DOC PS 1, DOC PS 2 or, when manufactured in Canada, CSA O437 or CSA O325. All panels shall be identified for grade, bond classification, and Performance Category by a grade *mark* or certificate of inspection issued by an *approved agency*. The Performance Category value shall be used as the "nominal panel thickness" or "panel thickness" whenever referenced in this code.

Commentary: Plywood that performs a load-carrying function in floor construction must conform to a known quality control standard; therefore, a method of identifying the limitations under which the plywood may be used is needed. This is accomplished by a grade mark or certificate of inspection issued by an approved agency.

Table R503.2.1.1(2) – Allowable Spans for Sanded Plywood Combination Subfloor Underlayment [a]

Identification	Spacing of Joists (inches)		
Species Group [b]	16	20	24
1	1/2	5/8	3/4
2, 3	5/8	3/4	7/8
4	3/4	7/8	1

a. Plywood continuous over two or more spans and face grain perpendicular to supports. Unsupported edges shall be tongue-and-groove or blocked except where nominal 1/4-inch-thick underlayment or 3/4-inch wood finish floor is used. Allowable uniform live load at maximum span based on deflection of 1/360 of span is 100 psf.

b. Applicable to all grades of sanded exterior-type plywood.

Commentary: For exterior type sanded plywood grades, the thickness required for a specific span is related to the specific grouping of the panel used. For example, species Group 1 may be 1/2 inch for 16 inch joist spacing, but Group 4 will require a thickness of 3/4 inch for the same span. When the panels are used as a combination subfloor/underlayment, extra precautions should be observed in attaching the panels to the floor framing. Joints in adjacent panels should not be continuous and should not occur at locations where the orientation of the joist supports is different.

Subfloor and combined subfloor underlayment (R503.2.1.1): Where used as subflooring or combination subfloor underlayment, wood structural panels shall be of one of the grades specified in Table R503.2.1.1(1). When sanded plywood is used as combination subfloor underlayment, the grade, bond classification, and Performance Category shall be as specified in Table R503.2.1.1(2).

Commentary: This section specifies grades of wood structural panels when they are used as subflooring or combination subflooring underlayment. It also addresses the use of sanded plywood as a combination subfloor underlayment. A floor system could consist of three elements: (1) a subfloor, (2) an underlayment or a combination subfloor/ underlayment system and (3) a finished floor surface material. A finished surfacing material may be wood strip flooring, tongue-and-groove flooring or various types of resilient floor coverings such as vinyl, tile or carpeting.
Wood structural panels are manufactured for use as either structural subfloor or combination subfloor underlayment. The allowable spans for structural subflooring and combination subfloor underlayment are based on the wood structural panels' face grain strength axis parallel to its supporting member, or they are based on the panels being continuous over two or more spans, with a face grain placed perpendicular to the supports. These qualifications are critical in determining the permissible spans. Most wood structural panels are considerably stronger when their face grain is parallel to the supports and continuous over two or more spans. Panels with multiple spans have greater capacity than those that are simply supported between the two joists.

Allowable spans (R503.2.2): The maximum allowable span for wood structural panels used as subfloor or combination subfloor underlayment shall be as set forth in Table R503.2.1.1(1), or APA E30. The maximum span for sanded plywood combination subfloor underlayment shall be as set forth in Table R503.2.1.1(2).
Commentary: Table R503.2.1.1(1) indicates spans for plywood and wood structural panels used as subflooring. This table also covers roof sheathing and is referenced in Section R803.2.2 for that purpose. The span limitations are predicated on the grade of plywood used. In the case of rated sheathing used as structural subflooring, the maximum span is easily identified through the panel span rating (identification index). Where the panel span rating is stamped on the sheet of plywood, the denominator represents the allowable span of the plywood floor sheathing {+see figure R503.2.2 (1)}. An illustration of the limitations imposed by notes j and k to Table R503.2.1.1(1) on combination subfloor underlayment applications is illustrated in Figure R503.2.2(2). Allowable increases in the maximum span for certain span ratings are permitted as described in Notes h and I to Table R503.2.1.1(1). In lieu of using Table R503.2.1.1(1), the code permits the use of APA E30—Engineered Wood Construction Guide. When plywood combination subfloor underlayment is to be used, the allowable span as listed in Table R503.2.1.1(2) is applicable to underlayment grade C-C plugged and sanded exterior type plywood of specific species.

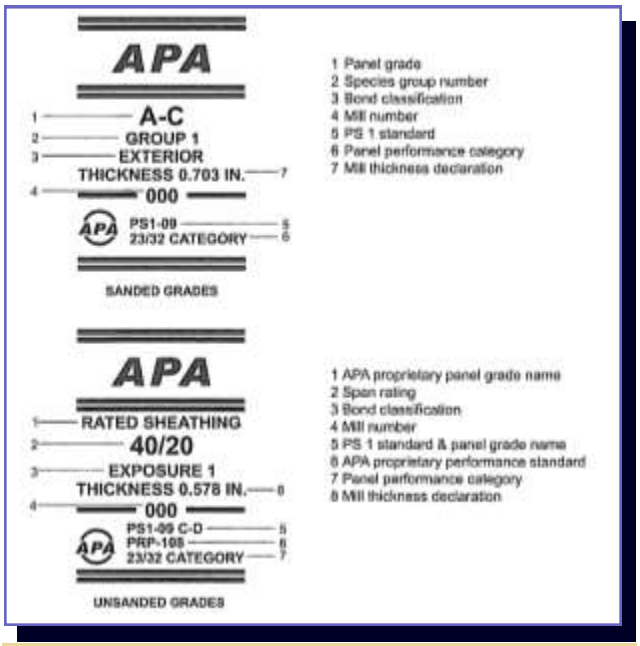

Figure R503.2.1—Plywood Grade Mark Examples

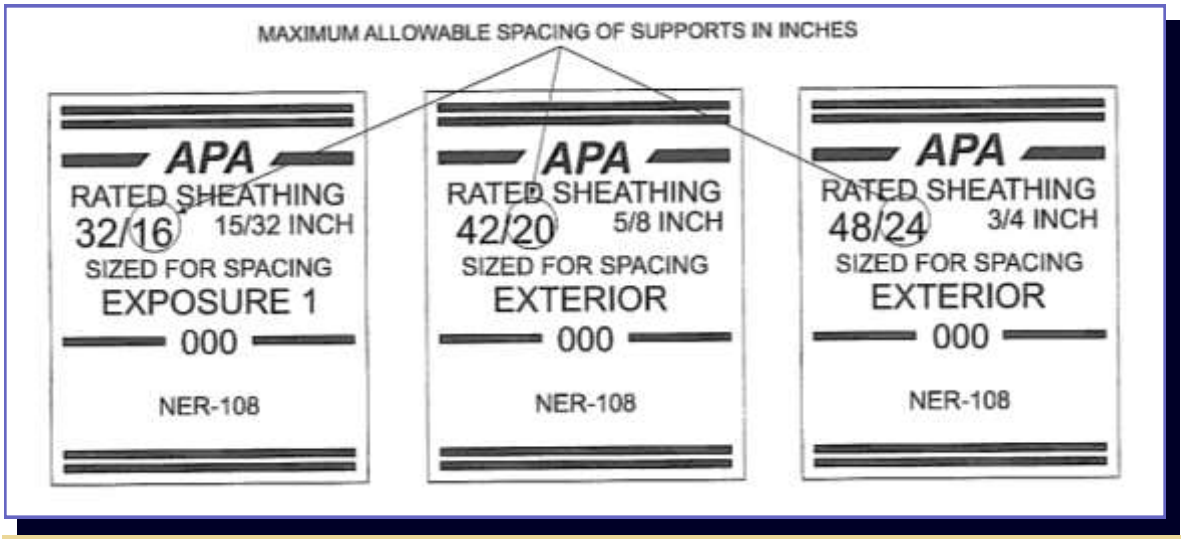

Figure R503.2.2(1) - Identification of Plywood Subfloor Span Limitations

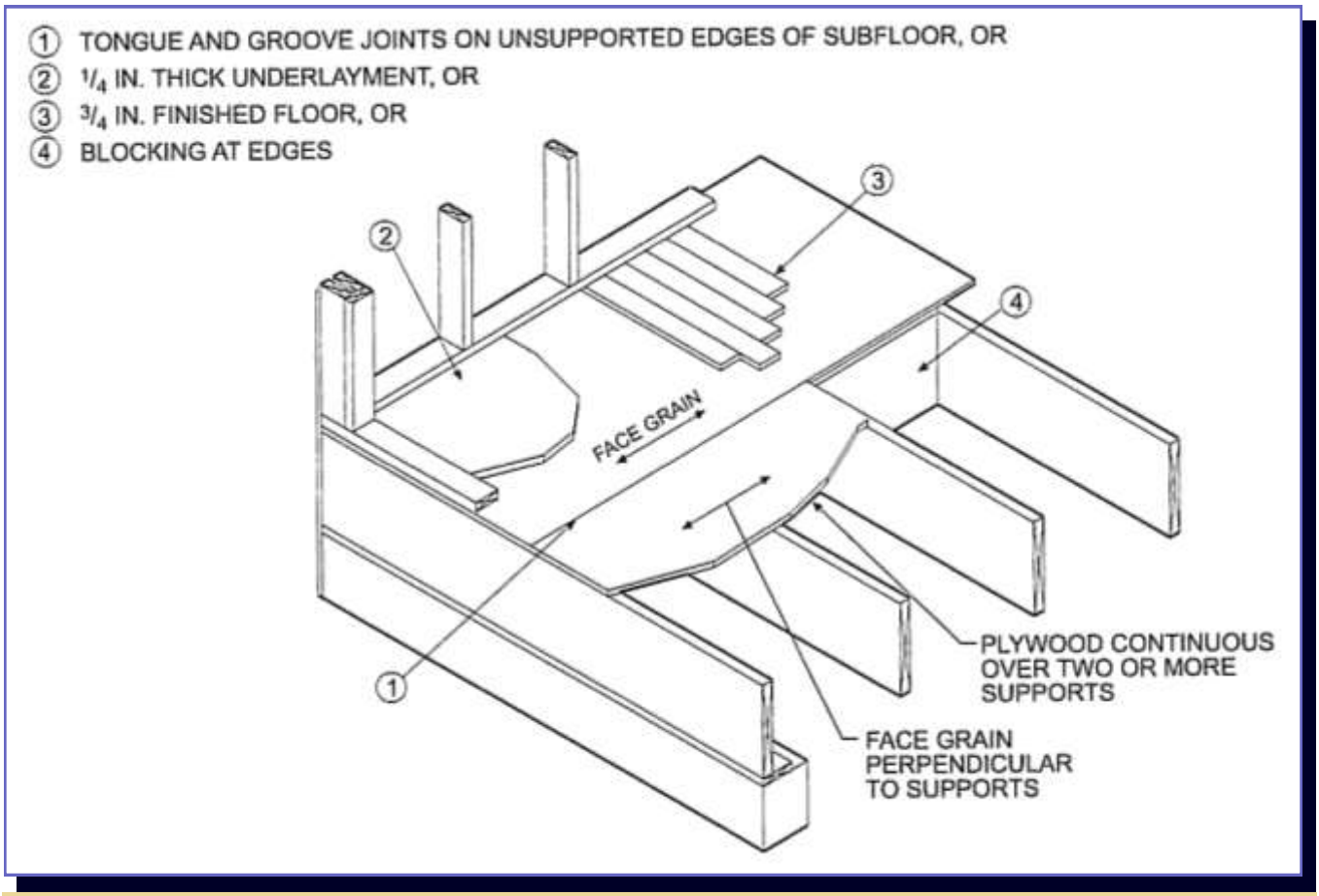

Figure R503.2.2(2) - Combination Subfloor Underlayment Alternatives

City of Republic

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The Planning and Development Department is made up of five full-time employees including a Planning and Development Director, Administrative Assistant, Principal Planner, Building Inspector, and Code Compliance Official. Our office is located at 204 North Main Street. The goal of the department is to serve the citizens of Republic through pursuance, guidance, and assistance in the development of the City. This is accomplished through marketing and strategic planning accompanied by oversight and enforcement of the City's Building Codes, Zoning Codes and Subdivision Regulations.

Planning and Development Department

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