

4101:8-5-01 Floors.

[Comment: When a reference is made within this rule to a federal statutory provision, an industry consensus standard, or any other technical publication, the specific date and title of the publication as well as the name and address of the promulgating agency are listed in rule 4101:8-44-01 of the Administrative Code. The application of the referenced standards shall be limited and as prescribed in section 102.5 of rule 4101:8-1-01 of the Administrative Code.]

SECTION 501
GENERAL

501.1 Application. The provisions of this chapter shall control the design and construction of the floors for buildings, including the floors of attic spaces used to house mechanical or plumbing fixtures and equipment.

501.2 Requirements. Floor construction shall be capable of accommodating all loads in accordance with Section 301 and of transmitting the resulting loads to the supporting structural elements.

SECTION 502
WOOD FLOOR FRAMING

502.1 General. Wood and wood-based products used for load-supporting purposes shall conform to the applicable provisions of this section.

502.1.1 Sawn lumber. Sawn lumber shall be identified by a grade mark of an accredited lumber grading or inspection agency and have design values certified by an accreditation body that complies with DOC PS 20. In lieu of a grade mark, a certificate of inspection issued by an approved lumber grading or inspection agency meeting the requirements of this section shall be accepted.

502.1.1.1 Preservative-treated lumber. Preservative treated dimension lumber shall be identified as required by Section 317.2.

502.1.1.2 End-jointed lumber. Approved end-jointed lumber identified by a grade mark conforming to Section 502.1.1 shall be permitted to be used interchangeably with solid-sawn members of the same species and grade. End-jointed lumber used in an assembly required elsewhere in this code to have a fire-resistance rating shall have the designation “Heat-Resistant Adhesive” or “HRA” included in its grade mark.

502.1.2 Prefabricated wood I-joists. Structural capacities and design provisions for prefabricated wood I-joists shall be established and monitored in accordance with ASTM D5055.

502.1.3 Structural glued laminated timbers. Glued laminated timbers shall be manufactured and identified as required in ANSI A190.1, ANSI 117 and ASTM D3737.

502.1.4 Structural log members. Structural log members shall comply with the provisions of ICC 400.

502.1.5 Structural composite lumber. Structural capacities for structural composite lumber shall be established and monitored in accordance with ASTM D5456.

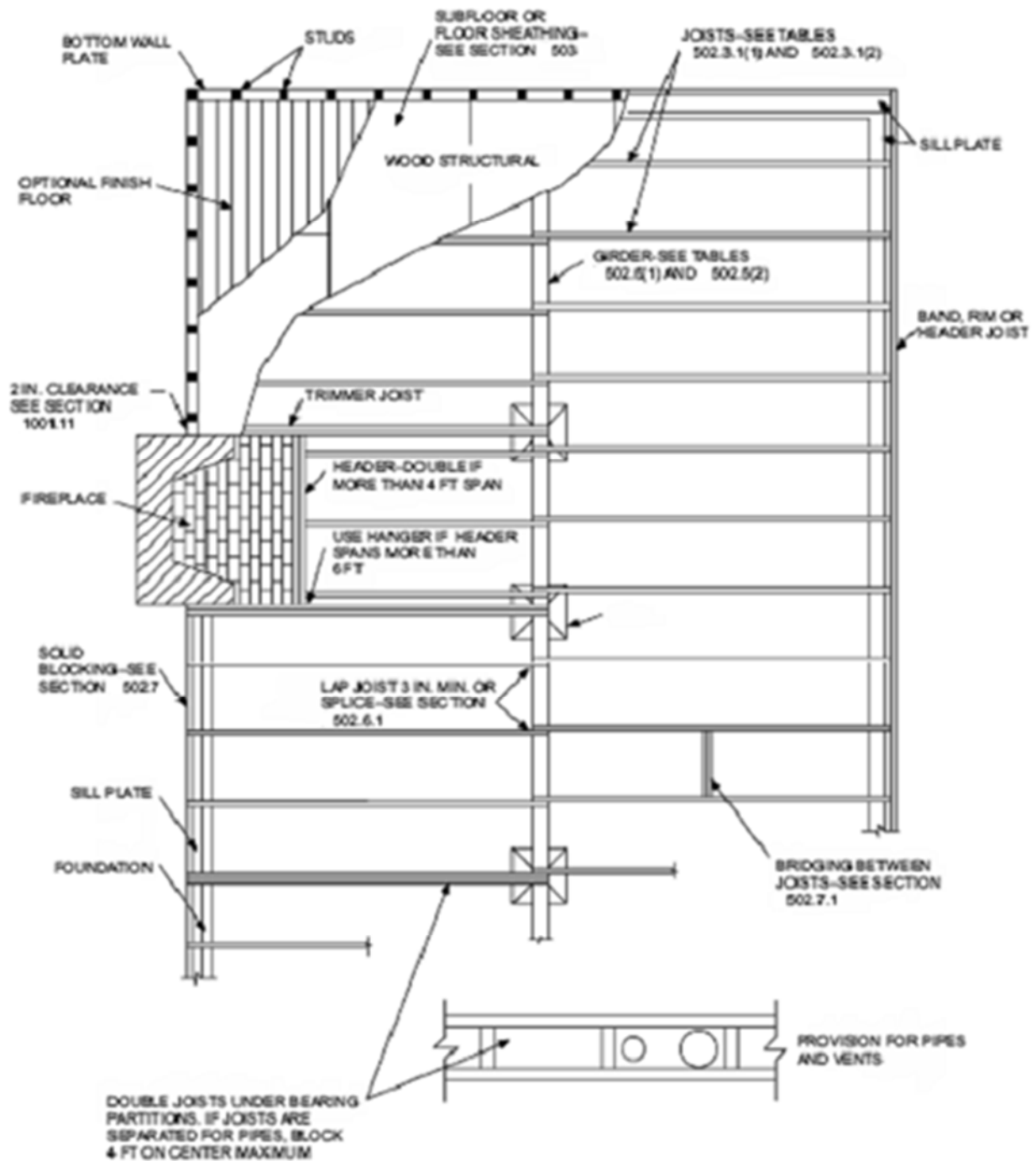
502.1.6 Cross-laminated timber. Cross-laminated timber shall be manufactured and identified as required by ANSI/APA PRG 320.

502.1.7 Engineered wood rim board. Engineered wood rim boards shall conform to ANSI/APA PRR 410 or shall be evaluated in accordance with ASTM D7672. Structural capacities shall be in accordance with ANSI/APA PRR 410 or established in accordance with ASTM D7672. Rim boards conforming to ANSI/APA PRR 410 shall be marked in accordance with that standard.

502.2 Design and construction. Floors shall be designed and constructed in accordance with the provisions of this chapter, Figure 502.2 and Sections 317 and 318 or in accordance with ANSI AWC NDS.

502.2.1 Framing at braced wall lines. A load path for lateral forces shall be provided between floor framing and braced wall panels located above or below a floor, as specified in Section 602.10.8.

502.2.2 Blocking and subflooring. Blocking for fastening panel edges or fixtures shall be not less than utility grade lumber. Subflooring shall be not less than utility grade lumber, No. 4 common grade boards or wood structural panels as specified in Section 503.2. Fireblocking shall be of any grade lumber.



For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

FIGURE 502.2
FLOOR CONSTRUCTION

502.3 Allowable joist spans. Spans for floor joists shall be in accordance with Tables 502.3.1(1) and 502.3.1(2). For other grades and species and for other loading conditions, refer to the AWC STJR.

502.3.1 Sleeping areas and attic joists. Table 502.3.1(1) shall be used to determine the maximum allowable span of floor joists that support sleeping areas and attics that are accessed by means of a fixed stairway in accordance with Section 311.7 provided that the design live load does not exceed 30 pounds per square foot (1.44 kPa) and the design dead load does not exceed 20 pounds per square foot (0.96 kPa). The allowable span of ceiling joists that support attics used for limited storage or no storage shall be determined in accordance with Section 802.5.

TABLE 502.3.1(1)
FLOOR JOIST SPANS FOR COMMON LUMBER SPECIES
(Residential sleeping areas, live load = 30 psf, L/Δ = 360) ^a

JOIST SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf				DEAD LOAD = 20 psf			
			2 × 6	2 × 8	2 × 10	2 × 12	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum floor joist spans							
		(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	
12	Douglas fir-larch	SS	12-6	16-6	21-0	25-7	12-6	16-6	21-0	25-7
	Douglas fir-larch	#1	12-0	15-10	20-3	24-8	12-0	15-7	19-0	22-0
	Douglas fir-larch	#2	11-10	15-7	19-10	23-4	11-8	14-9	18-0	20-11
	Douglas fir-larch	#3	9-11	12-7	15-5	17-10	8-11	11-3	13-9	16-0
	Hem-fir	SS	11-10	15-7	19-10	24-2	11-10	15-7	19-10	24-2
	Hem-fir	#1	11-7	15-3	19-5	23-7	11-7	15-3	18-9	21-9
	Hem-fir	#2	11-0	14-6	18-6	22-6	11-0	14-4	17-6	20-4
	Hem-fir	#3	9-8	12-4	15-0	17-5	8-8	11-0	13-5	15-7
	Southern pine	SS	12-3	16-2	20-8	25-1	12-3	16-2	20-8	25-1
	Southern pine	#1	11-10	15-7	19-10	24-2	11-10	15-7	18-7	22-0
	Southern pine	#2	11-3	14-11	18-1	21-4	10-9	13-8	16-2	19-1
	Southern pine	#3	9-2	11-6	14-0	16-6	8-2	10-3	12-6	14-9
	Spruce-pine-fir	SS	11-7	15-3	19-5	23-7	11-7	15-3	19-5	23-7
	Spruce-pine-fir	#1	11-3	14-11	19-0	23-0	11-3	14-7	17-9	20-7
	Spruce-pine-fir	#2	11-3	14-11	19-0	23-0	11-3	14-7	17-9	20-7
	Spruce-pine-fir	#3	9-8	12-4	15-0	17-5	8-8	11-0	13-5	15-7
16	Douglas fir-larch	SS	11-4	15-0	19-1	23-3	11-4	15-0	19-1	23-3
	Douglas fir-larch	#1	10-11	14-5	18-5	21-4	10-8	13-6	16-5	19-1
	Douglas fir-larch	#2	10-9	14-2	17-5	20-3	10-1	12-9	15-7	18-1
	Douglas fir-larch	#3	8-7	10-11	13-4	15-5	7-8	9-9	11-11	13-10
	Hem-fir	SS	10-9	14-2	18-0	21-11	10-9	14-2	18-0	21-11

JOIST SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf				DEAD LOAD = 20 psf			
			2 × 6	2 × 8	2 × 10	2 × 12	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum floor joist spans							
		(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	
16	Hem-fir	#1	10-6	13-10	17-8	21-1	10-6	13-4	16-3	18-10
	Hem-fir	#2	10-0	13-2	16-10	19-8	9-10	12-5	15-2	17-7
	Hem-fir	#3	8-5	10-8	13-0	15-1	7-6	9-6	11-8	13-6
	Southern pine	SS	11-2	14-8	18-9	22-10	11-2	14-8	18-9	22-10
	Southern pine	#1	10-9	14-2	18-0	21-4	10-9	13-9	16-1	19-1
	Southern pine	#2	10-3	13-3	15-8	18-6	9-4	11-10	14-0	16-6
	Southern pine	#3	7-11	10-0	11-1	14-4	7-1	8-11	10-10	12-10
	Spruce-pine-fir	SS	10-6	13-10	17-8	21-6	10-6	13-10	17-8	21-4
	Spruce-pine-fir	#1	10-3	13-6	17-2	19-11	9-11	12-7	15-5	17-10
	Spruce-pine-fir	#2	10-3	13-6	17-2	19-11	9-11	12-7	15-5	17-10
Spruce-pine-fir	#3	8-5	10-8	13-0	15-1	7-6	9-6	11-8	13-6	
19.2	Douglas fir-larch	SS	10-8	14-1	18-0	21-10	10-8	14-1	18-0	21-4
	Douglas fir-larch	#1	10-4	13-7	16-9	19-6	9-8	12-4	15-0	17-5
	Douglas fir-larch	#2	10-1	13-0	15-11	18-6	9-3	11-8	14-3	16-6
	Douglas fir-larch	#3	7-10	10-0	12-2	14-1	7-0	8-11	10-11	12-7
	Hem-fir	SS	10-1	13-4	17-0	20-8	10-1	13-4	17-0	20-7
	Hem-fir	#1	9-10	13-0	16-7	19-3	9-7	12-2	14-10	17-2
	Hem-fir	#2	9-5	12-5	15-6	17-1	8-11	11-4	13-10	16-1
	Hem-fir	#3	7-8	9-9	11-10	13-9	6-10	8-8	10-7	12-4
	Southern pine	SS	10-6	13-10	17-8	21-6	10-6	13-10	17-8	21-6
	Southern pine	#1	10-1	13-4	16-5	19-6	9-11	12-7	14-8	17-5
	Southern pine	#2	9-6	12-1	14-4	16-10	8-6	10-10	12-10	15-1
	Southern pine	#3	7-3	9-1	11-0	13-1	6-5	8-2	9-10	11-8
	Spruce-pine-fir	SS	9-10	13-0	16-7	20-2	9-10	13-0	16-7	19-6
	Spruce-pine-fir	#1	9-8	12-9	15-8	18-3	9-1	11-6	14-1	16-3
Spruce-pine-fir	#2	9-8	12-9	15-8	18-3	9-1	11-6	14-1	16-3	
Spruce-pine-fir	#3	7-8	9-9	11-10	13-9	6-10	8-8	10-7	12-4	
24	Douglas fir-larch	SS	9-11	13-1	16-8	20-3	9-11	13-1	16-5	19-1
	Douglas fir-larch	#1	9-7	12-4	15-0	17-5	8-8	11-0	13-5	15-7
	Douglas fir-larch	#2	9-3	11-8	14-3	16-6	8-3	10-5	12-9	14-9
	Douglas fir-larch	#3	7-0	8-11	10-11	12-7	6-3	8-0	9-9	11-3
	Hem-fir	SS	9-4	12-4	15-9	19-2	9-4	12-4	15-9	18-5
	Hem-fir	#1	9-2	12-1	14-10	17-2	8-7	10-10	13-3	15-5
	Hem-fir	#2	8-9	11-4	13-10	16-1	8-0	10-2	12-5	14-4
	Hem-fir	#3	6-10	8-8	10-7	12-4	6-2	7-9	9-6	11-0
	Southern pine	SS	9-9	12-10	16-5	19-11	9-9	12-10	16-5	19-8
	Southern pine	#1	9-4	12-4	14-8	17-5	8-10	11-3	13-1	15-7

JOIST SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf				DEAD LOAD = 20 psf			
			2 × 6	2 × 8	2 × 10	2 × 12	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum floor joist spans							
(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)		
	Southern pine	#2	8-6	10-10	12-10	15-1	7-7	9-8	11-5	13-6
	Southern pine	#3	6-5	8-2	9-10	11-8	5-9	7-3	8-10	10-5
	Spruce-pine-fir	SS	9-2	12-1	15-5	18-9	9-2	12-1	15-0	17-5
	Spruce-pine-fir	#1	8-11	11-6	14-1	16-3	8-1	10-3	12-7	14-7
	Spruce-pine-fir	#2	8-11	11-6	14-1	16-3	8-1	10-3	12-7	14-7
	Spruce-pine-fir	#3	6-10	8-8	10-7	12-4	6-2	7-9	9-6	11-0

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

Note: Check sources for availability of lumber in lengths greater than 20 feet.

a. Deleted

TABLE 502.3.1(2)
FLOOR JOIST SPANS FOR COMMON LUMBER SPECIES
(Residential living areas, live load = 40 psf, L/Δ = 360)^b

JOIST SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf				DEAD LOAD = 20 psf			
			2 × 6	2 × 8	2 × 10	2 × 12	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum floor joist spans							
(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)		
12	Douglas fir-larch	SS	11-4	15-0	19-1	23-3	11-4	15-0	19-1	23-3
	Douglas fir-larch	#1	10-11	14-5	18-5	22-0	10-11	14-2	17-4	20-1
	Douglas fir-larch	#2	10-9	14-2	18-0	20-11	10-8	13-6	16-5	19-1
	Douglas fir-larch	#3	8-11	11-3	13-9	16-0	8-1	10-3	12-7	14-7
	Hem-fir	SS	10-9	14-2	18-0	21-11	10-9	14-2	18-0	21-11
	Hem-fir	#1	10-6	13-10	17-8	21-6	10-6	13-10	17-1	19-10
	Hem-fir	#2	10-0	13-2	16-10	20-4	10-0	13-1	16-0	18-6
	Hem-fir	#3	8-8	11-0	13-5	15-7	7-11	10-0	12-3	14-3
	Southern pine	SS	11-2	14-8	18-9	22-10	11-2	14-8	18-9	22-10
	Southern pine	#1	10-9	14-2	18-0	21-11	10-9	14-2	16-11	20-1
	Southern pine	#2	10-3	13-6	16-2	19-1	9-10	12-6	14-9	17-5
	Southern pine	#3	8-2	10-3	12-6	14-9	7-5	9-5	11-5	13-6
	Spruce-pine-fir	SS	10-6	13-10	17-8	21-6	10-6	13-10	17-8	21-6
	Spruce-pine-fir	#1	10-3	13-6	17-3	20-7	10-3	13-3	16-3	18-10
	Spruce-pine-fir	#2	10-3	13-6	17-3	20-7	10-3	13-3	16-3	18-10
Spruce-pine-fir	#3	8-8	11-0	13-5	15-7	7-11	10-0	12-3	14-3	
16	Douglas fir-larch	SS	10-4	13-7	17-4	21-1	10-4	13-7	17-4	21-1
	Douglas fir-larch	#1	9-11	13-1	16-5	19-1	9-8	12-4	15-0	17-5
	Douglas fir-larch	#2	9-9	12-9	15-7	18-1	9-3	11-8	14-3	16-6
	Douglas fir-larch	#3	7-8	9-9	11-11	13-10	7-0	8-11	10-11	12-7
	Hem-fir	SS	9-9	12-10	16-5	19-11	9-9	12-10	16-5	19-11

JOIST SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf				DEAD LOAD = 20 psf			
			2 × 6	2 × 8	2 × 10	2 × 12	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum floor joist spans							
		(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	
	Hem-fir	#1	9-6	12-7	16-0	18-10	9-6	12-2	14-10	17-2
	Hem-fir	#2	9-1	12-0	15-2	17-7	8-11	11-4	13-10	16-1
	Hem-fir	#3	7-6	9-6	11-8	13-6	6-10	8-8	10-7	12-4
16	Southern pine	SS	10-2	13-4	17-0	20-9	10-2	13-4	17-0	20-9
	Southern pine	#1	9-9	12-10	16-1	19-1	9-9	12-7	14-8	17-5
	Southern pine	#2	9-4	11-10	14-0	16-6	8-6	10-10	12-10	15-1
	Southern pine	#3	7-1	8-11	10-10	12-10	6-5	8-2	9-10	11-8
	Spruce-pine-fir	SS	9-6	12-7	16-0	19-6	9-6	12-7	16-0	19-6
	Spruce-pine-fir	#1	9-4	12-3	15-5	17-10	9-1	11-6	14-1	16-3
	Spruce-pine-fir	#2	9-4	12-3	15-5	17-10	9-1	11-6	14-1	16-3
19.2	Spruce-pine-fir	#3	7-6	9-6	11-8	13-6	6-10	8-8	10-7	12-4
	Douglas fir-larch	SS	9-8	12-10	16-4	19-10	9-8	12-10	16-4	19-6
	Douglas fir-larch	#1	9-4	12-4	15-0	17-5	8-10	11-3	13-8	15-11
	Douglas fir-larch	#2	9-2	11-8	14-3	16-6	8-5	10-8	13-0	15-1
	Douglas fir-larch	#3	7-0	8-11	10-11	12-7	6-5	8-2	9-11	11-6
	Hem-fir	SS	9-2	12-1	15-5	18-9	9-2	12-1	15-5	18-9
	Hem-fir	#1	9-0	11-10	14-10	17-2	8-9	11-1	13-6	15-8
	Hem-fir	#2	8-7	11-3	13-10	16-1	8-2	10-4	12-8	14-8
	Hem-fir	#3	6-10	8-8	10-7	12-4	6-3	7-11	9-8	11-3
	Southern pine	SS	9-6	12-7	16-0	19-6	9-6	12-7	16-0	19-6
	Southern pine	#1	9-2	12-1	14-8	17-5	9-0	11-5	13-5	15-11
	Southern pine	#2	8-6	10-10	12-10	15-1	7-9	9-10	11-8	13-9
	Southern pine	#3	6-5	8-2	9-10	11-8	5-11	7-5	9-0	10-8
	Spruce-pine-fir	SS	9-0	11-10	15-1	18-4	9-0	11-10	15-1	17-9
	Spruce-pine-fir	#1	8-9	11-6	14-1	16-3	8-3	10-6	12-10	14-10
Spruce-pine-fir	#2	8-9	11-6	14-1	16-3	8-3	10-6	12-10	14-10	
Spruce-pine-fir	#3	6-10	8-8	10-7	12-4	6-3	7-11	9-8	11-3	
24	Douglas fir-larch	SS	9-0	11-11	15-2	18-5	9-0	11-11	15-0	17-5
	Douglas fir-larch	#1	8-8	11-0	13-5	15-7	7-11	10-0	12-3	14-3
	Douglas fir-larch	#2	8-3	10-5	12-9	14-9	7-6	9-6	11-8	13-6
	Douglas fir-larch	#3	6-3	8-0	9-9	11-3	5-9	7-3	8-11	10-4
	Hem-fir	SS	8-6	11-3	14-4	17-5	8-6	11-3	14-4	16-10 ^e
	Hem-fir	#1	8-4	10-10	13-3	15-5	7-10	9-11	12-1	14-0
	Hem-fir	#2	7-11	10-2	12-5	14-4	7-4	9-3	11-4	13-1
	Hem-fir	#3	6-2	7-9	9-6	11-0	5-7	7-1	8-8	10-1
	Southern pine	SS	8-10	11-8	14-11	18-1	8-10	11-8	14-11	18-0
	Southern pine	#1	8-6	11-3	13-1	15-7	8-1	10-3	12-0	14-3

JOIST SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf				DEAD LOAD = 20 psf			
			2 × 6	2 × 8	2 × 10	2 × 12	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum floor joist spans							
		(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	
	Southern pine	#2	7-7	9-8	11-5	13-6	7-0	8-10	10-5	12-4
	Southern pine	#3	5-9	7-3	8-10	10-5	5-3	6-8	8-1	9-6
	Spruce-pine-fir	SS	8-4	11-0	14-0	17-0	8-4	11-0	13-8	15-11
	Spruce-pine-fir	#1	8-1	10-3	12-7	14-7	7-5	9-5	11-6	13-4
	Spruce-pine-fir	#2	8-1	10-3	12-7	14-7	7-5	9-5	11-6	13-4
	Spruce-pine-fir	#3	6-2	7-9	9-6	11-0	5-7	7-1	8-8	10-1

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

Note: Check sources for availability of lumber in lengths greater than 20 feet.

- a. End bearing length shall be increased to 2 inches.
- b. Deleted

TABLE 502.3.3(1)
CANTILEVER SPANS FOR FLOOR JOISTS SUPPORTING
LIGHT-FRAME EXTERIOR BEARING WALL AND ROOF ONLY ^{a, b, c, f, g, h}
(Floor Live Load = 40 psf, Roof Live Load = 20 psf)

MEMBER & SPACING	MAXIMUM CANTILEVER SPAN (uplift force at backspan support in lbs.) ^{d, e}											
	Ground Snow Load											
	≤ 20 psf			30 psf			50 psf			70 psf		
	Roof Width			Roof Width			Roof Width			Roof Width		
	24 ft	32 ft	40 ft	24 ft	32 ft	40 ft	24 ft	32 ft	40 ft	24 ft	32 ft	40 ft
2 × 8 @ 12"	20" (177)	15" (227)	=	18" (209)	=	=	=	=	=	=	=	=
2 × 10 @ 16"	29" (228)	21" (297)	16" (364)	26" (271)	18" (354)	=	20" (375)	=	=	=	=	=
2 × 10 @ 12"	36" (166)	26" (219)	20" (270)	34" (198)	22" (263)	16" (324)	26" (277)	=	=	19" (356)	=	=
2 × 12 @ 16"	=	32" (287)	25" (356)	36" (263)	29" (345)	21" (428)	29" (367)	20" (484)	=	23" (471)	=	=
2 × 12 @ 12"	=	42" (209)	31" (263)	=	37" (253)	27" (317)	36" (271)	27" (358)	17" (447)	31" (348)	19" (462)	=
2 × 12 @ 8"	=	48" (136)	45" (169)	=	48" (164)	38" (206)	=	40" (233)	26" (294)	36" (230)	29" (304)	18" (379)

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

- a. Tabulated values are for clear-span roof supported solely by exterior bearing walls.
- b. Spans are based on No. 2 Grade lumber of Douglas fir-larch, hem-fir, and spruce-pine-fir for repetitive (three or more) members. No. 1 or better shall be used for Southern pine.
- c. Ratio of backspan to cantilever span shall be not less than 3:1.
- d. Connections capable of resisting the indicated uplift force shall be provided at the backspan support.
- e. Uplift force is for a backspan to cantilever span ratio of 3:1. Tabulated uplift values are permitted to be reduced by multiplying by a factor equal to 3 divided by the actual backspan ratio provided (3/backspan ratio).
- f. Deleted
- g. A full-depth rim joist shall be provided at the unsupported end of the cantilever joists. Solid blocking shall be provided at the supported end. Where the cantilever length is 24 inches or less and the building is assigned to Seismic Design Category A, B or C, solid blocking at the support for the cantilever shall not be required.
- h. Linear interpolation shall be permitted for building widths and ground snow loads other than shown.

TABLE 502.3.3(2)
CANTILEVER SPANS FOR FLOOR JOISTS
SUPPORTING EXTERIOR BALCONY ^{a, b, e, f}

MEMBER SIZE	SPACING	MAXIMUM CANTILEVER SPAN (uplift force at backspan support in lbs.) ^{c, d}		
		Ground Snow Load		
		≤ 30 psf	50 psf	70 psf
2 × 8	12"	42" (139)	39" (156)	34" (165)
2 × 8	16"	36" (151)	34" (171)	29" (180)
2 × 10	12"	61" (164)	57" (189)	49" (201)
2 × 10	16"	53" (180)	49" (208)	42" (220)
2 × 10	24"	43" (212)	40" (241)	34" (255)
2 × 12	16"	72" (228)	67" (260)	57" (268)
2 × 12	24"	58" (279)	54" (319)	47" (330)

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa.

- Spans are based on No. 2 Grade lumber of Douglas fir-larch, hem-fir, and spruce-pine-fir for repetitive (three or more) members. No.1 or better shall be used for Southern pine.
- Ratio of backspan to cantilever span shall be not less than 2:1.
- Connections capable of resisting the indicated uplift force shall be provided at the backspan support.
- Uplift force is for a backspan to cantilever span ratio of 2:1. Tabulated uplift values are permitted to be reduced by multiplying by a factor equal to 2 divided by the actual backspan ratio provided (2/backspan ratio).
- A full-depth rim joist shall be provided at the unsupported end of the cantilever joists. Solid blocking shall be provided at the supported end. Where the cantilever length is 24 inches or less and the building is assigned to Seismic Design Category A, B or C, solid blocking at the support for the cantilever shall not be required.
- Linear interpolation shall be permitted for ground snow loads other than shown.

502.3.2 Other floor joists. Table 502.3.1(2) shall be used to determine the maximum allowable span of floor joists that support other areas of the building, other than sleeping rooms and attics, provided that the design live load does not exceed 40 pounds per square foot (1.92 kPa) and the design dead load does not exceed 20 pounds per square foot (0.96 kPa).

502.3.3 Floor cantilevers. Floor cantilever spans shall not exceed the nominal depth of the wood floor joist. Floor cantilevers constructed in accordance with Table 502.3.3(1) shall be permitted where supporting a light- frame bearing wall and roof only. Floor cantilevers supporting an exterior balcony are permitted to be constructed in accordance with Table 502.3.3(2).

502.4 Joists under bearing partitions. Joists under parallel bearing partitions shall be of adequate size to support the load. Double joists, sized to adequately support the load, that are separated to permit the installation of piping or vents shall be full-depth solid blocked with lumber not less than 2 inches (51 mm) in nominal thickness spaced not more than 4 feet (1219 mm) on center. Bearing partitions perpendicular to joists shall not be offset from supporting girders, walls or partitions

more than the joist depth unless such joists are of sufficient size to carry the additional load.

502.5 Allowable girder and header spans. The allowable spans of girders and headers fabricated of dimension lumber shall not exceed the values set forth in Tables 602.7(1), 602.7(2) and 602.7(3).

502.6 Bearing. The ends of each joist, beam or girder shall have not less than 1½ inches (38 mm) of bearing on wood or metal, have not less than 3 inches of bearing (76 mm) on masonry or concrete or be supported by approved joist hangers. Alternatively, the ends of joists shall be supported on a 1-inch by 4-inch (25 mm by 102 mm) ribbon strip and shall be nailed to the adjacent stud. The bearing on masonry or concrete shall be direct, or a sill plate of 2-inch-minimum (51 mm) nominal thickness shall be provided under the joist, beam or girder. The sill plate shall provide a minimum nominal bearing area of 48 square inches (30 865 mm²).

502.6.1 Floor systems. Joists framing from opposite sides over a bearing support shall lap not less than 3 inches (76 mm) and shall be nailed together with a minimum three 10d face nails. A wood or metal splice with strength equal to or greater than that provided by the nailed lap is permitted.

502.6.2 Joist framing. Joists framing into the side of a wood girder shall be supported by approved framing anchors or on ledger strips not less than nominal 2 inches by 2 inches (51 mm by 51 mm).

502.6.3 Beams ending on an open pocket. *When not prescribed in the manufacturer's installation instructions, or as otherwise may be prescribed by a registered design professional, at a minimum, beams ending on an open pocket shall use clip angles to attach the beam to the foundation at beam pockets. The clip angle to beam connection shall be either a welded or a bolted connection.*

When the clip angle to beam connection is a welded connection, the clip angle shall be welded to the beam along the clip angle's entire length. When the clip angle to beam connection is a bolted connection, the clip angle shall be bolted to the beam using no less than ½" diameter bolts.

The clip angle shall be attached to the foundation wall using no less than a ½" diameter anchor placed in the middle of the clip angle.

502.7 Lateral restraint at supports. Joists shall be supported laterally at the ends by full-depth solid blocking not less than 2 inches (51 mm) nominal in

thickness; or by attachment to a full-depth header, band or rim joist, or to an adjoining stud or shall be otherwise provided with lateral support to prevent rotation.

Exceptions:

1. Trusses, structural composite lumber, structural glued-laminated members and I-joists shall be supported laterally as required by the manufacturer's recommendations.
2. *Deleted.*

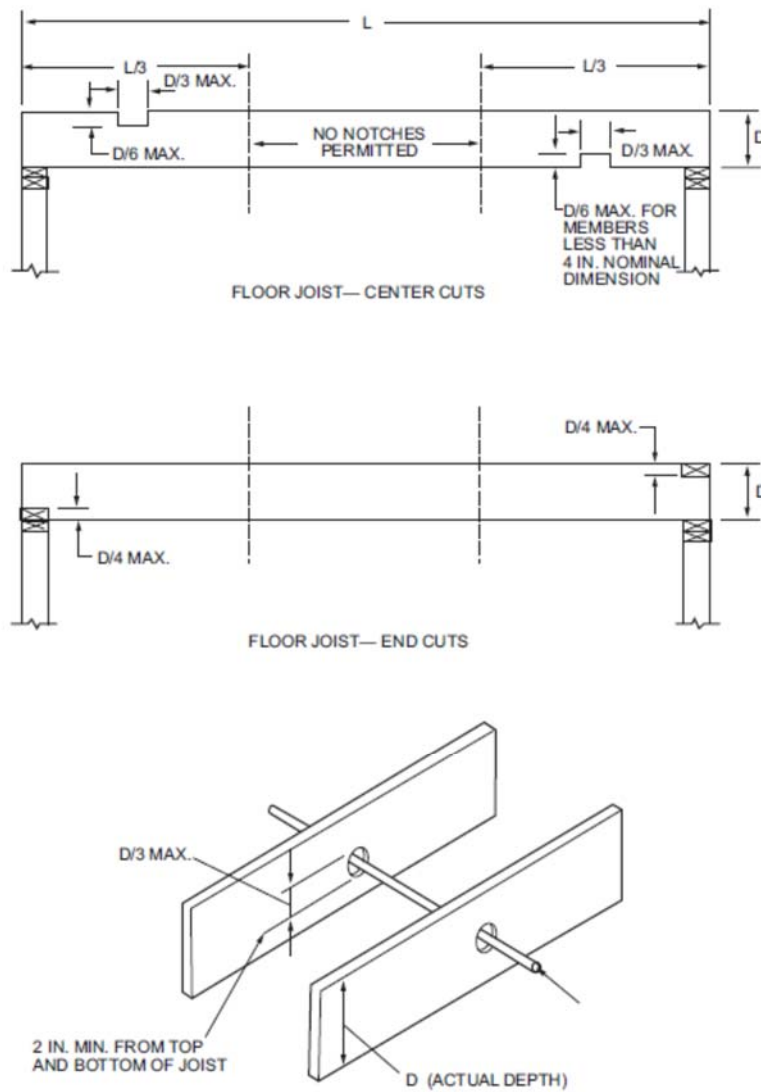
502.7.1 Bridging. Joists exceeding a nominal 2 inches by 12 inches (51 mm by 305 mm) shall be supported laterally by solid blocking, diagonal bridging (wood or metal), or a continuous 1-inch by 3-inch (25 mm by 76 mm) strip nailed across the bottom of joists perpendicular to joists at intervals not exceeding 8 feet (2438 mm).

Exception: Trusses, structural composite lumber, structural glued-laminated members and I-joists shall be supported laterally as required by the manufacturer's recommendations.

502.8 Cutting, drilling and notching. Structural floor members shall not be cut, bored or notched in excess of the limitations specified in this section. See Figure 502.8.

502.8.1 Sawn lumber. Notches in solid lumber joists, rafters and beams shall not exceed one-sixth of the depth of the member, shall not be longer than one-third of the depth of the member and shall not be located in the middle one-third of the span. Notches at the ends of the member shall not exceed one-fourth the depth of the member. The tension side of members 4 inches (102 mm) or greater in nominal thickness shall not be notched except at the ends of the members. The diameter of holes bored or cut into members shall not exceed one-third the depth of the member. Holes shall not be closer than 2 inches (51 mm) to the top or bottom of the member, or to any other hole located in the member. Where the member is notched, the hole shall not be closer than 2 inches (51 mm) to the notch.

502.8.2 Engineered wood products. Cuts, notches and holes bored in trusses, structural composite lumber, structural glue-laminated members, cross-laminated timber members or I-joists are prohibited except where permitted by the manufacturer's recommendations or where the effects of such alterations are specifically considered in the design of the member by a registered design professional.



For SI: 1 inch = 25.4 mm.

FIGURE 502.8
CUTTING, NOTCHING AND DRILLING

502.9 Fastening. Floor framing shall be nailed in accordance with Table 602.3(1). Where posts and beam or girder construction is used to support floor framing, positive connections shall be provided to ensure against uplift and lateral displacement.

502.9.1 Column to beam fastening. *When not prescribed in the manufacturer's installation instructions, or as otherwise may be prescribed by a registered design professional, at a minimum, the top plate of supporting steel column(s) shall be connected to the beam using either welded or bolted connections.*

1. *When a beam ends in a concrete pocket and the column to beam connection is a welded connection, the top plate of the column shall be welded along the length of the two sides of the top plate perpendicular to the steel beam's length. When the column to beam connection is a bolted connection, no less than two ½" diameter bolts placed diagonally shall be used through the top plate of the steel column(s) and the bottom of the beam. The base plate(s) of steel column(s) shall be anchored to concrete footing pad(s) with no less than two ½" diameter anchors or bolts placed diagonally through the base plate(s) of the steel column(s) into the concrete footing pad(s).*
2. *When a beam ends on a steel column rather than in a beam pocket, and that connection is a bolted connection, no less than four ½" diameter bolts shall be used connecting the top plate of the steel column to the beam. The base plate of the steel column shall be anchored to the concrete footing pad with no less than four ½" diameter anchors through the base plate of the steel column to the concrete footing pad.*

All powder actuated fasteners are prohibited when connecting steel column top plates to beams and steel column base plates to concrete footing pads.

502.10 Framing of openings. *Openings in floor framing shall be framed with header and trimmer joists. Where the header joist span does not exceed 4 feet (1219 mm), the header joist shall be a single member the same size as the floor joist. Single trimmer joists shall be used to carry a single header joist that is located within 3 feet (914 mm) of the trimmer joist bearing. Where the header joist span exceeds 4 feet (1219 mm), the trimmer joists and the header joist shall be doubled and of sufficient cross section to support the floor joists framing into the header.*

502.11 Wood trusses.

502.11.1 Design. *Wood trusses shall be designed in accordance with approved engineering practice. The design and manufacture of metal-plate-connected wood trusses shall comply with ANSI/TPI 1. The truss design drawings shall bear the identification of the person primarily responsible for their preparation and include all loads, reactions and calculations used in design or be prepared by a registered design professional. The truss design drawings shall comply with the requirements of this section and be in accordance with Section 106.1.*

502.11.2 Bracing. Trusses shall be braced to prevent rotation and provide lateral stability in accordance with the requirements specified in the construction documents for the building and on the individual truss design drawings. In the absence of specific bracing requirements, trusses shall be braced in accordance with accepted industry practices, such as, the SBCA Building Component Safety Information (BCSI) Guide to Good Practice for Handling, Installing & Bracing of Metal Plate Connected Wood Trusses.

502.11.3 Alterations to trusses. Truss members and components shall not be cut, notched, spliced or otherwise altered in any way without the approval of a registered design professional. Alterations resulting in the addition of load that exceeds the design load for the truss, shall not be permitted without verification that the truss is capable of supporting the additional loading.

502.11.4 Truss design drawings. Truss design drawings, prepared in compliance with Section 502.11.1, shall be submitted to the building official and approved prior to installation. Truss design drawings shall be provided with the shipment of trusses delivered to the job site. Truss design drawings shall include, at a minimum, the information specified as follows:

1. Slope or depth, span and spacing.
2. Location of all joints.
3. Required bearing widths.
4. Design loads as applicable:
 - 4.1. Top chord live load.
 - 4.2. Top chord dead load.
 - 4.3. Bottom chord live load.
 - 4.4. Bottom chord dead load.
 - 4.5. Concentrated loads and their points of application.
 - 4.6. Controlling wind and earthquake loads.
5. Adjustments to lumber and joint connector design values for conditions of use.
6. Each reaction force and direction.
7. Joint connector type and description, such as size, thickness or gage, and the dimensioned location of each joint connector except where symmetrically located relative to the joint interface.
8. Lumber size, species and grade for each member.
9. Connection requirements for:
 - 9.1. Truss-to-girder-truss.
 - 9.2. Truss ply-to-ply.
 - 9.3. Field splices.

10. Calculated deflection ratio, maximum description for live and total load, or both.
11. Maximum axial compression forces in the truss members to enable the building designer to design the size, connections and anchorage of the permanent continuous lateral bracing. Forces shall be shown on the truss drawing or on supplemental documents.
12. Required permanent truss member bracing location.

502.12 Draftstopping required. Draftstopping shall be provided in accordance with Section 302.12.

502.13 Fireblocking required. Fireblocking shall be provided in accordance with Section 302.11.

SECTION 503 **FLOOR SHEATHING**

503.1 Lumber sheathing. Maximum allowable spans for lumber used as floor sheathing shall conform to Tables 503.1, 503.2.1.1(1) and 503.2.1.1(2).

503.1.1 End joints. End joints in lumber used as sub- flooring shall occur over supports unless end-matched lumber is used, in which case each piece shall bear on not less than two joists. Subflooring shall be permitted to be omitted where joist spacing does not exceed 16 inches (406 mm) and a 1-inch (25 mm) nominal tongue-and-groove wood strip flooring is applied perpendicular to the joists.

TABLE 503.1
MINIMUM THICKNESS OF LUMBER FLOOR SHEATHING

<u>JOIST OR BEAM SPACING (inches)</u>	<u>MINIMUM NET THICKNESS</u>	
	<u>Perpendicular to joist</u>	<u>Diagonal to joist</u>
<u>24</u>	<u>1 1/16</u>	<u>3/4</u>
<u>16</u>	<u>5/8</u>	<u>5/8</u>
<u>48^a</u>	<u>1 1/2 T & G</u>	<u>N/A</u>
<u>54^b</u>		
<u>60^c</u>		

For SI: 1 inch = 25.4 mm, 1 pound per square inch = 6.895 kPa.

N/A = Not Applicable.

- a. For this support spacing, lumber sheathing shall have a minimum F_b of 675 and minimum E of 1,100,000 (see ANSI AWC NDS).
- b. For this support spacing, lumber sheathing shall have a minimum F_b of 765 and minimum E of 1,400,000 (see ANSI AWC NDS).
- c. For this support spacing, lumber sheathing shall have a minimum F_b of 855 and minimum E of 1,700,000 (see ANSI AWC NDS).

503.2 Wood structural panel sheathing.

503.2.1 Identification and grade. Wood structural panel sheathing used for structural purposes shall conform to CSA O325, CSA O437, DOC PS 1 or DOC PS 2. 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” wherever referenced in this code

503.2.1.1 Subfloor and combined subfloor underlayment. Where used as subflooring or combination subfloor underlayment, wood structural panels shall be of one of the grades specified in Table 503.2.1.1(1). Where sanded plywood is used as combination subfloor underlayment, the grade, bond classification, and Performance Category shall be as specified in Table 503.2.1.1(2).

TABLE 503.2.1.1(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,1}		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^c				Roof^f				Subfloor^j
<u>16/0</u>	<u>3/8</u>	<u>30</u>	<u>—</u>	<u>16</u>	<u>16</u>	<u>40</u>	<u>30</u>	<u>0</u>
<u>20/0</u>	<u>3/8</u>	<u>50</u>	<u>—</u>	<u>20</u>	<u>20</u>	<u>40</u>	<u>30</u>	<u>0</u>
<u>24/0</u>	<u>3/8</u>	<u>100</u>	<u>30</u>	<u>24</u>	<u>20^g</u>	<u>40</u>	<u>30</u>	<u>0</u>
<u>24/16</u>	<u>7/16</u>	<u>100</u>	<u>40</u>	<u>24</u>	<u>24</u>	<u>50</u>	<u>40</u>	<u>16</u>
<u>32/16</u>	<u>15/32, 1/2</u>	<u>180</u>	<u>70</u>	<u>32</u>	<u>28</u>	<u>40</u>	<u>30</u>	<u>16^h</u>
<u>40/20</u>	<u>19/32, 5/8</u>	<u>305</u>	<u>130</u>	<u>40</u>	<u>32</u>	<u>40</u>	<u>30</u>	<u>20^{h,i}</u>
<u>48/24</u>	<u>23/32, 3/4</u>	<u>—</u>	<u>175</u>	<u>48</u>	<u>36</u>	<u>45</u>	<u>35</u>	<u>24</u>
<u>60/32</u>	<u>7/8</u>	<u>—</u>	<u>305</u>	<u>60</u>	<u>48</u>	<u>45</u>	<u>35</u>	<u>32</u>
Underlayment, C-C plugged, single floor^c				Roof^f				Combination subfloor underlayment^k
<u>16 o.c.</u>	<u>19/32, 5/8</u>	<u>100</u>	<u>40</u>	<u>24</u>	<u>24</u>	<u>50</u>	<u>40</u>	<u>16ⁱ</u>
<u>20 o.c.</u>	<u>19/32, 5/8</u>	<u>150</u>	<u>60</u>	<u>32</u>	<u>32</u>	<u>40</u>	<u>30</u>	<u>20^{i,j}</u>
<u>24 o.c.</u>	<u>23/32, 3/4</u>	<u>240</u>	<u>100</u>	<u>48</u>	<u>36</u>	<u>35</u>	<u>25</u>	<u>24</u>
<u>32 o.c.</u>	<u>7/8</u>	<u>—</u>	<u>185</u>	<u>48</u>	<u>40</u>	<u>50</u>	<u>40</u>	<u>32</u>
<u>48 o.c.</u>	<u>1-3/32, 1-1/8</u>	<u>—</u>	<u>290</u>	<u>60</u>	<u>48</u>	<u>50</u>	<u>40</u>	<u>48</u>

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa.

- 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.
- Panels continuous over two or more spans with long dimension (strength axis) perpendicular to supports. Spans shall be limited to

- c. 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 where span is 48 inches), tongue-and- groove panel edges, or other approved type of edge support.
- e. Includes Structural I panels in these grades.
- f. Uniform load deflection limitation: $\frac{1}{180}$ of span under live load plus dead load, $\frac{1}{240}$ of span under live load only.
- g. Maximum span 24 inches for $\frac{15}{32}$ - and $\frac{1}{2}$ -inch panels.
- h. Maximum span 24 inches where $\frac{3}{4}$ -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 $\frac{1}{4}$ -inch-thick wood panel-type underlayment, fiber-cement underlayment with end and edge joints offset not less than 2 inches or $1\frac{1}{2}$ inches of lightweight concrete or approved cellular concrete is placed over the subfloor, or $\frac{3}{4}$ -inch wood finish flooring is installed at right angles to the supports. Fiber-cement underlayment shall comply with ASTM C1288 or ISO 8336 Category C. Allowable uniform live load at maximum span, based on deflection of $\frac{1}{360}$ of span, is 100 psf.
- k. Unsupported edges shall have tongue-and-groove joints or shall be supported by blocking unless nominal $\frac{1}{4}$ -inch-thick wood panel-type underlayment, fiber- cement underlayment with end and edge joints offset not less than 2 inches or $\frac{3}{4}$ -inch wood finish flooring is installed at right angles to the supports. Fiber-cement underlayment shall comply with ASTM C1288 or ISO 8336 Category C. Allowable uniform live load at maximum span, based on deflection of $\frac{1}{360}$ 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 inches on center and 24 inches on center taken from reference standard APA E30, APA Engineered Wood Construction Guide. Refer to reference standard for allowable spans not listed in the table.

TABLE 503.2.1.1(2)
ALLOWABLE SPANS FOR SANDED PLYWOOD
COMBINATION SUBFLOOR UNDERLAYMENT ^a

<u>IDENTIFICATION</u>	<u>SPACING OF JOISTS (inches)</u>		
	<u>16</u>	<u>20</u>	<u>24</u>
<u>Species group ^b</u>	=	=	=
<u>1</u>	<u>$\frac{1}{2}$</u>	<u>$\frac{5}{8}$</u>	<u>$\frac{3}{4}$</u>
<u>2, 3</u>	<u>$\frac{5}{8}$</u>	<u>$\frac{3}{4}$</u>	<u>$\frac{7}{8}$</u>
<u>4</u>	<u>$\frac{3}{4}$</u>	<u>$\frac{7}{8}$</u>	<u>1</u>

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa.

- 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 $\frac{1}{4}$ -inch-thick wood panel-type underlayment, fiber- cement underlayment or $\frac{3}{4}$ -inch wood finish floor is used. Fiber-cement underlayment shall comply with ASTM C1288 or ISO 8336 Category C. Allowable uniform live load at maximum span based on deflection of $\frac{1}{360}$ of span is 100 psf.
- b. Applicable to all grades of sanded exterior-type plywood.

503.2.2 Allowable spans. The maximum allowable span for wood structural panels used as subfloor or combination subfloor underlayment shall be as set forth in Table 503.2.1.1(1), or APA E30. The maximum span for sanded plywood combination subfloor underlayment shall be as set forth in Table 503.2.1.1(2).

503.2.3 Installation. Wood structural panels used as subfloor or combination subfloor underlayment shall be attached to wood framing in accordance with Table 602.3(1) and shall be attached to cold-formed steel framing in accordance with Table 505.3.1(2).

503.3 Particleboard.

503.3.1 Identification and grade. Particleboard shall conform to ANSI A208.1 and shall be so identified by a grade mark or certificate of inspection issued by an approved agency.

503.3.2 Floor underlayment. Particleboard floor underlayment shall conform to Type PBU and shall be not less than $\frac{1}{4}$ -inch (6.4 mm) in thickness.

503.3.3 Installation. Particleboard underlayment shall be installed in accordance with the recommendations of the manufacturer and attached to framing in accordance with Table 602.3(1).

SECTION 504 **PRESSURE PRESERVATIVE-TREATED WOOD FLOORS** **(ON GROUND)**

504.1 General. Pressure preservative-treated wood basement floors and floors on ground shall be designed to withstand axial forces and bending moments resulting from lateral soil pressures at the base of the exterior walls and floor live and dead loads. Floor framing shall be designed to meet joist deflection requirements in accordance with Section 301.

504.1.1 Unbalanced soil loads. Unless special provision is made to resist sliding caused by unbalanced lateral soil loads, wood basement floors shall be limited to applications where the differential depth of fill on opposite exterior foundation walls is 2 feet (610 mm) or less.

504.1.2 Construction. Joists in wood basement floors shall bear tightly against the narrow face of studs in the foundation wall or directly against a band joist that bears on the studs. Plywood subfloor shall be continuous over lapped joists or over butt joints between in-line joists. Sufficient blocking shall be provided between joists to transfer lateral forces at the base of the end walls into the floor system.

504.1.3 Uplift and buckling. Where required, resistance to uplift or restraint against buckling shall be provided by interior bearing walls or properly designed stub walls anchored in the supporting soil below.

504.2 Site preparation. The area within the foundation walls shall have all

vegetation, topsoil and foreign material removed, and any fill material that is added shall be free of vegetation and foreign material. The fill shall be compacted to ensure uniform support of the pressure preservative- treated wood floor sleepers.

504.2.1 Base. A minimum 4-inch-thick (102 mm) granular base of gravel having a maximum size of $\frac{3}{4}$ -inch (19.1 mm) or crushed stone having a maximum size of $\frac{1}{2}$ -inch (12.7 mm) shall be placed over the compacted earth.

504.2.2 Moisture barrier. Polyethylene sheeting of minimum 6-mil (0.15 mm) thickness shall be placed over the granular base. Joints shall be lapped 6 inches (152 mm) and left unsealed. The polyethylene membrane shall be placed over the pressure preservative-treated wood sleepers and shall not extend beneath the footing plates of the exterior walls.

504.3 Materials. Framing materials, including sleepers, joists, blocking and plywood subflooring, shall be pressure preservative-treated and dried after treatment in accordance with AWPA U1 (Commodity Specification A, Special Requirement 4.2), and shall bear the label of an *approved* agency.

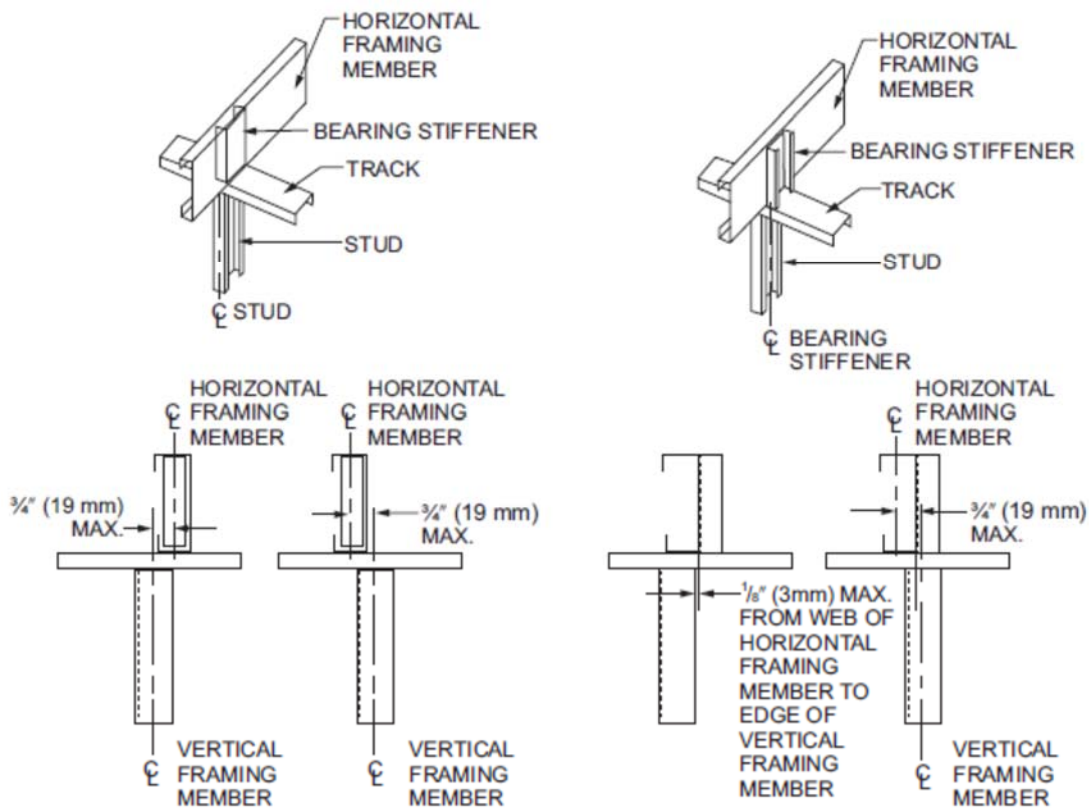
SECTION 505 **COLD-FORMED STEEL FLOOR FRAMING**

505.1 Cold-formed steel floor framing. Elements shall be straight and free of any defects that would significantly affect structural performance. Cold-formed steel floor framing members shall be in accordance with the requirements of this section.

505.1.1 Applicability limits. The provisions of this section shall control the construction of cold-formed steel floor framing for buildings not greater than 60 feet (18 288 mm) in length perpendicular to the joist span, not greater than 40 feet (12 192 mm) in width parallel to the joist span and less than or equal to three stories above grade plane. Cold-formed steel floor framing constructed in accordance with the provisions of this section shall be limited to sites where the ultimate design wind speed is less than 140 miles per hour (63 m/s), Exposure Category B or C, and the ground snow load is less than or equal to 70 pounds per square foot (3.35 kPa).

505.1.2 In-line framing. Where supported by cold-formed steel-framed walls in accordance with Section 603, cold-formed steel floor framing shall be constructed with floor joists located in-line with load-bearing studs located below the joists in accordance with Figure 505.1.2 and the tolerances specified as follows:

1. The maximum tolerance shall be $\frac{3}{4}$ -inch (19.1 mm) between the centerline of the horizontal framing member and the centerline of the vertical framing member.
2. Where the centerline of the horizontal framing member and bearing stiffener are located to one side of the centerline of the vertical framing member, the maximum tolerance shall be $\frac{1}{8}$ -inch (3 mm) between the web of the horizontal framing member and the edge of the vertical framing member.



For SI: 1 inch = 25.4 mm.

FIGURE 505.1.2
IN-LINE FRAMING

505.1.3 Floor trusses. Cold-formed steel trusses shall be designed, braced and installed in accordance with AISI S240. In the absence of specific bracing requirements, trusses shall be braced in accordance with accepted industry

practices, such as the SBCA Cold-Formed Steel Building Component Safety Information (CFSBCSI), Guide to Good Practice for Handling, Installing & Bracing of Cold-Formed Steel Trusses. Truss members shall not be notched, cut or altered in any manner without an approved design.

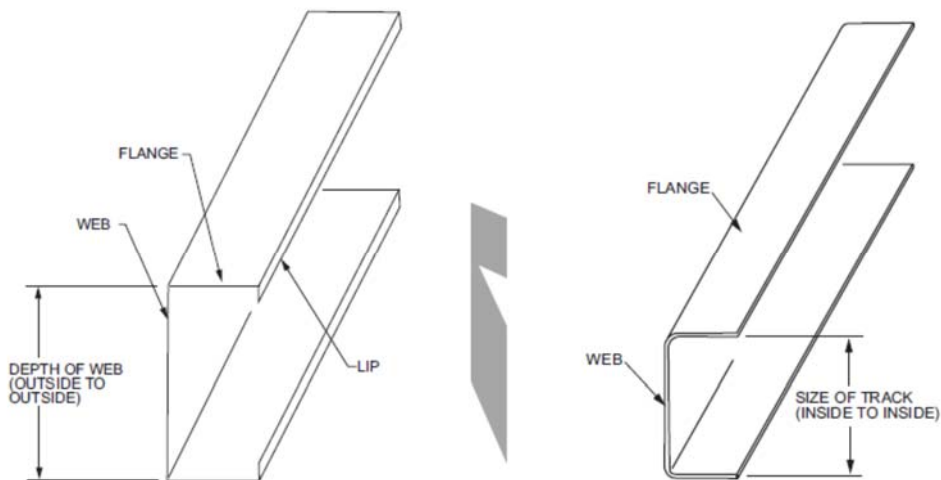
505.2 Structural framing. Load-bearing cold-formed steel floor framing members shall be in accordance with this section.

505.2.1 Material. Load-bearing cold-formed steel framing members shall be cold formed to shape from structural quality sheet steel complying with the requirements of ASTM A1003: Structural Grades 33 Type H and 50 Type H.

505.2.2 Corrosion protection. Load-bearing cold-formed steel framing shall have a metallic coating complying with ASTM A1003 and one of the following:

1. Not less than G 60 in accordance with ASTM A653.
2. Not less than AZ 50 in accordance with ASTM A792.

505.2.3 Dimension, thickness and material grade. Load-bearing cold-formed steel floor framing members shall comply with Figure 505.2.3(1) and with the dimensional and thickness requirements specified in Table 505.2.3. Additionally, all C-shaped sections shall have a minimum flange width of 1.625 inches (41 mm) and a maximum flange width of 2 inches (51 mm). The minimum lip size for C-shaped sections shall be 1/2 inch (12.7 mm). Track sections shall comply with Figure 505.2.3(2) and shall have a minimum flange width of 1 1/4 inch (32 mm). Minimum Grade 33 ksi steel shall be used wherever 33 mil and 43 mil thicknesses are specified. Minimum Grade 50 ksi steel shall be used wherever 54 and 68 mil thicknesses are specified.

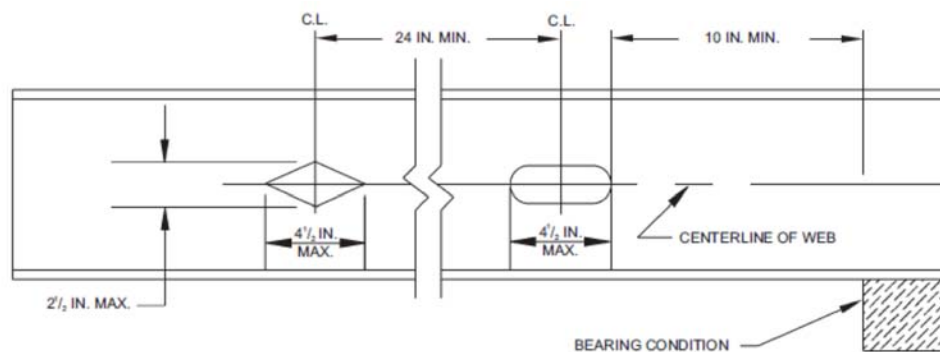


section.

505.2.6.1 Web holes. Web holes in floor joists shall comply with all of the following conditions:

1. Holes shall conform to Figure 505.2.6.1.
2. Holes shall be permitted only along the centerline of the web of the framing member.
3. Holes shall have a center-to-center spacing of not less than 24 inches (610 mm).
4. Holes shall have a web hole width not greater than 0.5 times the member depth, or 2¹/₂ -inches (64.5 mm).
5. Holes shall have a web hole length not exceeding 4¹/₂ -inches (114 mm)
6. Holes shall have a minimum distance between the edge of the bearing surface and the edge of the web hole of not less than 10 inches (254 mm).

Framing members with web holes not conforming to these requirements shall be reinforced in accordance with Section 505.2.6.2, patched in accordance with Section 505.2.6.3 or designed in accordance with accepted engineering practices.



For SI: 1 inch = 25.4 mm.

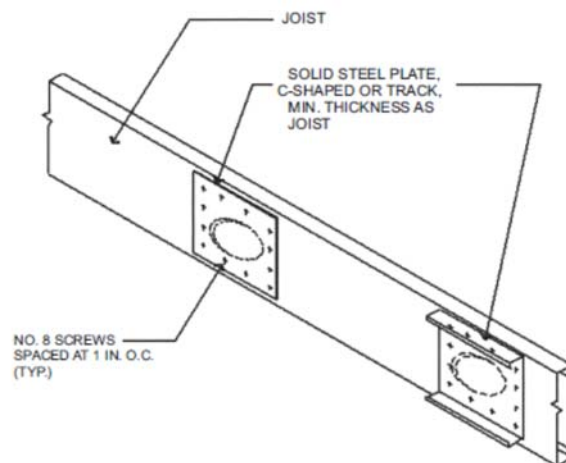
FIGURE 505.2.6.1
FLOOR JOIST WEB HOLES

505.2.6.2 Web hole reinforcing. Reinforcement of web holes in floor joists not conforming to the requirements of Section 505.2.6.1 shall be permitted if the hole is located fully within the center 40 percent of the span and the depth and length of the hole does not exceed 65 percent of the flat width of the web. The reinforcing shall be a steel plate or C-shaped section with a

hole that does not exceed the web hole size limitations of Section 505.2.6.1 for the member being reinforced. The steel reinforcing shall be not thinner than the thickness of the receiving member and shall extend not less than 1 inch (25 mm) beyond all edges of the hole. The steel reinforcing shall be fastened to the web of the receiving member with No. 8 screws spaced not more than 1 inch (25 mm) center-to-center along the edges of the patch with minimum edge distance of $\frac{1}{2}$ -inch (12.7 mm).

505.2.6.3 Hole patching. Patching of web holes in floor joists not conforming to the requirements in Section 505.2.6.1 shall be permitted in accordance with either of the following methods:

1. Framing members shall be replaced or designed in accordance with accepted engineering practices where web holes exceed the following size limits:
 - 1.1. The depth of the hole, measured across the web, exceeds 70 percent of the flat width of the web.
 - 1.2. The length of the hole, measured along the web, exceeds 10 inches (254 mm) or the depth of the web, whichever is greater.
2. Web holes not exceeding the dimensional requirements in Section 505.2.6.3, Item 1, shall be patched with a solid steel plate, stud section or track section in accordance with Figure 505.2.6.3. The steel patch shall, as a minimum, be of the same thickness as the receiving member and shall extend not less than 1 inch (25 mm) beyond all edges of the hole. The steel patch shall be fastened to the web of the receiving member with No. 8 screws spaced not more than 1 inch (25 mm) center-to-center along the edges of the patch with minimum edge distance of $\frac{1}{2}$ -inch (12.7 mm).



For SI: 1 inch = 25.4 mm.

FIGURE 505.2.6.3
FLOOR JOIST WEB HOLE PATCH

505.3 Floor construction. Cold-formed steel floors shall be constructed in accordance with this section.

505.3.1 Floor-to-foundation or load-bearing wall connections. Cold-formed steel-framed floors shall be anchored to foundations, wood sills or load-bearing walls in accordance with Table 505.3.1(1) and Figure 505.3.1(1), 505.3.1(2), 505.3.1(3), 505.3.1(4), 505.3.1(5) or 505.3.1(6). Anchor bolts shall be located not more than 12 inches (305 mm) from corners or the termination of bottom tracks. Continuous cold-formed steel joists supported by interior load-bearing walls shall be constructed in accordance with Figure 505.3.1(7). Lapped cold-formed steel joists shall be constructed in accordance with Figure 505.3.1(8). End floor joists constructed on foundation walls parallel to the joist span shall be doubled unless a C-shaped bearing stiffener, sized in accordance with Section 505.3.4, is installed web-to-web with the floor joist beneath each supported wall stud, as shown in Figure 505.3.1(9). Fastening of cold-formed steel joists to other framing members shall be in accordance with Section 505.2.5 and Table 505.3.1(2).

TABLE 505.3.1(1)
FLOOR-TO-FOUNDATION OR BEARING WALL CONNECTION REQUIREMENTS ^{a, b}

<u>FRAMING CONDITION</u>	<u>BASIC ULTIMATE WIND SPEED (mph) AND EXPOSURE</u>	
	<u>110 mph Exposure Category C or less than 139 mph Exposure Category B</u>	<u>Less than 139 mph Exposure Category C</u>
<u>Floor joist to wall track of exterior wall in accordance with Figure 505.3.1(1)</u>	<u>2-No. 8 screws</u>	<u>3-No. 8 screws</u>
<u>Rim track or end joist to load-bearing wall top track in accordance with Figure 505.3.1(1)</u>	<u>1-No. 8 screw at 24 inches o.c.</u>	<u>1-No. 8 screw at 24 inches o.c.</u>
<u>Rim track or end joist to wood sill in accordance with Figure 505.3.1(2)</u>	<u>Steel plate spaced at 4 feet o.c. with 4-No. 8 screws and 4-10d or 6-8d common nails</u>	<u>Steel plate spaced at 2 feet o.c. with 4-No. 8 screws and 4-10d or 6-8d common nails</u>
<u>Rim track or end joist to foundation in accordance with Figure 505.3.1(3)</u>	<u>1/2 -inch minimum diameter anchor bolt and clip-angle spaced at 6 feet o.c. with 8-No. 8 screws</u>	<u>1/2 -inch minimum diameter anchor bolt and clip angle spaced at 4 feet o.c. with 8-No. 8 screws</u>
<u>Cantilevered joist to foundation in accordance with Figure 505.3.1(4)</u>	<u>1/2 -inch minimum diameter anchor bolt and clip-angle spaced at 6 feet o.c. with 8-No. 8 screws</u>	<u>1/2 -inch minimum diameter anchor bolt and clip angle spaced at 4 feet o.c. with 8-No. 8 screws</u>
<u>Cantilevered joist to wood sill in accordance with Figure 505.3.1(5)</u>	<u>Steel plate spaced at 4 feet o.c. with 4-No. 8 screws and 4-10d or 6-8d common nails</u>	<u>Steel plate spaced at 2 feet o.c. with 4-No. 8 screws and 4-10d or 6-8d common nails</u>
<u>Cantilevered joist to exterior load-bearing wall track in accordance with Figure 505.3.1(6)</u>	<u>2-No. 8 screws</u>	<u>3-No. 8 screws</u>

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa, 1 mile per hour = 0.447 m/s, 1 foot = 304.8 mm.

- a. Anchor bolts are to be located not more than 12 inches from corners or the termination of bottom tracks such as at door openings or corners. Bolts extend not less than 15 inches into masonry or 7 inches into concrete. Anchor bolts connecting cold-formed steel

framing to the foundation structure are to be installed so that the distance from the center of the bolt hole to the edge of the connected member is not less than one and one-half bolt diameters.

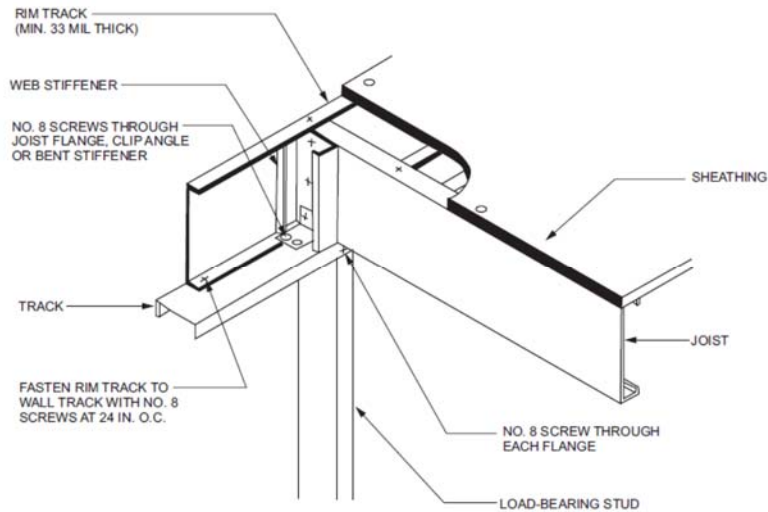
- b. All screw sizes shown are minimum.

TABLE 505.3.1(2)
FLOOR FASTENING SCHEDULE ^a

<u>DESCRIPTION OF BUILDING ELEMENTS</u>	<u>NUMBER AND SIZE OF FASTENERS</u>	<u>SPACING OF FASTENERS</u>
Floor joist to track of an interior load-bearing wall in accordance with Figures 505.3.1(7) and 505.3.1(8)	2 No. 8 screws	Each joist
Floor joist to track at end of joist	2 No. 8 screws	One per flange or two per bearing stiffener
Subfloor to floor joists	No. 8 screws	6 in. o.c. on edges and 12 in. o.c. at intermediate supports

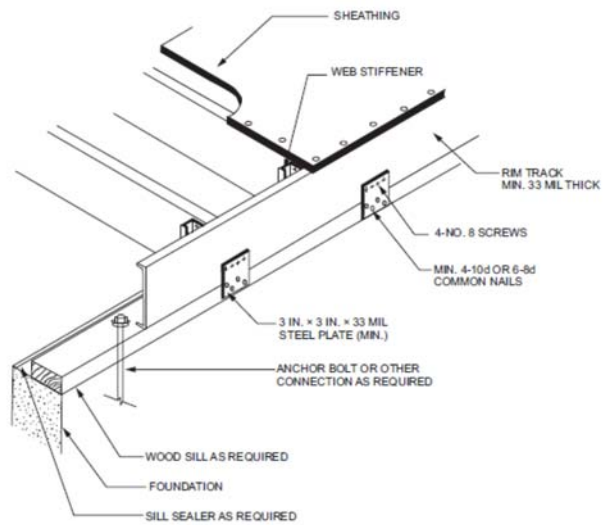
For SI: 1 inch = 25.4 mm.

- a. All screw sizes shown are minimum.



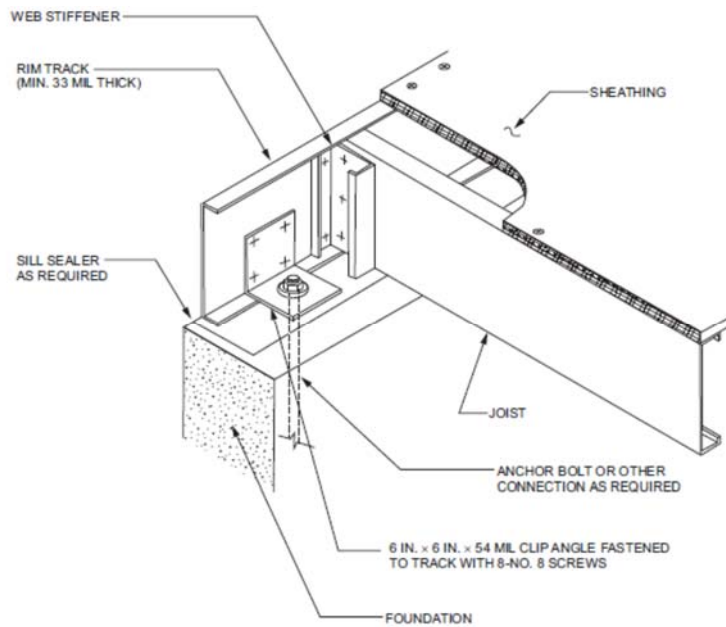
For SI: 1 mil = 0.0254 mm, 1 inch = 25.4 mm.

FIGURE 505.3.1(1)
FLOOR-TO-EXTERIOR LOAD-BEARING WALL STUD CONNECTION



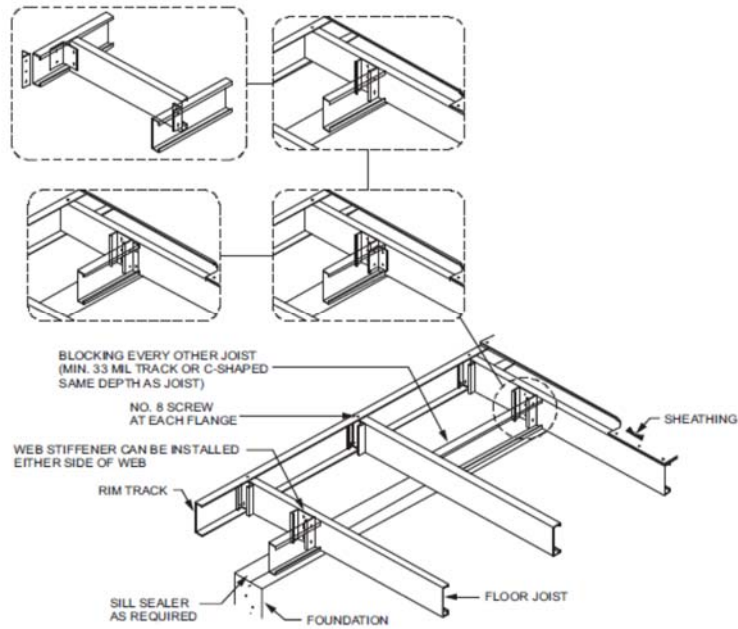
For SI: 1 mil = 0.0254 mm, 1 inch = 25.4 mm.

FIGURE 505.3.1(2)
FLOOR-TO-WOOD-SILL CONNECTION



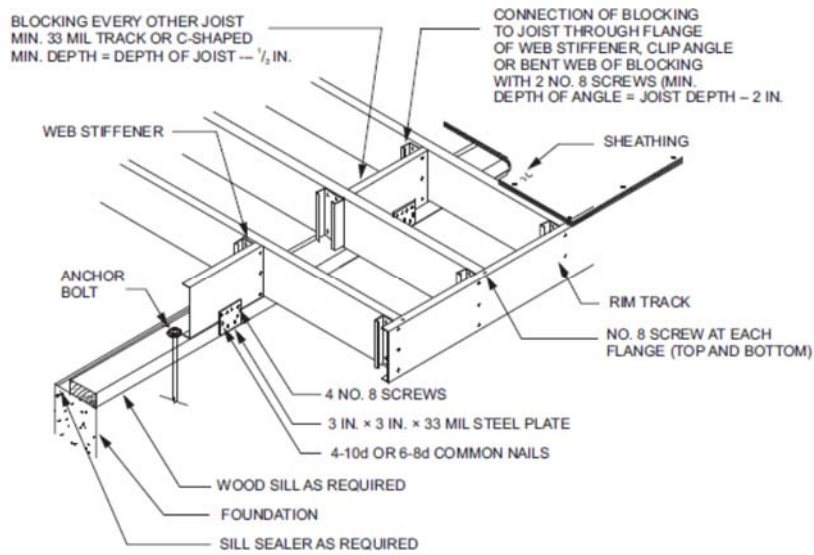
For SI: 1 mil = 0.0254 mm, 1 inch = 25.4 mm.

FIGURE 505.3.1(3)
FLOOR-TO-FOUNDATION CONNECTION



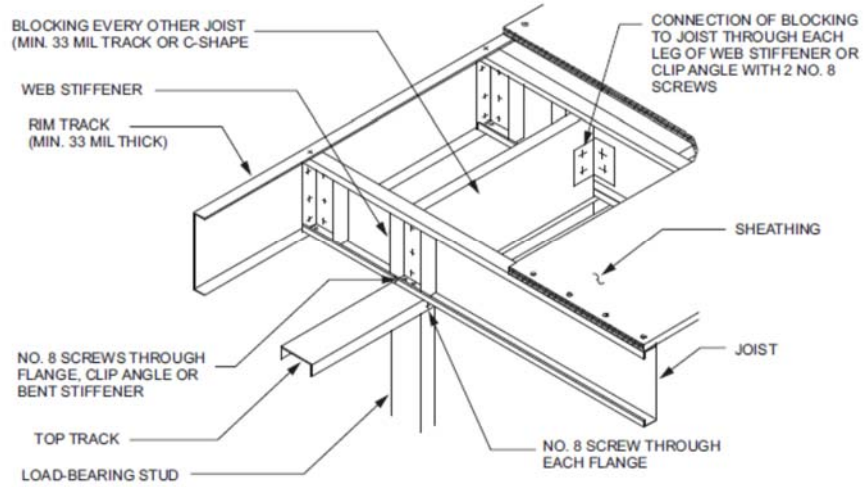
For SI: 1 mil = 0.0254 mm.

FIGURE 505.3.1(4)
CANTILEVERED FLOOR-TO-FOUNDATION CONNECTION



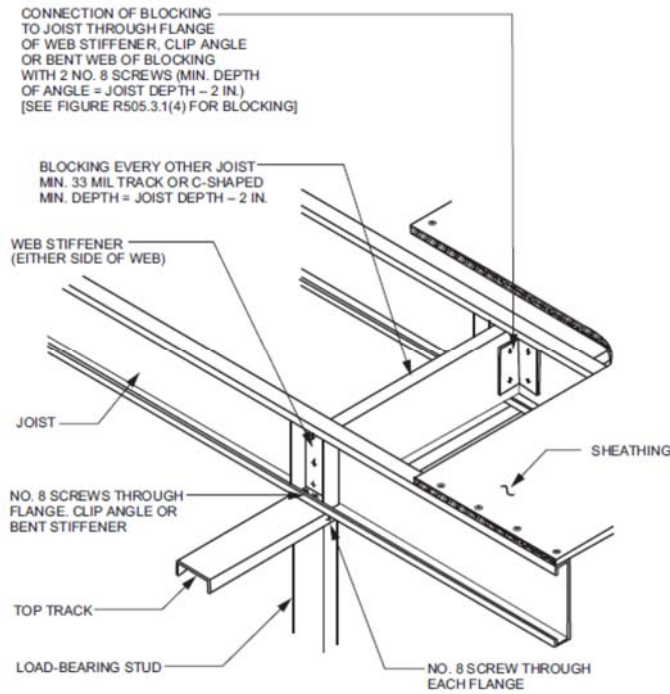
For SI: 1 mil = 0.0254 mm, 1 inch = 25.4 mm.

FIGURE 505.3.1(5)
CANTILEVERED FLOOR-TO-WOOD-SILL CONNECTION



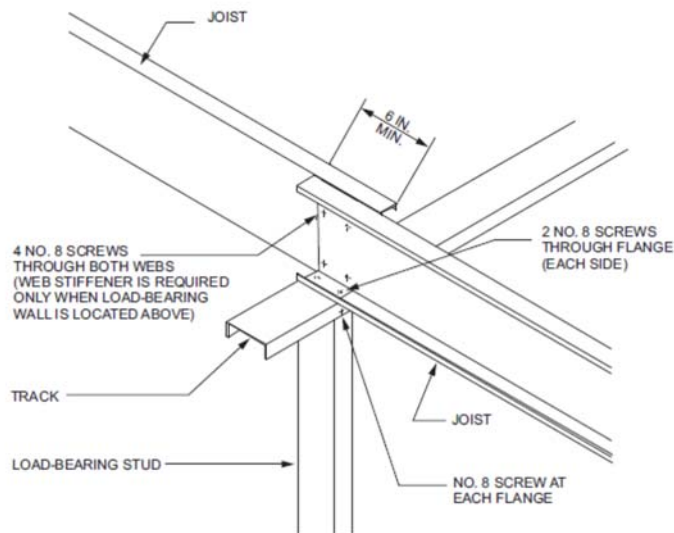
For SI: 1 mil = 0.0254 mm.

FIGURE 505.3.1(6)
CANTILEVERED FLOOR TO EXTERIOR LOAD-BEARING WALL CONNECTION



For SI: 1 mil = 0.0254 mm, 1 inch = 25.4 mm.

FIGURE 505.3.1(7)
CONTINUOUS SPAN JOIST SUPPORTED ON INTERIOR LOAD-BEARING WALL



For SI: 1 inch = 25.4 mm.

FIGURE 505.3.1(8)
LAPPED JOISTS SUPPORTED ON INTERIOR LOAD-BEARING WALL

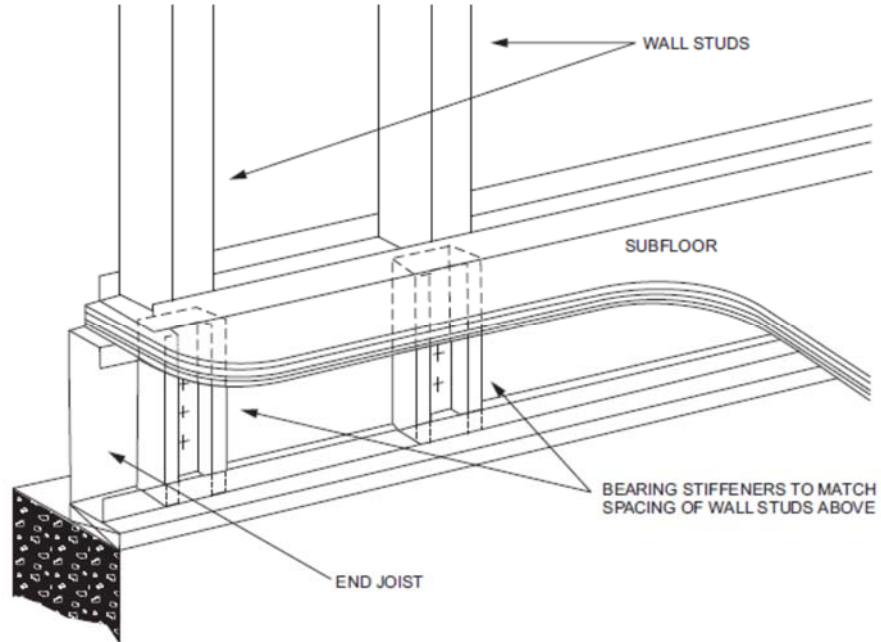


FIGURE 505.3.1(9)
BEARING STIFFENERS FOR END JOISTS

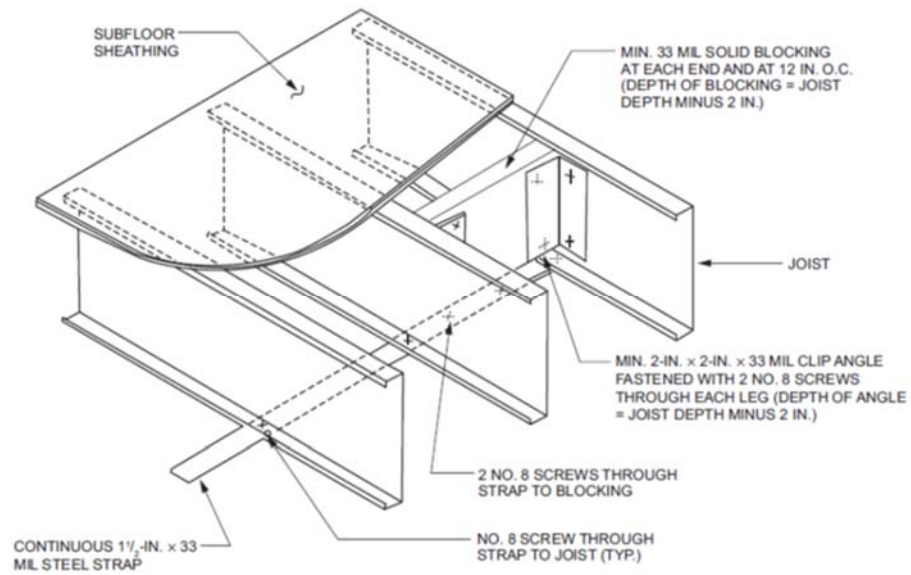
505.3.2 Minimum floor joist sizes. Floor joist size and thickness shall be determined in accordance with the limits set forth in Table 505.3.2 for single or continuous spans. Where continuous joist members are used, the interior bearing supports shall be located within 2 feet (610 mm) of mid-span of the cold-formed steel joists, and the individual spans shall not exceed the spans in Table 505.3.2. Floor joists shall have a bearing support length of not less than 1½ inches (38 mm) for exterior wall supports and 3½ inches (89 mm) for interior wall supports. Tracks shall be not less than 33 mils (0.84 mm) thick except where used as part of a floor header or trimmer in accordance with Section 505.3.8. Bearing stiffeners shall be installed in accordance with Section 505.3.4.

505.3.3 Joist bracing and blocking. Joist bracing and blocking shall be in accordance with this section.

505.3.3.1 Joist top flange bracing. The top flanges of cold-formed steel joists shall be laterally braced by the application of floor sheathing fastened to the joists in accordance with Section 505.2.5 and Table 505.3.1(2).

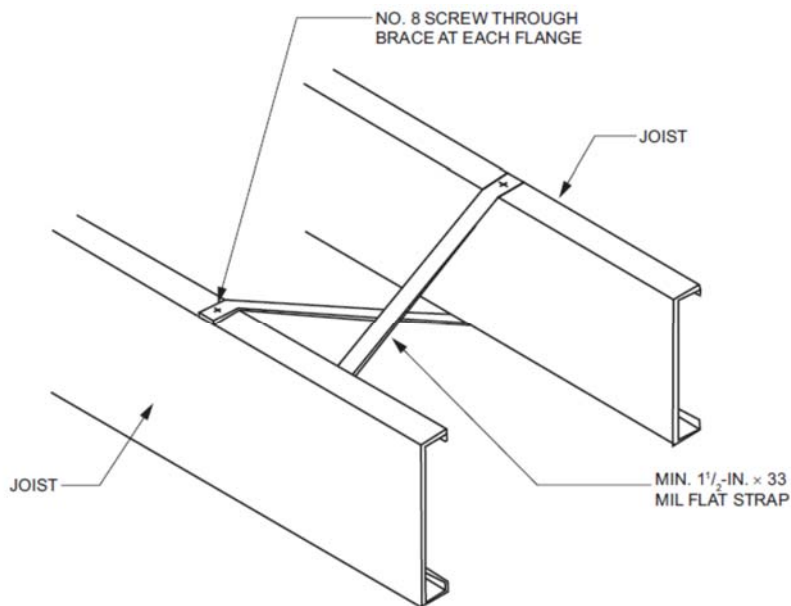
505.3.3.2 Joist bottom flange bracing/blocking. Floor joists with spans that exceed 12 feet (3658 mm) shall have the bottom flanges laterally braced in accordance with one of the following:

1. Gypsum board installed with minimum No. 6 screws in accordance with Section 702.
2. Continuous steel straps installed in accordance with Figure 505.3.3.2(1). Steel straps shall be spaced at not greater than 12 feet (3658 mm) on center and shall be not less than 1½ inches (38 mm) in width and 33 mils (0.84 mm) in thickness. Straps shall be fastened to the bottom flange of each joist with one No. 8 screw, fastened to blocking with two No. 8 screws, and fastened at each end (of strap) with two No. 8 screws. Blocking in accordance with Figure 505.3.3.2(1) or 505.3.3.2(2) shall be installed between joists at each end of the continuous strapping and at a maximum spacing of 12 feet (3658 mm) measured along the continuous strapping (perpendicular to the joist run). Blocking shall also be located at the termination of all straps. As an alternative to blocking at the ends, anchoring the strap to a stable building component with two No. 8 screws shall be permitted.



For SI: 1 mil = 0.0254, 1 inch = 25.4 mm.

FIGURE 505.3.3.2(1)
JOIST BLOCKING (SOLID)



For SI: 1 mil = 0.0254, 1 inch = 25.4 mm.

FIGURE 505.3.3.2(2)
JOIST BLOCKING (STRAP)

TABLE 505.3.2
ALLOWABLE SPANS FOR COLD-FORMED STEEL JOISTS—
SINGLE OR CONTINUOUS SPANS a, b, c, d, e, f

JOIST DESIGNATION	30 PSF LIVE LOAD				40 PSF LIVE LOAD			
	Spacing (inches)				Spacing (inches)			
	12	16	19.2	24	12	16	19.2	24
550S162-33	11'-8"	10'-4"	9'-5"	8'-5"	10'-7"	9'-2"	8'-5"	7'-6"
550S162-43	12'-8"	11'-6"	10'-8"	10'-5"	11'-6"	10'-4"	9'-10"	9'-3"
550S162-54	13'-7"	12'-4"	11'-7"	10'-9"	12'-4"	11'-3"	10'-7"	9'-10"
550S162-68	14'-7"	13'-3"	12'-6"	11'-7"	13'-3"	12'-0"	11'-4"	10'-6"
800S162-33	14'-6"	12'-6"	11'-5"	10'-3"	12'-10"	11'-1"	10'-2"	9'-1"
800S162-43	17'-0"	15'-1"	13'-9"	12'-4"	15'-5"	13'-5"	12'-3"	10'-11"
800S162-54	18'-3"	16'-7"	15'-8"	14'-6"	16'-7"	15'-1"	14'-2"	13'-2"
800S162-68	19'-9"	17'-11"	16'-11"	15'-8"	17'-11"	16'-3"	15'-4"	14'-3"
1000S162-43	19'-4"	16'-9"	15'-3"	13'-8"	17'-2"	14'-10"	13'-7"	12'-2"
1000S162-54	21'-9"	19'-9"	18'-7"	17'-3"	19'-9"	18'-0"	16'-11"	15'-8"
1000S162-68	23'-7"	21'-5"	20'-2"	18'-9"	21'-5"	19'-6"	18'-4"	17'-0"
1200S162-54	25'-1"	22'-10"	21'-6"	19'-9"	22'-10"	20'-9"	19'-6"	17'-6"
1200S162-68	27'-3"	24'-9"	23'-4"	21'-8"	24'-9"	22'-6"	21'-2"	19'-8"

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa, 1 mil = 0.0254 mm.

- a. Deflection criteria: $L/480$ for live loads, $L/240$ for total loads.
- b. Floor dead load = 10 psf.
- c. Table provides the maximum clear span in feet and inches.
- d. Bearing stiffeners are to be installed at all support points and concentrated loads.
- e. Minimum Grade 33 ksi steel shall be used for 33 mil and 43 mil thickness. Minimum Grade 50 ksi steel shall be used for 54 and 68 mil thickness.
- f. Table 505.3.2 is not applicable for 800S162-33 and 1000S162-43 continuous joist members.

505.3.3.3 Blocking at interior bearing supports. Blocking is not required for continuous back-to-back floor joists at bearing supports. Blocking shall be installed between every other joist for single continuous floor joists across bearing supports in accordance with Figure 505.3.1(7). Blocking shall consist of C-shaped or track section with a minimum thickness of 33 mils (0.84 mm). Blocking shall be fastened to each adjacent joist through a 33-mil (0.84 mm) clip angle, bent web of blocking or flanges of web stiffeners with two No. 8 screws on each side. The minimum depth of the blocking shall be equal to the depth of the joist minus 2 -inches (51 mm). The minimum length of the angle shall be equal to the depth of the joist minus 2 -inches (51 mm).

505.3.3.4 Blocking at cantilevers. Blocking shall be installed between every other joist over cantilever bearing supports in accordance with Figure 505.3.1(4), 505.3.1(5) or 505.3.1(6). Blocking shall consist of C-shaped or track section with minimum thickness of 33 mils (0.84 mm). Blocking shall

be fastened to each adjacent joist through bent web of blocking, 33 mil clip angle or flange of web stiffener with two No. 8 screws at each end. The depth of the blocking shall be equal to the depth of the joist. The minimum length of the angle shall be equal to the depth of the joist minus 2 -inches (51 mm). Blocking shall be fastened through the floor sheathing and to the support with three No. 8 screws (top and bottom).

505.3.4 Bearing stiffeners. Bearing stiffeners shall be installed at each joist bearing location in accordance with this section, except for joists lapped over an interior support not carrying a load-bearing wall above. Floor joists supporting jamb studs with multiple members shall have two bearing stiffeners in accordance with Figure 505.3.4(1). Bearing stiffeners shall be fabricated from a C-shaped, track or clip angle member in accordance with the one of following:

1. C-shaped bearing stiffeners:
 - 1.1. Where the joist is not carrying a load-bearing wall above, the bearing stiffener shall be a minimum 33 mil (0.84 mm) thickness.
 - 1.2. Where the joist is carrying a load-bearing wall above, the bearing stiffener shall be not less than the same designation thickness as the wall stud above.
2. Track bearing stiffeners:
 - 2.1. Where the joist is not carrying a load-bearing wall above, the bearing stiffener shall be a minimum 43 mil (1.09 mm) thickness.
 - 2.2. Where the joist is carrying a load-bearing wall above, the bearing stiffener shall be not less than one designation thickness greater than the wall stud above.

The minimum length of a bearing stiffener shall be the depth of member being stiffened minus $\frac{3}{8}$ -inch (9.5 mm). Each bearing stiffener shall be fastened to the web of the member it is stiffening as shown in Figure 505.3.4(2).

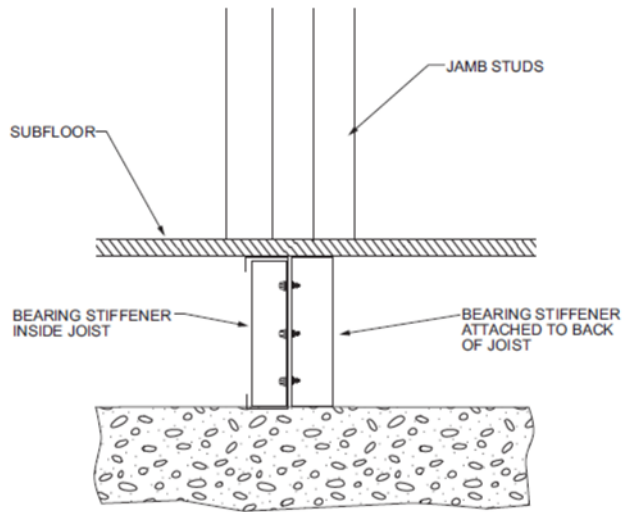
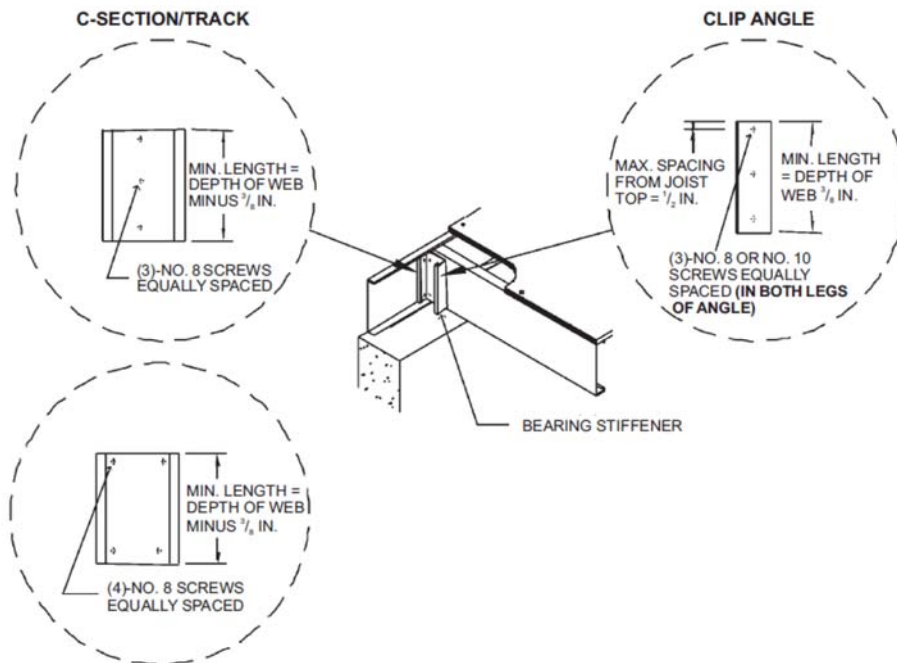


FIGURE 505.3.4(1)
BEARING STIFFENERS UNDER JAMB STUDS



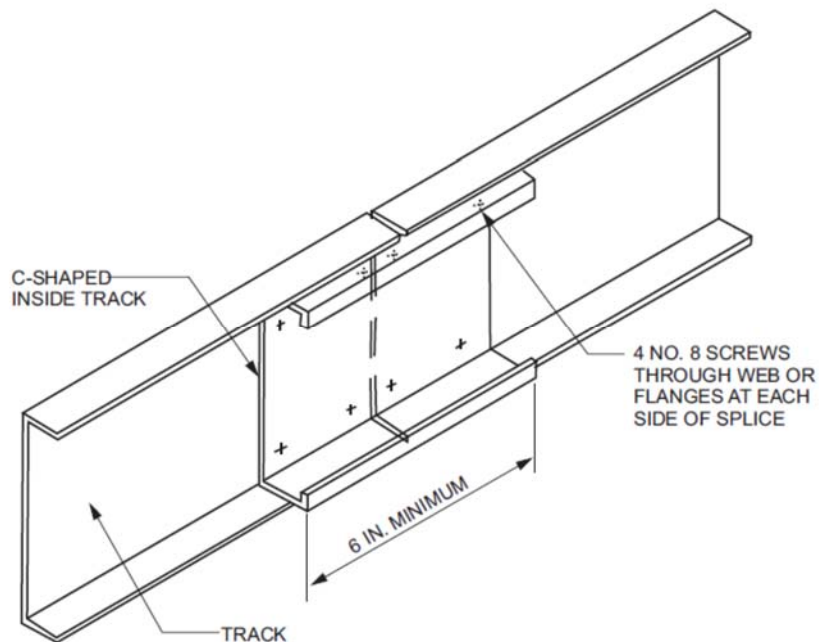
For SI: 1 inch = 25.4 mm.

FIGURE 505.3.4(2)
BEARING STIFFENER

505.3.5 Cutting and notching. Flanges and lips of load-bearing cold-formed steel floor framing members shall not be cut or notched.

505.3.6 Floor cantilevers. Floor cantilevers for the top floor of a two- or three-story building or the first floor of a one-story building shall not exceed 24 inches (610 mm). Cantilevers, not exceeding 24 inches (610 mm) and supporting two stories and roof (first floor of a two-story building), shall be permitted provided that all cantilevered joists are doubled (nested or back-to-back). The doubled cantilevered joists shall extend not less than 6 feet (1829 mm) toward the inside and shall be fastened with not less than two No. 8 screws spaced at 24 inches (610 mm) on center through the webs (for back-to-back) or flanges (for nested joists).

505.3.7 Splicing. Joists and other structural members shall not be spliced without an approved design. Splicing of tracks shall conform to Figure 505.3.7.



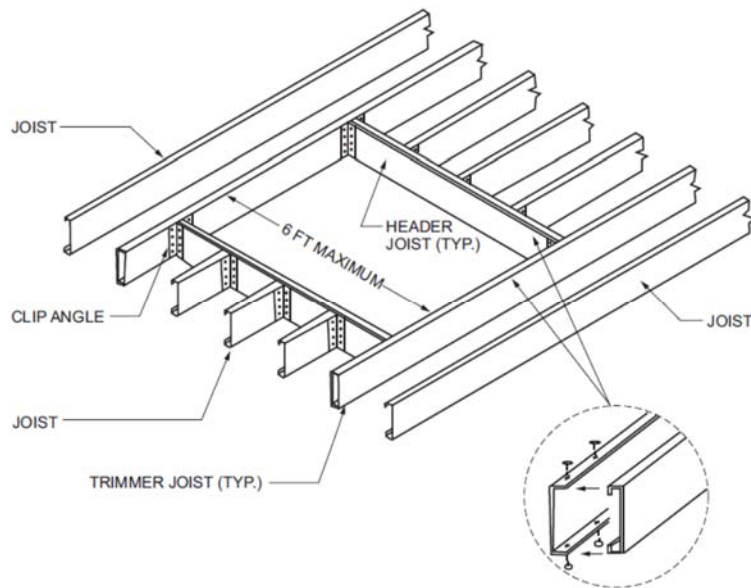
For SI: 1 inch = 25.4 mm.

FIGURE 505.3.7
TRACK SPLICE

505.3.8 Framing of floor openings. Openings in floors shall be framed with

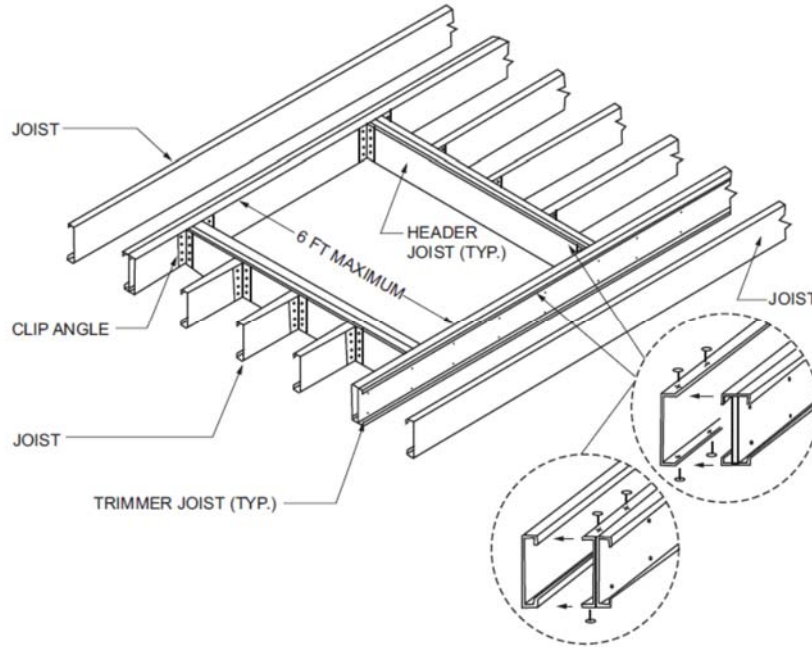
header and trimmer joists. Header joist spans shall not exceed 6 feet (1829 mm) or 8 feet (2438 mm) in length in accordance with Figure 505.3.8(1) or 505.3.8(2), respectively. Header and trimmer joists shall be fabricated from joist and track members, having a minimum size and thickness at least equivalent to the adjacent floor joists, and shall be installed in accordance with Figures 505.3.8(1), 505.3.8(2), 505.3.8(3) and 505.3.8(4).

Each header joist shall be connected to trimmer joists with four 2 -inch by 2 -inch (51-mm by 51-mm) clip angles. Each clip angle shall be fastened to both the header and trimmer joists with four No. 8 screws, evenly spaced, through each leg of the clip angle. The clip angles shall have a thickness not less than that of the floor joist. Each track section for a built-up header or trimmer joist shall extend the full length of the joist (continuous).



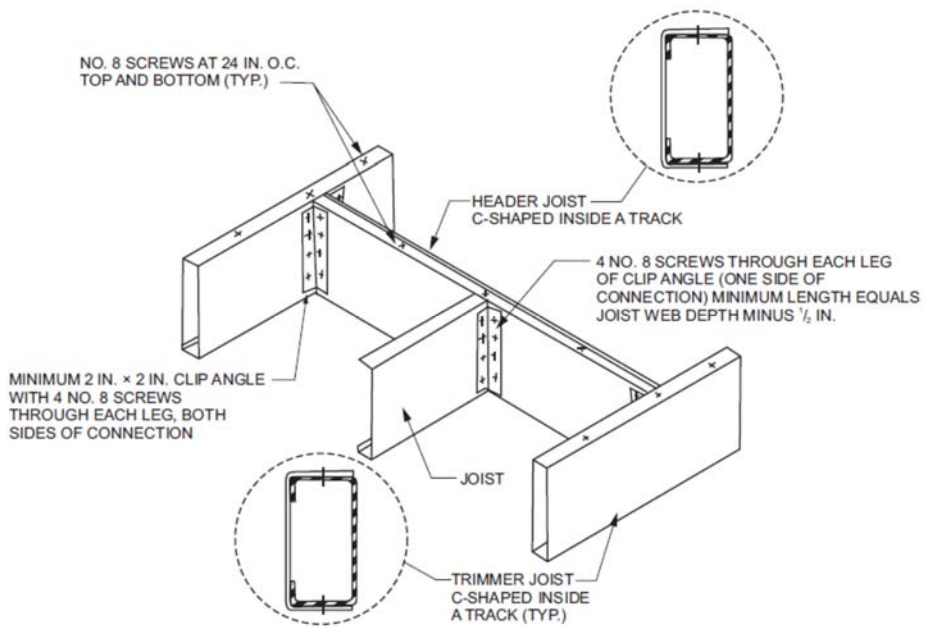
For SI: 1 foot = 304.8 mm.

FIGURE 505.3.8(1)
COLD-FORMED STEEL FLOOR CONSTRUCTION—
6-FOOT FLOOR OPENING



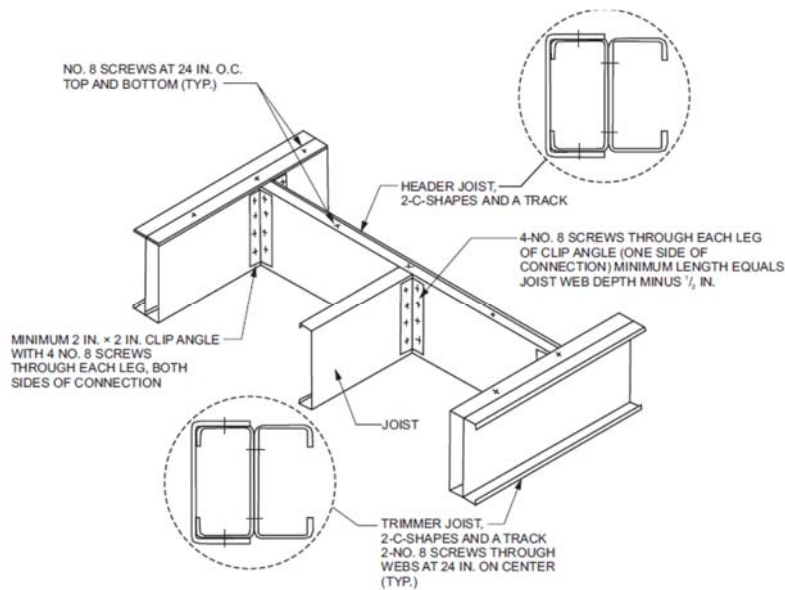
For SI: 1 foot = 304.8 mm.

FIGURE 505.3.8(2)
COLD-FORMED STEEL FLOOR CONSTRUCTION—
8-FOOT FLOOR OPENING



For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

FIGURE 505.3.8(3)
COLD-FORMED STEEL FLOOR CONSTRUCTION:
FLOOR HEADER TO TRIMMER CONNECTION—
6-FOOT OPENING



For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

FIGURE 505.3.8(4)
COLD-FORMED STEEL FLOOR CONSTRUCTION:
FLOOR HEADER TO TRIMMER CONNECTION—8-FOOT OPENING

SECTION 506
CONCRETE FLOORS (ON GROUND)

506.1 General. Concrete slab-on-ground floors shall be designed and constructed in accordance with the provisions of this section or ACI 332. Floors shall be a minimum 3¹/₂ -inches (89 mm) thick (for expansive soils, see Section 403.1.8). The specified compressive strength of concrete shall be as set forth in Section 402.2.

506.2 Site preparation. The area within the foundation walls shall have all vegetation, top soil and foreign material removed.

506.2.1 Fill. Fill material shall be free of vegetation and foreign material. The fill shall be compacted to ensure uniform support of the slab, and except where approved, the fill depths shall not exceed 24 inches (610 mm) for clean sand or gravel and 8 inches (203 mm) for earth.

Exception: *Fills constructed of controlled low-strength material (CLSM) need not be compacted.*

506.2.2 Base. A 4-inch-thick (102 mm) base course consisting of clean graded sand, gravel, crushed stone, crushed concrete or crushed blast-furnace slag passing a 2 -inch (51 mm) sieve shall be placed on the prepared subgrade where the slab is below grade.

Exception: A base course is not required where the concrete slab is installed on well-drained or sand-gravel mixture soils classified as Group I according to the United Soil Classification System in accordance with Table 405.1.

506.2.3 Vapor retarder. A 6-mil (0.006 inch; 152 μ m) polyethylene or approved vapor retarder with joints lapped not less than 6 inches (152 mm) shall be placed between the concrete floor slab and the base course or the prepared subgrade where a base course does not exist.

Exception: The vapor retarder is not required for the following:

1. Detached garages, utility buildings and other unheated accessory structures.
2. For unheated storage rooms having an area of less than 70 square feet (6.5 m²) and carports.
3. Driveways, walks, patios and other flatwork not likely to be enclosed and heated at a later date.
4. Where approved by the building official, based on local site conditions.

506.2.4 Reinforcement support. Where provided in slabs-on-ground, reinforcement shall be supported to remain in place from the center to upper one-third of the slab for the duration of the concrete placement.

SECTION 507 **EXTERIOR DECKS**

507.1 Decks. Wood-framed decks shall be in accordance with this section. For decks using materials and conditions not prescribed in this section, refer to Section 301.

507.2 Materials. Materials used for the construction of decks shall comply with this section.

507.2.1 Wood materials. Wood materials shall be No. 2 grade or better lumber, preservative-treated in accordance with Section 317, or approved, naturally durable lumber, and termite protected where required in accordance with Section 318. Where design in accordance with Section 301 is provided, wood structural members shall be designed using the wet service factor defined in AWC NDS. Cuts, notches and drilled holes of preservative-treated wood members shall be treated in accordance with Section 317.1.1. All preservative-treated wood products in contact with the ground shall be labeled for such usage.

507.2.1.1 Engineered wood products. Engineered wood products shall be in accordance with Section 502.

507.2.2 Plastic composite deck boards, stair treads, guards, or handrails. Plastic composite exterior deck boards, stair treads, guards and handrails shall comply with the requirements of ASTM D7032 and this section.

507.2.2.1 Labeling. Plastic composite deck boards and stair treads, or their packaging, shall bear a label that indicates compliance with ASTM D7032 and includes the allowable load and maximum allowable span determined in accordance with ASTM D7032. Plastic or composite handrails and guards, or their packaging, shall bear a label that indicates compliance with ASTM D7032 and includes the maximum allowable span determined in accordance with ASTM D7032.

507.2.2.2 Flame spread index. Plastic composite deck boards, stair treads, guards, and handrails shall exhibit a flame spread index not exceeding 200 when tested in accordance with ASTM E84 or UL 723 with the test specimen remaining in place during the test.

Exception: Plastic composites determined to be noncombustible.

507.2.2.3 Decay resistance. Plastic composite deck boards, stair treads, guards and handrails containing wood, cellulosic or other biodegradable materials shall be decay resistant in accordance with ASTM D7032.

507.2.2.4 Termite resistance. Where required by Section 318, plastic composite deck boards, stair treads, guards and handrails containing wood, cellulosic or other biodegradable materials shall be termite resistant in accordance with ASTM D7032.

507.2.2.5 Installation of plastic composites. Plastic composite deck boards, stair treads, guards and handrails shall be installed in accordance with this code and the manufacturer’s instructions.

507.2.3 Fasteners and connectors. Metal fasteners and connectors used for all decks shall be in accordance with Section 317.3 and Table 507.2.3.

**TABLE 507.2.3
FASTENER AND CONNECTOR SPECIFICATIONS FOR DECKS^{a, b}**

<u>ITEM</u>	<u>MATERIAL</u>	<u>MINIMUM FINISH/COATING</u>	<u>ALTERNATE FINISH/COATING^c</u>
<u>Nails and timber rivets</u>	<u>In accordance with ASTM F1667</u>	<u>Hot-dipped galvanized per ASTM A153</u>	<u>Stainless steel, silicon bronze or copper</u>
<u>Bolts^c Lag screws^d (including nuts and washers)</u>	<u>In accordance with ASTM A307 (bolts), ASTM A563 (nuts), ASTM F844 (washers)</u>	<u>Hot-dipped galvanized per ASTM A153, Class C (Class D for 3/8 -inch diameter and less) or mechanically galvanized per ASTM B695, Class 55 or 410 stainless steel</u>	<u>Stainless steel, silicon bronze or copper</u>
<u>Metal connectors</u>	<u>Per manufacturer’s specification</u>	<u>ASTM A653 type G185 zinc coated galvanized steel or post hot-dipped galvanized per ASTM A123 providing a minimum average coating weight of 2.0 oz./ft² (total both sides)</u>	<u>Stainless steel</u>

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

- a. Equivalent materials, coatings and finishes shall be permitted.
- b. Fasteners and connectors exposed to salt water or located within 300 feet of a salt water shoreline shall be stainless steel.
- c. Holes for bolts shall be drilled a minimum 1/32 -inch and a maximum 1/16 -inch larger than the bolt.
- d. Lag screws 1/2 -inch and larger shall be predrilled to avoid wood splitting per the National Design Specification (NDS) for Wood Construction.
- e. Stainless-steel-driven fasteners shall be in accordance with ASTM F1667.

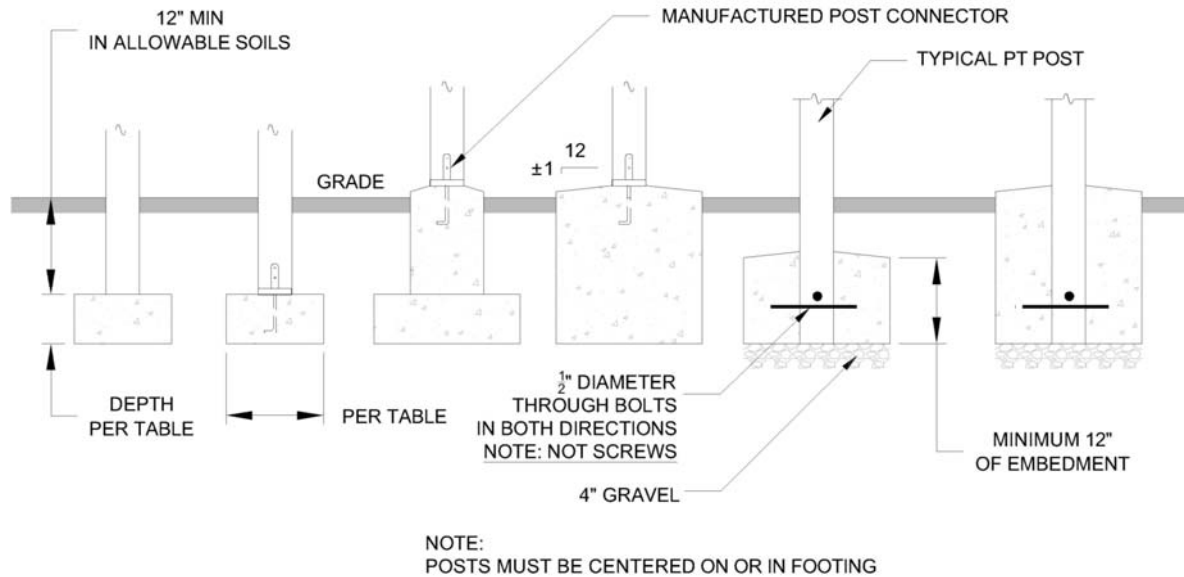
507.2.4 Flashing. Flashing shall be corrosion-resistant metal of nominal thickness not less than 0.019 inch (0.48 mm) or approved nonmetallic material that is compatible with the substrate of the structure and the decking materials.

507.2.5 Alternate materials. Alternative materials, including glass and metals, shall be permitted.

507.3 Footings. Decks shall be supported on concrete footings or other approved structural systems designed to accommodate all loads in accordance with Section 301. Deck footings shall be sized to carry the imposed loads from the deck structure to the ground as shown in Figure 507.3. The footing depth shall be in accordance with Section 403.1.4.

Exception: Free-standing decks consisting of joists directly supported on grade over their entire length.

507.3.1 Minimum size. The minimum size of concrete footings shall be in accordance with Table 507.3.1, based on the tributary area and allowable soil-bearing pressure in accordance with Table 401.4.1.



For SI: 1 inch = 25.4 mm.

FIGURE 507.3
DECK POSTS TO DECK FOOTING CONNECTION

**TABLE 507.3.1
MINIMUM FOOTING SIZE FOR DECKS**

LIVE OR GROUND SNOW LOAD ^b (psf)	TRIBUTARY AREA (sq. ft.)	LOAD BEARING VALUE OF SOILS ^{a, c, d} (psf)											
		1500 ^a			2000 ^a			2500 ^a			≥3000 ^a		
		Side of a square footing (inches)	Diameter of a round footing (inches)	Thickness (inches)	Side of a square footing (inches)	Diameter of a round footing (inches)	Thickness (inches)	Side of a square footing (inches)	Diameter of a round footing (inches)	Thickness (inches)	Side of a square footing (inches)	Diameter of a round footing (inches)	Thickness (inches)
40	20	12	14	6	12	14	6	12	14	6	12	14	6
	40	14	16	6	12	14	6	12	14	6	12	14	6
	60	17	19	6	15	17	6	13	15	6	12	14	6
	80	20	22	7	17	19	6	15	17	6	14	16	6
	100	22	25	8	19	21	6	17	19	6	15	17	6
	120	24	27	9	21	23	7	19	21	6	17	19	6
	140	26	29	10	22	25	8	20	23	7	18	21	6
160	28	31	11	24	27	9	21	24	8	20	22	7	
50	20	12	14	6	12	14	6	12	14	6	12	14	6
	40	15	17	6	13	15	6	12	14	6	12	14	6
	60	19	21	6	16	18	6	14	16	6	13	15	6
	80	21	24	8	19	21	6	17	19	6	15	17	6
	100	24	27	9	21	23	7	19	21	6	17	19	6
	120	26	30	10	23	26	8	20	23	7	19	21	6
	140	28	32	11	25	28	9	22	25	8	20	23	7
160	30	34	12	26	30	10	24	27	9	21	24	8	
60	20	12	14	6	12	14	6	12	14	6	12	14	6
	40	16	19	6	14	16	6	13	14	6	12	14	6
	60	20	23	7	17	20	6	16	18	6	14	16	6
	80	23	26	9	20	23	7	18	20	6	16	19	6
	100	26	29	10	22	25	8	20	23	7	18	21	6
	120	28	32	11	25	28	9	22	25	8	20	23	7
	140	31	35	12	27	30	10	24	27	9	22	24	8
160	33	37	13	28	32	11	25	29	10	23	26	9	
70	20	12	14	6	12	14	6	12	14	6	12	14	6
	40	18	20	6	15	17	6	14	15	6	12	14	6
	60	21	24	8	19	21	6	17	19	6	15	17	6
	80	25	28	9	21	24	8	19	22	7	18	20	6
	100	28	31	11	24	27	9	21	24	8	20	22	7
	120	30	34	12	26	30	10	24	27	9	21	24	8
	140	33	37	13	28	32	11	25	29	10	23	26	9
160	35	40	15	30	34	12	27	31	11	25	28	9	

For SI: 1 inch = 25.4 mm, 1 square foot = 0.0929 m², 1 pound per square foot = 0.0479 kPa.

- a. Interpolation permitted, extrapolation not permitted.
- b. Based on highest load case: Dead + Live or Dead + Snow.
- c. Assumes minimum square footing to be 12 inches x 12 inches x 6 inches for 6 x 6 post.
- d. If the support is a brick or CMU pier, the footing shall have a minimum 2-inch projection on all sides.
- e. Area, in square feet, of deck surface supported by post and footings.

507.3.2 Minimum depth. Deck footings shall extend below the frost line specified in Table 301.2(1) in accordance with Section 403.1.4.1.

Exceptions:

1. Free-standing decks that meet all of the following criteria:
 - 1.1. The joists bear directly on precast concrete pier blocks at grade without support by beams or posts.
 - 1.2. The area of the deck does not exceed 200 square feet (18.9 m²).
 - 1.3. The walking surface is not more than 20 inches (616 mm) above grade at any point within 36 inches (914 mm) measured horizontally from the edge.
2. Free-standing decks need not be provided with footings that extend below the frost line.

507.4 Deck posts. For single-level wood-framed decks with beams sized in accordance with Table 507.5, deck post size shall be in accordance with Table 507.4.

**TABLE 507.4
DECK POST HEIGHT ^a**

<u>DECK POST SIZE</u>	<u>MAXIMUM HEIGHT ^{a, b} (feet-inches)</u>
<u>4 x 4</u>	<u>6-9 ^c</u>
<u>4 x 6</u>	<u>8</u>
<u>6 x 6</u>	<u>14</u>
<u>8 x 8</u>	<u>14</u>

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

1 pound per square foot = 0.0479 kPa.

- a. Measured to the underside of the beam.
- b. Based on 40 psf live load.
- c. The maximum permitted height is 8 feet for one-ply and two-ply beams. The maximum permitted height for three-ply beams on post cap is 6 feet 9 inches.

507.4.1 Deck post to deck footing connection. Where posts bear on concrete footings in accordance with Section 403 and Figure 507.4.1, lateral restraint shall be provided by manufactured connectors or a minimum post embedment of 12 inches (305 mm) in surrounding soils or concrete piers. Other footing systems shall be permitted.

Exception: Where expansive, compressible, shifting or other questionable soils are present, surrounding soils shall not be relied on for lateral support.

507.5 Deck Beams. Maximum allowable spans for wood deck beams, as shown in Figure 507.5, shall be in accordance with Table 507.5. Beam plies shall be fastened with two rows of 10d (3-inch x 0.128-inch) nails minimum at 16 inches (406 mm) on center along each edge. Beams shall be permitted to cantilever at each end up to one-fourth of the allowable beam span. Deck beams of other materials shall be permitted where designed in accordance with accepted engineering practices.

TABLE 507.5
DECK BEAM SPAN LENGTHS^{a, b, g} (feet - inches)

SPECIES ^c	SIZE ^d	DECK JOIST SPAN LESS THAN OR EQUAL TO:						
		(feet)						
		6	8	10	12	14	16	18
Southern pine	1-2 x 6	4-11	4-0	3-7	3-3	3-0	2-10	2-8
	1-2 x 8	5-11	5-1	4-7	4-2	2-10	3-7	3-5
	1-2 x 10	7-0	6-0	5-5	4-11	4-7	4-3	4-0
	1-2 x 12	8-3	7-1	6-4	5-10	5-5	5-0	4-9
	2-2 x 6	6-11	5-11	5-4	4-10	4-6	4-3	4-0
	2-2 x 8	8-9	7-7	6-9	6-2	5-9	5-4	5-0
	2-2 x 10	10-4	9-0	8-0	7-4	6-9	6-4	6-0
	2-2 x 12	12-2	10-7	9-5	8-7	8-0	7-6	7-0
	3-2 x 6	8-2	7-5	6-8	6-1	5-8	5-3	5-0
	3-2 x 8	10-10	9-6	8-6	7-9	7-2	6-8	6-4
	3-2 x 10	13-0	11-3	10-0	9-2	8-6	7-11	7-6
3-2 x 12	15-3	13-3	11-10	10-9	10-0	9-4	8-10	
Douglas fir-larch ^e , hem-fir ^e , spruce-pine-fir ^e , redwood, western cedars, ponderosa pine ^f , red pine ^f	3 x 6 or 2-2 x 6	5-5	4-8	4-2	3-10	3-6	3-1	2-9
	3 x 8 or 2-2 x 8	6-10	5-11	5-4	4-10	4-6	4-1	3-8
	3 x 10 or 2-2 x 10	8-4	7-3	6-6	5-11	5-6	5-1	4-8
	3 x 12 or 2-2 x 12	9-8	8-5	7-6	6-10	6-4	5-11	5-7
	4 x 6	6-5	5-6	4-11	4-6	4-2	3-11	3-8
	4 x 8	8-5	7-3	6-6	5-11	5-6	5-2	4-10
	4 x 10	9-11	8-7	7-8	7-0	6-6	6-1	5-8
	4 x 12	11-5	9-11	8-10	8-1	7-6	7-0	6-7
	3-2 x 6	7-4	6-8	6-0	5-6	5-1	4-9	4-6
	3-2 x 8	9-8	8-6	7-7	6-11	6-5	6-0	5-8
	3-2 x 10	12-0	10-5	9-4	8-6	7-10	7-4	6-11
	3-2 x 12	13-11	12-1	10-9	9-10	9-1	8-6	8-1

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa, 1 pound = 0.454 kg.

- a. Ground snow load, live load = 40 psf, dead load = 10 psf, L/A = 360 at main span, L/A = 180 at cantilever with a 220-pound point load applied at the end.
- b. Beams supporting deck joists from one side only.
- c. No. 2 grade, wet service factor.
- d. Beam depth shall be greater than or equal to depth of joists with a flush beam condition.
- e. Includes incising factor.
- f. Northern species. Incising factor not included.
- g. Beam cantilevers are limited to the adjacent beam's span divided by 4.

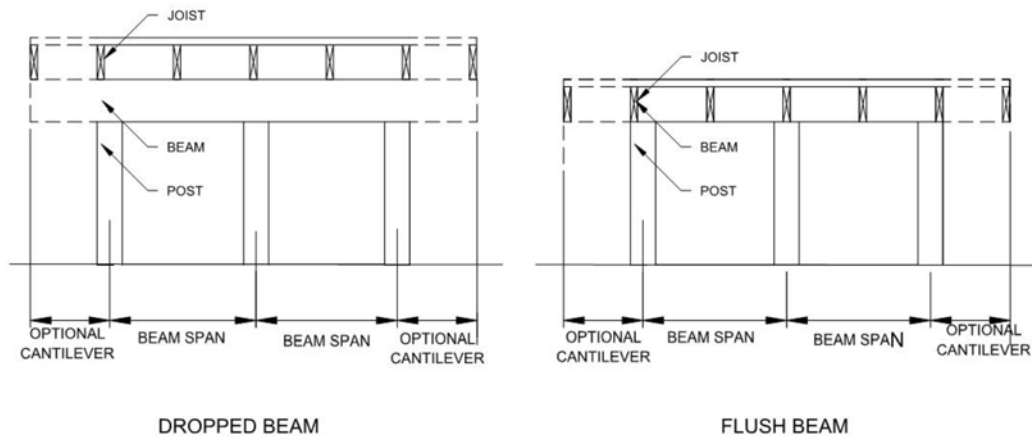
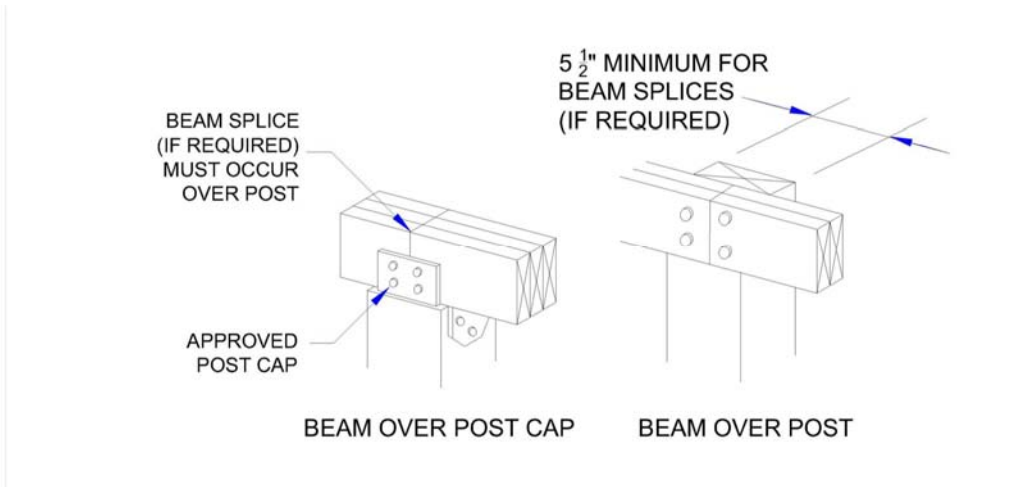


FIGURE 507.5
TYPICAL DECK JOIST SPANS

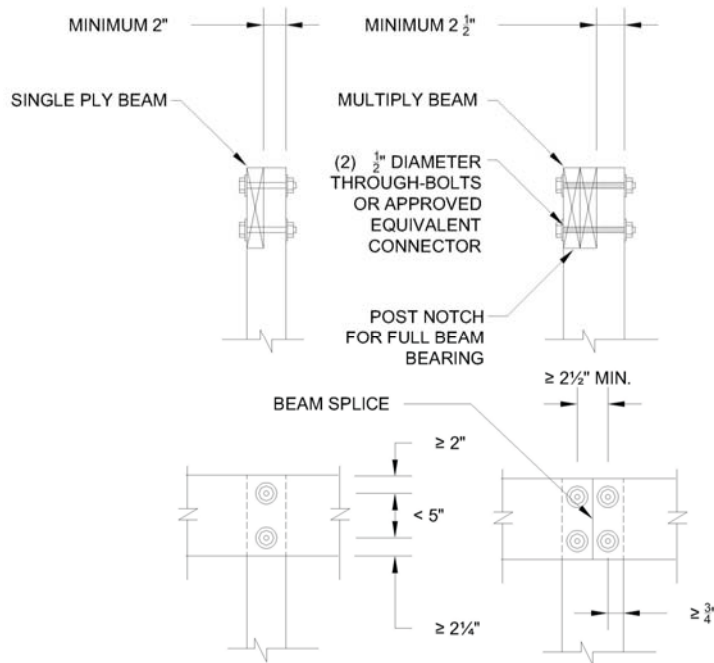
507.5.1 Deck beam bearing. The ends of beams shall have not less than 1½ - inches (38 mm) of bearing on wood or metal and not less than 3 -inches (76 mm) of bearing on concrete or masonry for the entire width of the beam. Where multiple-span beams bear on intermediate posts, each ply must have full bearing on the post in accordance with Figures 507.5.1(1) and 507.5.1(2).

507.5.2 Deck beam connection to supports. Deck beams shall be attached to supports in a manner capable of transferring vertical loads and resisting horizontal displacement. Deck beam connections to wood posts shall be in accordance with Figures 507.5.1(1) and 507.5.1(2). Manufactured post-to-beam connectors shall be sized for the post and beam sizes. Bolts shall have washers under the head and nut.



For SI: 1 inch = 25.4 mm.

FIGURE 507.5.1(1)
DECK BEAM TO DECK POST



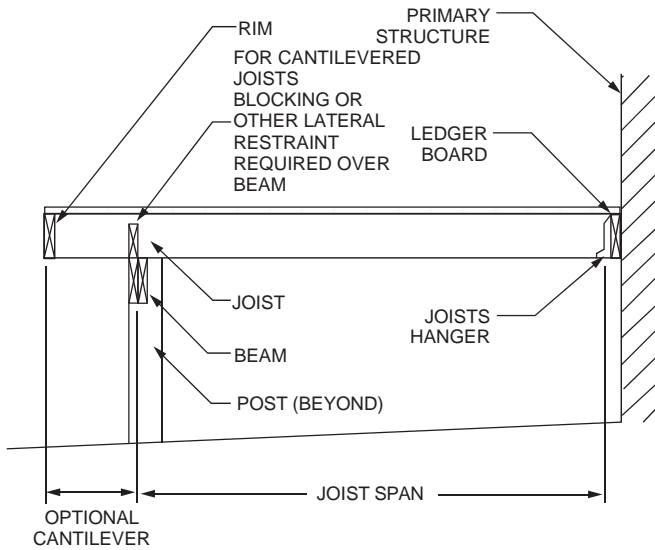
For SI: 1 inch = 25.4 mm.

FIGURE 507.5.1(2)
NOTCHED POST-TO-BEAM CONNECTION

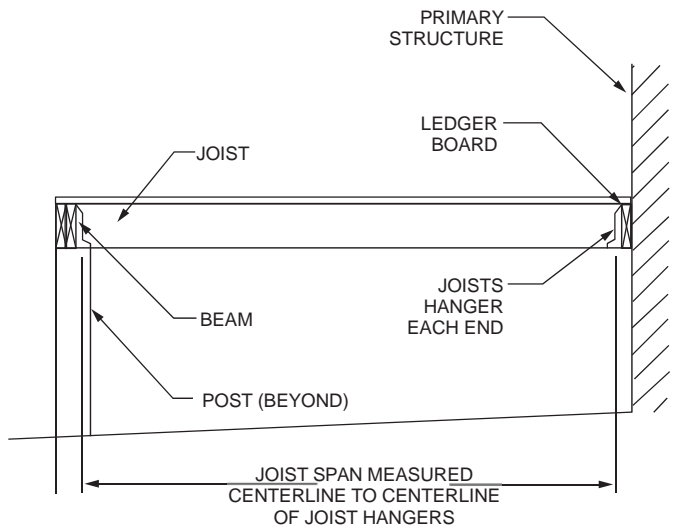
507.6 Deck joists. Maximum allowable spans for wood deck joists, as shown in Figure 507.6, shall be in accordance with Table 507.6. The maximum joist spacing shall be limited by the decking materials in accordance with Table 507.7. The maximum joist cantilever shall be limited to one-fourth of the joist span or the maximum cantilever length specified in Table 507.6, whichever is less.

507.6.1 Deck joist bearing. The ends of joists shall have not less than 1¹/₂ - inches (38 mm) of bearing on wood or metal and not less than 3 -inches (76 mm) of bearing on concrete or masonry over its entire width. Joists bearing on top of a multiple-ply beam or ledger shall be fastened in accordance with Table 602.3(1). Joists bearing on top of a single-ply beam or ledger shall be attached by a mechanical connector. Joist framing into the side of a beam or ledger board shall be supported by approved joist hangers.

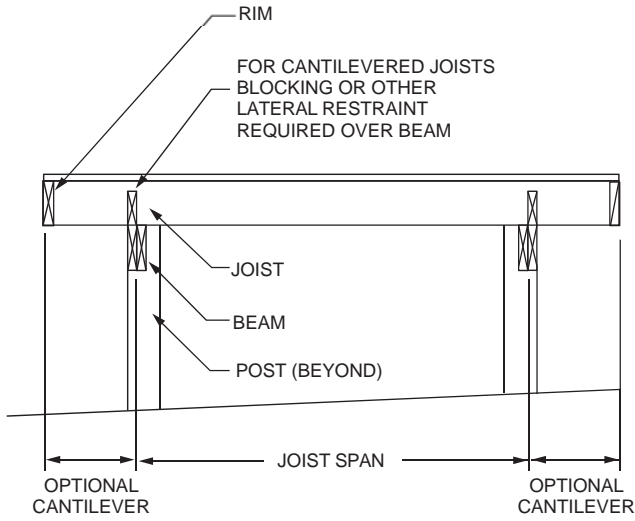
507.6.2 Deck joist lateral restraint. Joist ends and bearing locations shall be provided with lateral resistance to prevent rotation. Where lateral restraint is provided by joist hangers or blocking between joists, their depth shall equal not less than 60 percent of the joist depth. Where lateral restraint is provided by rim joists, they shall be secured to the end of each joist with not fewer than three 10d (3-inch by 0.128-inch) (76 mm by 3.3 mm) nails or three No. 10 x 3-inch (76 mm) long wood screws.



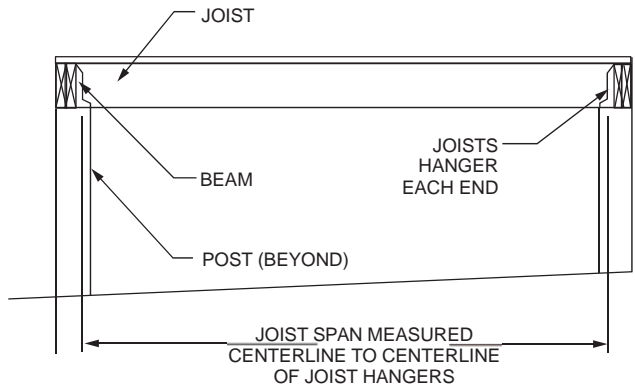
CANTILEVERED JOISTS WITH DROPPED BEAM



JOISTS WITH FLUSH BEAM



JOISTS ON FREE-STANDING DECK WITH DROPPED BEAM



JOISTS ON FREE-STANDING DECK WITH FLUSH BEAM

FIGURE 507.6
TYPICAL DECK JOIST SPANS



**TABLE 507.6
DECK JOIST SPANS FOR COMMON LUMBER SPECIES (ft. - in.)**

SPECIES ^a	SIZE	ALLOWABLE JOIST SPAN ^b			MAXIMUM CANTILEVER ^{c, f}		
		SPACING OF DECK JOISTS (inches)			SPACING OF DECK JOISTS WITH CANTILEVERS ^c (inches)		
		<u>12</u>	<u>16</u>	<u>24</u>	<u>12</u>	<u>16</u>	<u>24</u>
Southern pine	2 x 6	<u>9-11</u>	<u>9-0</u>	<u>7-7</u>	<u>1-3</u>	<u>1-4</u>	<u>1-6</u>
	2 x 8	<u>13-1</u>	<u>11-10</u>	<u>9-8</u>	<u>2-1</u>	<u>2-3</u>	<u>2-5</u>
	2 x 10	<u>16-2</u>	<u>14-0</u>	<u>11-5</u>	<u>3-4</u>	<u>3-6</u>	<u>2-10</u>
	2 x 12	<u>18-0</u>	<u>16-6</u>	<u>13-6</u>	<u>4-6</u>	<u>4-2</u>	<u>3-4</u>
Douglas fir-larch ^d , hem-fir ^d , spruce-pine-fir ^d	2 x 6	<u>9-6</u>	<u>8-8</u>	<u>7-2</u>	<u>1-2</u>	<u>1-3</u>	<u>1-5</u>
	2 x 8	<u>12-6</u>	<u>11-1</u>	<u>9-1</u>	<u>1-11</u>	<u>2-1</u>	<u>2-3</u>
	2 x 10	<u>15-8</u>	<u>13-7</u>	<u>11-1</u>	<u>3-1</u>	<u>3-5</u>	<u>2-9</u>
	2 x 12	<u>18-0</u>	<u>15-9</u>	<u>12-10</u>	<u>4-6</u>	<u>3-11</u>	<u>3-3</u>
Redwood, western cedars, ponderosa pine ^e , red pine ^e	2 x 6	<u>8-10</u>	<u>8-0</u>	<u>7-0</u>	<u>1-0</u>	<u>1-1</u>	<u>1-2</u>
	2 x 8	<u>11-8</u>	<u>10-7</u>	<u>8-8</u>	<u>1-8</u>	<u>1-10</u>	<u>2-0</u>
	2 x 10	<u>14-11</u>	<u>13-0</u>	<u>10-7</u>	<u>2-8</u>	<u>2-10</u>	<u>2-8</u>
	2 x 12	<u>17-5</u>	<u>15-1</u>	<u>12-4</u>	<u>3-10</u>	<u>3-9</u>	<u>3-1</u>

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa, 1 pound = 0.454 kg.

- a. No. 2 grade with wet service factor.
- b. Ground snow load, live load = 40 psf, dead load = 10 psf, L/A = 360.
- c. Ground snow load, live load = 40 psf, dead load = 10 psf, L/A = 360 at main span, L/A = 180 at cantilever with a 220-pound point load applied to end.
- d. Includes incising factor.
- e. Northern species with no incising factor.
- f. Cantilevered spans not exceeding the nominal depth of the joist are permitted.

507.7 Decking. Maximum allowable spacing for joists supporting decking shall be in accordance with Table 507.7. Wood decking shall be attached to each supporting member with not less than two 8d threaded nails or two No. 8 wood screws. Other approved decking or fastener systems shall be installed in accordance with the manufacturer's installation requirements.

**TABLE 507.7
MAXIMUM JOIST SPACING FOR DECKING**

DECKING MATERIAL TYPE AND NOMINAL SIZE	MAXIMUM ON-CENTER JOIST SPACING	
	Decking perpendicular to joist	Decking diagonal to joist ^a
1 1/2 -inch-thick wood	<u>16 inches</u>	<u>12 inches</u>
2-inch-thick wood	<u>24 inches</u>	<u>16 inches</u>
Plastic composite	In accordance with Section 507.2	In accordance with Section 507.2

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 degree = 0.01745 rad.

- a. Maximum angle of 45 degrees from perpendicular for wood deck boards.

507.8 Vertical and lateral supports. Where supported by attachment to an

exterior wall, decks shall be positively anchored to the primary structure and designed for both vertical and lateral loads. Such attachment shall not be accomplished by the use of toenails or nails subject to withdrawal. For decks with cantilevered framing members, connection to exterior walls or other framing members shall be designed and constructed to resist uplift resulting from the full live load specified in Table 301.5 acting on the cantilevered portion of the deck. Where positive connection to the primary building structure cannot be verified during inspection, decks shall be self-supporting.

507.9 Vertical and lateral supports at band joist. Vertical and lateral supports for decks shall comply with this section.

507.9.1 Vertical supports. Vertical loads shall be transferred to band joists with ledgers in accordance with this section.

507.9.1.1 Ledger details. Deck ledgers shall be a minimum 2-inch by 8-inch (51 mm by 203 mm) nominal, pressure-preservative-treated Southern pine, incised pressure-preservative-treated hem-fir, or approved, naturally durable, No. 2 grade or better lumber. Deck ledgers shall not support concentrated loads from beams or girders. Deck ledgers shall not be supported on stone or masonry veneer.

507.9.1.2 Band joist details. Band joists supporting a ledger shall be a minimum 2-inch-nominal (51 mm), solid-sawn, spruce-pine-fir or better lumber or a minimum 1-inch by 9¹/₂-inch (25 mm by 241 mm) dimensional, Douglas fir or better, laminated veneer lumber. Band joists shall bear fully on the primary structure capable of supporting all required loads.

507.9.1.3 Ledger to band joist details. Fasteners used in deck ledger connections in accordance with Table 507.9.1.3(1) shall be hot-dipped galvanized or stainless steel and shall be installed in accordance with Table 507.9.1.3(2) and Figures 507.9.1.3(1) and 507.9.1.3(2).

507.9.1.4 Alternate ledger details. Alternate framing configurations supporting a ledger constructed to meet the load requirements of Section 301.5 shall be permitted.

TABLE 507.9.1.3(1)
DECK LEDGER CONNECTION TO BAND JOIST ^{a, b}
(Deck live load = 40 psf, deck dead load = 10 psf, snow load ≤ 40 psf)

CONNECTION DETAILS	JOIST SPAN						
	6' and less	6' 1" to 8'	8' 1" to 10'	10' 1" to 12'	12' 1" to 14'	14' 1" to 16'	16' 1" to 18'
	On-center spacing of fasteners						
<u>1/2 -inch diameter lag screw with 1/2 -inch maximum sheathing</u> ^{c, d}	30	23	18	15	13	11	10
<u>1/2 -inch diameter bolt with 1/2 -inch maximum sheathing</u> ^d	36	36	34	29	24	21	19
<u>1/2 -inch diameter bolt with 1-inch maximum sheathing</u> ^e	36	36	29	24	21	18	16

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

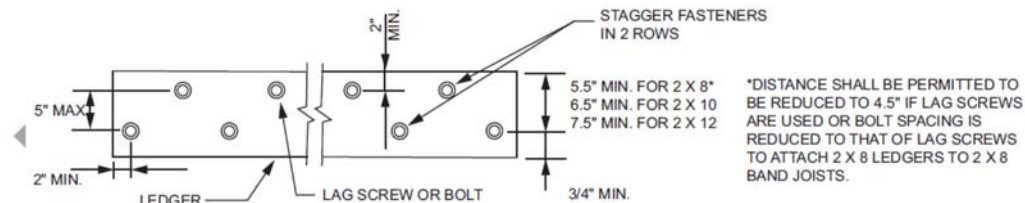
- a. Ledgers shall be flashed in accordance with Section 703.4 to prevent water from contacting the house band joist.
- b. Snow load shall not be assumed to act concurrently with live load.
- c. The tip of the lag screw shall fully extend beyond the inside face of the band joist.
- d. Sheathing shall be wood structural panel or solid sawn lumber.
- e. Sheathing shall be permitted to be wood structural panel, gypsum board, fiberboard, lumber or foam sheathing. Up to 1/2 -inch thickness of stacked washers shall be permitted to substitute for up to 1/2 -inch of allowable sheathing thickness where combined with wood structural panel or lumber sheathing.

TABLE 507.9.1.3(2)
PLACEMENT OF LAG SCREWS AND BOLTS IN
DECK LEDGERS AND BAND JOISTS

	MINIMUM END AND EDGE DISTANCES AND SPACING			
	TOP EDGE	BOTTOM EDGE	ENDS	ROW SPACING
<u>Ledger</u> ^a	2 inches ^d	3/4 -inch	2 inches ^b	1 5/8 inches ^b
<u>Band Joist</u> ^c	3/4 -inch	2 inches	2 inches ^b	1 5/8 inches ^b

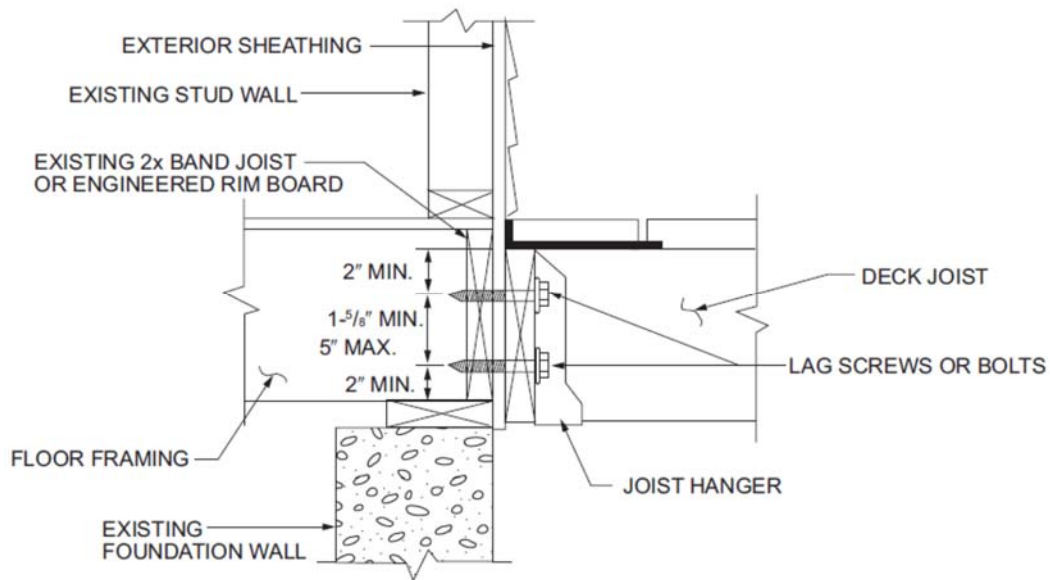
For SI: 1 inch = 25.4 mm.

- a. Lag screws or bolts shall be staggered from the top to the bottom along the horizontal run of the deck ledger in accordance with Figure 507.9.1.3(1).
- b. Maximum 5 inches.
- c. For engineered rim joists, the manufacturer's recommendations shall govern.
- d. The minimum distance from bottom row of lag screws or bolts to the top edge of the ledger shall be in accordance with Figure 507.9.1.3(1).



For SI: 1 inch = 25.4 mm.

FIGURE 507.9.1.3(1)
PLACEMENT OF LAG SCREWS AND BOLTS IN LEDGERS



For SI: 1 inch = 25.4 mm.

FIGURE 507.9.1.3(2)
PLACEMENT OF LAG SCREWS AND BOLTS IN BAND JOISTS

507.9.2 Lateral connection. Deleted

Delete Figure

FIGURE 507.9.2(1)
DECK ATTACHMENT FOR LATERAL LOADS

Delete Figure

FIGURE 507.9.2(2)
DECK ATTACHMENT FOR LATERAL LOADS

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