

Fire-Rated Assemblies
Boise Cascade Wood Products L.L.C.

PR-S201

Revised August 15, 2018

Products: BCI[®] and AJS[®] I-Joists, and VERSA-LAM[®] Rimboards
Boise Cascade Wood Products L.L.C., 1111 West Jefferson Street, Ste 300, Boise, ID 83702
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1. Basis of the product report:
 - 2018, 2015, 2012, and 2009 International Building Code (IBC): Sections 104.11 Alternative materials, 703 Fire-Resistance Ratings and Fire Tests, 721 Prescriptive Fire Resistance, 722.6 Wood assemblies, and 2303.1.2 Prefabricated wood I-joists
 - 2018 and 2015 International Residential Code (IRC): Sections R104.11 Alternative materials, R302.13 Fire protection of floors, R502.1.2 Prefabricated wood I-joists, and R802.1.8 (2018 IRC only)
 - 2012 and 2009 IRC: Sections R104.11 Alternative materials, R502.1.4 Prefabricated wood I-joists, and R501.3 Fire protection of floors (2012 IRC Only)
 - 2015 National Building Code of Canada (NBC): Clause 1.2.1.1 of Division A, Clauses 3.1.7, 4.1, 4.3.1.1, 9.10.3.1, 9.11, and 9.23.4.2 of Division B, Table 9.10.3.1.-B, and Appendix D
 - ASTM D5055-13e1, D5055-13, D5055-09, and D5055-05 recognized by the 2018 IBC and IRC, 2015 IBC and IRC, 2012 IBC and IRC, and 2009 IBC and IRC respectively
 - American Wood Council Design for Code Acceptance DCA 3, Fire-Rated Wood-Frame Wall and Floor/Ceiling Assemblies
 - ICC-ES/APA Joint Evaluation Reports ESR-1040, ESR-1144, and ESR-1336
 - CCMC Evaluation Reports 12472-R, 12787-R, and 13300-R
 - APA Product Reports PR-L310 and PR-L323
 - ASTM E119 and CAN/ULC S101 full-scale fire test reports, and engineering analyses
2. Product description:

The BCI[®] and AJS[®] I-joists covered by this report, as described in Tables 1 and 2, are made with laminated veneer lumber (LVL) or lumber flanges and OSB webs in accordance with the in-plant manufacturing standard approved by APA. The VERSA-LAM[®] rimboards covered by this report are made with LVL in accordance with the in-plant manufacturing standard approved by APA.
3. Design properties:

Design properties for BCI and AJS I-joists are provided in ICC-ES/APA ESR-1144 and ESR-1336, and APA PR-L310 and PR-L323 in the U.S., and CCMC 12787-R and 13300-R, and APA PR-L310C in Canada. Design properties for VERSA-LAM rimboards are provided in ICC-ES/APA ESR-1040 in the U.S. and CCMC 12472-R in Canada.
4. Product installation:

BCI and AJS I-joists, and VERSA-LAM rimboards covered by this report shall be installed in accordance with the recommendations provided by the manufacturer (www.bc.com/manufacturing).
5. Fire-rated assemblies:

BCI and AJS Series I-joist, and VERSA-LAM rimboard assemblies have been shown through testing and engineering analysis to achieve the fire resistance ratings described in this report. Fire-rated assemblies with BCI and AJS I-joists, and VERSA-LAM rimboards shall be constructed in accordance with the prescriptive requirements provided in this report or recommended by the manufacturer (see link above).

6. Fire-protection of floors:
 BCI and AJS I-joists as described in Table 3, when installed and protected as specified in this report, meet the requirements of 2015 and 2018 IRC Section R302.13 and 2012 IRC Section R501.3, or are alternatives to the 2-by-10 dimensional lumber prescribed in Exception 4 to 2015 and 2018 IRC Section R302.13 and 2012 IRC Section R501.3 with demonstrated equivalent fire performance.
7. Limitations:
 - a) BCI and AJS I-joists covered by this report shall be designed in accordance with the code using the design properties specified in ICC-ES/APA ESR-1144 and ESR-1336, and APA PR-L310 and PR-L323 in the U.S., and CCMC 12787-R and 13300-R, and APA PR-L310C in Canada. VERSA-LAM rimboards covered by this report shall be designed in accordance with the code using the design properties specified in ICC-ES/APA ESR-1040 in the U.S. and CCMC 12472-R in Canada.
 - b) BCI and AJS I-joists, and VERSA-LAM rimboards covered by this report are limited to dry service conditions where the average equilibrium moisture content of sawn lumber is less than 16 percent in the U.S. and the average equilibrium moisture content of solid-sawn lumber over a year is 15 percent or less and does not exceed 19 percent in Canada.
 - c) BCI and AJS I-joists, and VERSA-LAM rimboards covered by this report are produced at the Boise Cascade Wood Products L.L.C. facilities in White City, Oregon, Lena, Louisiana, St. Jacques, New Brunswick, or Roxboro, North Carolina under a quality assurance program audited by APA.
 - d) This report is subject to re-examination in one year.
8. Identification:
 BCI and AJS prefabricated wood I-joists, and VERSA-LAM rimboards described in this report are identified by a label bearing the manufacturer's name (Boise Cascade Wood Products L.L.C.) and/or trademark, the APA assigned plant number (1109 for White City, Oregon, 1105 for Lena, Louisiana, 1108 for St. Jacques, New Brunswick, and 1027 for Roxboro, North Carolina), the product series, the APA logo, and a means of identifying the date of manufacture.

Table 1. Description of BCI Series I-Joists^(a)

Joist Series	Joist Depths (in.)	Flanges					Web	
		Material	Width (in.)	Depth (in.)			Material	Thickness (in.)
				XX00 Series	XX0 Series	XX Series		
BCI 40/400/4000 BCI 40S/400S/4000S	9-1/2 – 14	LVL	1-1/2	1-1/8	1-5/16	1-1/2	OSB	3/8
BCI 45/450/4500 BCI 45S/450S/4500S	9-1/2 – 16	LVL	1-3/4	1-1/8	1-5/16	1-1/2	OSB	3/8
BCI 50/500/5000 BCI 50S/500S/5000S	9-1/2 – 16	LVL	2	1-1/8	1-5/16	1-1/2	OSB	3/8
BCI 60/600/6000 BCI 60S/600S/6000S	9-1/2 – 20	LVL	2-5/16	1-1/8	1-5/16	1-1/2	OSB	3/8
BCI 65/650/6500 BCI 65S/650S/6500S	9-1/2 – 20	LVL	2-9/16	1-1/8	1-5/16	1-1/2	OSB	3/8
BCI 90/900/9000 BCI 90S/900S/9000S	9-1/2 – 20	LVL	3-1/2	1-1/8	1-5/16	1-1/2	OSB	3/8
BCI 90e	9-1/2 – 24	LVL	3-1/2	-	-	1-1/2	OSB	7/16

For SI: 1 inch = 25.4 mm.

^(a) Referenced dimensions are nominal. Tolerances are as specified in the plant quality manual.

Table 2. Description of AJS Series I-Joists^(a)

Joist Series	Joist Depths (in.)	Flanges			Web	
		Material	Dimension		Material	Thickness (in.)
			Depth (in.)	Width (in.)		
AJS-5	9-1/2 – 11-7/8	Proprietary SPF	1-1/2	2-1/2	OSB	3/8
AJS-10	9-1/2 – 16	Proprietary Spruce	1-1/2	2-1/2	OSB	3/8
AJS-20	9-1/2 – 16	MSR Lumber	1-1/2	2-1/2	OSB	3/8
AJS-20v	9-1/4 – 16	MSR Lumber	1-1/2	2-1/2	OSB	3/8
AJS-110	9-1/4 – 16	Proprietary SPF	1-1/2	2-1/2	OSB	3/8
AJS-140	9-1/2 – 16	Proprietary SPF	1-1/2	2-1/2	OSB	3/8
AJS-150	9-1/2 – 16	MSR Lumber	1-1/2	2-1/2	OSB	3/8
AJS-150v	9-1/4 – 16	MSR Lumber	1-1/2	2-1/2	OSB	3/8
AJS-160	9-1/2 – 16	MSR Lumber	1-1/2	2-1/2	OSB	3/8
AJS-170	9-1/2 – 16	MSR Lumber	1-1/2	2-1/2	OSB	3/8
AJS-180	9-1/2 – 16	MSR Lumber	1-1/2	2-1/2	OSB	3/8
AJS-190	9-1/4 – 16	MSR Lumber	1-1/2	2-1/2	OSB	3/8
	18 – 20					7/16
AJS-200	9-1/2 – 16	MSR Lumber	1-1/2	2-1/2	OSB	3/8
AJS-24	9-1/4 – 16	MSR Lumber	1-1/2	3-1/2	OSB	3/8
AJS-25	9-1/2 – 16	MSR Lumber	1-1/2	3-1/2	OSB	3/8
	18 – 24					7/16
AJS-25v	9-1/4 – 16	MSR Lumber	1-1/2	3-1/2	OSB	3/8
AJS-30	18 – 24	MSR Lumber	1-1/2	3-1/2	OSB	7/16

For SI: 1 inch = 25.4 mm.

^(b) Referenced dimensions are nominal. Tolerances are as specified in the plant quality manual.

Table 3. Applicable BCI and AJS Series I-joists that complies with Section 6 of this Report

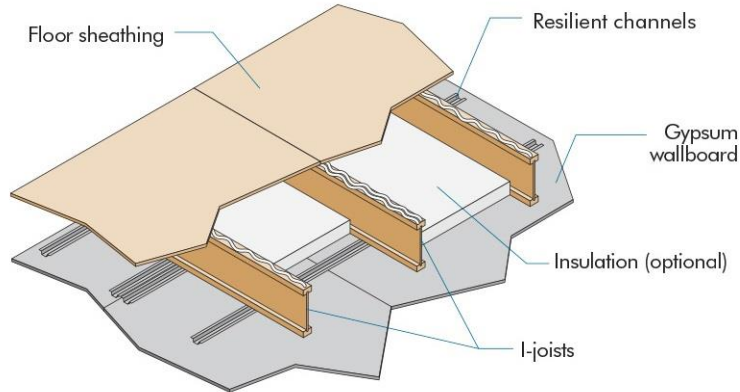
Applicable Assemblies	Applicable Joist Series
FP-01	All BCI Joists; All AJS Joists
FP-02	BCI 50, 60, 60S, 65, 90 and 90e; All AJS Joists
FP-03	All BCI Joists except for BCI 40/400/4000 Joists; All AJS Joists
FP-04	All BCI Joists except for BCI 40/400/4000 Joists; All AJS Joists
FP-05	BCI 60, 60S, 65, 90 and 90e; All AJS Joists
FP-06	All BCI Joists except for BCI 40/400/4000 and 45/450/4500 Joists; All AJS Joists
FP-07	All BCI Joists except for BCI 40/400/4000 and 45/450/4500 Joists; All AJS Joists
FP-08	BCI 60, 60S, 65, 90 and 90e Joists; All AJS Joists
FP-09	All BCI Joists except for BCI 40/400/4000 and 45/450/4500 Joists; All AJS Joists
FP-10	BCI 60, 60S, 65, 90, and 90e Joists; All AJS Joists



Boise Cascade Assembly FR1

45-Minute Fire Resistance Rated Floor and Roof Assembly

The following fire resistance design is listed in accordance with ASTM E119 and CAN/ULC S101



A. BASIC ASSEMBLIES

- 1) Floor Topping (Optional): Varies (reference sound ratings if applicable).
- 2) Floor Sheathing: Min. 23/32-inch (18-mm) T&G Wood Structural Panels. Min. 19/32-inch (15-mm) Wood Structural Panels are permitted when joists are spaced 20 inches (508 mm) or less and light weight concrete or proprietary topping is used. A construction adhesive must be applied to the top of the joists prior to placing sheathing. The sheets shall be installed with their long edge perpendicular to the joists with end joints centered over the top flange of joists and staggered one joist spacing with adjacent sheets. Floor sheathing must be installed per code requirements.
- 3) Insulation (Optional): Min. 3-1/2-inch (89-mm) Glass Fiber Insulation or 2-inch (51-mm) Rock Wool Insulation, 2.5 pcf nominal (reference sound ratings if applicable).
- 4) Structural Members: Min. 9-1/2-inch (241-mm) Deep I-Joists. Max. 24 inches (610 mm) on center spacing. Min. BCI flange dimensions of 1-1/8 inches (29 mm) thick by 2 inches (51 mm) wide. Min. AJS flange dimensions of 1-1/2 inches (38 mm) thick by 2-1/2 inches (64 mm) wide.
- 5) Resilient Channels: Min. 0.019-inch (0.5-mm) Galvanized Resilient Channels. Attached perpendicular to the bottom flange of the I-joist with 1-1/8-inch (29-mm) Type W drywall screws. Channels are spaced a max. of 16 inches (406 mm) on center. Additional channels required at gypsum wallboard end joints such that each board rests on its own channel. These additional channels shall extend to the next joist on each side of the board edges.
- 6) Ceiling: One layer of 5/8-inch (16-mm) Type C Gypsum Wallboard. Installed with long dimension perpendicular to resilient channels and fastened with min. 1-1/8-inch (29-mm) Type S drywall screws at 7 inches (178 mm) on center. The end joints of the wallboard must be staggered the equivalent of two joist spacings with those of adjacent sheets. Screws shall be min. 1-1/2 inches (38 mm) from board edge and 3/4 inch (19 mm) from board ends.
 - a) Finish: The face layer joints must be covered with tape and coated with joint compound. Screw heads must also be covered with joint compound.

B. SIMILAR ASSEMBLIES

- 1) BCI Joists: 2015 NBC Table 9.10.3.1.-B. Assemblies F8, F10, F14, and F20.
- 2) AJS Joists: 2015 NBC Table 9.10.3.1.-B. Assemblies F8, F10, F14, and F20.

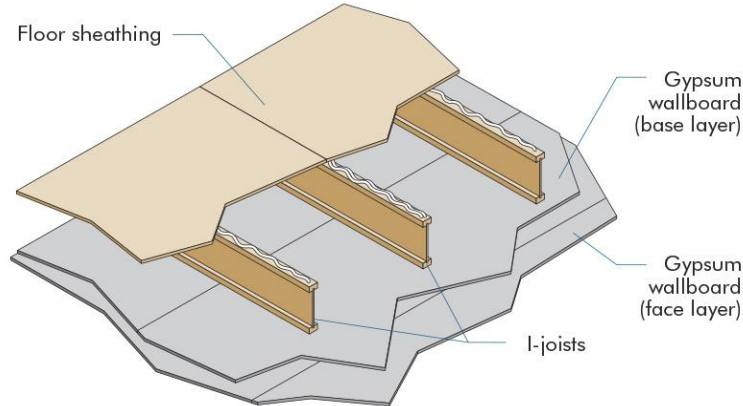
REPRESENTING THE ENGINEERED WOOD INDUSTRY



Boise Cascade Assembly FR2

One-Hour Fire Resistance Rated Floor and Roof Assembly

The following fire resistance design is listed in accordance with ASTM E119 and CAN/ULC S101



A. BASIC ASSEMBLIES

- 1) Floor Topping (Optional): Varies (reference sound ratings if applicable).
- 2) Floor Sheathing: Min. 23/32-inch (18-mm) T&G Wood Structural Panels. A construction adhesive must be applied to the top of the joists prior to placing sheathing. The sheets shall be installed with their long edge perpendicular to the joists with end joints centered over the top flange of joists and staggered one joist spacing with adjacent sheets. Floor sheathing must be installed per code requirements.
- 3) Insulation (Optional): Max. 9-1/2-inch (241-mm) Glass Fiber Insulation (reference sound ratings if applicable).
- 4) Structural Members: Min. 9-1/2 inches (241 mm) Deep I-Joists. Max. 24 inches (610 mm) on center spacing. Min. BCI flange dimensions of 1-1/8 inches (29 mm) thick by 1-1/2 inches (38 mm) wide. Min. AJS flange dimensions of 1-1/2 inches (38 mm) thick by 2-1/2 inches (64 mm) wide.
- 5) Resilient Channels (Optional): Min. 0.019-inch (0.5-mm) Galvanized Resilient Channels. Attached perpendicular to the bottom flange of the I-joist with 1-1/4-inch (32-mm) Type S drywall screws. Channels are spaced a max. of 16 inches (406 mm) or 24 inches (610 mm) on center when I-joists are spaced a max. of 16 inches (406 mm) on center.
- 6) Ceiling: Two layers of 5/8-inch (16-mm) Type X Gypsum Wallboard.
 - a) Base Layer: Install with long dimension perpendicular to joist length. Attach to the bottom flange of the joists using 1-1/4-inch (32-mm) Type W drywall screws at 24 inches (610 mm) on center. The end joints of the wallboard must be centered on the bottom flange of the joist and must be staggered the equivalent of two joist spacings with those of adjacent sheets.
 - b) Face Layer: Install with long dimension perpendicular to joist length. Attach to the bottom flange of the joists through the first layer using 1-7/8-inch (48-mm) Type W drywall screws spaced at 12 inches (305 mm) on center. The longitudinal joints of this layer must be offset 24 inches (610 mm) from those of the base layer. The end joints must be centered on the bottom flange of the joists and offset a min. of one joist spacing from those of the base layer. Additionally, face layer end joints are attached to the base layer with 1-1/2-inch (38-mm) Type G drywall screws at 12 inches (305 mm) on center placed 2 inches (51 mm) either side of the joint.
 - c) With Resilient Channels: Attached as described above except use 1-3/8-inch (35-mm) and 1-3/4-inch (44-mm) Type S screws for the base and face layer, respectively. The end joints of the wallboard must be centered on a resilient channel and must be staggered the equivalent of two joist spacings with those of adjacent sheets.
 - d) Finish: The face layer joints must be covered with tape and coated with joint compound. Screw heads must also be covered with joint compound.

B. SOUND RATING (with Resilient Channels)

Components	STC	IIC
Base Assembly with Carpet and Padding	54	68
Base Assembly with 3-1/2-inch (89-mm) Insulation	55	46
Base Assembly with additional layer of 5/8-inch (16-mm) Sheathing and 9-1/2-inch (241-mm) Insulation	61	50
Base Assembly with Tarkett "Acoustiflor" vinyl and 3-1/2-inch (89-mm) Insulation	59	50
Base Assembly with cushioned vinyl, 3/4-inch (19-mm) Gypsum Concrete and 3-1/2-inch (89-mm) Insulation	67	51

C. SIMILAR ASSEMBLIES

- 1) BCI Joists: 2009 IBC Table 720.1(3) Item 21.1.1, 2012/2015/2018 IBC Table 721.1(3) Item 21-1.1, 2015 NBC Table 9.10.3.1.-B Assemblies F4, F9, F11, F13, F15, F17, and F21, and ICC-ES ESR 1336 Figure 2.
- 2) AJS Joists: 2009 IBC Table 720.1(3) Item 21.1.1, 2012/2015/2018 IBC Table 721.1(3) Item 21-1.1, and 2015 NBC Table 9.10.3.1.-B Assemblies F4, F9, F11, F13, F15, F17, and F21.

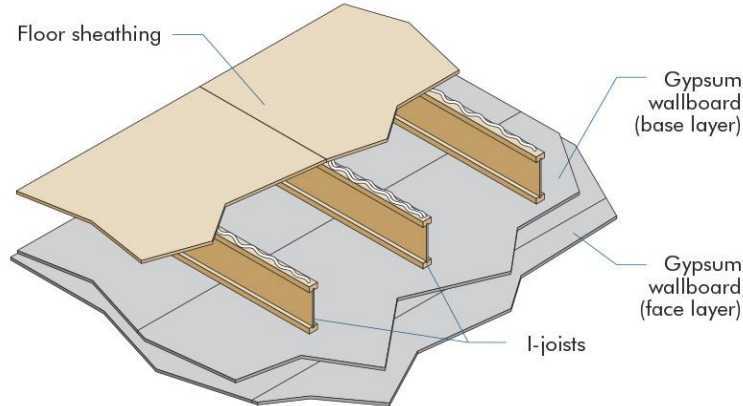
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Boise Cascade Assembly FR2a

One-Hour Fire Resistance Rated Floor and Roof Assembly

The following fire resistance design is listed in accordance with ASTM E119 and CAN/ULC S101



A. BASIC ASSEMBLIES

- 1) Floor Topping: Min. 1-1/2-inch (38-mm) Gypsum Concrete.
- 2) Floor Sheathing: Min. 19/32-inch (15-mm) T&G Wood Structural Panel. A construction adhesive must be applied to the top of the joists prior to placing sheathing. The sheets shall be installed with their long edge perpendicular to the joists with end joints centered over the top flange of joists and staggered one joist spacing with adjacent sheets. Floor sheathing must be installed per code requirements.
- 3) Insulation (Optional): Max. 9-1/2-inch (241-mm) Glass Fiber Insulation (reference sound ratings if applicable).
- 4) Structural Members: Min. 9-1/2 inches (241 mm) Deep I-Joists. Max. 16 inches (406 mm) on center spacing. Min. BCI flange dimensions of 1-1/8 inches (29 mm) thick by 1-1/2 inches (38 mm) wide. Min. AJS flange dimensions of 1-1/2 inches (38 mm) thick by 2-1/2 inches (64 mm) wide.
- 5) Resilient Channels (Optional): Min. 0.019-inch (0.5-mm) Galvanized Resilient Channels. Attached perpendicular to the bottom flange of the I-joist with 1-1/4-inch (32-mm) Type S drywall screws. Channels are spaced a max. of 16 inches (406 mm) or 24 inches (610 mm) on center when I-joists are spaced a max. of 16 inches on center.
- 6) Ceiling: Two layers of 5/8-inch (16-mm) Type X Gypsum Wallboard.
 - a) Base Layer: Install with long dimension perpendicular to joist length. Attach to the bottom flange of the joists using 1-1/4-inch (32-mm) Type W drywall screws at 24 inches (610 mm) on center. The end joints of the wallboard must be centered on the bottom flange of the joist and must be staggered the equivalent of two joist spacings with those of adjacent sheets.
 - b) Face Layer: Install with long dimension perpendicular to joist length. Attach to the bottom flange of the joists through the first layer using 1-7/8-inch (48-mm) Type W drywall screws spaced at 12 inches (305 mm) on center. The longitudinal joints of this layer must be offset 24 inches (610 mm) from those of the base layer. The end joints must be centered on the bottom flange of the joists and offset a min. of one joist spacing from those of the base layer. Additionally, face layer end joints are attached to the base layer with 1-1/2-inch (38-mm) Type G drywall screws at 12 inches (305 mm) on center placed 2 inches (51 mm) either side of the joint.
 - c) With Resilient Channels: Attached as described above except use 1-3/8-inch (35-mm) and 1-3/4-inch (44-mm) Type S screws for the base and face layer, respectively. The end joints of the wallboard must be centered on a resilient channel and must be staggered the equivalent of two joist spacings with those of adjacent sheets.
 - d) Finish: The face layer joints must be covered with tape and coated with joint compound. Screw heads must also be covered with joint compound.

B. SOUND RATING (with Resilient Channels)

Components	STC	IIC
Base Assembly with Carpet and Padding	54	68
Base Assembly with 3-1/2-inch (89-mm) Insulation	55	46
Base Assembly with additional layer of 5/8-inch (16-mm) Sheathing and 9-1/2-inch (241-mm) Insulation	61	50
Base Assembly with Tarkett "Acoustiflor" vinyl and 3-1/2-inch (89-mm) Insulation	59	50
Base Assembly with cushioned vinyl, 3/4-inch (19-mm) Gypsum Concrete and 3-1/2-inch (89-mm) Insulation	67	51

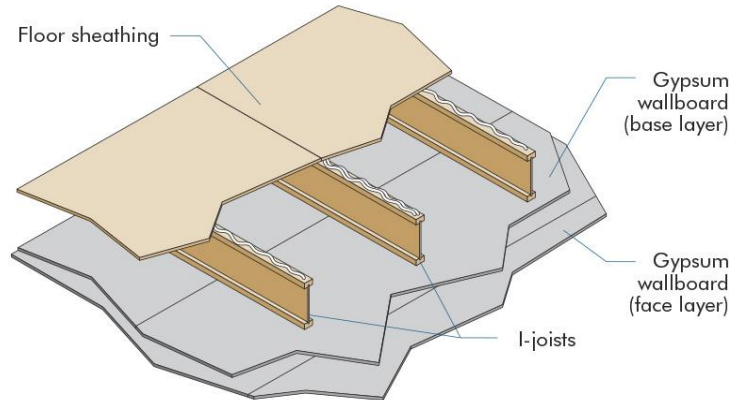
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Boise Cascade Assembly FR3

One-Hour Fire Resistance Rated Floor and Roof Assembly

The following fire resistance design is listed in accordance with ASTM E119 and CAN/ULC S101



A. BASIC ASSEMBLIES

- 1) Floor Topping (Optional): Varies (reference sound ratings if applicable).
- 2) Floor Sheathing: Min. 23/32-inch (18-mm) T&G Wood Structural Panel. A construction adhesive must be applied to the top of the joists prior to placing sheathing. The sheets shall be installed with their long edge perpendicular to the joists with end joints centered over the top flange of joists and staggered one joist spacing with adjacent sheets. Floor sheathing must be installed per code requirements.
- 3) Insulation (Optional): Max. 9-1/2-inch (241-mm) Glass Fiber Insulation (reference sound ratings if applicable).
- 4) Structural Members: Min. 9-1/2 inches (241 mm) Deep I-Joists. Max. 24 inches (610 mm) on center spacing. Min. BCI flange dimensions of 1-1/8 inches (29 mm) thick by 1-1/2 inches (38 mm) wide. Min. AJS flange dimensions of 1-1/2 inches (38 mm) thick by 2-1/2 inches (64 mm) wide.
- 5) Resilient Channels (Optional): Min. 0.019-inch (0.5-mm) Galvanized Resilient Channels. Attached perpendicular to the bottom flange of the I-joist with 1-1/4-inch (32-mm) Type S drywall screws. Channels are spaced a max. of 16 inches (406 mm) or 24 inches (610 mm) on center when I-joists are spaced a max. of 16 inches on center.
- 6) Ceiling: Two layers of 1/2-inch (13-mm) Type C Gypsum Wallboard.
 - a) Base Layer: Install with long dimension perpendicular to joist length. Attach to the bottom flange of the joists using 1-1/4-inch (32-mm) Type W drywall screws at 12 inches (305 mm) on center. The end joints of the wallboard must be centered on the bottom flange of the joist and must be staggered the equivalent of two joist spacings with those of adjacent sheets.
 - b) Face Layer: Install with long dimension perpendicular to joist length. Attach to the bottom flange of the joists through the first layer using 1-5/8-inch (41-mm) Type W drywall screws spaced at 12 inches (305 mm) on center on intermediate joists and 6 inches (152 mm) on center at end joints. The longitudinal joints of this layer must be offset 24 inches (610 mm) from those of the base layer. The end joints must be centered on the bottom flange of the joists and offset a min. of one joist spacing from those of the base layer. Additionally, face layer end joints are attached to the base layer with 1-1/2-inch (38-mm) Type G drywall screws at 8 inches (203 mm) on center placed 6 inches (152 mm) either side of the joint.
 - c) With Resilient Channels: Attached as described above except use 1-1/4-inch (32-mm) and 1-5/8-inch (41-mm) Type S screws for the base and face layer, respectively. The end joints of the wallboard must be centered on a resilient channel and must be staggered the equivalent of two joist spacings with those of adjacent sheets.
 - d) Finish: The face layer joints must be covered with tape and coated with joint compound. Screw heads must also be covered with joint compound.

B. SOUND RATING (with Resilient Channels)

Components	STC	IIC
Base Assembly with Carpet and Padding	54	68
Base Assembly with 3-1/2-inch (89-mm) Insulation	55	46
Base Assembly with additional layer of 5/8-inch (16-mm) Sheathing and 9-1/2-inch (241-mm) Insulation	61	50
Base Assembly with Tarkett "Acoustiflor" vinyl and 3-1/2-inch (89-mm) Insulation	59	50
Base Assembly with cushioned vinyl, 3/4-inch (19-mm) Gypsum Concrete and 3-1/2-inch (89-mm) Insulation	67	51

C. SIMILAR ASSEMBLIES

- 1) BCI Joists: 2009 IBC Table 720.1(3) Items 26.1.1 and 28.1.1/27.1.1, 2012/2015/2018 IBC Table 721.1(3) Items 26-1.1 and 27-1.1, 2015 NBC Table 9.10.3.1.-B Assemblies F4, F9, F11, F13, F15, F17, and F21, and ICC-ES/APA ESR 1336 Figure 3.
- 2) AJS Joists: 2009 IBC Table 720.1(3) Items 26.1.1 and 28.1.1/27.1.1, 2012/2015/2018 IBC Table 721.1(3) Items 26-1.1 and 27-1.1, and 2015 NBC Table 9.10.3.1.-B Assemblies F4, F9, F11, F13, F15, F17, and F21.

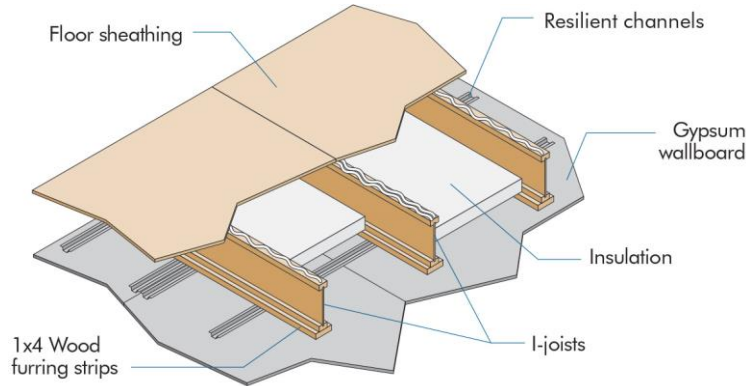
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Boise Cascade Assembly FR4

One-Hour Fire Resistance Rated Floor and Roof Assembly

The following fire resistance design is listed in accordance with ASTM E119 and CAN/ULC S101



A. BASIC ASSEMBLIES

- 1) Floor Topping (Optional): Varies (reference sound ratings if applicable).
- 2) Floor Sheathing: Min. 23/32-inch (18-mm) T&G Wood Structural Panel. A construction adhesive must be applied to the top of the joists prior to placing sheathing. The sheets shall be installed with their long edge perpendicular to the joists with end joints centered over the top flange of joists and staggered one joist spacing with adjacent sheets. Floor sheathing must be installed per code requirements.
- 3) Insulation: Min. 2-inch (51-mm) Mineral Fiber Insulation, Min. 3.5 pcf. Installed adjacent to the bottom flange of the I-joist and supported by 1x4 furring strips. The ends of the batts must be centered over resilient channels.
- 4) Structural Members: Min. 9-1/2 inches (241 mm) Deep I-Joists. Max. 24 inches (610 mm) on center spacing. Min. flange dimensions of 1-5/16 inches (33 mm) thick by 1-3/4 inches (44mm) wide.
- 5) Furring Strips: 1x4 (nominal) Wood Furring Strips centered on the bottom flange of the I-joist and attached with 1-1/2-inch (38-mm) Type W screws at 24 inches (610 mm) on center.
- 6) Resilient Channels: Min. 0.019-inch (0.5-mm) Galvanized Resilient Channels. Attached perpendicular to the bottom flange of the I-joist with 1-7/8-inch (48-mm) Type S drywall screws. Channels are spaced a maximum of 16 inches (406 mm) on center and doubled at each wallboard end joint extending to the next joist beyond each joint.
- 7) Ceiling: One layer of 5/8-inch (16-mm) Type C Gypsum Wallboard. Installed with long dimension perpendicular to resilient channels and fastened with minimum 1-1/8-inch (29-mm) Type S drywall screws at 7 inches (178 mm) on center. The end joints of the wallboard must be staggered the equivalent of two joist spacings with those of adjacent sheets.
 - a) Finish: The face layer joints must be covered with tape and coated with joint compound. Screw heads must also be covered with joint compound.

B. SOUND RATING

Components	STC	IIC
Base Assembly with Carpet and Padding	52	66
Base Assembly with cushioned vinyl, 3/4-inch (19-mm) Gypsum Concrete	55	49
Base Assembly with cushioned vinyl, 1-inch (25-mm) Gypsum Concrete, 1/4-inch (6-mm) Acousti-Mat II	58	57

C. SIMILAR ASSEMBLIES

- 1) BCI Joists: 2009 IBC Table 720.1(3) Item 23.1.1, 2012/2015/2018 IBC Table 721.1(3) Item 23-1.1, and ICC-ES/APA ESR 1336, Figure 4.
- 2) AJS Joists: 2009 IBC Table 720.1(3) Item 23.1.1 and 2012/2015/2018 IBC Table 721.1(3) Item 23-1.1.

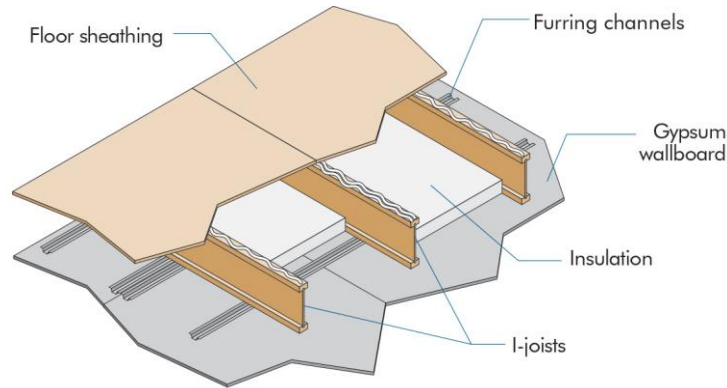
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Boise Cascade Assembly FR5

One-Hour Fire Resistance Rated Floor and Roof Assembly

The following fire resistance design is listed in accordance with ASTM E119 and CAN/ULC S101



A. BASIC ASSEMBLIES

- 1) Floor Topping (Optional): Varies (reference sound ratings if applicable).
- 2) Floor Sheathing: Min. 23/32-inch (18-mm) T&G Wood Structural Panel. A construction adhesive must be applied to the top of the joists prior to placing sheathing. The sheets shall be installed with their long edge perpendicular to the joists with end joints centered over the top flange of joists and staggered one joist spacing with adjacent sheets. Floor sheathing must be installed per code requirements.
- 3) Insulation: Min. 1-1/2-inch (38-mm) Mineral Fiber Insulation, Min. 2.8 pcf. Installed adjacent to the bottom flange of the I-joist and supported by the furring channels. Ends of bats shall be centered over resilient channels.
- 4) Structural Members: Min. 9-1/2 inches (241 mm) Deep I-Joists. Max. 24 inch (610 mm) on center spacing. Min. flange dimensions of 1-1/2 inches (38 mm) thick by 3-1/2 inches (89 mm) wide.
- 5) Furring Channels: Min. 0.026-inch (0.66-mm) Hat Shaped Galvanized Steel Channels attached perpendicular to the bottom flange of the I-joist with 1-5/8-inch (41-mm) Type S drywall screws. Channels are spaced a max. of 16 inches (406 mm) on center and doubled at each wallboard end joint extending to the next joist beyond each joint.
- 6) Ceiling: One layer of 5/8-inch (16-mm) Type C Gypsum Wallboard. Installed with long dimension perpendicular to resilient channels and fastened with min. 1-1/8-inch (29-mm) Type S drywall screws spaced at 12 inches (305 mm) on center on intermediate joists and 8 inches (203 mm) on center at end joints. The end joints of the wallboard must be staggered the equivalent of two joist spacings with those of adjacent sheets.
 - a) Finish: The face layer joints must be covered with tape and coated with joint compound. Screw heads must also be covered with joint compound.

B. SOUND RATING^(a)

Components	STC	IIC
Base Assembly with Carpet and Padding, Gypsum Concrete	49	59

^(a) Sound ratings from the American Wood Council publication *Design for Code Acceptance 3*. Available from <http://www.awc.org/publications/DCA/DCA3/DCA3.pdf>.

C. SIMILAR ASSEMBLIES

- 1) BCI 90 Joists: 2009 IBC Table 720.1(3) Item 24.1.1, 2012/2015/2018 IBC Table 721.1(3) Item 24-1.1, and DCA 3 WIJ-1.1.
- 2) AJS 25/30 Joists: 2009 IBC Table 720.1(3) Item 24.1.1, 2012/2015/2018 IBC Table 721.1(3) Item 24-1.1, and DCA 3 WIJ-1.1.

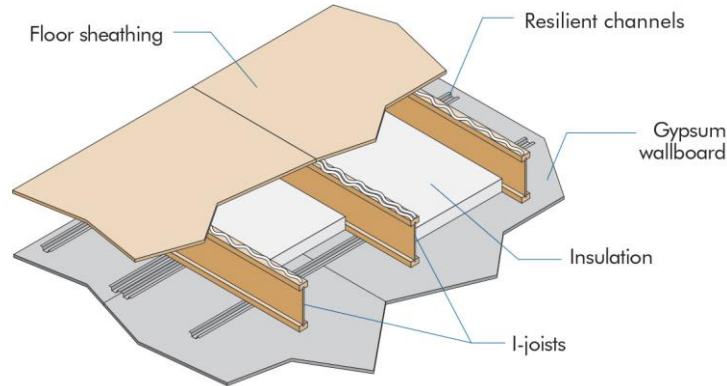
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Boise Cascade Assembly FR6

One-Hour Fire Resistance Rated Floor and Roof Assembly

The following fire resistance design is listed in accordance with ASTM E119 and CAN/ULC S101



A. BASIC ASSEMBLIES

- 1) Floor Topping (Optional): Varies (reference sound ratings if applicable).
- 2) Floor Sheathing: Min. 23/32-inch (18-mm) T&G Wood Structural Panel. A construction adhesive must be applied to the top of the joists prior to placing sheathing. The sheets shall be installed with their long edge perpendicular to the joists with end joints centered over the top flange of joists and staggered one joist spacing with adjacent sheets. Floor sheathing must be installed per code requirements.
- 3) Insulation: Min. 1-1/2-inch (38-mm) Mineral Fiber Insulation, Min. 2.8 pcf. Installed adjacent to the bottom flange of the I-joist and supported by the furring channels. The ends of the batts shall be centered over resilient channels.
- 4) Structural Members: Min. 9-1/2 inches (241 mm) Deep I-Joists. Max. 24 inches (610 mm) on center spacing. Min. flange dimensions of 1-1/2 inches (38 mm) thick by 3-1/2 inches (89 mm) wide.
- 5) Resilient Channels: Min. 0.019-inch (0.5-mm) Galvanized Resilient Channels. Attached perpendicular to the bottom flange of the I-joist with 1-5/8-inch (41-mm) Type S drywall screws. Channels are spaced a max. of 16 inches (406 mm) on center and doubled at each wallboard end joint extending to the next joist beyond each joint.
- 6) Ceiling: One layer of 5/8-inch (16-mm) Type C Gypsum Wallboard. Installed with long dimension perpendicular to resilient channels and fastened with min. 1-1/8-inch (29-mm) Type S drywall screws spaced at 12 inches (305 mm) on center on intermediate joists and 8 inches (203 mm) on center at end joints. The end joints of the wallboard must be staggered the equivalent of two joist spacings with those of adjacent sheets.
 - a) Finish: The face layer joints must be covered with tape and coated with joint compound. Screw heads must also be covered with joint compound.

B. SOUND RATING^(a)

Components	STC	IIC
Base Assembly with cushioned vinyl	51	46
Base Assembly with Carpet and Padding	51	64
Base Assembly with cushioned vinyl, Gypsum Concrete	60	50
Base Assembly with Carpet and Padding, Gypsum Concrete	60	65

^(a) Sound ratings from the American Wood Council publication *Design for Code Acceptance 3*. Available from <http://www.awc.org/publications/DCA/DCA3/DCA3.pdf>.

C. SIMILAR ASSEMBLIES

- 1) BCI 90 Joists: 2009 IBC Table 720.1(3) Item 25.1.1, 2012/2015/2018 IBC Table 721.1(3) Item 25.1.1, 2015 NBC Table 9.10.3.1.-B Assemblies F10, F14, and F20, DCA 3 WIJ-1.2, and ICC-ES/APA ESR 1336 Figure 5.
- 2) AJS 25/30 Joists: 2009 IBC Table 720.1(3) Item 25.1.1, 2012/2015/2018 IBC Table 721.1(3) Item 25.1.1, 2015 NBC Table 9.10.3.1.-B Assemblies F10, F14, and F20, and DCA 3 WIJ-1.2.

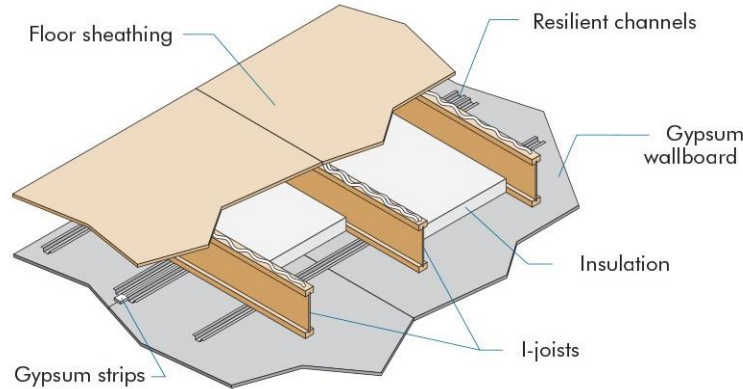
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Boise Cascade Assembly FR7

One-Hour Fire Resistance Rated Floor and Roof Assembly

The following fire resistance design is listed in accordance with ASTM E119 and CAN/ULC S101



A. BASIC ASSEMBLIES

- 1) Floor Topping (Optional): Varies (reference sound ratings if applicable).
- 2) Floor Sheathing: Min. 23/32-inch (18-mm) T&G Wood Structural Panel. A construction adhesive must be applied to the top of the joists prior to placing sheathing. The sheets shall be installed with their long edge perpendicular to the joists with end joints centered over the top flange of joists and staggered one joist spacing with adjacent sheets. Floor sheathing must be installed per code requirements.
- 3) Insulation: Min. 2-inch (51-mm) Mineral Fiber Insulation, Min. 3.5 pcf. Installed adjacent to the bottom flange of the I-joist and supported by the furring channels. The ends of the batts shall be centered over resilient channels.
- 4) Structural Members: Min. 9-1/2 inches (241 mm) Deep I-Joists. Max. 24 inches (610 mm) on center spacing. Min. flange dimensions of 1-5/16 inches (33 mm) thick by 3-1/2 inches (89 mm) wide.
- 5) Resilient Channels: Min. 0.019-inch (0.5-mm) Galvanized Resilient Channels. Attached perpendicular to the bottom flange of the I-joist with 1-1/4-inch (32-mm) Type W drywall screws. Channels are spaced a max. of 16 inches (406 mm) on center and doubled at each wallboard end joint extending to the next joist beyond each joint.
- 6) Gypsum Strips: 2 inches (51 mm) wide by 1/2 inch (13 mm) Type C Gypsum Wallboard. Installed perpendicular to the I-joists above each end joint of the 5/8-inch (16-mm) gypsum wallboard. The strips are attached with one 1-1/4-inch (32-mm) Type W drywall screw at each joist.
- 7) Ceiling: One layer of 5/8-inch (16-mm) Type C Gypsum Wallboard. Installed with long dimension perpendicular to resilient channels and fastened with min. 1-1/8-inch (29-mm) Type S drywall screws spaced at 8 inches (203 mm) on center. The end joints of the wallboard must be staggered the equivalent of two joist spacings with those of adjacent sheets.
 - a) Finish: The face layer joints must be covered with tape and coated with joint compound. Screw heads must also be covered with joint compound.

B. SOUND RATING

Components	STC	IIC
Base Assembly with Carpet and Padding	55	62
Base Assembly with cushioned vinyl, 3/4-inch (19-mm) Gypsum Concrete	58	45
Base Assembly with cushioned vinyl, 1-inch (25-mm) Gypsum Concrete, 1/4-inch (6-mm) Acousti-Mat II	61	53

C. SIMILAR ASSEMBLIES

- 1) BCI 90 Joists: ICC-ES/APA ESR 1336 Figure 6.

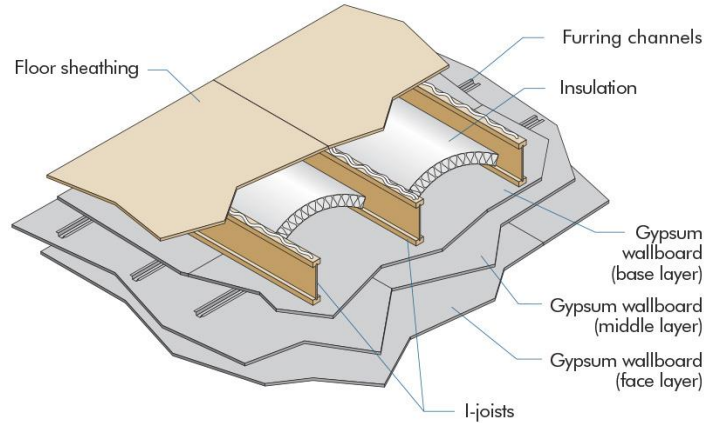
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Boise Cascade Assembly FR8

Two-Hour Fire Resistance Rated Floor and Roof Assembly

The following fire resistance design is listed in accordance with ASTM E119 and CAN/ULC S101



A. BASIC ASSEMBLIES

- 1) Floor Topping (Optional): Varies (reference sound ratings if applicable).
- 2) Floor Sheathing: Min. 23/32-inch (18-mm) T&G Wood Structural Panel. A construction adhesive must be applied to the top of the joists prior to placing sheathing. The sheets shall be installed with their long edge perpendicular to the joists with end joints centered over the top flange of joists and staggered one joist spacing with adjacent sheets. Floor sheathing must be installed per code requirements.
- 3) Insulation: Max. 3-1/2-inch (89-mm) Unfaced Glass Fiber Insulation. Friction fitted between I-joists and supported by stay wires spaced 12 inches (305 mm) on center along the top of the I-joist bottom flange.
- 4) Structural Members: Min. 9-1/2 inches (241 mm) Deep I-Joists. Max. 24 inches (610 mm) on center spacing. Min. BCI flange dimensions of 1-1/8 inches (29 mm) thick by 2 inches (51 mm) wide. Min. AJS flange dimensions of 1-1/2 inches (38 mm) thick by 2-1/2 inches (64 mm) wide.
- 5) Furring Channels: Min. 0.019-inch (0.5-mm) Hat Shaped Galvanized Steel Channels attached perpendicular to the bottom flange of the I-joist with 1-5/8-inch (41-mm) Type S drywall screws penetrating through the wallboard base layer into each I-joist flange. Channels are spaced a max. of 16 inches (406 mm) on center and doubled at each wallboard end joint extending to the next joist beyond each joint.
- 6) Ceiling: Three layers of 5/8-inch (16-mm) Type C Gypsum Wallboard.
 - a) Base Layer: Install with long dimension perpendicular to joist length. Attach to the bottom flange of the joists using 1-5/8-inch (41-mm) Type S drywall screws at 12 inches (305 mm) on center. The end joints of the wallboard must be centered on the bottom flange of the I-joist and must be staggered the equivalent of two joist spacings with those of adjacent sheets.
 - b) Middle Layer: Attached to furring channels using 1-inch (25-mm) Type S drywall screws at 12 inches (305 mm) on center with the long dimension perpendicular to furring channels. End joints must be staggered from end joints of adjacent sheets and end joints on the face layer.
 - c) Face Layer: Attached to furring channels through the middle layer using 1-5/8-inch (41-mm) Type S drywall screws spaced at 8 inches (203 mm) on center with long dimension perpendicular to furring channel. End joints must be staggered from end joints of adjacent sheets and staggered 32 inches (813 mm) from end joints on the middle layer. Edge joints (long dimension) must be offset 24 inches (610 mm) from those of the middle layer.
 - d) Finish: The face layer joints must be covered with tape and coated with joint compound. Screw heads must also be covered with joint compound.

B. SOUND RATING^(a)

Components	STC	IIC
Base Assembly with Carpet and Padding	49	54
Base Assembly with cushioned vinyl, Gypsum Concrete	52	46
Base Assembly with Carpet and Padding, Gypsum Concrete	52	60

^(a) Sound ratings from the American Wood Council publication *Design for Code Acceptance 3*. Available from <http://www.awc.org/publications/DCA/DCA3/DCA3.pdf>.

C. SIMILAR ASSEMBLIES

- 1) BCI Joists: 2009 IBC Table 720.1(3) Item 28.1.1, 2012/2015/2018 IBC Table 721.1(3) Item 28-1.1, DCA 3 WIJ-2.1, and ICC-ES/APA ESR 1336 Figure 7.
- 2) AJS Joists: 2009 IBC Table 720.1(3) Item 28.1.1, 2012/2015/2018 IBC Table 721.1(3) Item 28-1.1, and DCA 3 WIJ-2.1.

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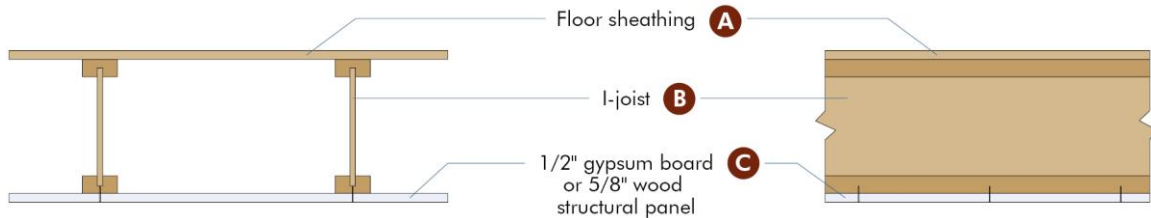


Fire Protection of Floors (**FP-01**) for Compliance with 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13

Fire Protection: 1/2-inch Gypsum Board Attached to Bottom of Flange

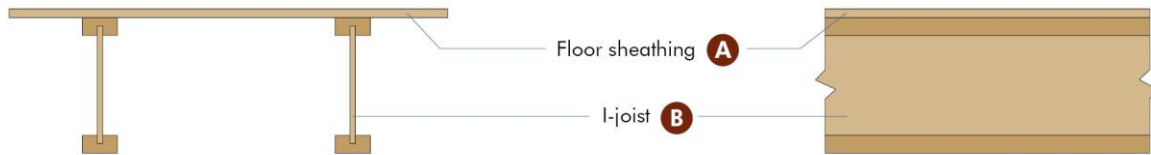
The following fire resistance design is in compliance with 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13
All BCI Joists; All AJS Joists

1/2-inch Gypsum Board Attached to Bottom of Flange^(a,b,d)



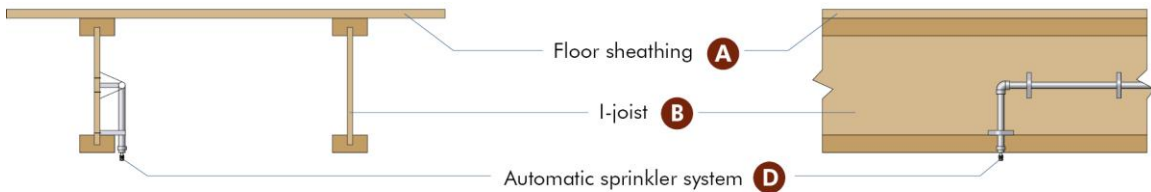
Crawl Space Exception^(b)

In accordance with Exception 2 of the 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13, floor assemblies located directly over a crawl space not intended for storage or fuel-fired appliances do not require membrane protection.



Automatic Sprinkler Exception^(c)

In accordance with Exception 1 of the 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13, floor assemblies located directly over a space protected by an automatic sprinkler system do not require membrane protection.



- (A) Floor sheathing: Materials and installation in accordance with 2012, 2015, and 2018 IRC Section R503.
- (B) I-joist: Installation in accordance with Section 4.0 of this report. Max. 24 inches on center spacing. Applicable to all flange sizes. Minimum web thickness of 3/8 inch. Adhesives used shall be as described in the quality manual approved by APA.
- (C) 1/2-inch gypsum board: Materials and installation in accordance with 2012, 2015, and 2018 IRC Section R702.3.1 or equivalent. 1x3 (nominal) wood furring strips are permitted to be installed perpendicular to the bottom flange of the I-joists at 16 inches on center provided that the gypsum boards are directly attached to the furring strips using 1-1/4-inch (32-mm) Type W drywall screws at 12 inches (305 mm) on center. Gypsum board not required to be finished with tape and joint compound; or 5/8-inch wood structural panel: Materials and installation in accordance with 2012, 2015, and 2018 IRC Section R503.2 or equivalent. Wood structural panel not required to be finished with wood filler or sanded.
- (D) Automatic sprinkler system: System in accordance with Section P2904 of the 2012, 2015, and 2018 IRC, NFPA 13D, or other equivalent sprinkler systems.

Notes:

- (a) In accordance with Exception 3 of the 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13, portions of floor assembly can be unprotected when complying with the following:
 - 1) The aggregate area of the unprotected portions shall not exceed 80 square feet.
 - 2) Fire blocking in accordance with 2012, 2015, and 2018 IRC Section R302.11.1 shall be installed along the perimeter of the unprotected portion to separate the unprotected portion from the remainder of the floor assembly.
- (b) Insulation may be required for energy code compliance purposes. Check with the local building official for specific jurisdictional requirements.

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REPRESENTING THE ENGINEERED WOOD INDUSTRY



(FP-01 Continued)

- (c) In accordance with 2012, 2015, and 2018 IRC Section P2904, partial residential sprinkler systems are permitted to be installed only when the entire dwelling unit is not required to be equipped with a residential sprinkler system. Check with the local building official for specific jurisdictional requirements.
- (d) Penetrations or openings for ducts, vents, electrical outlets, lighting, devices, luminaires, wires, speakers, drainage, piping and similar openings or penetrations shall be permitted.

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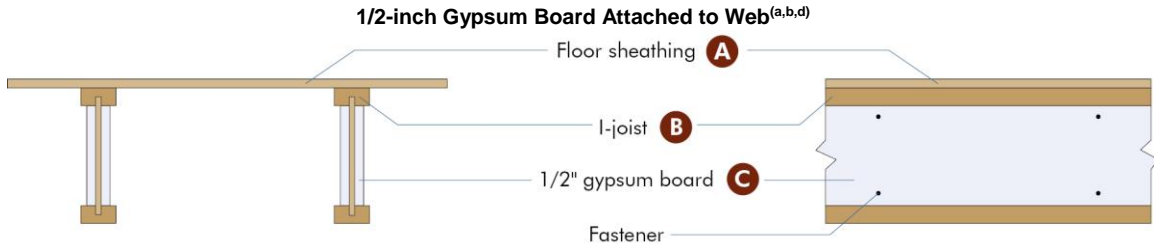


Fire Protection of Floors (FP-02) for Compliance with 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13

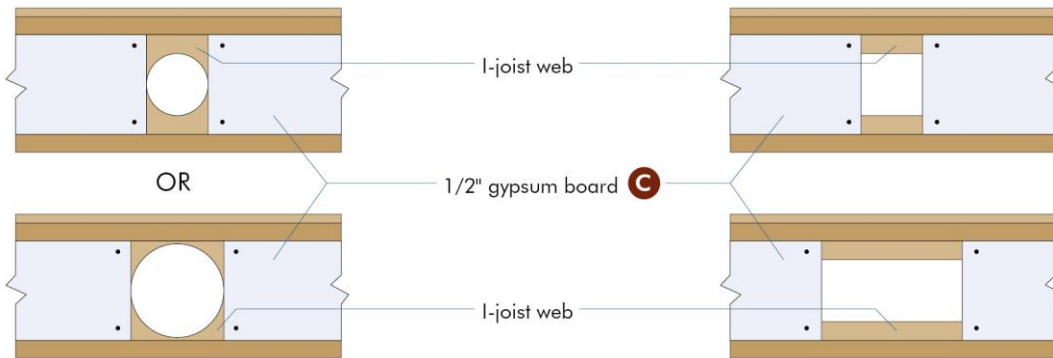
Fire Protection: 1/2-inch Gypsum Board Attached Directly to Web

The following fire resistance design is an alternative to the 2-by-10 dimensional lumber prescribed in 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13 Exception 4, with demonstrated equivalent fire performance

BCI 50, 60, 60S, 65, 90 and 90e Joists; All AJS Joists

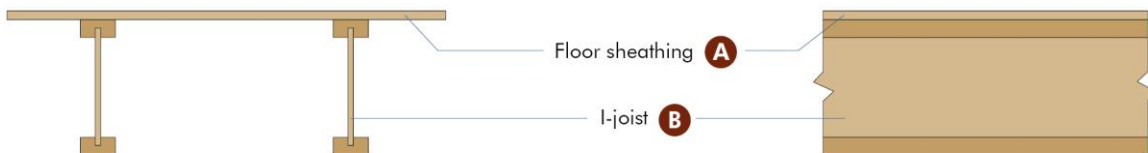


Installation Requirements at Web Holes



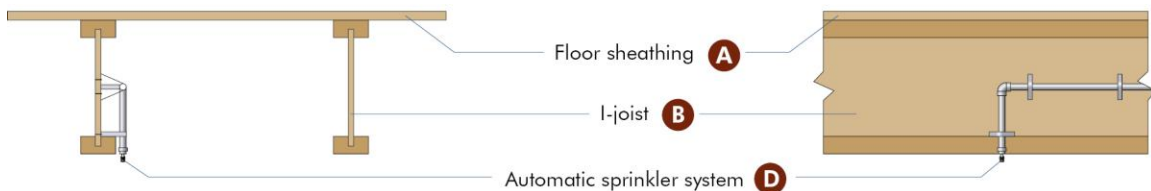
Crawl Space Exception^(b)

In accordance with Exception 2 of the 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13, floor assemblies located directly over a crawl space not intended for storage or fuel-fired appliances do not require 1/2-inch gypsum board attached to web.



Automatic Sprinkler Exception^(c)

In accordance with Exception 1 of the 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13, floor assemblies located directly over a space protected by an automatic sprinkler system do not require 1/2-inch gypsum board attached to web.



- (A) Floor sheathing: Materials and installation in accordance with 2012, 2015, and 2018 IRC Section R503.
- (B) I-joist: Installation in accordance with Section 4 of this report. Maximum 24 inches on center spacing. Minimum flange size of 1-1/2 inches thick x 2 inches wide. Minimum web thickness of 3/8 inch. Adhesives used shall be as described in the quality manual approved by APA. At hole location, fasteners shall be installed 1 inch from the edge of the gypsum board.

(Continued next page)

REPRESENTING THE ENGINEERED WOOD INDUSTRY



(FP-02 Continued)

- (C) 1/2-inch gypsum board: Materials (entire length of I-joist) in accordance with 2012, 2015, and 2018 IRC Section R702.3.1 (not required to be finished with tape and joint compound). Fasteners: Minimum 1-inch screws (Type W or Type S) or nails installed 1 inch from edges and 16 inches on center, top and bottom. Fasteners may be staggered from top to bottom.
- (D) Automatic sprinkler system: System in accordance with Section P2904 of the 2012, 2015, and 2018 IRC, NFPA 13D, or other equivalent sprinkler systems.

Notes:

- (a) In accordance with Exception 3 of the 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13, portions of floor assembly can be unprotected when complying with the following:
 - 1) The aggregate area of the unprotected portions shall not exceed 80 square feet.
 - 2) Fire blocking in accordance with 2012, 2015, and 2018 IRC Section R302.11.1 shall be installed along the perimeter of the unprotected portion to separate the unprotected portion from the remainder of the floor assembly.
- (b) Insulation may be required for energy code compliance purposes. Check with the local building official for specific jurisdictional requirements.
- (c) In accordance with 2012, 2015, and 2018 IRC Section P2904, partial residential sprinkler systems are permitted to be installed only when the entire dwelling unit is not required to be equipped with a residential sprinkler system. Check with the local building official for specific jurisdictional requirements.
- (d) Penetrations or openings for ducts, vents, electrical outlets, lighting, devices, luminaires, wires, speakers, drainage, piping and similar openings or penetrations shall be permitted.

REPRESENTING THE ENGINEERED WOOD INDUSTRY



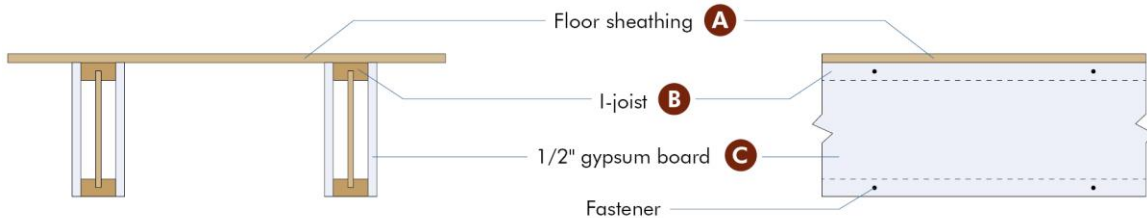
Fire Protection of Floors (FP-03) for Compliance with 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13

Fire Protection: 1/2-inch Gypsum Board Attached Directly to Sides of Flange

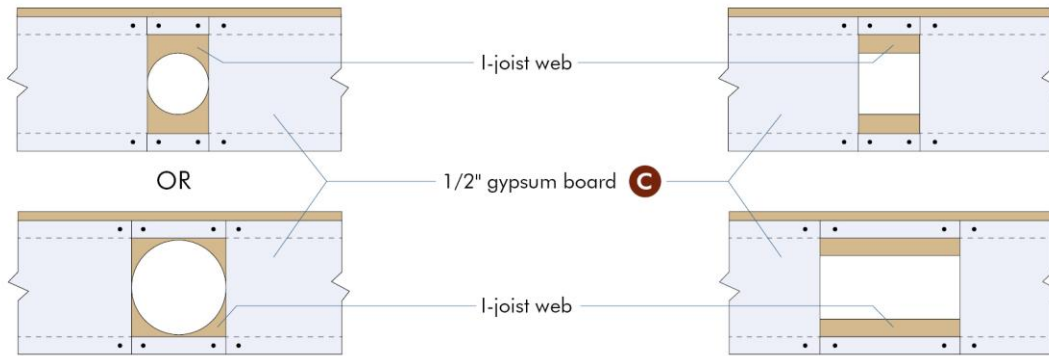
The following fire resistance design is an alternative to the 2-by-10 dimensional lumber prescribed in 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13 Exception 4, with demonstrated equivalent fire performance

All BCI Joists except for BCI 40, 400, and 4000 Joists; All AJS Joists

1/2-inch Gypsum Board Attached to Sides of Flange^(a,b,d)

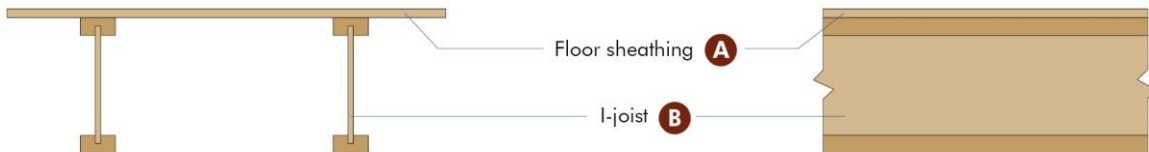


Installation Requirements at Web Holes



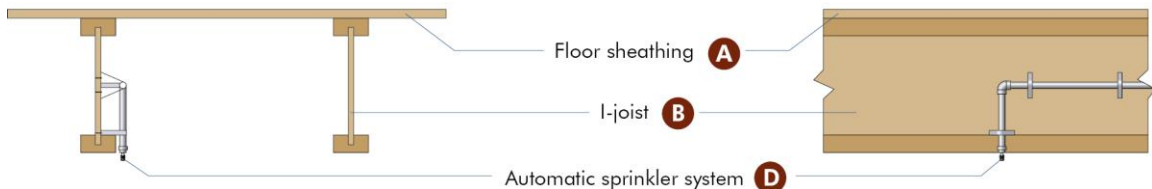
Crawl Space Exception^(b)

In accordance with Exception 2 of the 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13, floor assemblies located directly over a crawl space not intended for storage or fuel-fired appliances do not require 1/2-inch gypsum board attached to sides of flange.



Automatic Sprinkler Exception^(c)

In accordance with Exception 1 of the 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13, floor assemblies located directly over a space protected by an automatic sprinkler system do not require 1/2-inch gypsum board attached to sides of flange.



- (A) Floor sheathing: Materials and installation in accordance with 2012, 2015, and 2018 IRC Section R503.
- (B) I-joist: Installation in accordance with Section 4.0 of this report. Maximum 24 inches on center spacing. Minimum flange size of 1-1/8 inches thick x 1-3/4 inches wide. Minimum web thickness of 3/8 inch. Adhesives used shall be as described in the quality manual approved by APA. At hole location, fasteners shall be installed 1 inch from the edge of the gypsum board. Maximum fastener spacing shall be no more than 8 inches on gypsum board above and below the hole.

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REPRESENTING THE ENGINEERED WOOD INDUSTRY



(FP-03 Continued)

- (C) 1/2-inch gypsum board: Materials (entire length of I-joist) in accordance with 2012, 2015, and 2018 IRC Section R702.3.1 (not required to be finished with tape and joint compound). Fasteners: Minimum 1-inch screws (Type W or Type S) or nails installed 1/2 inch from edges and 16 inches on center, top and bottom. Fasteners may be staggered from top to bottom.
- (D) Automatic sprinkler system: System in accordance with Section P2904 of the 2012, 2015, and 2018 IRC, NFPA 13D, or other equivalent sprinkler systems.

Notes:

- (a) In accordance with Exception 3 of the 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13, portions of floor assembly can be unprotected when complying with the following:
 - 1) The aggregate area of the unprotected portions shall not exceed 80 square feet.
 - 2) Fire blocking in accordance with 2012, 2015, and 2018 IRC Section R302.11.1 shall be installed along the perimeter of the unprotected portion to separate the unprotected portion from the remainder of the floor assembly.
- (b) Insulation may be required for energy code compliance purposes. Check with the local building official for specific jurisdictional requirements.
- (c) In accordance with 2012, 2015, and 2018 IRC Section P2904, partial residential sprinkler systems are permitted to be installed only when the entire dwelling unit is not required to be equipped with a residential sprinkler system. Check with the local building official for specific jurisdictional requirements.
- (d) Penetrations or openings for ducts, vents, electrical outlets, lighting, devices, luminaires, wires, speakers, drainage, piping and similar openings or penetrations shall be permitted.

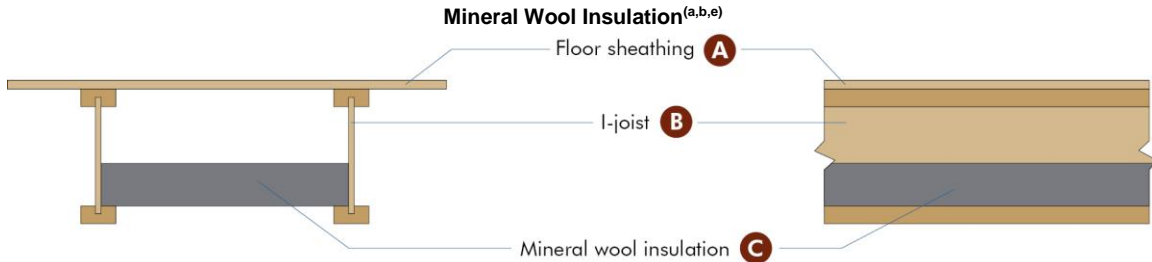


Fire Protection of Floors (FP-04) for Compliance with 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13

Fire Protection: Mineral Wool Insulation

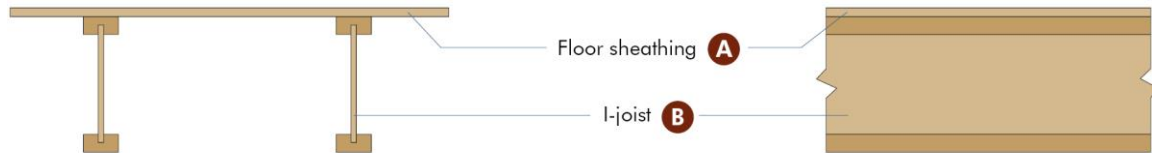
The following fire resistance design is an alternative to the 2-by-10 dimensional lumber prescribed in 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13 Exception 4, with demonstrated equivalent fire performance

All BCI Joists except for BCI 40, 400, and 4000 Joists; All AJS Joists



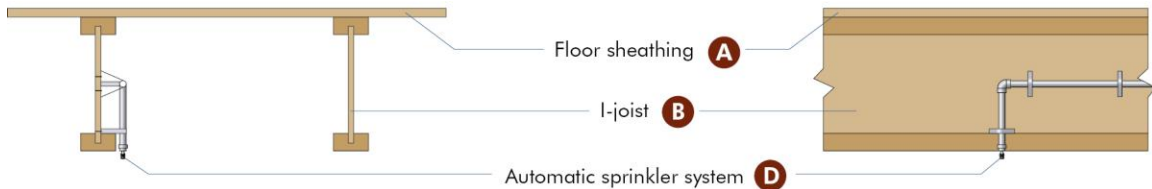
Crawl Space Exception^(c)

In accordance with Exception 2 of the 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13, floor assemblies located directly over a crawl space not intended for storage or fuel-fired appliances do not require mineral wool insulation for fire protection.



Automatic Sprinkler Exception^(d)

In accordance with Exception 1 of the 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13, floor assemblies located directly over a space protected by an automatic sprinkler system do not require mineral wool insulation for fire protection.



- (A) Floor sheathing: Materials and installation in accordance with 2012, 2015, and 2018 IRC Section R503.
- (B) I-joist: Installation in accordance with Section 4.0 of this report. Maximum 19.2 inches on center spacing. Minimum flange size of 1-1/8 inches thick x 1-3/4 inches wide. Minimum web thickness of 3/8 inch. Adhesives used shall be as described in the quality manual approved by APA.
- (C) Mineral wool insulation: Minimum 2.9 lb/ft³ (nominal) and 2 inches thick mineral wool batt insulation installed as shown with insulation supports, spaced no more than 24 inches apart and no more than 4 inches from ends of batts. Minimum 2.5 lb/ft³ (nominal) and 2 inches thick mineral wool insulation shall be permitted if the I-joists are spaced no more than 16 inches on center. Use min. 15.25 inches and 18.5 inches wide batts when I-joist spacing is 16 inches and 19.2 inches on center, respectively.
- (D) Automatic sprinkler system: System in accordance with Section P2904 of the 2012, 2015, and 2018 IRC, NFPA 13D, or other equivalent sprinkler systems.

Notes:

- (a) In accordance with Exception 3 of 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13, portions of floor assembly can be unprotected when complying with the following:
 - 1) The aggregate area of the unprotected portions shall not exceed 80 square feet.
 - 2) Fire blocking in accordance with 2012, 2015, and 2018 IRC Section R302.11.1 shall be installed along the perimeter of the unprotected portion to separate the unprotected portion from the remainder of the floor assembly.
- (b) Thicker insulation may be required for energy code compliance purposes. Check with the local building official for specific jurisdictional requirements.

(Continued next page)

REPRESENTING THE ENGINEERED WOOD INDUSTRY



(FP-04 Continued)

- (c) Insulation may be required for energy code compliance purposes. Check with the local building official for specific jurisdictional requirements.
- (d) In accordance with 2012, 2015, and 2018 IRC Section P2904, partial residential sprinkler systems are permitted to be installed only when the entire dwelling unit is not required to be equipped with a residential sprinkler system. Check with the local building official for specific jurisdictional requirements.
- (e) Penetrations or openings for ducts, vents, electrical outlets, lighting, devices, luminaires, wires, speakers, drainage, piping and similar openings or penetrations shall be permitted.

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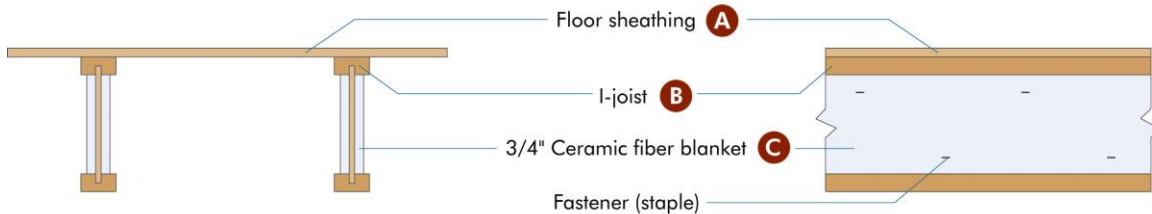
Fire Protection of Floors (FP-05) for Compliance with 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13

Fire Protection: Ceramic Fiber Blanket Insulation

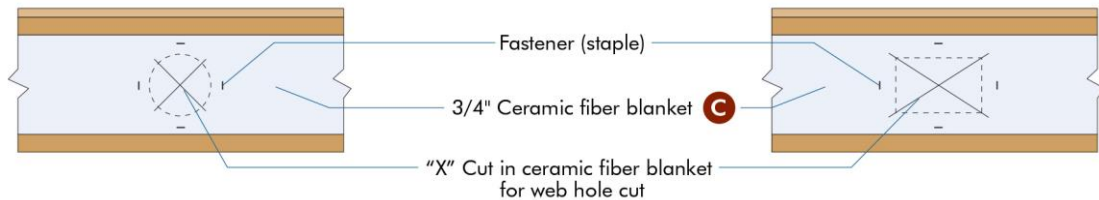
The following fire resistance design is an alternative to the 2-by-10 dimensional lumber prescribed in 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13 Exception 4, with demonstrated equivalent fire performance

BCI 60, 60S, 65, 90 and 90e Joists; All AJS Joists

FireBreak™ Proprietary Ceramic Fiber Blanket Insulation^(a,b,d)

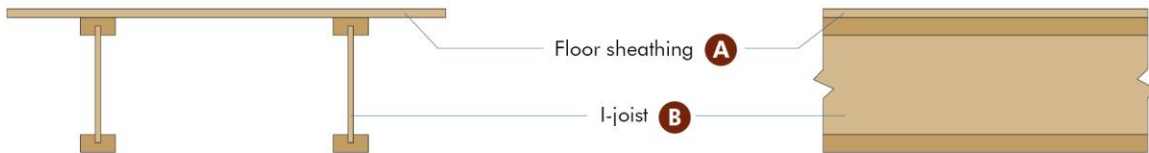


Installation Requirements at Web Holes



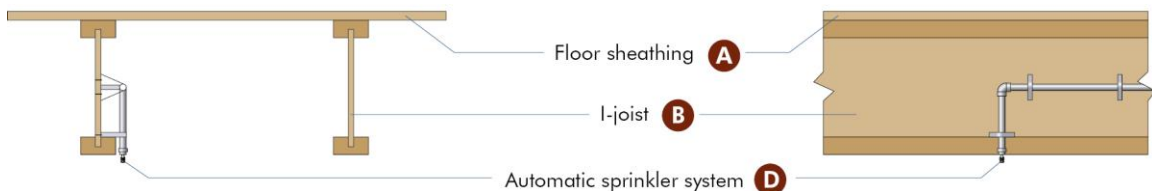
Crawl Space Exception^(b)

In accordance with Exception 2 of the 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13, floor assemblies located directly over a crawl space not intended for storage or fuel-fired appliances do not require ceramic fiber blanket insulation for fire protection.



Automatic Sprinkler Exception^(c)

In accordance with Exception 1 of the 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13, floor assemblies located directly over a space protected by an automatic sprinkler system do not require ceramic fiber blanket insulation for fire protection.



- (A) Floor sheathing: Materials and installation in accordance with 2012, 2015, and 2018 IRC Section R503.
- (B) I-joist: Installation in accordance with Section 4.0 of this report. Maximum 24 inches on center spacing. Minimum flange size of 1-1/2 inches thick x 2-5/16 inches wide. Minimum web thickness of 3/8 inch. Adhesives used shall be as described in the quality manual approved by APA. At each hole location, an "X" cut that is 1 inch larger than the web hole on both sides of the I-joist shall be made in the ceramic fiber blanket to allow the passage of a wire, pipe, or duct.

(Continued next page)

REPRESENTING THE ENGINEERED WOOD INDUSTRY



(FP-05 Continued)

- (C) Mei Guo International, LLC (USA) FireBreak™ proprietary ceramic fiber blanket insulation (entire length of I-joist): Minimum 4.0 lb/ft³ (nominal) and 3/4 inch thick full width ceramic fiber blanket made of aluminum oxide (Al₂O₃) and silicon dioxide (SiO₂) in compliance with ASTM C892 Type III or higher. The ceramic fiber blanket must fill the web space with no gaps and a snug fit within inside faces of the flanges. Fasteners: 7/8 inch long staples spaced 16 inches on center and staggered in 2 rows with 1-3/4 inches from both top and bottom of the web, as shown. The vertical staple-to-staple distance between adjacent rows of staples must be 3 inches maximum with additional rows of staples added as necessary (i.e., 2 rows for 9-1/2-inch, 3 rows for 11-7/8-inch, 4 rows for 14-inch, and 5 rows for 16-inch deep I-joists). At each hole location, 4 staples shall be added at 1 inch from the top, bottom, left, and right edges of the web hole.
- (D) Automatic sprinkler system: System in accordance with Section P2904 of the 2012, 2015, and 2018 IRC, NFPA 13D, or other equivalent sprinkler systems.

Notes:

- (a) In accordance with Exception 3 of 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13, portions of floor assembly can be unprotected when complying with the following:
 - 1) The aggregate area of the unprotected portions shall not exceed 80 square feet.
 - 2) Fire blocking in accordance with 2012, 2015, and 2018 IRC Section R302.11.1 shall be installed along the perimeter of the unprotected portion to separate the unprotected portion from the remainder of the floor assembly.
- (b) Insulation may be required for energy code compliance purposes. Check with the local building official for specific jurisdictional requirements.
- (c) In accordance with 2012, 2015, and 2018 IRC Section P2904, partial residential sprinkler systems are permitted to be installed only when the entire dwelling unit is not required to be equipped with a residential sprinkler system. Check with the local building official for specific jurisdictional requirements.
- (d) Penetrations or openings for ducts, vents, electrical outlets, lighting, devices, luminaires, wires, speakers, drainage, piping and similar openings or penetrations shall be permitted.

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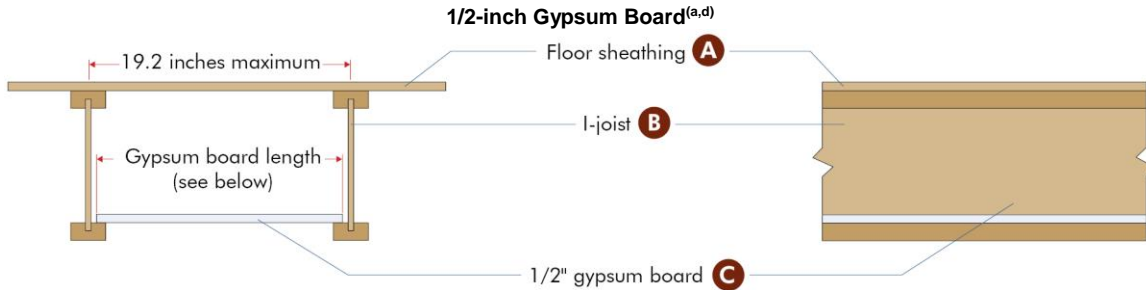


Fire Protection of Floors (FP-06) for Compliance with 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13

Fire Protection: 1/2-inch Gypsum Board Installed on Top of the Bottom Flange

The following fire resistance design is an alternative to the 2-by-10 dimensional lumber prescribed in 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13 Exception 4, with demonstrated equivalent fire performance

All BCI Joists except for BCI 40, 400, 4000, 45, 450, and 4500 Joists; All AJS Joists



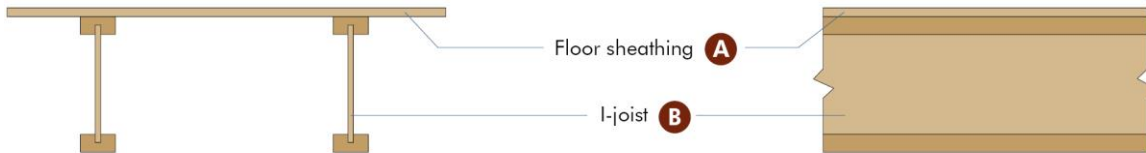
Joist spacing (in.)	Required length for gypsum boards (in.)
12	11-1/8 ± 1/8
16	15-1/8 ± 1/8
19.2	18-1/4 ± 1/8

Note:

Gypsum board lengths shown above provide at least 1/4" bearing on the top of the bottom flange in each I-joist as installed.

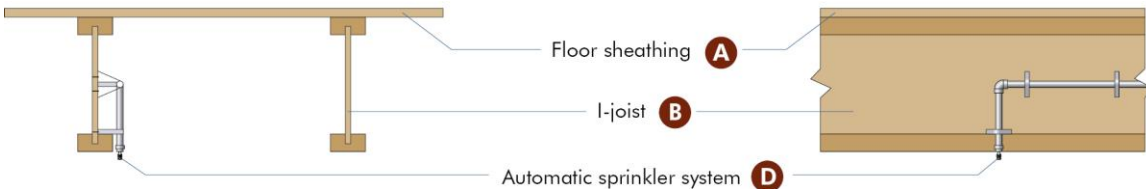
Crawl Space Exception^(b)

In accordance with Exception 2 of the 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13, floor assemblies located directly over a crawl space not intended for storage or fuel-fired appliances do not require gypsum board for fire protection.



Automatic Sprinkler Exception^(c)

In accordance with Exception 1 of the 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13, floor assemblies located directly over a space protected by an automatic sprinkler system do not require gypsum board for fire protection.



- (A) Floor sheathing: Materials and installation in accordance with 2012, 2015, and 2018 IRC Section R503.
- (B) I-joist: Installation in accordance with Section 4.0 of this report. Maximum 19.2 inches on center spacing. Minimum flange size of 1-1/8 inches thick x 2 inches wide. Minimum web thickness of 3/8 inch. Adhesives used shall be as described in the quality manual approved by APA.
- (C) 1-layer of 1/2-inch lightweight or normal weight (nominal 1.5 psf minimum) gypsum wall board meeting ASTM C1396 Section 5: Installed on the top of the bottom flange. Mechanical fastener or adhesive attachment to the top of the bottom flange is not required.
- (D) Automatic sprinkler system: System in accordance with Section P2904 of the 2012, 2015, and 2018 IRC, NFPA 13D, or other equivalent sprinkler systems.

(Continued next page)



(FP-06 Continued)

Notes:

- (a) In accordance with Exception 3 of 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13, portions of floor assembly can be unprotected when complying with the following:
 - 1) The aggregate area of the unprotected portions shall not exceed 80 square feet.
 - 2) Fire blocking in accordance with 2012, 2015, and 2018 IRC Section R302.11.1 shall be installed along the perimeter of the unprotected portion to separate the unprotected portion from the remainder of the floor assembly.
- (b) Insulation may be required for energy code compliance purposes. Check with the local building official for specific jurisdictional requirements.
- (c) In accordance with 2012, 2015, and 2018 IRC Section P2904, partial residential sprinkler systems are permitted to be installed only when the entire dwelling unit is not required to be equipped with a residential sprinkler system. Check with the local building official for specific jurisdictional requirements.
- (d) Penetrations or openings for ducts, vents, electrical outlets, lighting, devices, luminaires, wires, speakers, drainage, piping and similar openings or penetrations shall be permitted.

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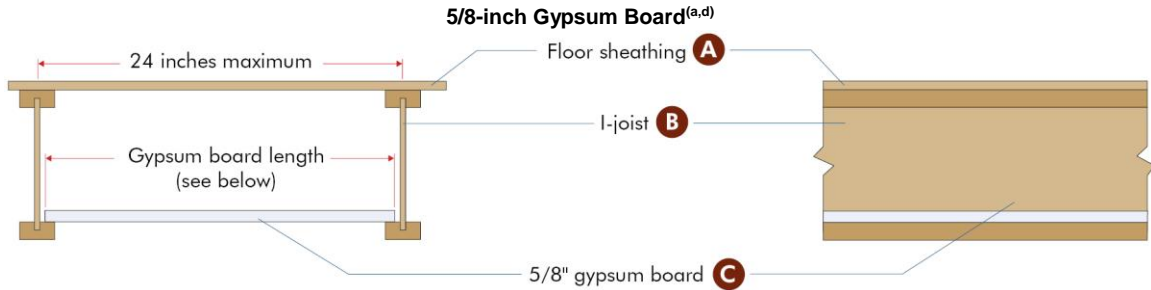


Fire Protection of Floors (FP-07) for Compliance with 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13

Fire Protection: 5/8-inch Gypsum Board Installed on Top of the Bottom Flange

The following fire resistance design is an alternative to the 2-by-10 dimensional lumber prescribed in 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13 Exception 4, with demonstrated equivalent fire performance

All BCI Joists except for BCI 40, 400, 4000, 45, 450, and 4500 Joists; All AJS Joists



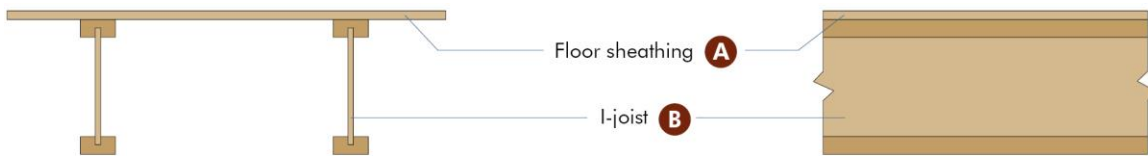
Joist spacing (in.)	Required length for gypsum boards (in.)
12	11-1/8 ± 1/8
16	15-1/8 ± 1/8
19.2	18-1/4 ± 1/8
24	23-1/8 ± 1/8

Note:

Gypsum board lengths shown above provide at least 1/4" bearing on the top of the bottom flange in each I-joist as installed.

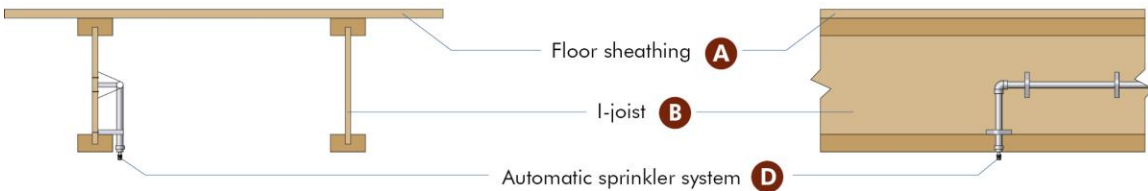
Crawl Space Exception^(b)

In accordance with Exception 2 of the 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13, floor assemblies located directly over a crawl space not intended for storage or fuel-fired appliances do not require gypsum board for fire protection.



Automatic Sprinkler Exception^(c)

In accordance with Exception 1 of the 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13, floor assemblies located directly over a space protected by an automatic sprinkler system do not require gypsum board for fire protection.



- (A) Floor sheathing: Materials and installation in accordance with 2012, 2015, and 2018 IRC Section R503.
- (B) I-joist: Installation in accordance with Section 4.0 of this report. Maximum 24 inches on center spacing. Minimum flange size of 1-1/8 inches thick x 2 inches wide. Minimum web thickness of 3/8 inch. Adhesives used shall be as described in the quality manual approved by APA.
- (C) 1-layer of 5/8-inch lightweight or normal weight (nominal 1.9 psf minimum) gypsum wall board meeting ASTM C1396 Section 5: Installed on the top of the bottom flange. Mechanical fastener or adhesive attachment to the top of the bottom flange is not required.
- (D) Automatic sprinkler system: System in accordance with Section P2904 of the 2012, 2015, and 2018 IRC, NFPA 13D, or other equivalent sprinkler systems.

(Continued next page)

REPRESENTING THE ENGINEERED WOOD INDUSTRY



(FP-07 Continued)

Notes:

- (a) In accordance with Exception 3 of 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13, portions of floor assembly can be unprotected when complying with the following:
 - 1) The aggregate area of the unprotected portions shall not exceed 80 square feet.
 - 2) Fire blocking in accordance with 2012, 2015, and 2018 IRC Section R302.11.1 shall be installed along the perimeter of the unprotected portion to separate the unprotected portion from the remainder of the floor assembly.
- (b) Insulation may be required for energy code compliance purposes. Check with the local building official for specific jurisdictional requirements.
- (c) In accordance with 2012, 2015, and 2018 IRC Section P2904, partial residential sprinkler systems are permitted to be installed only when the entire dwelling unit is not required to be equipped with a residential sprinkler system. Check with the local building official for specific jurisdictional requirements.
- (d) Penetrations or openings for ducts, vents, electrical outlets, lighting, devices, luminaires, wires, speakers, drainage, piping and similar openings or penetrations shall be permitted.

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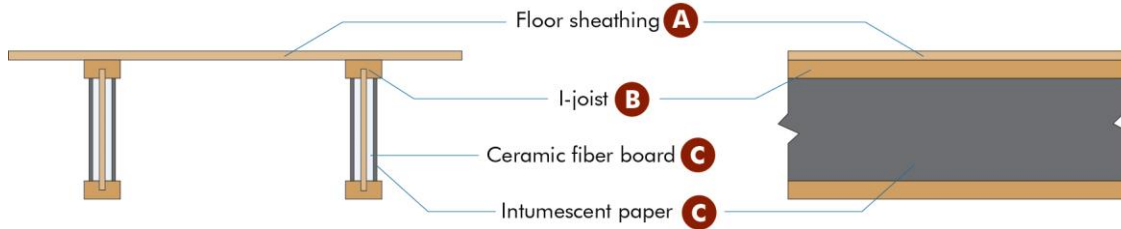
Fire Protection of Floors (FP-08) for Compliance with 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13

Fire Protection: Factory-Applied FireBreak HITS® Ceramic Fiber Board and Intumescent Paper

The following fire resistance design is an alternative to the 2-by-10 dimensional lumber prescribed in 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13 Exception 4, with demonstrated equivalent fire performance

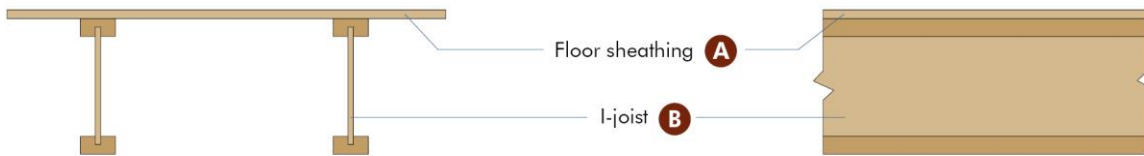
BCI 60, 60S, 65, 90 and 90e Joists; All AJS Joists

Factory-Applied FireBreak HITS® Ceramic Fiber Board and Intumescent Paper^(a,b)



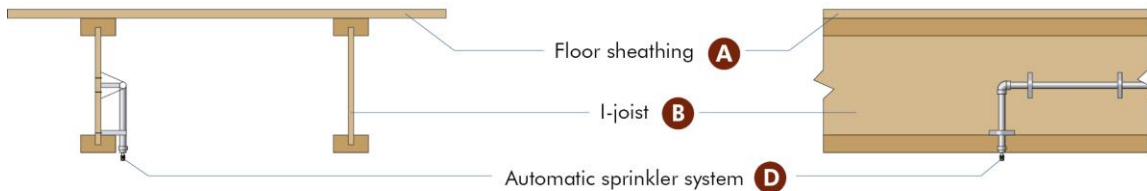
Crawl Space Exception^(c)

In accordance with Exception 2 of the 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13, floor assemblies located directly over a crawl space not intended for storage or fuel-fired appliances do not require mineral wool insulation for fire protection.



Automatic Sprinkler Exception^(d)

In accordance with Exception 1 of the 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13, floor assemblies located directly over a space protected by an automatic sprinkler system do not require ceramic fiber board for fire protection.



- (A) Floor sheathing: Materials and installation in accordance with 2012, 2015, and 2018 IRC Section R503.
- (B) I-joist: Installation in accordance with Section 4.0 of this report. Maximum 24 inches on center spacing. Minimum flange size of 1-1/2 inches thick x 2-5/16 inches wide. Minimum web thickness of 3/8 inch. I-joist adhesives used shall be as described in the quality manual approved by APA.
- (C) Factory-applied proprietary FireBreak HITS® Ceramic Fiber Board and Intumescent Paper: The factory-applied proprietary FireBreak HITS® ceramic fiber board and intumescent paper, as documented in the quality manual, covers the web.
- (D) Automatic sprinkler system: System in accordance with Section P2904 of the 2012, 2015, and 2018 IRC, NFPA 13D, or other equivalent sprinkler systems.

Notes:

- (a) In accordance with Exception 3 of 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13, portions of floor assembly can be unprotected when complying with the following:
 - 1) The aggregate area of the unprotected portions shall not exceed 80 square feet.
 - 2) Fire blocking in accordance with 2012, 2015, and 2018 IRC Section R302.11.1 shall be installed along the perimeter of the unprotected portion to separate the unprotected portion from the remainder of the floor assembly.

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REPRESENTING THE ENGINEERED WOOD INDUSTRY



(FP-08 Continued)

- (b) Insulation may be required for energy code compliance purposes. Check with the local building official for specific jurisdictional requirements.
- (c) In accordance with 2012, 2015, and 2018 IRC Section P2904, partial residential sprinkler systems are permitted to be installed only when the entire dwelling unit is not required to be equipped with a residential sprinkler system. Check with the local building official for specific jurisdictional requirements.
- (d) Penetrations or openings for ducts, vents, electrical outlets, lighting, devices, luminaires, wires, speakers, drainage, piping and similar openings or penetrations shall be permitted.

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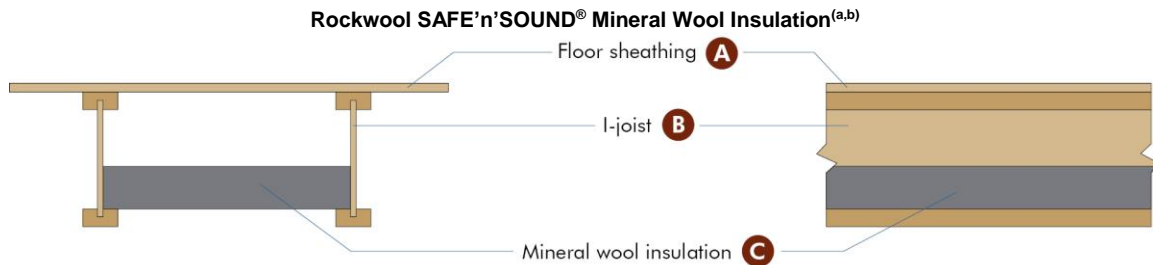


Fire Protection of Floors (**FP-09**) for Compliance with 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13

Fire Protection: Rockwool SAFE'n'Sound® Mineral Wool Insulation

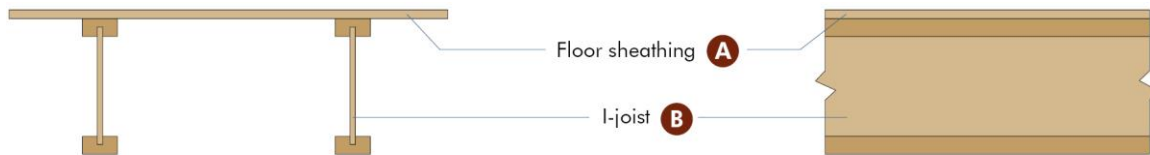
The following fire resistance design is an alternative to the 2-by-10 dimensional lumber prescribed in 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13 Exception 4, with demonstrated equivalent fire performance

All BCI Joists except for BCI 40, 400, 4000, 45, 450, and 4500 Joists; All AJS Joists



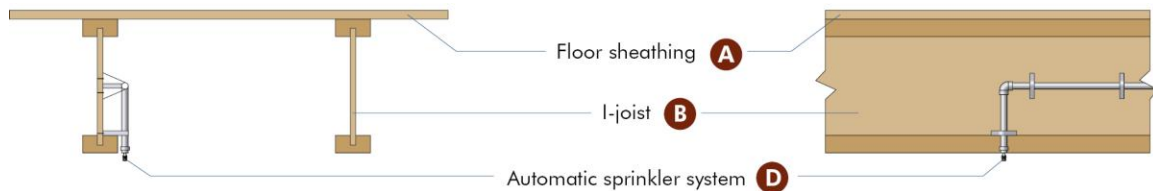
Crawl Space Exception^(c)

In accordance with Exception 2 of the 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13, floor assemblies located directly over a crawl space not intended for storage or fuel-fired appliances do not require mineral wool insulation for fire protection.



Automatic Sprinkler Exception^(d)

In accordance with Exception 1 of the 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13, floor assemblies located directly over a space protected by an automatic sprinkler system do not require mineral wool insulation for fire protection.



- (A) Floor sheathing: Materials and installation in accordance with 2012, 2015, and 2018 IRC Section R503.
- (B) I-joist: Installation in accordance with Section 4.0 of this report. Maximum 24 inches on center spacing. Minimum flange size of 1-1/8 inches thick x 2 inches wide. Minimum web thickness of 3/8 inch. Adhesives used shall be as described in the quality manual approved by APA.
- (C) Mineral wool insulation: Rockwool SAFE'n'SOUND® minimum 2.5 lb/ft³ (nominal) and 3 inches thick mineral wool batt insulation made of rock or furnace slag (ASTM C665 Type 1 compliant) installed as shown with insulation stay wire supports, spaced no more than 24 inches apart and no more than 4 inches from ends of batts. Use min. 15.25 inches, 18.5 inches, and 23 inches wide batts when I-joist spacing is 16 inches, 19.2 inches, and 24 inches on center, respectively.
- (D) Automatic sprinkler system: System in accordance with Section P2904 of the 2012, 2015, and 2018 IRC, NFPA 13D, or other equivalent sprinkler systems.

Notes:

- (a) In accordance with Exception 3 of 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13, portions of floor assembly can be unprotected when complying with the following:
 - 1) The aggregate area of the unprotected portions shall not exceed 80 square feet.
 - 2) Fire blocking in accordance with 2012, 2015, and 2018 IRC Section R302.11.1 shall be installed along the perimeter of the unprotected portion to separate the unprotected portion from the remainder of the floor assembly.
- (b) Thicker insulation may be required for energy code compliance purposes. Check with the local building official for specific jurisdictional requirements.

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REPRESENTING THE ENGINEERED WOOD INDUSTRY



(FP-09 Continued)

- (c) Insulation may be required for energy code compliance purposes. Check with the local building official for specific jurisdictional requirements.
- (d) In accordance with 2012, 2015, and 2018 IRC Section P2904, partial residential sprinkler systems are permitted to be installed only when the entire dwelling unit is not required to be equipped with a residential sprinkler system. Check with the local building official for specific jurisdictional requirements.
- (e) Penetrations or openings for ducts, vents, electrical outlets, lighting, devices, luminaires, wires, speakers, drainage, piping and similar openings or penetrations shall be permitted.

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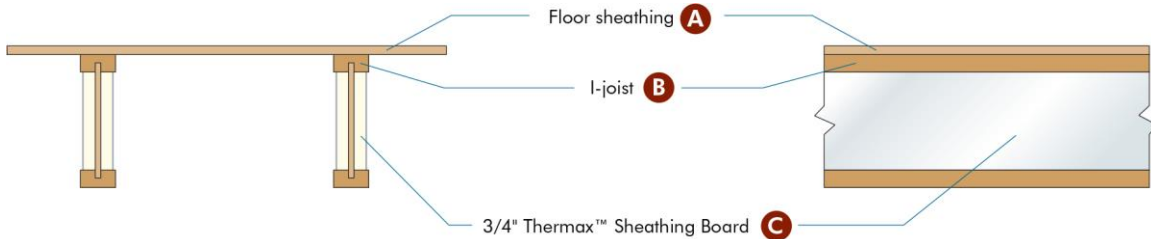
Fire Protection of Floors (**FP-10**) for Compliance with 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13

Fire Protection: FMJ - Factory-Applied Thermax™ Sheathing Board

The following fire resistance design is an alternative to the 2-by-10 dimensional lumber prescribed in 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13 Exception 4, with demonstrated equivalent fire performance

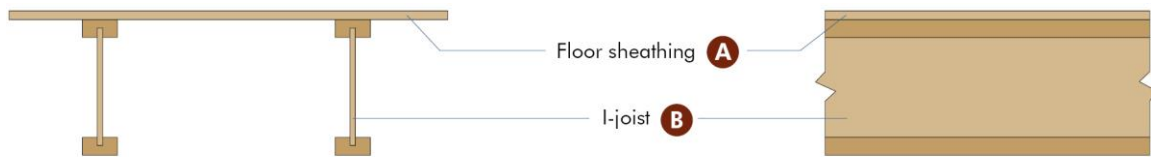
BCI 60, 60S, 65, 90, and 90e Joists; All AJS Joists

FMJ - Factory-Applied Thermax™ Sheathing Board ^(a,b)



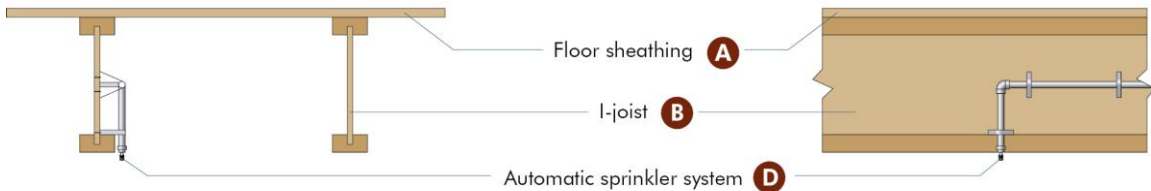
Crawl Space Exception^(c)

In accordance with Exception 2 of the 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13, floor assemblies located directly over a crawl space not intended for storage or fuel-fired appliances do not require additional fire protection.



Automatic Sprinkler Exception^(d)

In accordance with Exception 1 of the 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13, floor assemblies located directly over a space protected by an automatic sprinkler system do not require additional fire protection.



- (A) Floor sheathing: Materials and installation in accordance with 2012, 2015, and 2018 IRC Section R503.
- (B) I-joist: Installation in accordance with Section 4.0 of this report. Maximum 24 inches on center spacing. Minimum flange size of 1-1/2 inches thick x 2-5/16 inches wide. Minimum web thickness of 3/8 inch. I-joist adhesives used shall be as described in the quality manual approved by APA.
- (C) FMJ Factory-applied Thermax™ Sheathing Board: One layer of 3/4-inch thick Thermax™ Sheathing board conforming to ICC-ES ESR-1659 is adhered to each side of the I-joist web to tight fit within inside faces of the flanges. Adjacent Thermax™ Sheathing boards shall be tight fit in accordance with the in-plant manufacturing standard.
- (D) Automatic sprinkler system: System in accordance with Section P2904 of the 2012, 2015, and 2018 IRC, NFPA 13D, or other equivalent sprinkler systems.

Notes:

- (a) In accordance with Exception 3 of 2012 IRC Section R501.3 and 2015/2018 IRC Section R302.13, portions of floor assembly can be unprotected when complying with the following:
 - 1) The aggregate area of the unprotected portions shall not exceed 80 square feet.
 - 2) Fire blocking in accordance with 2012, 2015, and 2018 IRC Section R302.11.1 shall be installed along the perimeter of the unprotected portion to separate the unprotected portion from the remainder of the floor assembly.
- (b) Insulation may be required for energy code compliance purposes. Check with the local building official for specific jurisdictional requirements.
- (c) In accordance with 2012, 2015, and 2018 IRC Section P2904, partial residential sprinkler systems are permitted to be installed only when the entire dwelling unit is not required to be equipped with a residential sprinkler system. Check with the local building official for specific jurisdictional requirements.
- (d) Penetrations or openings for ducts, vents, electrical outlets, lighting, devices, luminaires, wires, speakers, drainage, piping and similar openings or penetrations shall be permitted.

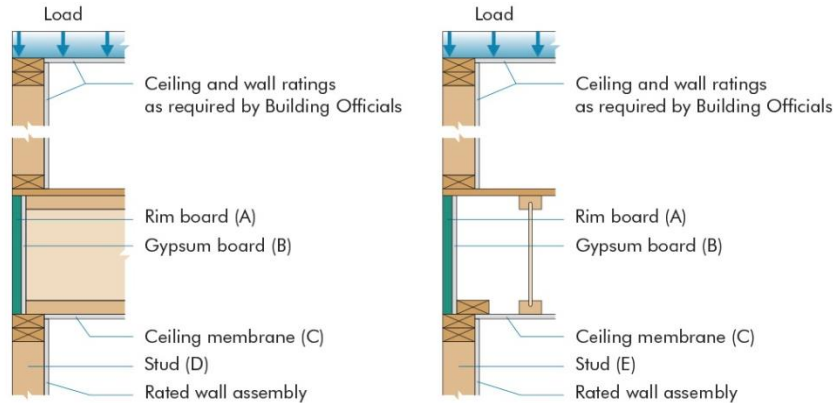
REPRESENTING THE ENGINEERED WOOD INDUSTRY



Boise Cascade Assembly RB1

Fire Resistance Rated Rim Board Assembly

The following fire resistance design is listed in accordance with ASTM E119 and CAN/ULC S101



End Wall Configuration Base Assembly

Rim Board Thickness, in.	Rim Board Protection	Ceiling Membrane Req. for 1-hr	Ceiling Membrane Req. for 2-hr	Stud Size	Stud Size
A	B	C	C	D	E
1	Unprotected	1-hour Fire-rated Assembly	2-hour Fire-rated Assembly	2x4	2x4
	(1) 1/2" Type X	5/8" Type X	2-hour Fire-rated Assembly	2x4	2x4
	(1) 5/8" Type X	5/8" Type X	90-min Fire-rated Assembly	2x4	2x4
	(2) 1/2" Type X	No Ceiling Required	1-hour Fire-rated Assembly	2x6	2x4
	(2) 5/8" Type X	No Ceiling Required	5/8" Type X	2x6	2x4
1-1/8	Unprotected	1-hour Fire-rated Assembly	2-hour Fire-rated Assembly	2x4	2x4
	(1) 1/2" Type X	5/8" Type X	2-hour Fire-rated Assembly	2x4	2x4
	(1) 5/8" Type X	5/8" Type X	90-min Fire-rated Assembly	2x4	2x4
	(2) 1/2" Type X	No Ceiling Required	1-hour Fire-rated Assembly	2x6	2x4
	(2) 5/8" Type X	No Ceiling Required	5/8" Type X	2x6	2x4
1-1/4	Unprotected	1-hour Fire-rated Assembly	2-hour Fire-rated Assembly	2x4	2x4
	(1) 1/2" Type X	5/8" Type X	2-hour Fire-rated Assembly	2x4	2x4
	(1) 5/8" Type X	5/8" Type X	90-min Fire-rated Assembly	2x6	2x4
	(2) 1/2" Type X	No Ceiling Required	1-hour Fire-rated Assembly	2x6	2x4
	(2) 5/8" Type X	No Ceiling Required	5/8" Type X	2x6	2x4
1-1/2	Unprotected	1-hour Fire-rated Assembly	2-hour Fire-rated Assembly	2x4	2x4
	(1) 1/2" Type X	5/8" Type X	90-min Fire-rated Assembly	2x6	2x4
	(1) 5/8" Type X	1/2" Type X	90-min Fire-rated Assembly	2x6	2x4
	(2) 1/2" Type X	No Ceiling Required	1-hour Fire-rated Assembly	2x6	2x4
	(2) 5/8" Type X	No Ceiling Required	5/8" Type X	2x6	2x6
1-3/4	Unprotected	1-hour Fire-rated Assembly	2-hour Fire-rated Assembly	2x4	2x4
	(1) 1/2" Type X	5/8" Type X	90-min Fire-rated Assembly	2x6	2x4
	(1) 5/8" Type X	1/2" Type X	90-min Fire-rated Assembly	2x6	2x4
	(2) 1/2" Type X	No Ceiling Required	45-min Fire-rated Assembly	2x6	2x6
	(2) 5/8" Type X	No Ceiling Required	5/8" Type X	2x6	2x6

- 1) Rim assembly for fire from inside of structure.
- 2) Gypsum wallboard shown on the ceiling is to protect the Rim Board only. It does not necessarily cause the floor assembly to be rated.
- 3) Attach 1/2" Type X to Rim Board with 1-1/2-inch Type W drywall screws spaced 12 inches o.c.
- 4) Attach 5/8" Type X to Rim Board with 2-inch Type W drywall screws spaced 12 inches o.c.
- 5) Provide min. 1-3/4-inch bearing for I-joint.
- 6) Use only fire rated gypsum wallboard. Type C may be substituted for Type X.
- 7) Rim Board and gypsum wallboard thickness are shown as minimums. Thicker Rim Board and gypsum wallboard may be substituted.
- 8) When two layers of gypsum wallboard are used, I-joint end nails shall be 16d box (0.135 inch x 3-1/2 inches) nails.
- 9) Rim board needs to be sized for vertical and lateral load.

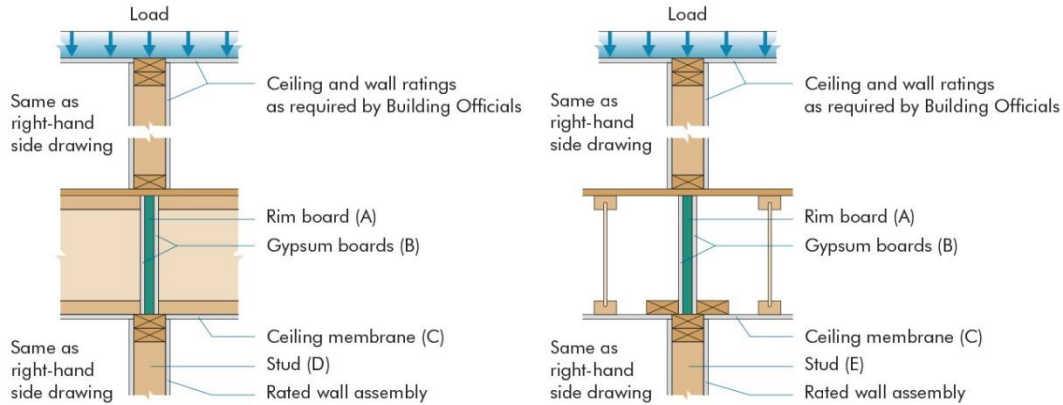
REPRESENTING THE ENGINEERED WOOD INDUSTRY



Boise Cascade Assembly RB2

Fire Resistance Rated Rim Board Assembly

The following fire resistance design is listed in accordance with ASTM E119 and CAN/ULC S101



Single Wall Configuration Base Assembly

Rim Board Thickness, in.	Rim Board Protection	Ceiling Membrane Req. for 1-hr	Ceiling Membrane Req. for 2-hr	Stud Size	Stud Size
A	B	C	C	D	E
1	Unprotected	45-min Fire-rated Assembly	2-hour Fire-rated Assembly	2x6	2x4
	(1) 1/2" Type X	1/2" Type X	90-min Fire-rated Assembly	2x6	2x6
	(1) 5/8" Type X	1/2" Type X	90-min Fire-rated Assembly	2x8	2x6
	(2) 1/2" Type X	No Ceiling Required	5/8" Type X	2x8	2x6
	(2) 5/8" Type X	No Ceiling Required	1/2" Type X	2x8	2x6
1-1/8	Unprotected	45-min Fire-rated Assembly	2-hour Fire-rated Assembly	2x6	2x4
	(1) 1/2" Type X	1/2" Type X	90-min Fire-rated Assembly	2x8	2x6
	(1) 5/8" Type X	1/2" Type X	90-min Fire-rated Assembly	2x8	2x6
	(2) 1/2" Type X	No Ceiling Required	5/8" Type X	2x8	2x6
	(2) 5/8" Type X	No Ceiling Required	1/2" Type X	2x8	2x6
1-1/4	Unprotected	5/8" Type X	2-hour Fire-rated Assembly	2x6	2x4
	(1) 1/2" Type X	1/2" Type X	90-min Fire-rated Assembly	2x8	2x6
	(1) 5/8" Type X	1/2" Type X	90-min Fire-rated Assembly	2x8	2x6
	(2) 1/2" Type X	No Ceiling Required	1/2" Type X	2x8	2x6
	(2) 5/8" Type X	No Ceiling Required	1/2" Type X	2x8	2x6
1-1/2	Unprotected	5/8" Type X	2-hour Fire-rated Assembly	2x6	2x4
	(1) 1/2" Type X	1/2" Type X	90-min Fire-rated Assembly	2x8	2x6
	(1) 5/8" Type X	No Ceiling Required	1-hour Fire-rated Assembly	2x8	2x6
	(2) 1/2" Type X	No Ceiling Required	1/2" Type X	2x8	2x6
	(2) 5/8" Type X	No Ceiling Required	1/2" Type X	2x8	2x8
1-3/4	Unprotected	5/8" Type X	90-min Fire-rated Assembly	2x6	2x4
	(1) 1/2" Type X	1/2" Type X	90-min Fire-rated Assembly	2x8	2x6
	(1) 5/8" Type X	No Ceiling Required	1-hour Fire-rated Assembly	2x8	2x6
	(2) 1/2" Type X	No Ceiling Required	1/2" Type X	2x8	2x6
	(2) 5/8" Type X	No Ceiling Required	No Ceiling Required	2x8	2x8

- Rim assembly for fire from either side of wall.
- Gypsum wallboard shown on the ceiling is to protect the Rim Board only. It does not necessarily cause the floor assembly to be rated.
- Attach 1/2-inch Type X to Rim Board with 1-1/2-inch Type W drywall screws spaced 12 inches o.c.
- Attach 5/8-inch Type X to Rim Board with 2-inch Type W drywall screws spaced 12 inches o.c.
- Provide min. 1-3/4-inch bearing for I-joint.
- Use only fire rated gypsum wallboard. Type C may be substituted for Type X.
- Rim Board and gypsum wallboard thickness are shown as minimums. Thicker Rim Board and gypsum wallboard may be substituted.
- Toe nailing from the I-joint flange to the rim is permitted. When 2-layer (or more) gypsum wallboards are used, I-joint end nails shall be 16d box (0.135 inch x 3-1/2 inches) nails.
- Rim board needs to be sized for vertical and lateral load.

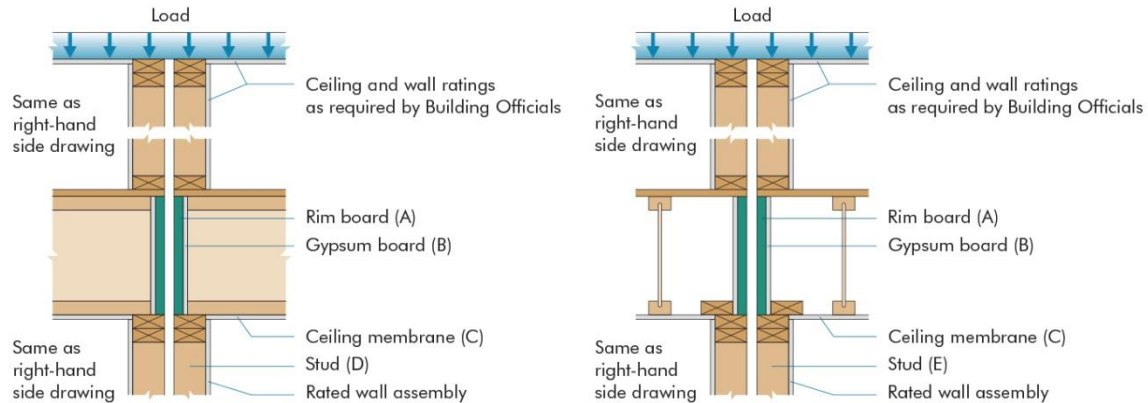
REPRESENTING THE ENGINEERED WOOD INDUSTRY



Boise Cascade Assembly RB3

Fire Resistance Rated Rim Board Assembly

The following fire resistance design is listed in accordance with ASTM E119 and CAN/ULC S101



Double Wall Configuration with Load Transfer Base Assembly

Rim Board Thickness, in.	Rim Board Protection	Ceiling Membrane Req. for 1-hr	Ceiling Membrane Req. for 2-hr	Stud Size	Stud Size
A	B	C	C	D	E
1	Unprotected	1/2" Type X	90-min Fire-rated Assembly	2x4	2x4
	(1) 1/2" Type X	No Ceiling Required	1-hour Fire-rated Assembly	2x4	2x4
	(1) 5/8" Type X	No Ceiling Required	45-min Fire-rated Assembly	2x6	2x4
	(2) 1/2" Type X	No Ceiling Required	No Ceiling Required	2x6	2x4
	(2) 5/8" Type X	No Ceiling Required	No Ceiling Required	2x6	2x4
1-1/8	Unprotected	1/2" Type X	90 min Fire-rated Assembly	2x4	2x4
	(1) 1/2" Type X	No Ceiling Required	1-hour Fire-rated Assembly	2x4	2x4
	(1) 5/8" Type X	No Ceiling Required	5/8" Type X	2x4	2x4
	(2) 1/2" Type X	No Ceiling Required	No Ceiling Required	2x6	2x4
	(2) 5/8" Type X	No Ceiling Required	No Ceiling Required	2x6	2x4
1-1/4	Unprotected	1/2" Type X	90 min Fire-rated Assembly	2x4	2x4
	(1) 1/2" Type X	No Ceiling Required	45-min Fire-rated Assembly	2x4	2x4
	(1) 5/8" Type X	No Ceiling Required	5/8" Type X	2x4	2x4
	(2) 1/2" Type X	No Ceiling Required	No Ceiling Required	2x6	2x4
	(2) 5/8" Type X	No Ceiling Required	No Ceiling Required	2x6	2x4
1-1/2	Unprotected	No Ceiling Required	1-hour Fire-rated Assembly	2x4	2x4
	(1) 1/2" Type X	No Ceiling Required	5/8" Type X	2x6	2x4
	(1) 5/8" Type X	No Ceiling Required	1/2" Type X	2x6	2x4
	(2) 1/2" Type X	No Ceiling Required	No Ceiling Required	2x6	2x4
	(2) 5/8" Type X	No Ceiling Required	No Ceiling Required	2x6	2x6
1-3/4	Unprotected	No Ceiling Required	1-hour Fire-rated Assembly	2x6	2x6
	(1) 1/2" Type X	No Ceiling Required	1/2" Type X	2x6	2x6
	(1) 5/8" Type X	No Ceiling Required	No Ceiling Required	2x6	2x6
	(2) 1/2" Type X	No Ceiling Required	No Ceiling Required	2x6	2x6
	(2) 5/8" Type X	No Ceiling Required	No Ceiling Required	2x6	2x6

- 1) Rim assembly for fire from either side of wall. "With load transfer" assumes load transfers to the adjacent rim board if the fire exposed rim board fails.
- 2) Gypsum wallboard shown on the ceiling is to protect the Rim Board only. It does not necessarily cause the floor assembly to be rated.
- 3) Attach 1/2-inch Type X to Rim Board with 1-1/2-inch Type W drywall screws spaced 12 inches o.c.
- 4) Attach 5/8-inch Type X to Rim Board with 2-inch Type W drywall screws spaced 12 inches o.c.
- 5) Provide min. 1-3/4-inch bearing for I-joist.
- 6) Use only fire rated gypsum wallboard. Type C may be substituted for Type X.
- 7) Rim Board and gypsum wallboard thickness are shown as minimums. Thicker Rim Board and gypsum wallboard may be substituted.
- 8) Toe nailing from the I-joist flange to the rim is permitted. When 2-layer (or more) gypsum wallboards are used, I-joist end nails shall be 16d box (0.135 inch x 3-1/2 inches) nails.
- 9) Rim board needs to be sized for vertical and lateral load.

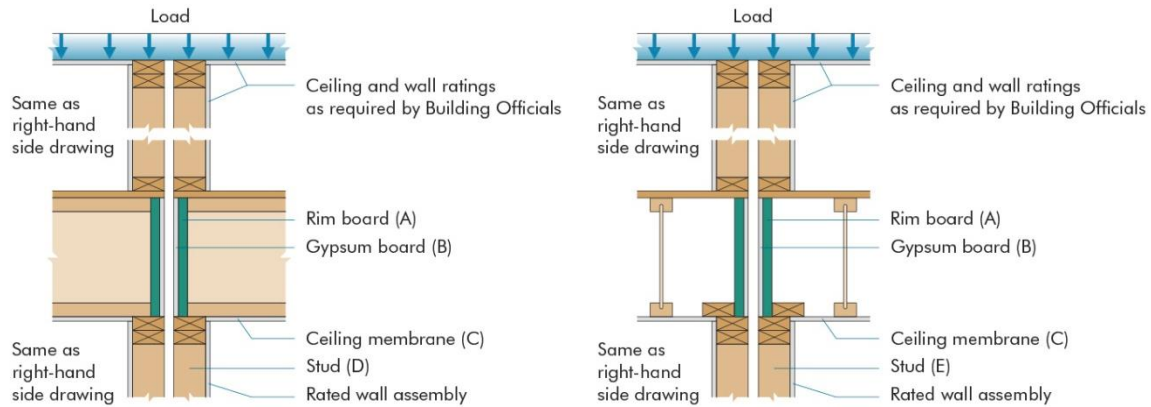
REPRESENTING THE ENGINEERED WOOD INDUSTRY



Boise Cascade Assembly RB4

Fire Resistance Rated Rim Board Assembly

The following fire resistance design is listed in accordance with ASTM E119 and CAN/ULC S101



Double Wall Configuration with Load Transfer Base Assembly

Rim Board Thickness, in.	Rim Board Protection	Ceiling Membrane Req. for 1-hr	Ceiling Membrane Req. for 2-hr	Stud Size	Stud Size
A	B	C	C	D	E
1	Unprotected	1/2" Type X	90-min Fire-rated Assembly	2x4	2x4
	(1) 1/2" Type X	No Ceiling Required	1-hour Fire-rated Assembly	2x4	2x4
	(1) 5/8" Type X	No Ceiling Required	1-hour Fire-rated Assembly	2x4	2x4
	(2) 1/2" Type X (2) 5/8" Type X	No Ceiling Required	1/2" Type X 1/2" Type X	2x6 2x6	2x4 2x4
1-1/8	Unprotected	1/2" Type X	90 min Fire-rated Assembly	2x4	2x4
	(1) 1/2" Type X	No Ceiling Required	1-hour Fire-rated Assembly	2x4	2x4
	(1) 5/8" Type X	No Ceiling Required	1-hour Fire-rated Assembly	2x4	2x4
	(2) 1/2" Type X (2) 5/8" Type X	No Ceiling Required	1/2" Type X No Ceiling Required	2x6 2x6	2x4 2x4
1-1/4	Unprotected	1/2" Type X	90 min Fire-rated Assembly	2x4	2x4
	(1) 1/2" Type X	No Ceiling Required	1-hour Fire-rated Assembly	2x4	2x4
	(1) 5/8" Type X	No Ceiling Required	45-min Fire-rated Assembly	2x6	2x4
	(2) 1/2" Type X (2) 5/8" Type X	No Ceiling Required	1/2" Type X No Ceiling Required	2x6 2x6	2x4 2x4
1-1/2	Unprotected	No Ceiling Required	1-hour Fire-rated Assembly	2x4	2x4
	(1) 1/2" Type X	No Ceiling Required	5/8" Type X	2x6	2x4
	(1) 5/8" Type X	No Ceiling Required	5/8" Type X	2x6	2x4
	(2) 1/2" Type X (2) 5/8" Type X	No Ceiling Required	No Ceiling Required No Ceiling Required	2x6 2x6	2x4 2x6
1-3/4	Unprotected	No Ceiling Required	1-hour Fire-rated Assembly	2x4	2x4
	(1) 1/2" Type X	No Ceiling Required	1/2" Type X	2x6	2x4
	(1) 5/8" Type X	No Ceiling Required	1/2" Type X	2x6	2x4
	(2) 1/2" Type X (2) 5/8" Type X	No Ceiling Required	No Ceiling Required No Ceiling Required	2x6 2x6	2x6 2x6

- 1) Rim assembly for fire from either side of wall. "With load transfer" assumes load transfers to the adjacent rim board if the fire exposed rim board fails.
- 2) Gypsum wallboard shown on the ceiling is to protect the Rim Board only. It does not necessarily cause the floor assembly to be rated.
- 3) Attach 1/2-inch Type X to Rim Board with 1-1/2-inch Type W drywall screws spaced 12 inches o.c.
- 4) Attach 5/8-inch Type X to Rim Board with 2-inch Type W drywall screws spaced 12 inches o.c.
- 5) Provide min. 1-3/4-inch bearing for I-joist.
- 6) Use only fire rated gypsum wallboard. Type C may be substituted for Type X.
- 7) Rim Board and gypsum wallboard thickness are shown as minimums. Thicker Rim Board and gypsum wallboard may be substituted.
- 8) Toe nailing from the I-joist flange to the rim is permitted. When 2-layer (or more) gypsum wallboards are used, I-joist end nails shall be 16d box (0.135 inch x 3-1/2 inches) nails.
- 9) Rim board needs to be sized for vertical and lateral load.

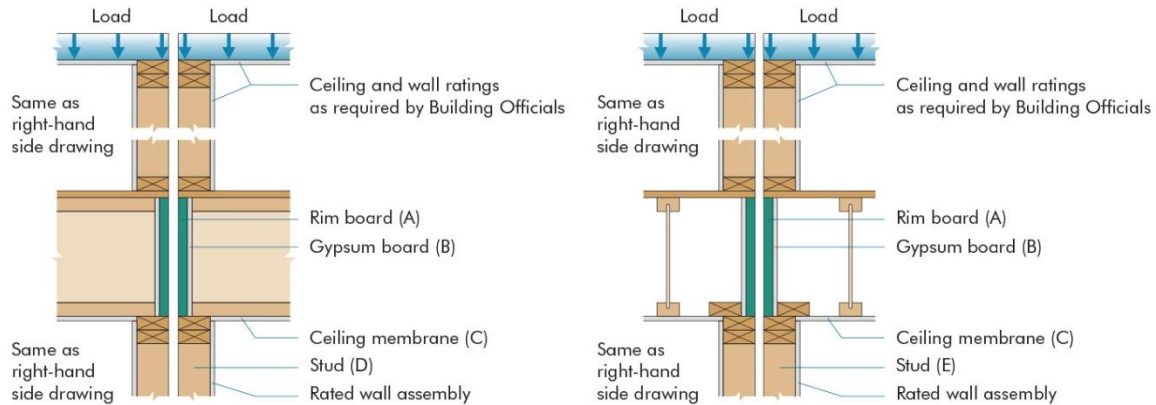
REPRESENTING THE ENGINEERED WOOD INDUSTRY



Boise Cascade Assembly RB5

Fire Resistance Rated Rim Board Assembly

The following fire resistance design is listed in accordance with ASTM E119 and CAN/ULC S101



Double Wall Configuration with No Load Transfer Base Assembly

Rim Board Thickness, in.	Rim Board Protection	Ceiling Membrane Req. for 1-hr	Ceiling Membrane Req. for 2-hr	Stud Size	Stud Size
A	B	C	C	D	E
1	Unprotected	5/8" Type X	2-hour Fire-rated Assembly	2x4	2x4
	(1) 1/2" Type X	1/2" Type X	90-min Fire-rated Assembly	2x4	2x4
	(1) 5/8" Type X	1/2" Type X	90-min Fire-rated Assembly	2x4	2x4
	(2) 1/2" Type X	No Ceiling Required	5/8" Type X	2x6	2x4
	(2) 5/8" Type X	No Ceiling Required	1/2" Type X	2x6	2x4
1-1/8	Unprotected	5/8" Type X	2-hour Fire-rated Assembly	2x4	2x4
	(1) 1/2" Type X	1/2" Type X	90-min Fire-rated Assembly	2x4	2x4
	(1) 5/8" Type X	1/2" Type X	90-min Fire-rated Assembly	2x4	2x4
	(2) 1/2" Type X	No Ceiling Required	5/8" Type X	2x6	2x4
	(2) 5/8" Type X	No Ceiling Required	1/2" Type X	2x6	2x4
1-1/4	Unprotected	5/8" Type X	2-hour Fire-rated Assembly	2x4	2x4
	(1) 1/2" Type X	1/2" Type X	90-min Fire-rated Assembly	2x4	2x4
	(1) 5/8" Type X	1/2" Type X	90-min Fire-rated Assembly	2x6	2x4
	(2) 1/2" Type X	No Ceiling Required	5/8" Type X	2x6	2x4
	(2) 5/8" Type X	No Ceiling Required	1/2" Type X	2x6	2x4
1-1/2	Unprotected	1/2" Type X	90-min Fire-rated Assembly	2x4	2x4
	(1) 1/2" Type X	1/2" Type X	90-min Fire-rated Assembly	2x6	2x4
	(1) 5/8" Type X	No Ceiling Required	1-hour Fire-rated Assembly	2x6	2x4
	(2) 1/2" Type X	No Ceiling Required	1/2" Type X	2x6	2x4
	(2) 5/8" Type X	No Ceiling Required	1/2" Type X	2x6	2x6
1-3/4	Unprotected	1/2" Type X	90-min Fire-rated Assembly	2x4	2x4
	(1) 1/2" Type X	No Ceiling Required	1-hour Fire-rated Assembly	2x6	2x4
	(1) 5/8" Type X	No Ceiling Required	1-hour Fire-rated Assembly	2x6	2x4
	(2) 1/2" Type X	No Ceiling Required	1/2" Type X	2x6	2x6
	(2) 5/8" Type X	No Ceiling Required	No Ceiling Required	2x6	2x6

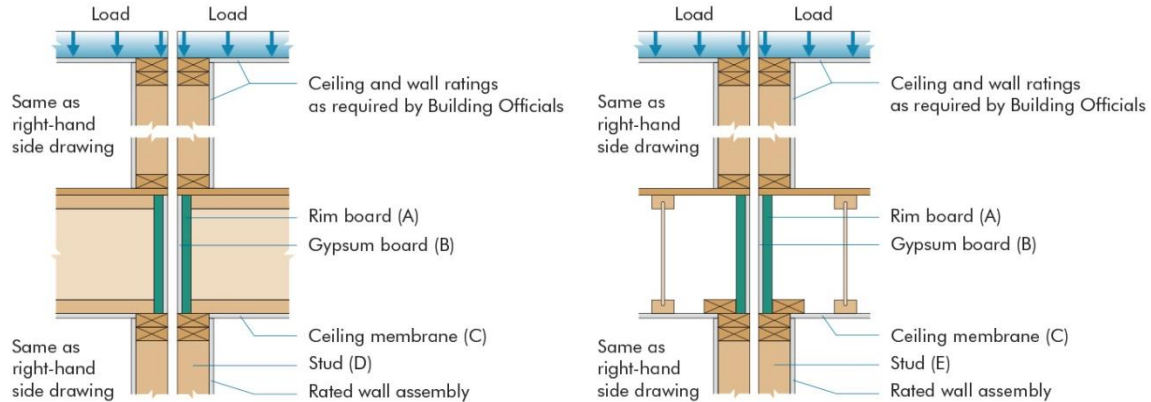
- 1) Rim assembly for fire from either side of wall. "With no load transfer" assumes no load transfers to the adjacent rim board if the fire exposed rim board fails.
- 2) Gypsum wallboard shown on the ceiling is to protect the Rim Board only. It does not necessarily cause the floor assembly to be rated.
- 3) Attach 1/2-inch Type X to Rim Board with 1-1/2-inch Type W drywall screws spaced 12 inches o.c.
- 4) Attach 5/8-inch Type X to Rim Board with 2-inch Type W drywall screws spaced 12 inches o.c.
- 5) Provide min. 1-3/4-inch bearing for I-joist.
- 6) Use only fire rated gypsum wallboard. Type C may be substituted for Type X.
- 7) Rim Board and gypsum wallboard thickness are shown as minimums. Thicker Rim Board and gypsum wallboard may be substituted.
- 8) Toe nailing from the I-joist flange to the rim is permitted. When 2-layer (or more) gypsum wallboards are used, I-joist end nails shall be 16d box (0.135 inch x 3-1/2 inches) nails.
- 9) Rim board needs to be sized for vertical and lateral load.

REPRESENTING THE ENGINEERED WOOD INDUSTRY



Boise Cascade Assembly RB6 Fire Resistance Rated Rim Board Assembly

The following fire resistance design is listed in accordance with ASTM E119 and CAN/ULC S101



Double Wall Configuration with No Load Transfer Base Assembly

Rim Board Thickness, in.	Rim Board Protection	Ceiling Membrane Req. for 1-hr	Ceiling Membrane Req. for 2-hr	Stud Size	Stud Size
A	B	C	C	D	E
1	Unprotected	5/8" Type X	2-hour Fire-rated Assembly	2x4	2x4
	(1) 1/2" Type X	1/2" Type X	90-min Fire-rated Assembly	2x4	2x4
	(1) 5/8" Type X	1/2" Type X	90-min Fire-rated Assembly	2x4	2x4
	(2) 1/2" Type X	No Ceiling Required	5/8" Type X	2x6	2x4
	(2) 5/8" Type X	No Ceiling Required	1/2" Type X	2x6	2x4
1-1/8	Unprotected	5/8" Type X	2-hour Fire-rated Assembly	2x4	2x4
	(1) 1/2" Type X	1/2" Type X	90-min Fire-rated Assembly	2x4	2x4
	(1) 5/8" Type X	1/2" Type X	90-min Fire-rated Assembly	2x4	2x4
	(2) 1/2" Type X	No Ceiling Required	1/2" Type X	2x6	2x4
	(2) 5/8" Type X	No Ceiling Required	1/2" Type X	2x6	2x4
1-1/4	Unprotected	5/8" Type X	2-hour Fire-rated Assembly	2x4	2x4
	(1) 1/2" Type X	1/2" Type X	90-min Fire-rated Assembly	2x4	2x4
	(1) 5/8" Type X	No Ceiling Required	1-hour Fire-rated Assembly	2x6	2x4
	(2) 1/2" Type X	No Ceiling Required	1/2" Type X	2x6	2x4
	(2) 5/8" Type X	No Ceiling Required	1/2" Type X	2x6	2x4
1-1/2	Unprotected	1/2" Type X	90-min Fire-rated Assembly	2x4	2x4
	(1) 1/2" Type X	1/2" Type X	90-min Fire-rated Assembly	2x6	2x4
	(1) 5/8" Type X	No Ceiling Required	1-hour Fire-rated Assembly	2x6	2x4
	(2) 1/2" Type X	No Ceiling Required	1/2" Type X	2x6	2x4
	(2) 5/8" Type X	No Ceiling Required	No Ceiling Required	2x6	2x6
1-3/4	Unprotected	1/2" Type X	90-min Fire-rated Assembly	2x4	2x4
	(1) 1/2" Type X	No Ceiling Required	1-hour Fire-rated Assembly	2x6	2x4
	(1) 5/8" Type X	No Ceiling Required	45-min Fire-rated Assembly	2x6	2x4
	(2) 1/2" Type X	No Ceiling Required	No Ceiling Required	2x6	2x6
	(2) 5/8" Type X	No Ceiling Required	No Ceiling Required	2x6	2x6

- 1) Rim assembly for fire from either side of wall. "With no load transfer" assumes no load transfers to the adjacent rim board if the fire exposed rim board fails.
- 2) Gypsum wallboard shown on the ceiling is to protect the Rim Board only. It does not necessarily cause the floor assembly to be rated.
- 3) Attach 1/2-inch Type X to Rim Board with 1-1/2-inch Type W drywall screws spaced 12 inches o.c.
- 4) Attach 5/8-inch Type X to Rim Board with 2-inch Type W drywall screws spaced 12 inches o.c.
- 5) Provide min. 1-3/4-inch bearing for I-joist.
- 6) Use only fire rated gypsum wallboard. Type C may be substituted for Type X.
- 7) Rim Board and gypsum wallboard thickness are shown as minimums. Thicker Rim Board and gypsum wallboard may be substituted.
- 8) Toe nailing from the I-joist flange to the rim is permitted. When 2-layer (or more) gypsum wallboards are used, I-joist end nails shall be 16d box (0.135 inch x 3-1/2 inches) nails.
- 9) Rim board needs to be sized for vertical and lateral load.

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