KUIKEN BROTHERS COMPANY, INC.
RESIDENTIAL & COMMERCIAL BUILDING MATERIALS
Since 1912
8 Locations in NJ & NY
www.kuikenbrothers.com/boisecascade | 201.652.1000 | info@kuikenbrothers.com

Welcome
to
Kuiken Brothers Architect Seminar Series:
Understanding Changes to 2015 Building Codes: Fire, Connectors & Energy

Boise Cascade Engineered I-Joist

Fire Protection Application

2012 Section 501.3 & 2015 IRC Section R302.13

February 2016

Boise Cascade
Engineered Wood Products

Great products are only the beginning.®

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Boise Cascade
Engineered Wood Products

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APA Code Approved
2012 IRC Section 501.3
and 2015 IRC Section R302.13

As of 01/2016

Boise Cascade
Engineered Wood Products

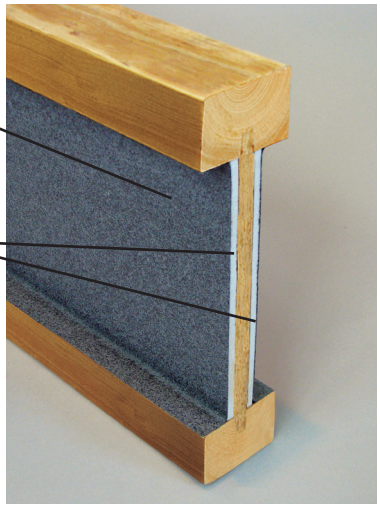
Applications	Installation	Material Estimated Cost	Product	Estimated Labor Cost
Firebreak™ HITS over Ceramic Fiberboard Layer *New* Due out Q1 2016	High Intumescent Thermal Shield over ceramic fiberboard layer on both sides of the I-Joist. Approved for AJS® and BCI® 5000 and larger series ***Pre-installed at the ALLJOIST® Mill***	33% more	9½" AJS® 20s 11⅞" AJS® 20s	X X
1½" VERSA-LAM® (LVL)	At this time, no fire protection is needed when framing with solid 1½" LVL or similar type material.			
½" Gypsum Drywall	Applied to bottom of flange, no tape or spackle required. Do not have to frame around drop duct work.			
Partial Sprinkler System In Accordance with IRCSP2904	Sprinkler heads to be installed in unfinished areas of basement.			
Drop In ½" Gypsum Drywall Panels	Pre-cut strips of ½" gypsum drywall panels between I-Joist bays supported on the top of the bottom joist flange			
Mineral wool, 3½" thickness	Mineral wool batts tucked between I-Joist bays held in with metal wire tension ties 24" o/c.			
FireBreak™ Ceramic Fiber, Field Applied; 29'-0 Rolls/Sold in Bundles	High purity ceramic fiber. Pre-cut to fit within the web of the I-Joist. Available for 9½", 11⅞" & 14" series I-joist.			
	Field Applied Intumescent Paint Application IRC 2012 & IBC 2012 Uniform Evaluation Report by International Association of Plumbing & Mechanical Officials (IAPMO)			
				Estimated Cost
NO-BURN® Plus Intumescent Paint Spray	Low VOC organic compound spray, applied to the I-Joist after I-Joist is installed.		9½" AJS® 20s 11⅞" AJS® 20s 14" AJS® 20s	$1.25 sq/ft $1.50 sq/ft $1.75 sq/ft

NEW "FIREBREAK™ HITS" FIRE-RESISTANT I-JOISTS:

INTRODUCING HIGH INTUMESCENT THERMAL SHIELD OVER CERAMIC FIBERBOARD:

FIREBREAK™ HITS (HIGH INTUMESCENT THERMAL SHIELD) reacts to fire by automatically activating and expanding into a strong, thick fire shield.

CERAMIC FIBERBOARD LAYER, protected by the thermal shield, guards the BCI® or AJS® joist web in high heat.



DELIVERED TO THE JOBSITE READY TO INSTALL
Competitively priced, and arrives at the jobsite ready to install. No additional steps or trades are needed, and web holes can be cut as with regular BCI® and AJS® joists. Learn more by calling 800-232-0788.

AND 4 OTHER BOISE CASCADE OPTIONS:

GYPSUM DRYWALL CEILINGS nailed to AJS® or BCI® joists provide about 3x longer fire resistance than 2x10" dimension lumber joists not covered by gypsum.

DROP-IN-DRYWALL FIRE PROTECTION with easy access to plumbing, heating and electrical. Uses 12" gypsum — quick and easy to install with no nailing or screwing.

MINERAL WOOL INSULATION has been in use for decades and installs easily by quickly dropping batts into place between AJS® or BCI® 5000 and larger series, no stapling or nailing.

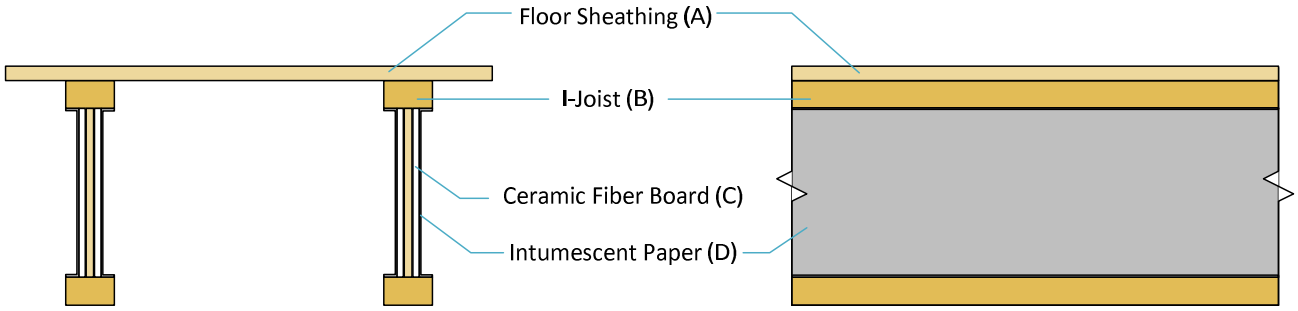
PARTIAL SPRINKLER SYSTEM installed with AJS® or BCI® joists is part of a residential cold water system protecting certain zones of the home.

Boise Cascade
Engineered Wood Products

Great products are only the beginning.®

FireBreak HITS™ Fire Protection for AJS® Joists: Installation Guide

Materials



- (A) Floor Sheathing: Materials and installation per Section R503 of the IRC
- (B) I-Joists (marked with "FBH" after series number within grade stamp on flange)
  - AJS® Joists (all series): APA PR-S201 & ICC ES ESR-1144 (pending)
- (C) Ceramic Fiber Board and (D) Intumescent Paper: Ceramic fiber board covers the web and intumescent paper covers the fiber board, extending over the horizontal flange edges adjacent to the web–flange joint. Both products applied at joist manufacturing plant.

FireBreak™ Joist Installation Instructions

- Maximum joist spacing = 24" o.c.
- Web Stiffeners: Install over the top of FireBreak HITS™, nail and clinch per AJS® Installation Guides.
- Web Holes: Cut with standard hole cutting tools (e.g.: hole saw, reciprocating saw). Hole size and location per AJS® Installation Guides or BC Calc® sizing software. Wear a dust mask while cutting product.

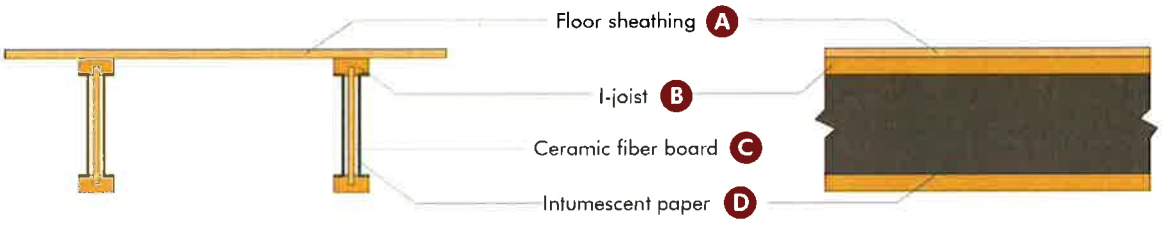
Fire Protection of Floors (FP-08) for Compliance with 2012 IRC Section R501.3 and 2015 IRC Section R302.13

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 IRC Section R302.13 Exception 4, with demonstrated equivalent fire performance

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

Factory-Applied FireBreak HITS® Ceramic Fiber Board and Intumescent Paper [a,b]

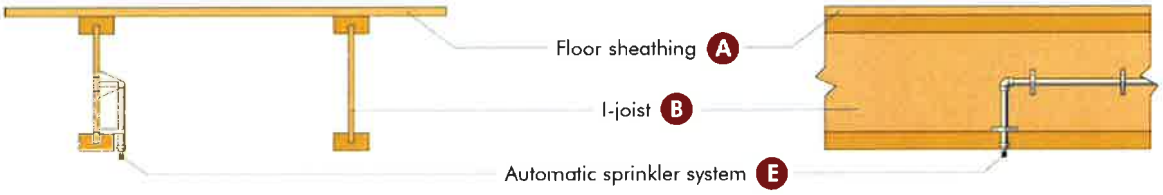


Crawl Space Exception[c]

In accordance with Exception 2 of the 2012 IRC Section R501.3 and 2015 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 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 and 2015 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 2.3 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: The factory-applied proprietary FireBreak HITS® ceramic fiber board, as documented in the quality manual, covers the web.

(D) Factory-applied Poprietary Intumescent Paper: The factory-applied poprietary intumescent paper, as documented in the quality manual, covers the fiber board and extends over the bottom face of the top flange and over the top face of the bottom flange.

(E) Automatic sprinkler system: System in accordance with Section P2904 of the 2012 and 2015 IRC, NFPA 13D, or other equivalent sprinkler systems.

Notes:

(a) In accordance with Exception 3 of 2012 IRC Section R501.3 and 2015 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 and 2015 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.

(Continued next page)

(**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 and 2015 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.

IF YOU'RE ALREADY INVESTING A LITTLE MORE TO BUILD HOMES THE RIGHT WAY WITH I-JOISTS, YOUR BEST BET FOR FIRE SAFETY IS TO DRYWALL THE BASEMENT CEILING.

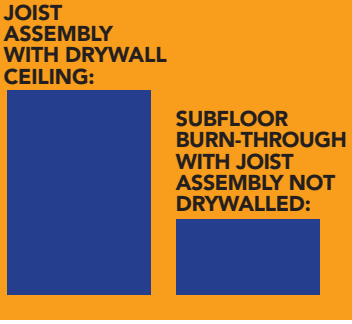
Gypsum board ceilings provide about 3 times longer fire resistance for evacuation -- almost 27 minutes with I-Joists covered by drywall vs. under 10 minutes to subfloor burn-through with any joist assembly that hasn't been drywalled.

Regardless of how long floor joists last, the subfloor could burn through in as little as 8 to 10 minutes without a gypsum drywall ceiling.

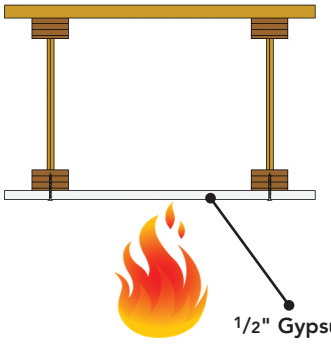
TIME TO FAILURE:

1) JOIST ASSEMBLY WITH DRYWALL CEILING:
   26 minutes, 45 seconds*

2) SUBFLOOR BURN-THROUGH WITH JOIST ASSEMBLY NOT DRYWALLED:
   8-10 minutes**



JOIST ASSEMBLY WITH DRYWALL CEILING:



FIRE PROTECTION MANY HOMEBUYERS CAN SEE AND GLADLY PAY FOR:

Much of your installation cost should be recoverable, particularly with homebuyers who value fire protection. They won't be able to see joists or other internal workings, but they'll clearly see and value the drywall ceilings. And your home-buyers willl enjoy the benefits of a drywalled basement ceiling for as long as they own the home.

GYPSUM DRYWALL IS A NATURAL FIRE FIGHTER:

GYPSUM DRYWALL IS A PROVEN AND COMMON FIRE RESISTANCE BUILDING MATERIAL, USING THE WATER LOCKED INSIDE THE GYPSUM TO HEP INSULATE FRAMING MATERIALS.

TAPE AND COMPOUND NOT NECESSARY, PROVIDING EASY ACCESS.

If you don't plan to finish your ceilings, you'll be pleased that the ceiling does not need to be taped, mudded or finished in order to provide fire resistance. The only requirement is that gypsum panels be screwed or nailed in place. That can help keep costs down and allow access.

To learn more, call Boise Cascade today at 800-232-0788
or ask your Boise Cascade EWP Area Manager (www.bcewp.com).

Boise Cascade
Engineered Wood Products

Great products are only the beginning.®

** Underwriters Laboratories, Inc. (2008). Report on Structural Stability of Engineered Lumber in Fire Conditions. Northbrook, IL: Underwriters Laboratories.*

*** Duration calculated using the methodology specified in Chapter 16 of the National Design Specification (NDS) for Wood Construction, assuming a 1-sided fire exposure, a nominal char rate of 1.5 inches/hr., a subfloor thickness of 19/32" or 23/32", a bending strength to ASD ratio of 2.85 and a load corresponding to 50 percent of the full ASD bending design load.*

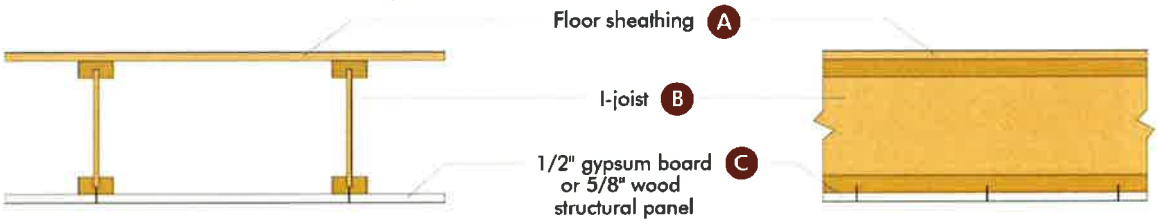
Fire Protection of Floors (FP-01) for Compliance with 2012 IRC Section R501.3 and 2015 IRC Section R302.13

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 IRC Section R302.13

All BCI® Joists; All AJS® Joists

1/2-inch Gypsum Board Attached to Bottom of Flange[a,b,d]

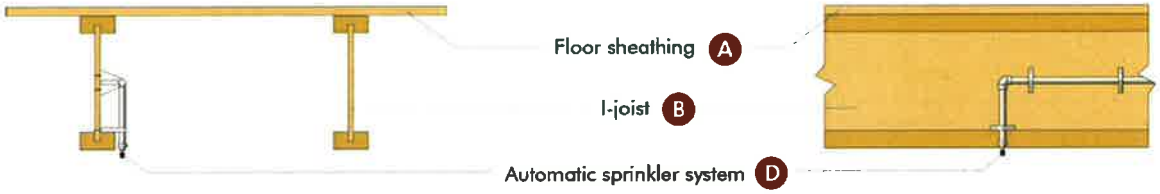


Crawl Space Exception[b]

In accordance with Exception 2 of the 2012 IRC Section R501.3 and 2015 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 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 and 2015 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 and 2015 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 and 2015 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 and 2015 IRC, NFPA 13D, or other equivalent sprinkler systems.

Notes:

(a) In accordance with Exception 3 of the 2012 IRC Section R501.3 and 2015 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 and 2015 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.

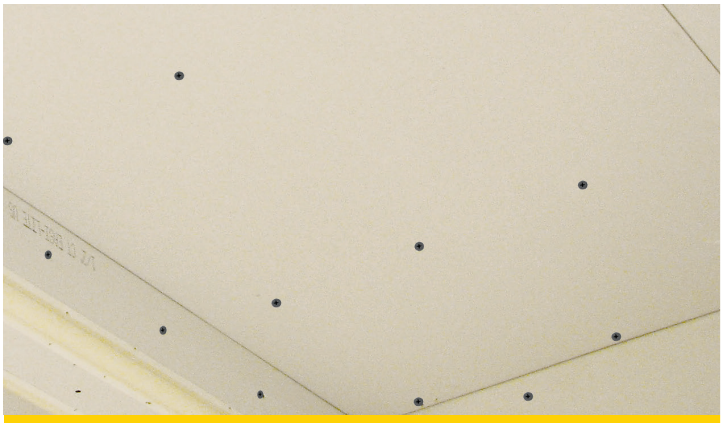
(b) Insulation may be required for energy code compliance purposes. Check with the local building official for specific jurisdictional requirements.

(Continued next page)

(**FP-01** Continued)

(c) In accordance with 2012 and 2015 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.

OR, CHOOSE ONE OF THESE OTHER FOUR FIRE-RESISTANT SOLUTIONS.



CEILINGS DRYWALLED WITH GYPSUM, a natural fire fighter, to BCI® or AJS® joists. Gypsum board ceilings provide about 3 times longer fire resistance than 2x10 joists not covered by gypsum.*

MINERAL WOOL INSULATION, another known fire fighter, installed between BCI® or AJS® joists. Mineral wool's stronger "body" enables precise cutting and snug fitting for better insulating properties.

PARTIAL SPRINKLER SYSTEM installations with BCI® or AJS® joists, part of a residential cold water system. Could be installed to protect a specific area or hazard even though the rest of the home may not require it.

WEB ARMOR™ vertical installation also pairing BCI® or AJS® joists with gypsum drywall – as mentioned above, well known as a famous fire fighter for generations.

These five solutions are all readily available, easily scheduled and quickly installed. Boise Cascade offers you these five choices for improved fire resistance in your homes. For more information or to get going all Boise Cascade solutions, contact:

Building Materials Distribution
Delanco EWP
T 855-305-6003 or
email: DOLEWPDept@BC.com

Boise Cascade
Engineered Wood Products

Great products are only the beginning.®

* *Duration calculated using the methodology specified in Chapter 16 of the National Design Specification (NDS) for Wood Construction assuming a 3-sided fire exposure, a nominal char rate of 1.5 inches/hour, a bending strength to ASD ratio of 2.85 and a load corresponding to 50 percent of the full ASD bending design load.*

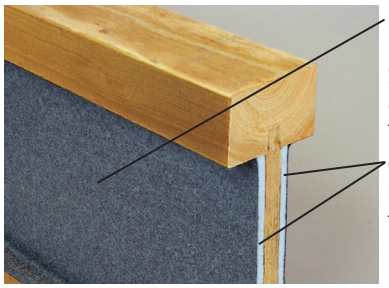
GET THE FIRE PROTECTION OF GYPSUM AND KEEP UTILITIES ACCESSIBLE:

WITH FAST, NEW "DROP-IN-DRYWALL" FROM BOISE CASCADE.

- Drop-In-Drywall uses ½" or ⅝" gypsum — quick and easy to install.
- Drops in between Boise Cascade BCI® and AJS® joist flanges — no nailing or screwing.
- Inexpensive — gypsum is a common building material available anywhere.
- Superior fire protection plus easy access to plumbing, heating and electrical components. Just pop the panel out, then drop it back in later.
- Protects the entire joist cavity from fire (joist and sub-floor), not just the joist web.
- Provides clean ceiling appearance.
- A gypsum ceiling will brighten your unfinished basement and add value.
- Finished cost should be less than fire-coated I-joist products.

AND 4 OTHER BOISE CASCADE OPTIONS:

GYPSUM DRYWALL CEILINGS nailed to AJS® or BCI® joists provide about 3x longer fire resistance than 2x10" dimension lumber joists not covered by gypsum.



FIREBREAK HITS HIGH INTUMESCENT THERMAL SHIELD reacts to fire by activating into a strong, thick fire shield, limiting fire.

CERAMIC FIBERBOARD LAYER, protected by the thermal shield, guards the BCI® and AJS® joist web in high heat.

MINERAL WOOL INSULATION has been in use for decades and installs easily by quickly dropping batts into place between AJS® or BCI® 5000 and larger series, no stapling or nailing.

PARTIAL SPRINKLER SYSTEM installed with AJS® or BCI® joists is part of a residential cold water system protecting certain zones of the home.

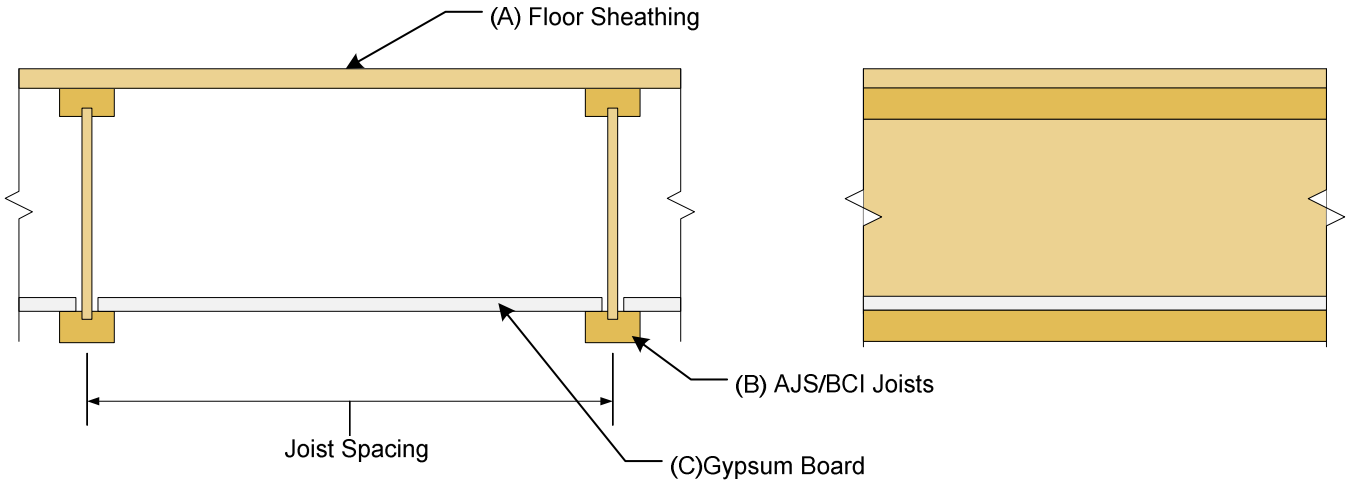
Boise Cascade
Engineered Wood Products

Great products are only the beginning.®

Drop-In Drywall™ for Floor Fire Protection Installation Guide

Drop-In Drywall™ system for compliance with 2012 IRC R501.3 and 2015 IRC R302.13, exception 4 (alternate to ceiling membrane).

Materials

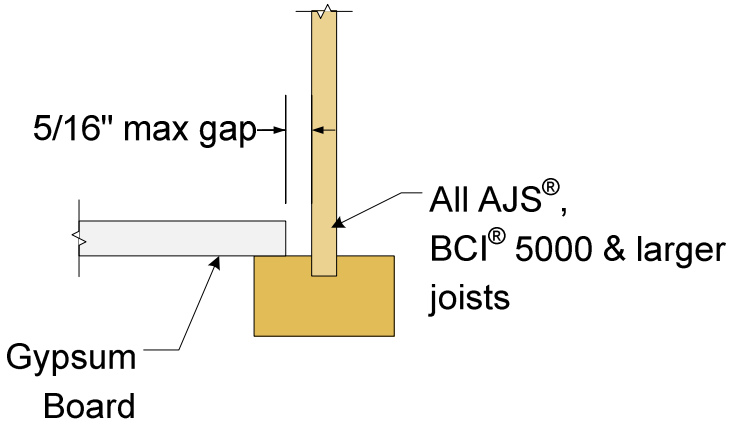


(A) Floor Sheathing: Materials and installation per Section R503 of the IRC
(B) AJS® Joists (all series): APA PR-S201, ICC ES ESR-1144 (pending)
BCI® Joists (5000 and larger series): APA PR-S201, ICC ES ESR-1336 (pending)
(C) Gypsum board: installed as shown, bearing on tops of bottom flanges

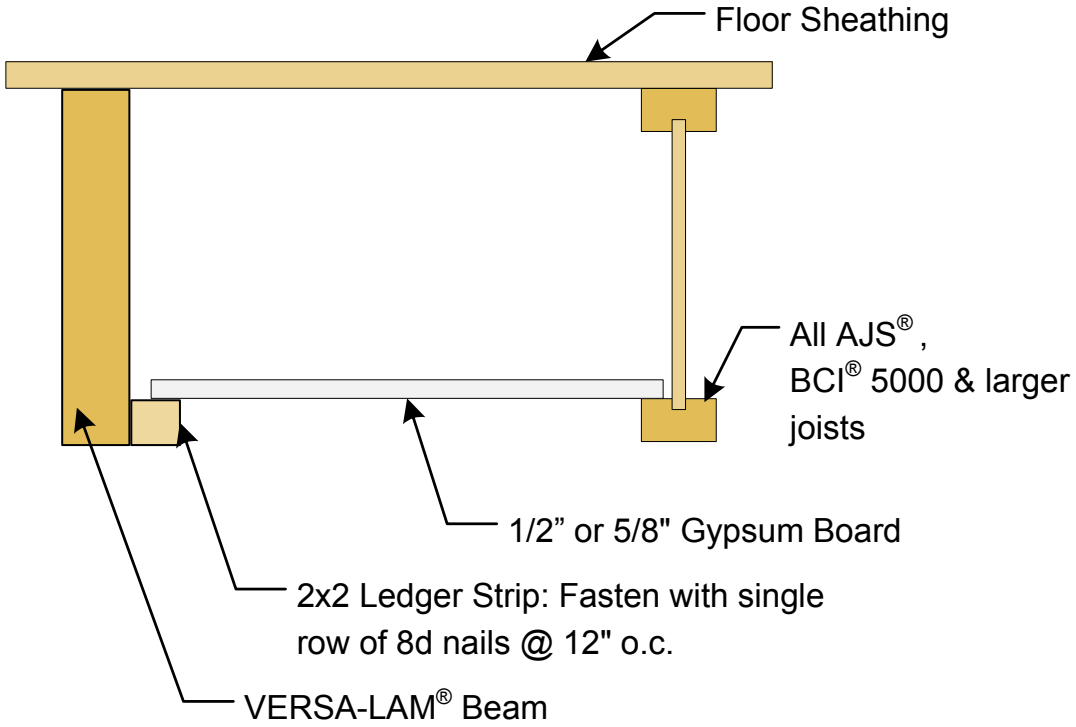
- 1 layer of regular or lightweight gypsum board
  - 1/2" thickness for 19.2" & less joist spacing
  - 5/8" thickness up to 24" joist spacing
- Installed on top of bottom flange
- No attachment required of gypsum board to AJS® / BCI® Joist
- Joint taping is not required
- 5/16" gap allowed on each board/web intersection

Installation Instructions

- Follow gypsum board manufacturer's instructions regarding personal protective equipment.
- Install gypsum board between joist webs on top of the bottom flanges by tilting the board, and then approximately centering the board between joists.
- Allowed gap at web:



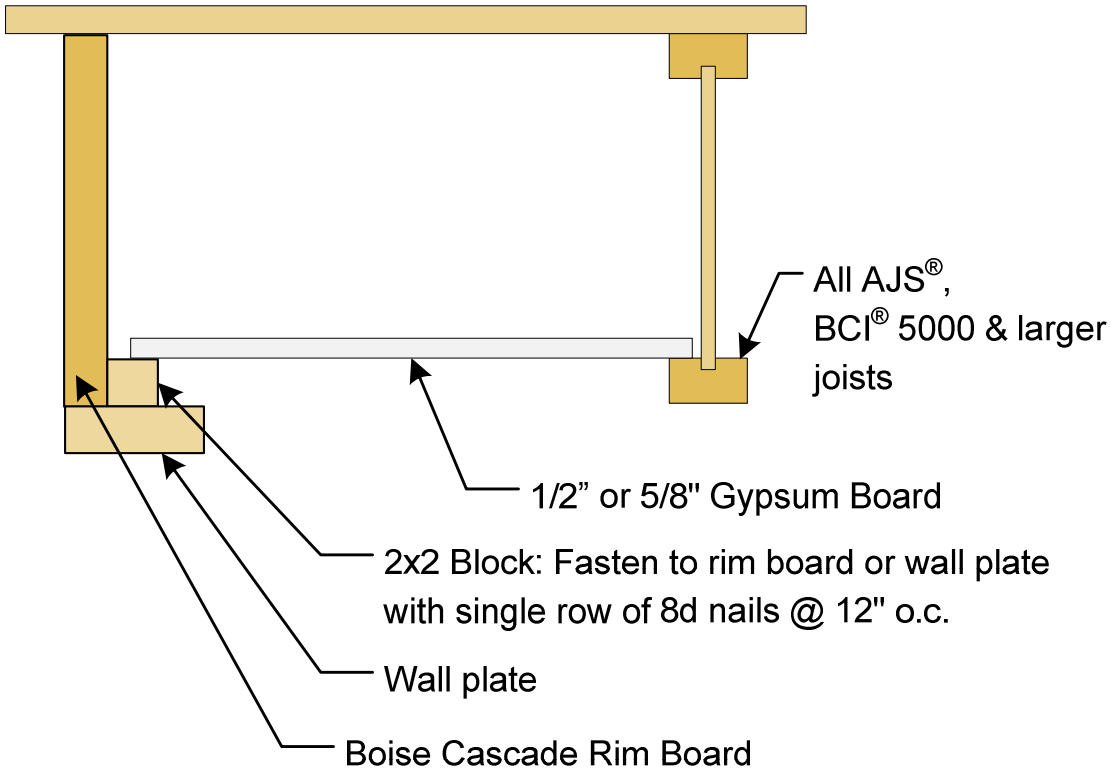
- Parallel Beams:



Note: Detail may be used between two VERSA-LAM® beams as well, though floor protection not required between two VERSA-LAM® beams/joists (1 ½" x 9 ¼" or greater sizes) per 2012 IRC R501.3 and 2015 IRC R302.13, exception 4.

Installation Instructions (cont.)

- End Wall Detailing:



Note: In conditions where perpendicular blocking is installed between endwall and first floor joist, install gypsum board between blocking panels.

Penetrations

- Penetrations or openings for ducts, vents, electrical outlets, lighting, devices, luminaires, wires, speakers, drainage, piping and similar openings or penetrations shall be permitted.
- 2012 IRC R501.3 and 2015 IRC R302.13 allows an aggregate area of unprotected ceiling portions, not to exceed 80 square feet.

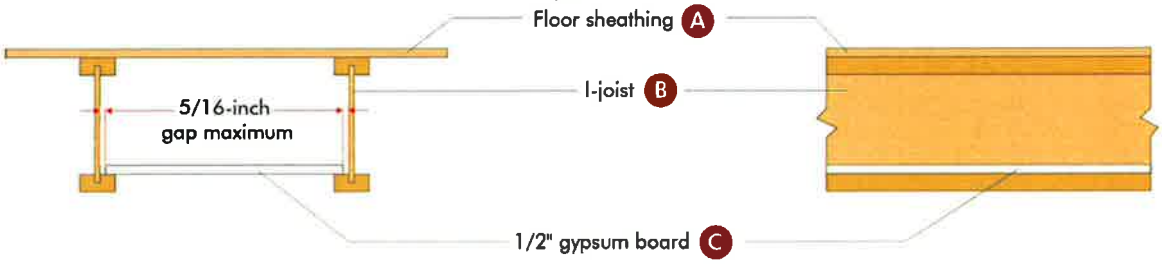
Fire Protection of Floors (FP-06) for Compliance with 2012 IRC Section R501.3 and 2015 IRC Section R302.13

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 IRC Section R302.13 Exception 4, with demonstrated equivalent fire performance

All BCI® Joists except for BCI 400, 4000, and 4500 Joists; All AJS® Joists

1/2-inch Gypsum Board[a,d]

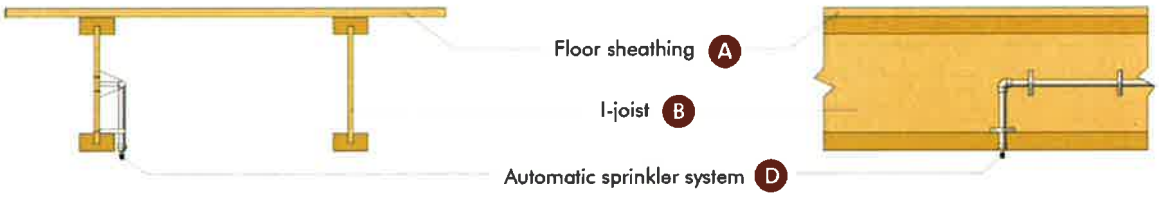


Crawl Space Exception[b]

In accordance with Exception 2 of the 2012 IRC Section R501.3 and 2015 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 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 and 2015 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. A maximum gap of 5/16 inch between the edge of the gypsum and the I-joist web shall be permiited.

(D) Automatic sprinkler system: System in accordance with Section P2904 of the 2012 and 2015 IRC, NFPA 13D, or other equivalent sprinkler systems.

Notes:

(a) In accordance with Exception 3 of 2012 IRC Section R501.3 and 2015 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 and 2015 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.

(Continued next page)

(FP-06 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 and 2015 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.

THE NEWEST FIRE-RESISTANT I-JOIST SOLUTION COULD ALSO BE THE VERY BEST SOLUTION:

Boise Cascade is now introducing another fire-resistant I-joist solution to increase residential fire protection. This program combines Boise Cascade engineered wood I-joists and mineral wool insulation to insulate better and suppress residential fires for longer periods of time. These products also solve two important code issues – new energy conservation code provisions for insulation in the floor cavity, and new fire resistance code requirements.

LONG HISTORY OF SUCCESS IN FIRE SUPPRESSION

Mineral wool insulation has a long history of success in fire suppression. It's a dependable fire-resistant solution that's proven itself for decades. One 3-1/2" thick batt (R15) protects the joist web and underside of floor sheathing from fire. In addition, mineral wool insulation and I-joists together help protect the whole floor system, not just the joists.

2-HOUR FIRE RATING AND 2,000 DEGREE MELTING POINT

From a heat-resistant standpoint, the melting point of a typical mineral wool insulation is in the area of 2,000 degrees Fahrenheit vs. 1,000 to 1,200 degrees usually found in glass fiber insulations. This is no surprise given the 2-hour fire rating of mineral wool insulation. In addition, mineral wool insulation is water-resistant and doesn't absorb water, as others can.

GREATER "BODY" COULD MEAN BETTER INSULATION

Mineral wool insulation batts are very stable and tend to have more "body" than glass fiber insulation, so they're easier to handle, trim and install compared to glass fiber batts. You'll experience precise cutting, snug fitting and probably better insulating properties – particularly helpful in cutting to fit into odd-shaped cavities. Some manufacturers go even further to add more body, spinning in a small amount of glass fiber to act as a super-bonding agent. This type of mineral wool insulation may also stay together as a unit vs. competitive steel slag-based insulation products, which may crumble or chip off pieces over time.

2 IMPORTANT NEW CODE ISSUES RESOLVED

Mineral wool insulation and Boise Cascade I-joists together solve two of today's most important code issues – energy conservation code provisions regarding insulation in the floor cavity, and fire-resistance requirements. Two 3-1/2" thick batts provide R30, required by many jurisdictions in northern climates.

QUICK INSTALLATION

Speed of installation comes from being able to simply drop the batts in between I-joists atop the joist bottom flange. The solidness of mineral wool insulation also means it won't settle and change shape over time as some other types of insulation may.

EASY SCHEDULING

Installation of both products is easily scheduled because no special training is needed. Virtually anyone can do the installation.

BROAD COMPATIBILITY AND COAST-TO-COAST AVAILABILITY

Mineral wool insulation products are compatible with every series and depth of Boise Cascade AJS® and BCI® joists. And both products are widely available throughout the U.S. and Canada for delivery on relatively short notice.

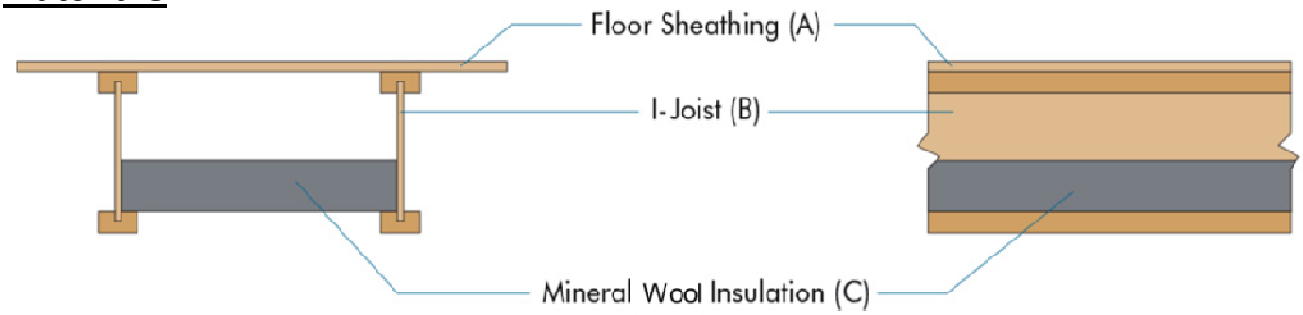
For more information or to get going with this solution, call 800-232-0788.

Boise Cascade
Engineered Wood Products

Great products are only the beginning.®

Mineral Wool Insulation for Floor Fire Protection Installation Guide

Materials



(A) Floor Sheathing: Materials and installation per Section R503 of the IRC
(B) AJS® Joists (all series): APA PR-S201, ICC ES ESR-1144
BCI® Joists (all series): APA PR-S201, ICC ES ESR-1336
(C) Mineral Wool Insulation: installed as shown, resting on tops of bottom flanges
Minimum Density:2.5 lb/ft^3
Insulation Batt Thickness:
3.5" or 3": 24" o.c. joist spacing or less (19.2" o.c. spacing or less per APA S-201)
Insulation Batt Width
16" joist spacing: Min. 15.25"
19.2" joist spacing: Min. 18.5"
24" joist spaing: Min. 23"

Mineral Wool Installation Instructions

- Follow insulation manufacturer's instructions regarding personal protective equipment.
- Install batts between joist webs, on top of the bottom flanges, use batt width that corresponds to the joist spacing.
- Install batts snug around any pipes located in the joist cavity area.
- Use rigid wire insulation stays between bottom flanges, 24" on-center and and no more than 6 inches from batt ends, to assist in insulation support.
- When necessary, cut mineral wool insulation with serrated knife or table saw.
- Glass fiber insulation may not be substituted for mineral wool insulation as fire resistant component.
- Compressing mineral wool to a 2 inch thickness to fit under mechanical pipe / ducts does not compromise the fire resistance if the batts remain tight to top of the bottom flanges.

Energy Conservation Code Considerations

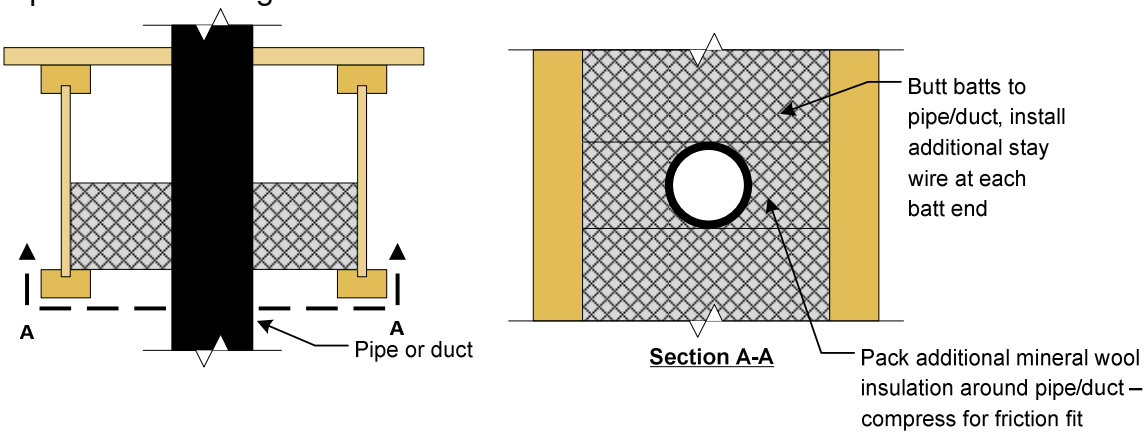
- Multiple or thicker layers and/or wider width of mineral wool insulation may be installed or required by applicable building code. Consult the authority having jurisdiction (AHJ) for energy conservation code requirements.
- Typical 2.5 lb/ft^3 x 3.5 inch thick mineral wool insulation has a rating of R-15. Higher R-values are required in northern climates. Multiple or thicker layers of mineral wool insulation may be installed.
- Glass fiber insulaton may be installed on top of the minimum required mineral wool insulation for energy conservation purposes noted previously.
- Additional insulation at joist end support locations and/or vapor/air barriers may be required per the AHJ.

Detailing

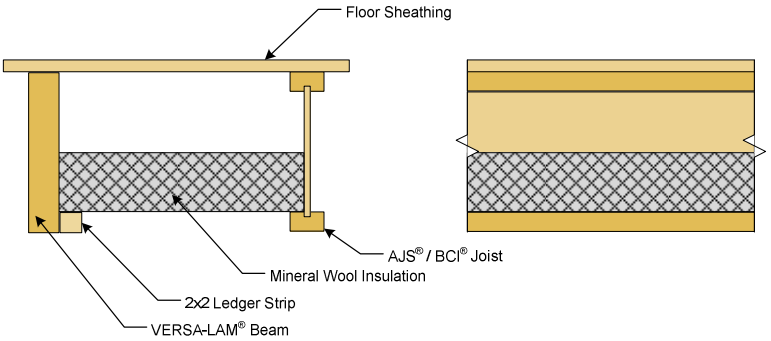
Penetrations

- Penetrations or openings for ducts, vents, electrical outlets, lighting, devices, luminaires, wires, speakers, drainage, piping and similar openings or penetrations shall be permitted.
- 2012 IRC R501.3 and 2015 IRC R302.13 allows an aggregate area of unprotected ceiling portions, not to exceed 80 square feet.

Pipe/Duct Detailing



Parallel Beam Application



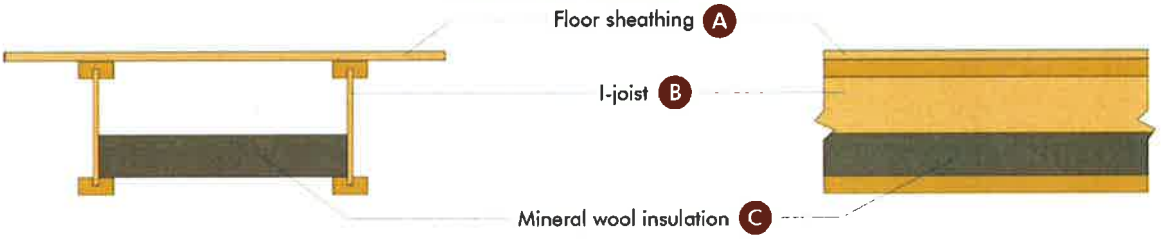
Fire Protection of Floors (FP-04) for Compliance with 2012 IRC Section R501.3 and 2015 IRC Section R302.13

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 IRC Section R302.13 Exception 4, with demonstrated equivalent fire performance

All BCI® Joists except for BCI 400 and 4000 Joists; All AJS® Joists

Mineral Wool Insulation[a,b,e]

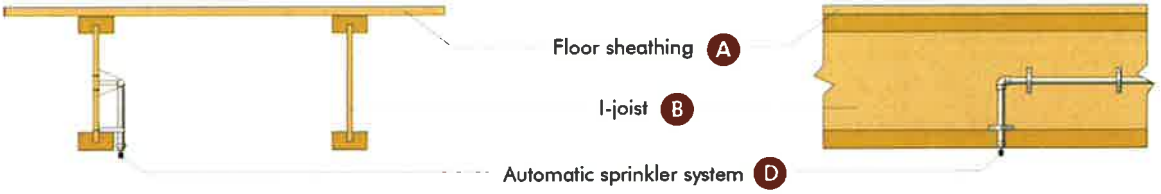


Crawl Space Exception[c]

In accordance with Exception 2 of the 2012 IRC Section R501.3 and 2015 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 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 and 2015 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/ft^3 (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/ft^3 (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 and 2015 IRC, NFPA 13D, or other equivalent sprinkler systems.

Notes:

(a) In accordance with Exception 3 of 2012 IRC Section R501.3 and 2015 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 and 2015 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 juristictional requirements.

(Continued next page)

(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 and 2015 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.

INTRODUCING FIREBREAK™, THE NEWEST FIRE-RESISTANT JOIST SOLUTION:

PROTECTS AGAINST FIRE LONGER

Boise Cascade's newest heat-resistant I-joist solution employs FireBreak™, a proprietary blend that provides extreme heat obstruction with integrated fire resistance, heat separation and thermal insulation. FireBreak™ is made from a blend of high purity ceramic, alumina and zirconia crystal fiber -- cutting edge technology that combines with AJS® or BCI® (60 & 90 series) joists to protect against fire longer.

FAST, EASY INSTALLATION

Another main advantage of Boise Cascade I-joists with the FireBreak™ insulation system is the ease with which the insulation batts can be stapled to both sides of the I-joist web. They're simply fastened to the OSB web using standard 7/8"staples. The batts can be installed on the jobsite, or pre-installed at the dealer and delivered to the jobsite ready to frame. This quick installation time can equal lower labor cost.

SOLVES THE CODE ISSUE

Pairing of Boise Cascade BCI® and AJS® joists with FireBreak™ solves the code issue of fire resistance requirements for light frame construction, specific to floor framing over unfinished basements. The AJS® /BCI® - FireBreak™ system is listed in Boise Cascade ICC ES® evaluation and APA® product reports.

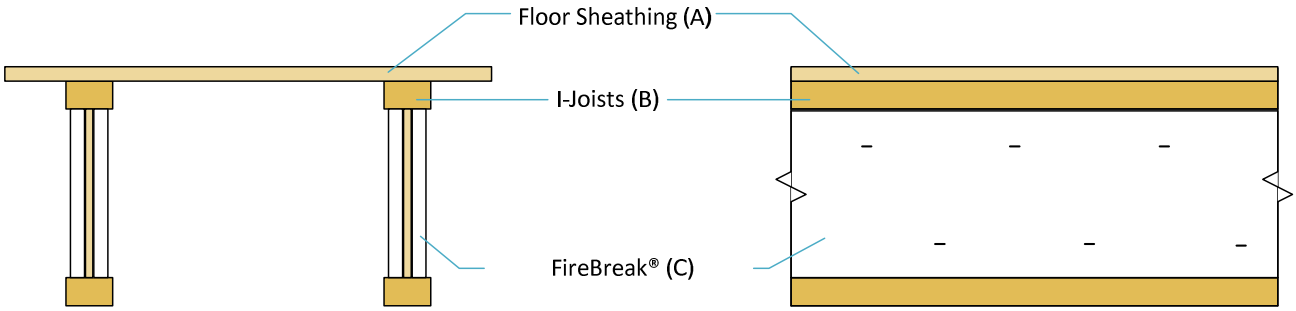
A GREAT LOW COST OPTION

FireBreak™ may very well be your lowest cost option when you consider all that goes into having an effective fire-resistant solution -- including both product cost and installation time at the jobsite. And you shouldn't have to stock additional SKUs because FireBreak™ works with all AJS® and larger BCI® joist series. For more information about FireBreak™ or to get started, call Delanco EWP at 855-305-6003 or email: DOLEWPDept@BC.com.

(More fire-resistant solutions on back)

FireBreak® Ceramic Fiber Blanket Protection for AJS®/BCI® Joists: Installation Guide

Materials

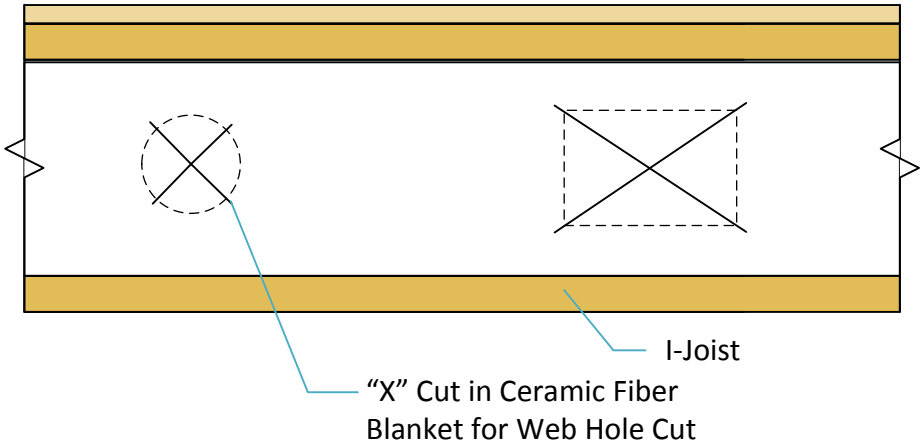


- (A) Floor Sheathing: Materials and installation per Section R503 of the IRC
- (B) I-Joists
  - AJS® Joists (all series): APA PR-S201, ICC ES ESR-1144
  - BCI® Joists (60 & 90 series): APA PR-S201, ICC ES ESR-1336
- (C) FireBreak® Ceramic Fiber Blanket: ¾" thick, min 4 lb/ft^3, Mei Guo International, LLC (USA) FireBreak® proprietary ceramic fiber blanket made of aluminum oxide and silicon dioxide (ASTM C892 Type III compliant) is attached directly on web as shown with rows of 7/8" long staples installed staggered at 8" horizontal on-center spacing, number of rows as follows:
  - 9 ½" Joists: 2 rows
  - 11 7/8" Joists: 3 rows
  - 14" Joists: 4 rows (see page 2 for multiple blanket roll detailing)
  - 16" Joists: 5 rows (see page 2 for multiple blanket roll detailing)

FireBreak® Installation Instructions

- Maximum joist spacing = 24" o.c.
- Ceramic blanket must fill the web space with no gaps and contact both inside flange faces to protect the web.
- Pneumatic or hand staplers may be used to apply fasteners.

Web Holes



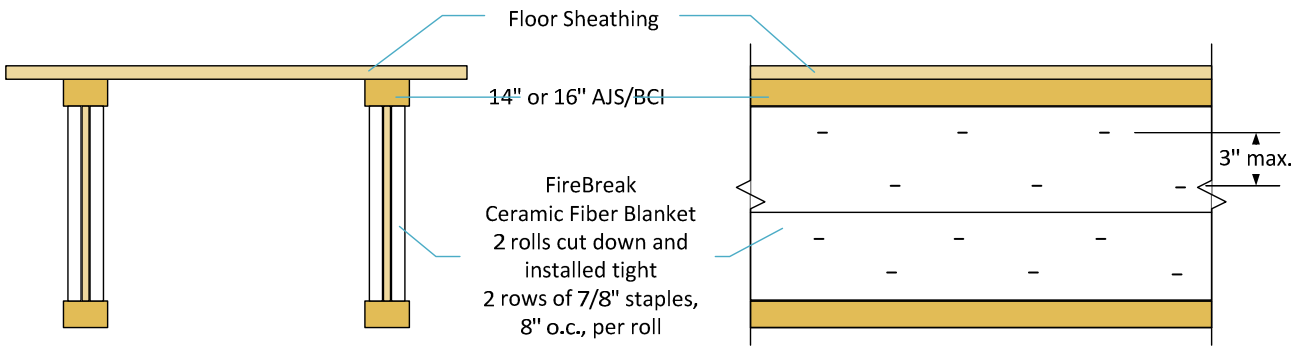
Pre-Cut Web Hole Instructions

- Cut hole at least 1" larger than pipe/duct dimension
- Increase fastening at the hole with (4) additional staples as shown
- After installing FireBreak, cut an "X" at the web hole location with an utility knife, both sides of web
- Insert pipe/duct

Post-Cut Web Hole Instructions

- Cut an "X" at the web hole location with an utility knife, both sides of web
- Increase fastening at the hole with (4) additional staples as shown
- Peel back FireBreak and cut web hole at least 0.5" larger than pipe/duct dimension
- Insert pipe/duct

Multiple Blanket Roll Installation



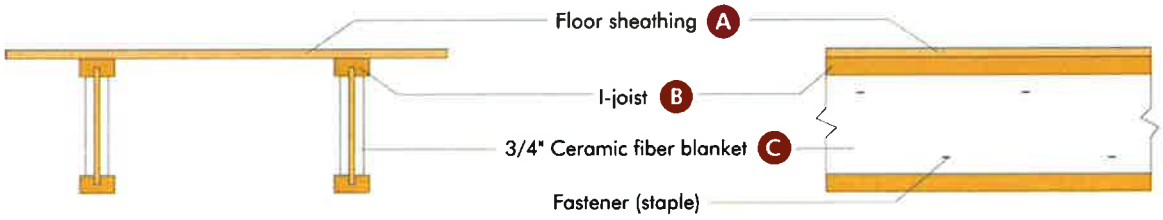
Fire Protection of Floors (FP-05) for Compliance with 2012 IRC Section R501.3 and 2015 IRC Section R302.13

Fire Protection: Ceramic Fiber Blanket Insulation

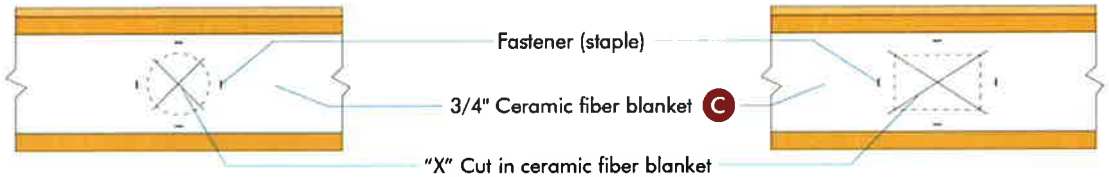
The following fire resistance design is an alternative to the 2-by-10 dimensional lumber prescribed in 2012 IRC Section R501.3 and 2015 IRC Section R302.13 Exception 4, with demonstrated equivalent fire performance

BCI® 60, 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 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 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 and 2015 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 2.3 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)

(**FP-05** Continued)

(C) Mei Guo International, LLC (USA) FireBreak™ proprietary ceramic fiber blanket insulation (entire length of I-joist): Minimum 4.0 lb/ft^3 (nominal) and 3/4 inch thick full width ceramic fiber blanket made of aluminum oxide (Al_2O_3) and silicon dioxide (SiO_2) 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 and 2015 IRC, NFPA 13D, or other equivalent sprinkler systems.

Notes:

(a) In accordance with Exception 3 of 2012 IRC Section R501.3 and 2015 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 and 2015 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 and 2015 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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