

XHBN.HW-D-0401 Joint Systems

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Joint Systems

[See General Information for Joint Systems](#)

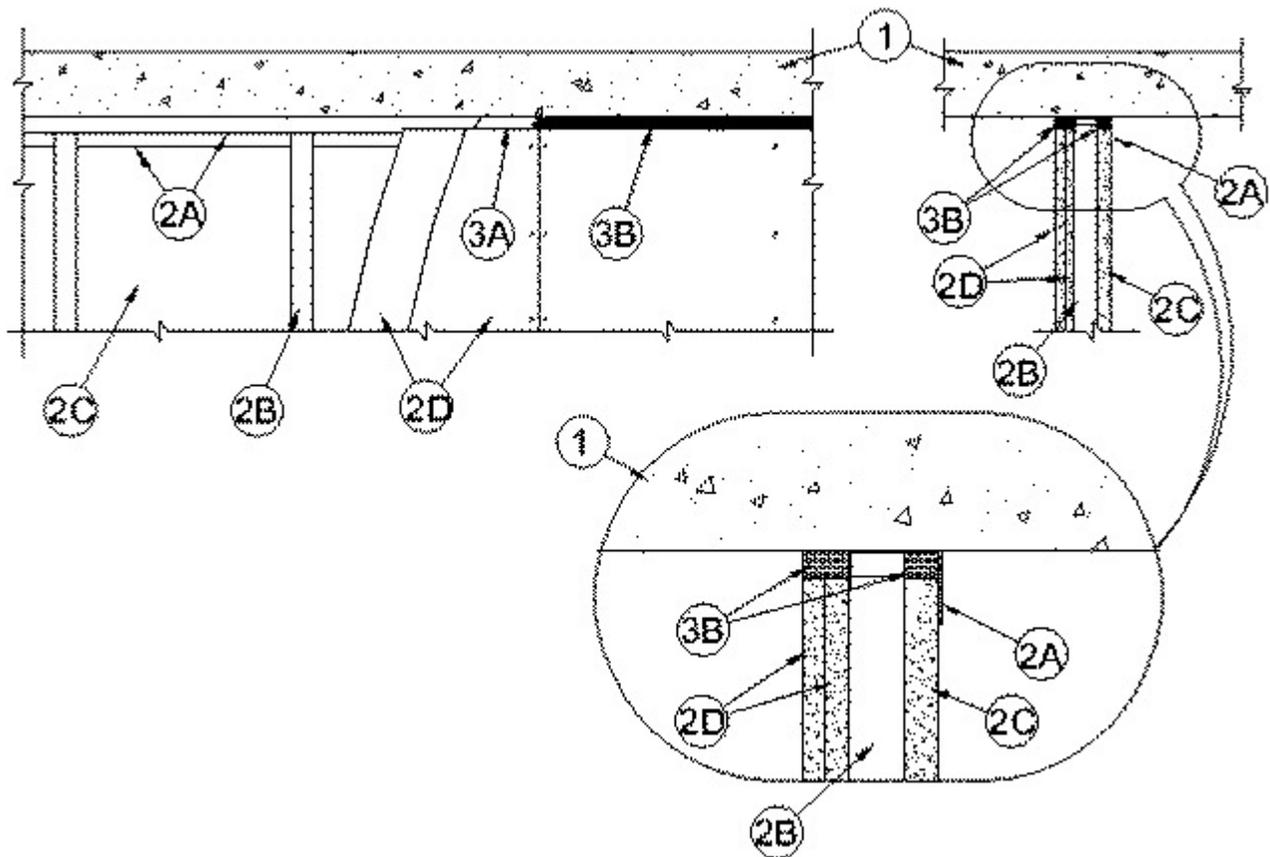
System No. HW-D-0401

January 06, 2010

Assembly Ratings — 1 and 2 Hr (See Item 2)

Joint Width — 1 in. Max

Class II Movement Capabilities — 25 Percent Compression



1. **Floor Assembly** — Min 2-1/2 in. (64 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) structural concrete.

2. **Shaft Wall Assembly** — The 1 or 2 hr fire rated shaft wall assembly shall be constructed of the materials and in the manner described in the individual U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory. The wall shall include the following construction features:

A. **Floor and Ceiling Runners** — "J"-shaped runner, min 2-1/2 in. (64 mm) wide with unequal legs of min 1 in. (25 mm) and min 2 in. (51 mm), fabricated from min 24 MSG galv steel. The length of the shorter leg of the "J"-shaped runner used for the ceiling runner shall be min 1/4 in. (6 mm) greater than the joint width. Runners positioned with shorter leg toward finished side of wall. Runners attached to floor and ceiling with steel fasteners spaced max 24 in. (610 mm) OC. As an alternate to the "J"-shaped runner, a min 2-1/2 in. (64 mm) wide by 1 or 1-1/4 in. (25 or 32 mm) deep channel formed from min 24 MSG galv steel may be used for the floor runner.

A1. **Light Gauge Framing* — Slotted Ceiling Track** — (Not Shown) - As an alternate to the "J"-shaped runner in Item 2A, a ceiling track consisting of galv steel channel with slotted flanges may be used. Slotted ceiling track sized to accommodate steel "C-T", "I" or "C-H" studs (Item 2C). Attached to concrete at ceiling with steel fasteners spaced max 24 in. (610 mm) OC.

BRADY CONSTRUCTION INNOVATIONS INC,

DBA SLIPTRACK SYSTEMS — SLP-TRK

A2. **Light Gauge Framing Members*** — (Not Shown) - As an option, the steel studs (Item 3B) may incorporate vertical deflection clips for attachment to the ceiling runner (Item 3A) in accordance with the manufacturer's instructions.

THE STEEL NETWORK INC — VertiClip SLD 250, VertiClip SLD 400

B. **Steel Studs** — "C-T", "I" or "C-H"-shaped steel studs to be min 2-1/2 in. (64 mm) wide and formed of min 24 MSG galv steel. Studs cut 1/2 to 3/4 in. (13 to 19 mm) less in length than assembly height with bottom nesting in and resting on floor runner and with top nesting in "J"-shaped runner or slotted ceiling track. Studs spaced max 24 in. (610 mm) OC. After installation of gypsum board liner panels (Item 2D), studs secured to flange of floor runner on finished side of wall only with No. 6 by 1/2 in. (13 mm) long self-drilling, self-tapping steel screws. If slotted ceiling track (Item 2A1) is used, studs secured to flange of slotted ceiling track on finished side of wall only with No. 8 by 1/2 in. (13 mm) long self-drilling, self-tapping wafer head steel screws at slot midheight.

C. **Gypsum Board*** — 1 in. (25 mm) thick by max 24 in. (610 mm) wide gypsum board liner panels. Panels cut max 1 in. (25 mm) less in length than floor to ceiling height. Vertical edges inserted into "T"-shaped section of "C-T" studs, into holding tabs of "I" studs or into "H"-shaped section of "C-H" studs.

D. **Gypsum Board*** — Gypsum board sheets, 1/2 or 5/8 in. (13 or 16 mm) thick, applied on finished side of wall as specified in the individual Wall and Partition Design. A max 1 in. (25 mm) gap shall be maintained between the top of the gypsum board and the bottom surface of the concrete floor. The screws attaching the gypsum board layer(s) to the "C-T", "I" or "C-H" studs shall be located 1 in. (25 mm) below the bottom of the "J"-shaped runner (Item 2A) or slotted ceiling track (Item 2A1). No gypsum board attachment screws are to penetrate the ceiling runner.

3. **Joint System** — Max separation between bottom of floor and top of liner panel (Item 2C) and between bottom of floor and top of gypsum board (Item 2D) at time of installation of joint system is 1 in. (25 mm). The joint system is designed to accommodate a maximum 25 percent compression from its installed width. The joint system consists of bond breaker tape and sealant, as follows:

A. **Bond Breaker Tape** — Polyethylene tape supplied in rolls. Tape applied to flanges of "J"-shaped runner (Item 2A) or slotted ceiling track (Item 2A1) to prevent bonding of the sealant at points other than the top and bottom of the linear gap. When FS 900+ is used, bond breaker tape is not required.

B. **Fill, Void or Cavity Material* — Sealant** — Min 1 in. (25 mm) depth of sealant to be installed to fill linear gap between top of gypsum board liner panel (Item 2C) and top inside surface of "J"-shaped ceiling runner or slotted ceiling track prior to installation of gypsum board sheets on finished side of wall. The depth of sealant to be installed to fill the linear gap between the top of the gypsum board sheets (Item 2D) and the bottom of the concrete floor shall be equal to the overall thickness of the gypsum board sheets and shall be flush with the finished side of the wall.

RECTORSEAL — FS900+ or FS1900 Sealant

*Bearing the UL Classification Mark

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XHBN.HW-D-0476 Joint Systems

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Joint Systems

[See General Information for Joint Systems](#)

System No. HW-D-0476

April 20, 2010

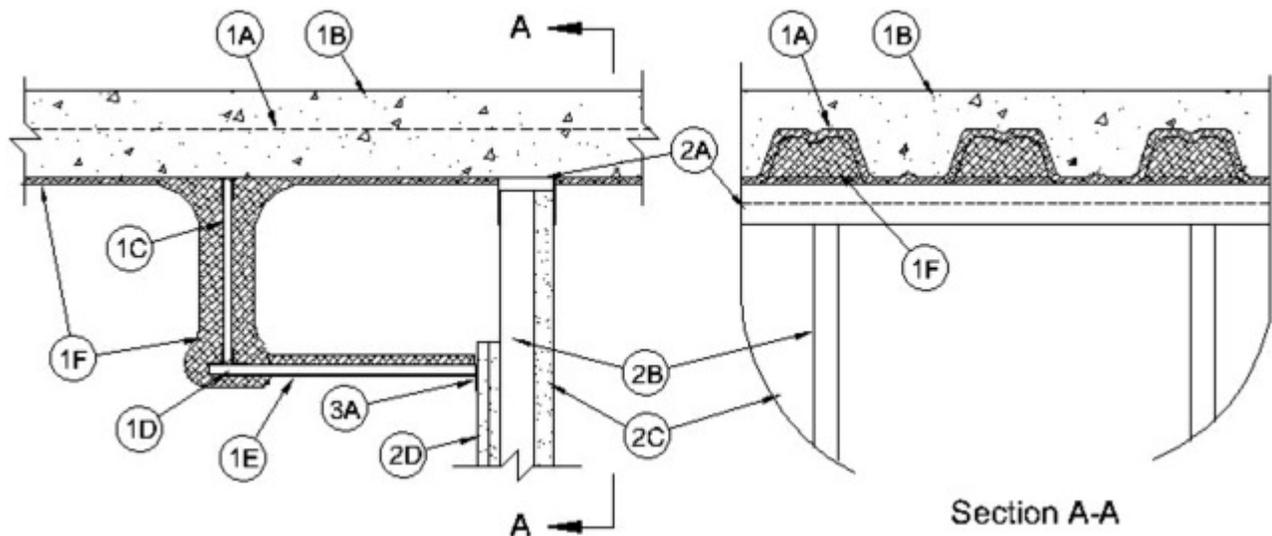
Assembly Ratings — 1 and 2 Hr (See Item 2)

L Rating at Ambient — Less Than 1 CFM/Lin ft

L Rating at 400° F —Less Than 1 CFM/Lin ft

Nominal Joint Width — 1/2 in.

Class II and III Movement Capabilities — 100% Compression or Extension



1. **Floor Assembly** — The fire-rated fluted steel deck/concrete floor assembly shall be constructed of the materials and in the manner described in the individual D700 Series Floor-Ceiling Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Steel Floor And Floor Units*** — Max 3 in. (76 mm) deep galv steel fluted floor units.

B. **Concrete** — Min 2-1/2 in. (64 mm) thick reinforced concrete, as measured from the top plane of the floor units.

C. **Structural Steel Support** — Steel beam, as specified in the individual D700 Series Floor-Ceiling Design, used to support steel floor units. Structural steel support oriented parallel to and 1 to 7 in. (25 to 178 mm) from wall assembly.

D. **Steel Attachment Clips** — Z-shaped clips formed from 1-1/2 in. (38 mm) wide strips of min 20 ga galv steel. Clips to be sized to extend through the thickness of the spray-applied fire-resistive material on the bottom flange of the steel beam with 1-1/2 in. (38 mm) long upper and lower legs. Legs of clips fastened to bottom of beam (prior to application of spray-applied fire-resistive materials) with steel fasteners or welds. Clips spaced max 16 in. (406 mm) OC and extend to within 1/4 to 3/4 in. (6 to 19 mm) from the surface of the wall.

E. **Steel Plate** — Min 22 ga. galv steel plate, sized to extend from beam to within 1/4 in. (6 mm) of wall surface. Plate is secured to bottom surface of each Z clip with min No. 8 steel sheet metal screws spaced a max 2in. (51 mm) from edges of plate and a max 4 in. (102 mm) OC.

F. **Spray-Applied Fire Resistive Material*** — After installation of the steel attachment clips, structural steel and ceiling runners, support to be sprayed with the min thickness of material specified in the individual D700 Series Design. The flutes of the steel floor units are to be filled with material across the entire top flange of the ceiling runner. The area on top of steel plate and in between Z clips is to be filled to the height of the Z clips plus an additional min 1 in. (25 mm) thickness.

W R GRACE & CO - CONN — Type MK-6/HY

ISOLATEK INTERNATIONAL — Type 300

2. **Shaft Wall Assembly** — The 1 or 2 hr fire rated shaft wall assembly shall be constructed of the materials and in the manner described in the individual U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory. The wall shall include the following construction features:

A. **Floor and Ceiling Runners** — "J"-shaped runner, min 2-1/2 in. (64 mm) wide with unequal legs of min 1-1/2 in. (32 mm) and 2 in. (52 mm), fabricated from min 24 MSG galv steel. Attached to steel deck with steel fasteners or welds spaced max 24 in. (610 mm) OC.

A1. **Light Gauge Framing* — Slotted Ceiling Track** — (Not Shown) - As an alternate to the "J"-shaped runner in Item 2A, a ceiling track consisting of galv steel channel with slotted flanges may be used. Slotted ceiling track sized to accommodate steel "C-T", "I" or "C-H" studs (Item 2C). Attached to steel deck with steel fasteners or welds spaced max 24 in. (610 mm) OC.

BRADY CONSTRUCTION INNOVATIONS INC,

DBA SLIPTRACK SYSTEMS — SLP-TRK

CALIFORNIA EXPANDED METAL PRODUCTS CO — CST

CLARKWESTERN BUILDING SYSTEMS INC — Type SLT, SLT-H

METAL-LITE INC — The System

SCAFCO STEEL STUD MANUFACTURING CO — Slotted Track

TELLING INDUSTRIES L L C — True-Action Deflection Track

B. **Steel Studs** — "C-T", "I" or "C-H"-shaped steel studs to be min 2-1/2 in. (64 mm) wide and formed of min 24 MSG galv steel. Studs cut 1/2 to 3/4 in. (13 to 19 mm) less in length than assembly height with bottom nesting in and resting on floor runner and with top nesting in "J"-shaped runner or slotted ceiling track. Studs spaced max 24 in. (610 mm) OC. After installation of gypsum board liner panels (Item 2D), studs secured to flange of floor runner on finished side of wall only with No. 6 by 1/2 in. (13 mm) long self-drilling, self-tapping steel screws. If slotted ceiling track (Item 2A1) is used, studs secured to flange of slotted ceiling track on finished side of wall only with No. 8 by 1/2 in. (13 mm) long self-drilling, self-tapping wafer head steel screws at slot mid-height.

C. **Gypsum Board*** — 1 in. (25 mm) thick by max 24 in. (610 mm) wide gypsum board liner panels. Panels cut max 1/2 in. (13 mm) less in length than floor to ceiling height. Vertical edges inserted into

"T"-shaped section of "C-T" studs, into holding tabs of "I" studs or into "H"-shaped section of "C-H" studs.

D. **Gypsum Board*** — Gypsum board, 1/2 or 5/8 in. (13 or 16 mm) thick, applied on finished side of wall as specified in the individual Wall and Partition Design. The boards to extend a min 3 in. (76 mm) above the bottom of Z clips. The screws attaching the gypsum board layer(s) to the "C-T", "I" or "C-H" studs shall be located a max of 2 in. (51 mm) below the bottom of the Z clips.

The hourly fire rating of the joint system is equal to the hourly fire rating of the wall.

3. Joint System — Max separation between spray-applied material on bottom of floor and top of wall (at time of installation of joint system) is 1/2 in. (13 mm). The joint system is designed to accommodate a max 100 percent compression or extension from its installed width.

A. **Fill, Void or Cavity Material*** — A nom 20 gauge steel angle provided with a nom 1 in. (25 mm) wide intumescent strip on one leg to be secured to the bottom leg of each z clip with the intumescent strip against the outer face of gypsum board on finished side of wall with min No. 8 steel sheet metal screws such that the intumescent strip is flat against the outer surface of the wall.

CALIFORNIA EXPANDED METAL PRODUCTS CO — Firestik FS1 or FS2

*Bearing the UL Classification Mark

Last Updated on 2010-04-20

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XHBN.HW-D-0480 Joint Systems

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Joint Systems

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System No. HW-D-0480

April 20, 2010

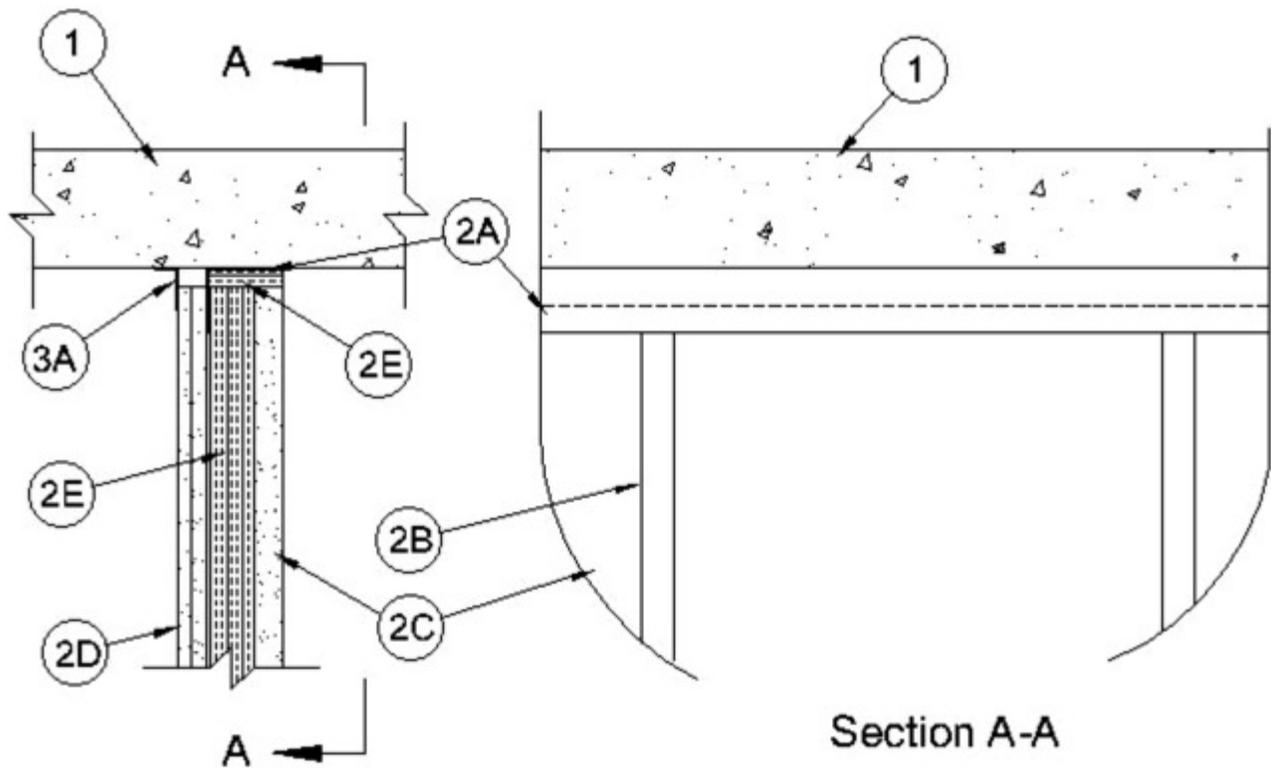
Assembly Ratings — 1 and 2 Hr (See Item 2)

L Rating at Ambient — Less Than 1 CFM/Lin ft

L Rating at 400° F — Less Than 1 CFM/Lin ft

Nominal Joint Width — 3/4 in.

Class II and III Movement Capabilities — 50% Compression or 83% Extension



1. **Floor Assembly** — Min 4-1/2 in. (114 mm) thick steel reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) structural concrete. Floor may also be constructed of any min 6 in. thick UL Classified hollow-core **Precast Concrete Units***.

See **Precast Concrete Units** (CFTV) category in the Fire Resistance Directory for names of manufacturers.

2. **Shaft Wall Assembly** — The 1 or 2 hr fire rated shaft wall assembly shall be constructed of the materials and in the manner described in the individual U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory. The wall shall include the following construction features:

A. **Floor and Ceiling Runners** — "J"-shaped runner, min 2-1/2 in. (64 mm) wide with unequal legs of min 1-1/2 in. (32 mm) and 2 in. (52 mm), fabricated from min 24 MSG galv steel.

A1. **Light Gauge Framing* — Slotted Ceiling Track** — (Not Shown) - As an alternate to the "J"-shaped runner in Item 2A, a ceiling track consisting of galv steel channel with slotted flanges may be used. Slotted ceiling track sized to accommodate steel "C-T", "I" or "C-H" studs (Item 2C). Attached to steel deck with steel fasteners or welds spaced max 24 in. (610 mm) OC.

CALIFORNIA EXPANDED METAL PRODUCTS CO — CST

METAL-LITE INC — The System

BRADY CONSTRUCTION INNOVATIONS INC,

DBA SLIPTRACK SYSTEMS — SLP-TRK

SCAFCO STEEL STUD MANUFACTURING CO — Slotted Track

TELLING INDUSTRIES L L C — True-Action Deflection Track

B. **Steel Studs** — "C-T", "I" or "C-H"-shaped steel studs to be min 2-1/2 in. (64 mm) wide and formed of min 24 MSG galv steel. Studs cut 1/2 to 3/4 in. (13 to 19 mm) less in length than assembly height with bottom nesting in and resting on floor runner and with top nesting in "J"-shaped runner or slotted ceiling track. Studs spaced max 24 in. (610 mm) OC. After installation of gypsum board liner panels (Item 2D), studs secured to flange of floor runner on finished side of wall only with No. 6 by 1/2 in. (13 mm) long self-drilling, self-tapping steel screws. If slotted ceiling track (Item 2A1) is used, studs secured to flange of slotted ceiling track on finished side of wall only with No. 8 by 1/2 in. (13 mm) long self-drilling, self-tapping wafer head steel screws at slot mid-height.

C. **Gypsum Board*** — 1 in. (25 mm) thick by max 24 in. (610 mm) wide gypsum board liner panels. Panels cut 3/4 in. (19 mm) less in length than floor to ceiling height. Vertical edges inserted into "T"-shaped section of "C-T" studs, into holding tabs of "I" studs or into "H"-shaped section of "C-H" studs.

D. **Gypsum Board*** — Gypsum board, 1/2 or 5/8 in. (13 or 16 mm) thick, applied on finished side of wall as specified in the individual Wall and Partition Design. The boards cut 3/4 in. (19 mm) less in length than floor to ceiling height. The screws attaching the gypsum board layer(s) to the "C-T", "I" or "C-H" studs shall be located a max of 2 in. (51 mm) below the bottom of the ceiling runner.

E. **Mineral Wool** — Min 1-1/2 in. (38 mm) thick min 4 pcf (64 kg/m³) mineral wool batt insulation cut to the width of ceiling runner and compressed 50 percent in thickness, installed to completely fill ceiling runner above the studs. Additional min 1-1/2 in. (38 mm) thick min 4 pcf (64 kg/m³) mineral wool batt insulation installed to fill stud cavities.

The hourly fire rating of the joint system is equal to the hourly fire rating of the wall.

3. Joint System — Max separation between bottom of floor and top of wall (at time of installation of joint system) is 3/4 in. (19 mm). The joint system is designed to accommodate a max 50 percent compression or 83 percent extension from its installed width.

A. **Fill, Void or Cavity Material*** — A nom 20 gauge steel angle provided with a nom 1 or 2 in. (25 or 51 mm) wide intumescent strip on one leg to be secured to the bottom floor assembly with the intumescent strip against the outer face of gypsum board on finished side of wall with min steel masonry fasteners spaced a max 24 in. (610 mm) OC.

CALIFORNIA EXPANDED METAL PRODUCTS CO — Firestik FS1 or FS2

*Bearing the UL Classification Mark

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System No. HW-D-0496

August 05, 2009

Assembly Ratings — 1, 2 and 3 Hr (See Item 2)

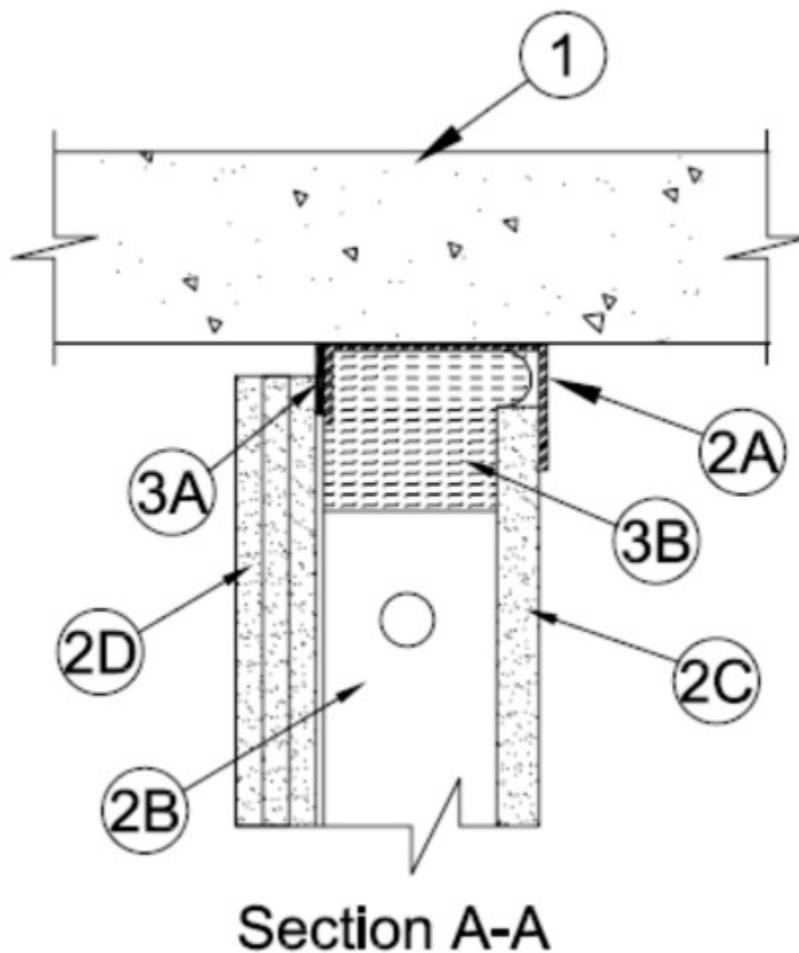
L Rating At Ambient — Less Than 1 CFM/LIN Ft

L Rating At 400 F — Less Than 1 CFM/LIN Ft

Nominal Joint Width — 3/8 to 3/4 in.

Class II and III Movement Capabilities — 100% Compression or Extension with Nominal Joint of 3/8 or 1/2 in. (See Items 3A and 3A1)

Class II and III Movement Capabilities — 67% Compression or 100% Extension with Nominal Joint 3/4 in. (See Item 3A2)



1. **Floor Assembly** — Min 4 1/2 in. (114 mm) thick steel reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) structural concrete. Floor may also be constructed of any min 6 in. thick UL Classified hollow-core **Precast Concrete Units***.

See **Precast Concrete Units** (CFTV) category in the Fire Resistance Directory for names manufacturers.

The hourly fire rating of the floor assembly shall be equal or greater than the hourly fire rating of the wall assembly.

2. **Shaft Wall Assembly** — The 1, 2 or 3 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Steel Floor and Ceiling Runners** — Floor runner J-shaped or U-shaped, sized to accommodate steel studs (Item 2B) with unequal legs of 1 in. (25 mm) and 2 in. (51 mm), fabricated from 25 ga galv steel. The ceiling runners are provided with a fill, void or cavity material and are described in Item 3A.

B. **Studs** — "C-T", "I", or "C-H" shaped steel studs to be min 2 1/2 in. (64 mm) wide and formed of min 24 ga galv steel. Studs cut 1/2 to 3/4 in (13 to 19 mm) less in length than assembly height with bottom nesting in and secured to floor runner. Studs to nest in ceiling runner without attachment when DL or JR Series (Item 3) is used. When slotted ceiling runner SL or SS Series (Item 3) is used, steel studs secured to slotted leg of ceiling runner on finished side with No. 8 by 1/2 in. (13 mm) long wafer head steel screws at mid-height of exposed slot. Studs spaced max 24 in. (610 mm) OC.

C. **Gypsum Board*** — 1 in. (25 mm) thick by max 24 in. (610 mm) wide gypsum board liner panels. Panels cut 1 in. (25 mm) less in length than floor to ceiling height when Item 3A is used. Panels cut 1-1/2 in. (38 mm) less in length than floor to ceiling height when Item 3A1 or 3A2 is used. Vertical edges inserted into "T" shaped section of "C-T" studs, into holding tabs of "I" studs or into "H"-shaped section of "C-H" studs.

D. **Gypsum Board*** — Gypsum board 1/2 or 5/8 in. (13 or 16 mm) thick, applied on finished side of wall as specified in the individual Wall and Partition Design. The boards cut a max 3/8 to 3/4 in. (10 to 19 mm) less in length than the floor to ceiling height. The screws attaching the gypsum board layer(s) to the "C-T", "I", or "C-H" studs shall be located 1 in. (25 mm) below the bottom of the ceiling runner legs. No gypsum board attachment screws shall be driven into the ceiling runner.

The hourly fire rating of the joint system is equal to the hourly fire rating of the wall.

3. **Joint System** — Max separation between bottom of floor and top of gypsum board (at time of installation) is 3/8 to 3/4 in. (10 to 19 mm). The joint system is designed to accommodate a max 100 percent compression or extension from its installed width when Items 3A or 3A1 are used, or max 67% compression and 100% extension from its installed width when Item 3A2 is used .

A. Fill, Void or Cavity Material* — For nom 3/8 in. (10 mm) joints at time of installation, one of the following nom 20 ga tracks shall be used: U-shaped track having 2 in. (51 mm) solid legs, or U-shaped track with one 3 in. (76 mm) solid leg and one 3 in. (76 mm) slotted leg, or J-shaped track having one 2 in. (51 mm) solid leg and one 3 in. (76 mm) slotted leg, or J-shaped track with unequal solid legs of 2 and 3 in. (51 and 76 mm). Track provided with a nom 1 in. (25 mm) wide intumescent strip affixed to the top of the leg or slotted leg facing the finished side of wall. Gypsum board to overlap a min of 5/8 in. (16 mm) over the intumescent strip. Track to be secured to bottom side of floor assembly with steel fasteners spaced a max of 24 in. (610 mm) OC.

JAK INNOVATIONS — BlazeFrame JR1, DL1, SL1 or SS1 series

A1. Fill, Void or Cavity Material* — For nom 1/2 in. (13 mm) joints at time of installation, one of the following nom 20 ga tracks shall be used: J-shaped track having unequal solid legs of 2 and 3 in. (51 and 76 mm), or J-shaped track having one 3 in. (76 mm) solid leg and one 3 in. (76 mm) slotted leg. Track provided with a nom 1-1/4 in. (32 mm) wide intumescent strip affixed to the top of the leg or slotted leg facing the finished side of wall. Gypsum board to overlap a min of 3/4 in. (19 mm) over the intumescent strip. Track to be secured to bottom side of floor assembly with steel fasteners spaced a max of 24 in. (610 mm) OC.

JAK INNOVATIONS — BlazeFrame JRW1 or SSW1 series

A2. Fill, Void or Cavity Material* — For nom 3/4 in. (19 mm) joints at time of installation, one of the following nom 20 ga tracks shall be used: J-shaped track having unequal solid legs of 2 and 3 in. (51 and 76 mm), or J-shaped track having one 3 in. (76 mm) solid leg and one 4 in. (102 mm) slotted leg. Track provided with a nom 1-3/4 in. (44 mm) wide intumescent strip affixed to the top of the leg or slotted leg facing the finished side of wall. Gypsum board to overlap a min of 1 in. (25 mm) over the intumescent strip. Track to be secured to bottom side of floor assembly with steel fasteners spaced a max of 24 in. (610 mm) OC.

JAK INNOVATIONS — BlazeFrame JRX1 or SSX1 series

B. Mineral Wool — Min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m³) mineral wool batt insulation cut to the width of the ceiling runner and compressed 33 percent in thickness, installed into ceiling runner between leg of track and gypsum liner board.

FIBREX INSULATIONS INC — FBX Safing Insulation

IIG MINWOOL L L C — MinWool-1200 Safing

ROCK WOOL MANUFACTURING CO — Delta Board

ROXUL INC — Safe

THERMAFIBER INC — SAF

*Bearing the UL Classification Mark

Last Updated on 2009-08-05

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Joint Systems

[See General Information for Joint Systems](#)

System No. HW-D-0497

August 05, 2009

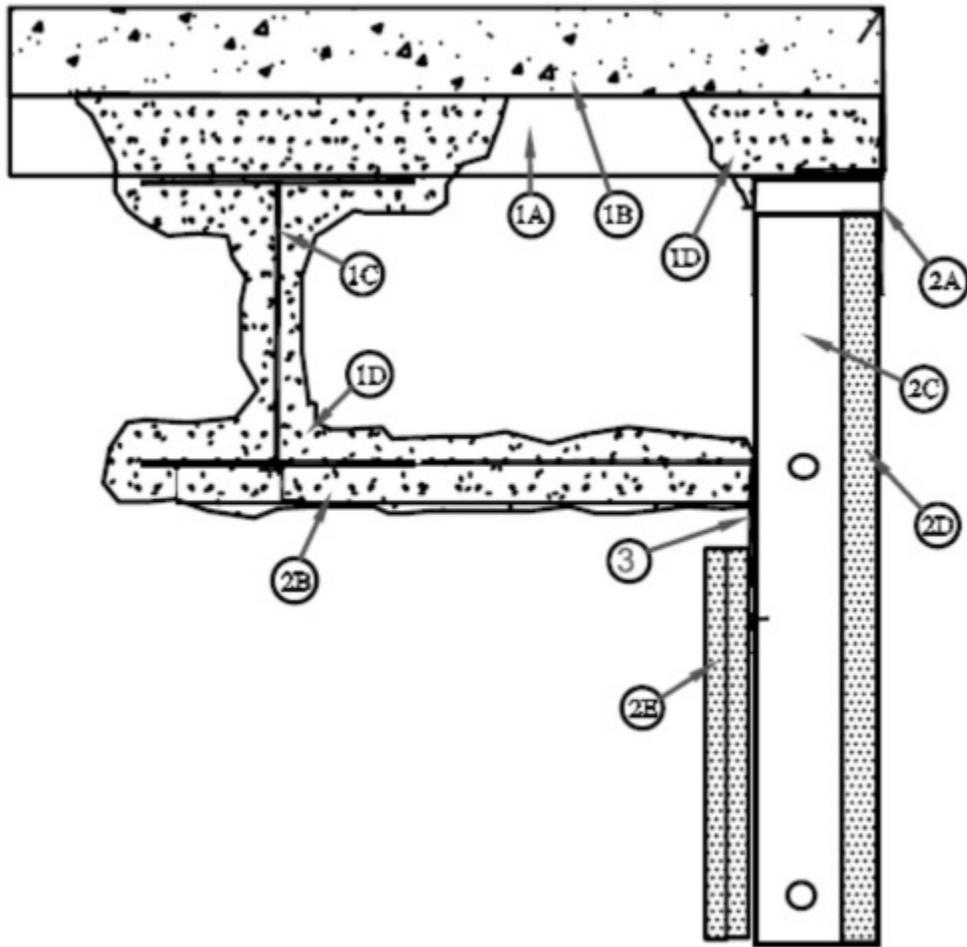
Assembly Ratings — 1 and 2 HR (See Item 2)

L Rating At Ambient — Less Than 1 CFM/LIN Ft

L Rating At 400 F — Less Than 1 CFM/LIN Ft

Nominal Joint Width — 3/8 to 3/4 in.

Class II and III Movement Capabilities — 100% Compression or Extension



1. **Floor Assembly** — The fire-rated fluted steel deck/concrete floor assembly shall be constructed of the materials and in the manner described in the individual D900 Series Floor-Ceiling Design in the UL Fire Resistance Directory and shall include the following construction features:

- A. **Steel Floor And Form Units*** — Max 3 in. (76 mm) deep galv steel fluted floor units.
- B. **Concrete** — Min 2-1/2 in. (64 mm) thick reinforced concrete, as measured from the top plane of the floor units.
- C. **Structural Steel Support** — Steel beam or open web steel joist, as specified in the individual D900 Series Floor-Ceiling Design, used to support steel floor units. Structural steel support oriented parallel to wall assembly. Structural steel support oriented parallel to and 1 to 7 in. (25 to 178 mm) from wall assembly.
- D. **Spray-Applied Fire Resistive Material*** — As specified in the individual D900 Series Floor-Ceiling Design after installation of the ceiling runner (Item 2A), attachment clips (Item 2B), and composite angle (Item 3), all surfaces of the structural steel support to be sprayed with the thickness of material as specified in the individual design. The flutes of the steel floor units are to be filled with material across the entire top flange of the structural steel support and ceiling runner (Item 2A). The area between the z-clips (Item 2B) is to be filled to the depth of the z-clips plus an additional 1-1/2 in. (38 mm) thickness above and on top of the composite angle (Item 3A).

ISOLATEK INTERNATIONAL — Type 300

W R GRACE & CO - CONN — Type MK-6/HY

2. **Shaft Wall Assembly** — The 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

- A. **Steel Floor and Ceiling Runners** — Floor and ceiling runners to be min 2-1/2 in. (64 mm) wide with floor runner having min legs of 1-1/4 in. (32 mm) and ceiling runner having min legs of 2 in. (51 mm), fabricated from 25 ga galv steel. Ceiling runner attached to steel deck with steel fasteners or welds spaced a max 24 in. (610 mm) OC.
- B. **Steel Attachment Clips** — Z-shaped clips having 1-1/2 in. (38 mm) wide center leg of min 20 ga

galv steel. Clips to extend through the thickness of the spray-applied fire resistive material on the bottom flange of the steel beam with 1-1/2 in. (38 mm) long upper and lower legs. Legs of clips fastened to bottom of beam (prior to application of spray-applied fire-resistive materials) with steel fasteners or welds. Clips spaced max 16 in. (406 mm) OC and extend to with in 1/4 to 3/4 in. (6 to 19 mm) from the surface of the wall studs.

C. **Studs** — "C-T", "I", or "C-H" shaped steel studs to be min 2-1/2 in. (64 mm) wide and formed of min 24 ga galv steel. Studs cut 1/2 to 3/4 in (13 to 19 mm) less in length than assembly height with bottom nesting in and secured to floor runner. Studs to nest in ceiling runner without attachment. When AN Series (Item 3) is used the studs are not attached. When slotted SA Series (Item 3) is used, steel studs secured through slots in downward facing leg with No. 8 by 1/2 in. (13 mm) long wafer head steel screws at mid-height of exposed slot. Studs spaced max 24 in. (610 mm) OC.

D. **Gypsum Board*** — 1 in. (25 mm) thick by max 24 in. (610 mm) wide gypsum board liner panels. Panels cut 3/4 to 1 in. (19 to 25 mm) less in length than floor to ceiling height. Vertical edges inserted into "T" shaped section of "C-T" studs, into holding tabs of "I" studs or into "H"-shaped section of "C-H" studs.

E. **Gypsum Board*** — Gypsum board 1/2 or 5/8 in. (13 or 16 mm) thick, applied on finished side of wall as specified in the individual Wall and Partition Design. The boards cut a max 3/8 to 3/4 in. (10 to 19 mm) less in length (see Item 3) than the floor to bottom of plane of steel attachment clips (Item 2B). The screws attaching the gypsum board layer(s) to the "C-T", "I", or "C-H" studs shall be located 1 in. (50 mm) below the bottom of the composite angle vertical leg. No gypsum board attachment screws shall be driven into the composite angle.

The hourly fire rating of the joint system is equal to the hourly fire rating of the wall.

3. **Joint System** — Max separation between bottom of steel attachment clips, and top of gypsum board (at time of installation) is 3/8 to 3/4 in. (10 to 19 mm). The joint system is designed to accommodate a max 100 percent compression or extension from its installed width.

A. **Fill, Void or Cavity Material*** — For nom 3/8 in. (10 mm) joints, a nom 20 ga L-shaped angle having min 3-1/2 in. (89 mm) vertical leg and a min 2 in. (51 mm) horizontal leg or nom 20 ga L-shaped angle having min 4-1/2 in. (114 mm) vertical slotted leg with and a min 2 in. (51 mm) horizontal leg with a nom 1 in. (25 mm) wide intumescent strip affixed to the vertical leg 1-1/2 in. (38 mm) below the horizontal leg facing the finished side. Composite angle to extend from edge of bottom beam flange to wall studs and (prior to application of spray applied fire-resistive materials) attached to the top of the steel attachment clips with typical steel fasteners. Gypsum board to overlap a min of 5/8 in. (16 mm) over the intumescent strip.

JAK INNOVATIONS — BlazeFrame IAN or ISA series

A1. **Fill, Void or Cavity Material*** — For nom 1/2 in (13 mm) joints, a nom 20 ga L-shaped angle having min 3-1/2 in. (89 mm) vertical leg and a min 2 in. (51 mm) horizontal leg or nom 20 ga L-shaped angle having min 4-1/2 in. (114 mm) vertical slotted leg with and a min 2 in. (51 mm) horizontal leg with a nom 1 1/4 in. (32 mm) wide intumescent strip affixed to the vertical leg 1-1/2 in. (38 mm) below the horizontal leg facing the finished side. Composite angle to extend from edge of bottom beam flange to wall studs and (prior to application of spray applied fire-resistive materials) attached to the top of the steel attachment clips with typical steel fasteners. Gypsum board to overlap a min of 3/4 in. (19 mm) over the intumescent strip.

JAK INNOVATIONS — BlazeFrame IANW or ISAW series

A2. **Fill, Void or Cavity Material*** — For nom 3/4 in (19 mm) joints, a nom 20 ga L-shaped angle having min 3-1/2 in. (89 mm) vertical leg and a min 2 in. (51 mm) horizontal leg or nom 20 ga L-shaped angle having min 5 in. (127 mm) vertical slotted leg with and a min 2 in. (51 mm) horizontal leg with a nom 1 3/4 in. (44 mm) wide intumescent strip affixed to the vertical leg 1-1/2 in. (38 mm) below the horizontal leg facing the finished side. Composite angle to extend from edge of bottom beam flange to wall studs and (prior to application of spray applied fire-resistive materials) attached to the top of the steel attachment clips with typical steel fasteners. Gypsum board to overlap a min of 1 in. (25 mm) over the intumescent strip.

JAK INNOVATIONS — BlazeFrame IANX or ISAX series

*Bearing the UL Classification Mark

Last Updated on 2009-08-05

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XHBN.HW-D-0504 Joint Systems

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 - When field issues arise, it is recommended the first contact for assistance be the technical service staff provided by the product manufacturer noted for the design. Users of fire resistance assemblies are advised to consult the general Guide Information for each product category and each group of assemblies. The Guide Information includes specifics concerning alternate materials and alternate methods of construction.
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Joint Systems

[See General Information for Joint Systems](#)

System No. HW-D-0504

August 05, 2009

Assembly Rating — 2 Hr

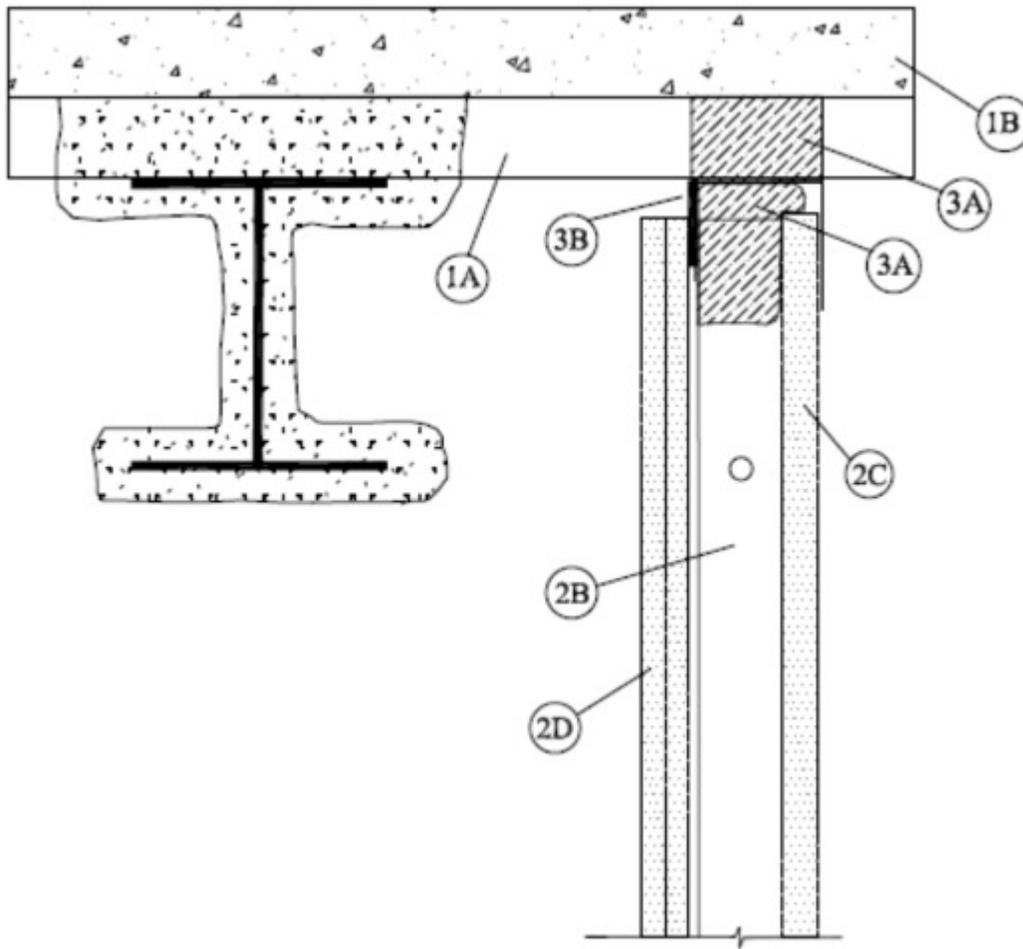
L Rating At Ambient — Less Than 1 CFM/LIN Ft

L Rating At 400 F — Less Than 1 CFM/LIN Ft

Nominal Joint Width — 3/8 to 3/4 in.

Class II and III Movement Capabilities — 100% Compression or Extension with Nominal Joint of 3/8 or 1/2 in. (See Items 3B and 3B1)

Class II and III Movement Capabilities — 67% Compression or 100% Extension with Nominal Joint of 3/4 in. (See Item 3B2)



1. **Floor Assembly** — The fire-rated fluted steel deck/concrete floor assembly shall be constructed of the materials and in the manner described in the individual D700 or D900 Series Floor-Ceiling Design in the UL Fire Resistance Directory and shall include the following construction features:

- A. **Steel Floor And Form Units*** — Max 3 in. (76 mm) deep galv steel fluted floor units.
- B. **Concrete** — Min 2-1/2 in. (64 mm) thick reinforced concrete, as measured from the top plane of the floor units.
- C. **Spray-Applied Fire Resistive Material*** — Steel floor units and structural steel supports to be sprayed with the thickness of material specified in the individual D700 or D900 Series Design. The flutes of the steel floor units above the structural steel supports shall be filled with spray-applied fire resistive material. The spray-applied fire resistive material in the flutes above the wall shall be applied to follow the contour of the steel floor units.

ISOLATEK INTERNATIONAL — Type 300

W R GRACE & CO - CONN — Type MK-6/HY

- D. **Structural Steel Support** — (Optional) Steel Beam or open web steel joist, as specified in the individual D900 Series Floor-Ceiling Design, used to support steel floor units. Structural steel support oriented parallel to wall assembly.

The hourly fire rating of the floor assembly shall be equal or greater than the hourly fire rating of the wall assembly.

2. **Shaft Wall Assembly** — The 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

- A. **Steel Floor and Ceiling Runners** — Floor runner J-shaped or U-shaped, sized to accommodate steel studs (Item 2B) wide with unequal legs of 1 in. and 2 in. (25 and 51 mm), fabricated from 24 MSG galv steel. Runner positioned with short leg toward finished side of wall. Runners attached to floor with steel fasteners located not greater than 2 in. from ends and not greater than 24 in OC. The ceiling runners are provided with a fill, void or cavity material and are described in Item 3.

B. Studs — "C-T", "I", or "C-H" shaped steel studs to be min 2 1/2 in. (64 mm) wide and formed of min 24 ga galv steel. Studs cut 1/2 to 3/4 in (13 to 19 mm) less in length than assembly height with bottom nesting in and secured to floor runner. Studs to nest in ceiling runner without attachment when JR or DL Series (Item 3) is used. When slotted ceiling runner SL Series (Item 3) is used, steel studs secured to slotted leg of ceiling runner on finished side with No. 8 by 1/2 in. (13 mm) long wafer head steel screws at mid-height of exposed slot. Studs spaced max 24 in. (610 mm) OC.

C. Gypsum Board* — 1 in. (25 mm) thick by max 24 in. (610 mm) wide gypsum board liner panels. Panels cut 1 in. (25 mm) less in length than floor to ceiling height when Item 3B is used. Panels cut 1-1/2 in. (38 mm) less in length than floor to ceiling height when Item 3B1 or 3B2 is used.. Vertical edges inserted into "T" shaped section of "C-T" studs, into holding tabs of "I" studs or into "H"-shaped section of "C-H" studs.

D. Gypsum Board* — Gypsum board 1/2 or 5/8 in. (13 or 16 mm) thick, applied on finished side of wall as specified in the individual Wall and Partition Design. The boards cut a max 1/2 to 3/4 in. (13 to 19 mm) less in length (Item 3) than the floor to ceiling height. The screws attaching the gypsum board layer(s) to the "C-T", "I", or "C-H" studs shall be located 1 in. (51 mm) below the bottom of the ceiling runner legs. No gypsum board attachment screws shall be driven into the ceiling runner. Where the top of the wall assembly is inaccessible above the lowest elevation of the structural steel support, the gypsum board attachment screws may be located below the bottom of the ceiling runner legs at the lowest elevation of the structural steel support.

The hourly fire rating of the joint system is equal to the hourly fire rating of the wall.

3. Joint System — Max separation between bottom of floor and top of gypsum board (at time of installation) is 3/8 to 3/4 in. (10 to 19 mm). The joint system is designed to accommodate a max 100 percent compression or extension from its installed width when Items 3B or 3B1 are used, or max 67 percent compression and 100 percent extension from its installed width when Item 3B2 is used.

A. Forming Material* — Min 4 pcf (64 kg/m³) mineral wool insulation cut to the shape of the fluted steel floor units, approx 33% larger than the area of the flutes. Pieces compressed and inserted into the flutes above the top ceiling runner flush with the finished wall surface. Min 4 in. (102 mm) thick min 4 pcf (64 kg/m³) mineral wool batt insulation cut to the width of the ceiling runner and compressed 33 percent in thickness, installed into ceiling runner between leg of track and gypsum liner board.

FIBREX INSULATIONS INC — FBX Safing Insulation

IIG MINWOOL L L C — MinWool-1200 Safing

ROXUL INC — Safe

ROCK WOOL MANUFACTURING CO — Delta Board

THERMAFIBER INC — SAF

B. Fill, Void or Cavity Material* — For nom 3/8 in. (10 mm) joints, a nom 20 ga J-shaped track having one 2 in. (51 mm) and one 3 in. (76 mm) leg or a 20ga U-shaped track having 2 in. (51mm) solid legs or nom 20 ga J-shaped track having one 2 in. (51 mm) solid leg and one 3 in. (76 mm) slotted leg or nom 20 ga J-shaped track having one 3 in. (51 mm) solid leg and one 3 in. (76 mm) slotted leg with a nom 1 in. (25 mm) wide intumescent strip affixed to the top of the leg facing the finished side of wall. Gypsum board to overlap a min of 5/8 in. (16 mm) over the intumescent strip. The intumescent strip is set 1/2 in. (13 mm) down from the top of the legs on the SL1CD series track for use in D700 assemblies. Track to be secured to bottom side of floor assembly with steel fasteners spaced a max of 24 in. (610 mm) OC.

JAK INNOVATIONS — BlazeFrame JR1, DL1, SL1, or SL1CD series

B1. Fill, Void or Cavity Material* — For nom 1/2 in. (13 mm) joints, a nom 20 ga J-shaped track with unequal legs of 2 in. (51 mm) and 3 in. (76 mm) or nom 20 ga U-shaped track having one 3 in. (76 mm) solid leg and one 3 in. (76 mm) slotted leg with a nom 1 1/4 in. (32 mm) wide intumescent strip affixed to the top of the leg or slotted leg facing the finished side of wall. Gypsum board to overlap a min of 3/4 in. (19 mm) over the intumescent strip. The intumescent strip is set 1/2 in. (13 mm) down from the top of the legs on the JRW1CD and SSW1CD series track for use in D700 assemblies. Track to be secured to bottom side of floor assembly with steel fasteners a max of 24 in. (610 mm) OC.

JAK INNOVATIONS — BlazeFrame JRW1, JRW1CD, SSW1, or SSW1CD series

B2. Fill, Void or Cavity Material* — For nom 3/4 in (19 mm) joints, a nom 20 ga J-shaped track with unequal legs of 2 1/2 in. (64 mm) and 3 in. (76 mm), or nom 20 ga U-shaped track having one 3 in. (76

mm) solid leg and one 4 in. (102 mm) slotted leg with a nom 1 3/4 in. (44 mm) wide intumescent strip affixed to the top of the leg or slotted leg facing the finished side of wall. Gypsum board to overlap a min of 1 in. (25 mm) over the intumescent strip. The intumescent strip is set 1/2 in. (13 mm) down from the top of the legs on the JRX1CD and SSX1CD series track for use in D700 assemblies. Track to be secured to bottom side of floor assembly with typical steel fasteners a max of 24 in. (610 mm) OC.

JAK INNOVATIONS — BlazeFrame JRX1, SSX1, JRX1CD, or SSX1CD series

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XHBN.HW-D-0525 Joint Systems

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Joint Systems

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System No. HW-D-0525

September 08, 2010

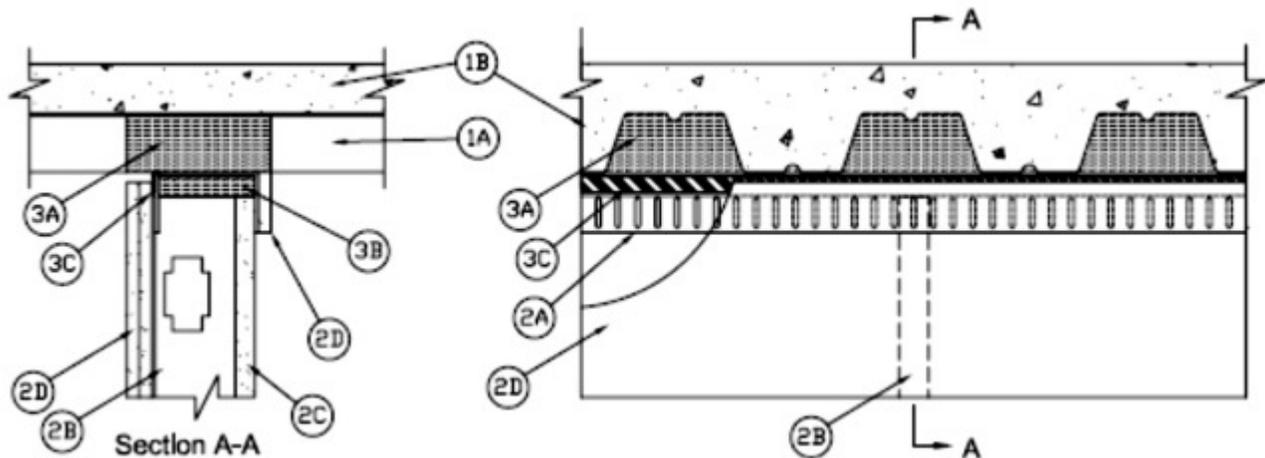
Assembly Rating — 2 Hr

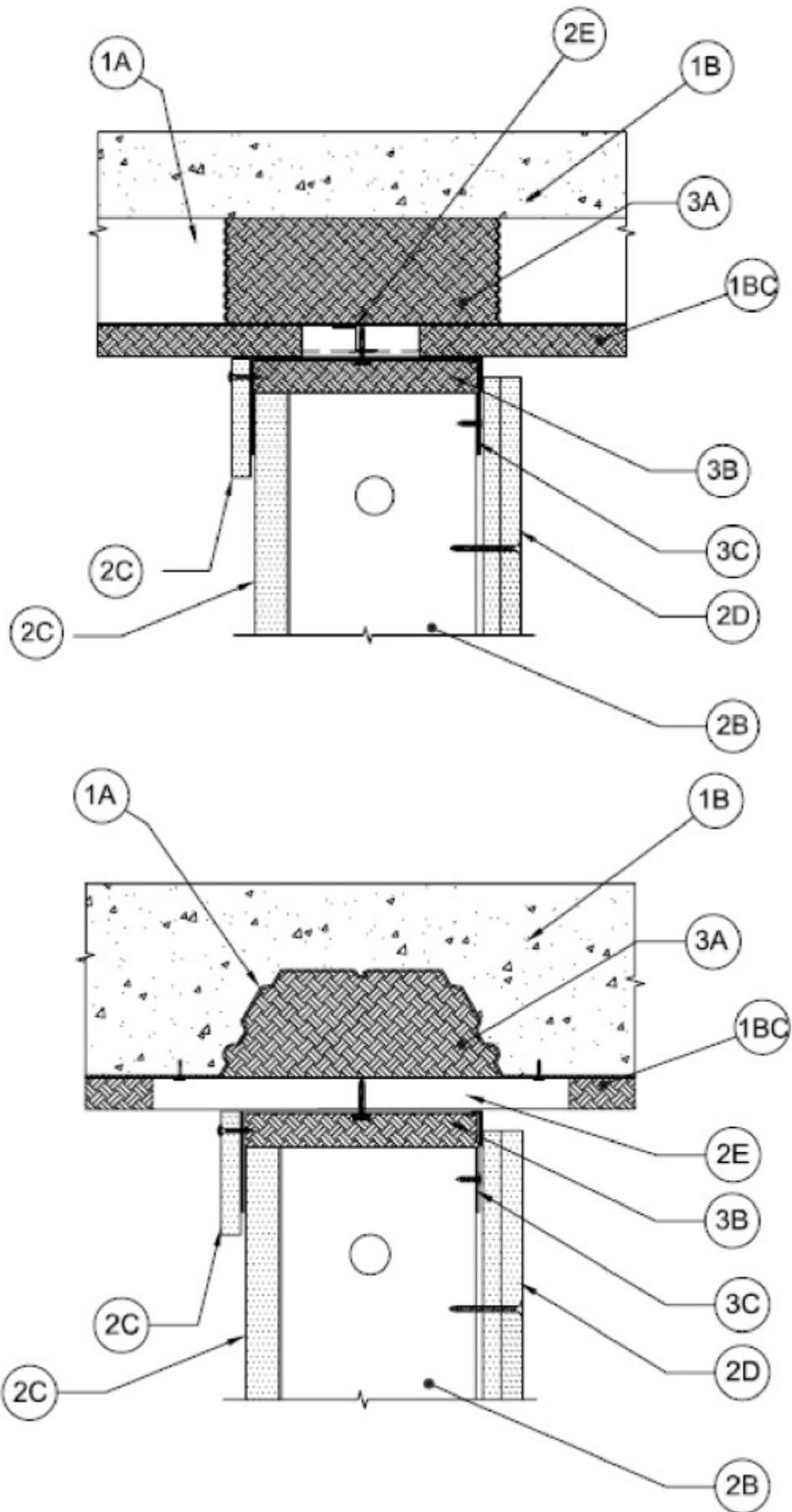
L Rating at Ambient -2.1 CFM/Lin ft

L Rating at 400° F -1.33 CFM/Lin ft

Nominal Joint Width — 1/2 in.

Class II and III Movement Capabilities — 100% Compression or Extension





1. **Floor Assembly** — The fire-rated fluted steel deck/concrete floor assembly shall be constructed of the materials and in the manner described in the individual D900 Series Floor-Ceiling Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Steel Floor and Form Units*** — Max 3 in. (76 mm) deep galv steel fluted floor units.

B. **Concrete** — Min 2-1/2 in. (64 mm) thick reinforced concrete, as measured from the top plane of the floor units.

1A. **Roof Assembly** — (Not Shown) - As an alternate to the floor assembly, a fire rated fluted steel deck roof assembly may be used. The roof shall be constructed of the materials and in the manner described in the individual P900-Series Roof-Ceiling designs in the UL Fire Resistance Directory. The hourly rating of the roof assembly shall be equal to or greater than the hourly rating of the wall assembly. The roof assembly shall include the following construction features:

A. **Steel Roof Deck** — Max 3 in. deep galv steel fluted roof deck.

B. **Roof Insulation** — Roof insulation to consist of min 2-1/4 in. (57 mm) thick poured insulating concrete, as measured from the top plane of the roof deck.

1B. **Floor Assembly** — (Configurations B and C) - The fire-rated fluted steel deck/concrete floor assembly shall be constructed of the materials and in the manner described in the individual D700 Series Floor-Ceiling Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Steel Floor And Form Units*** — Max 3 in. (76 mm) deep galv steel fluted floor units.

B. **Concrete** — Min 2-1/2 in. (64 mm) thick reinforced concrete, as measured from the top plane of the floor units.

C. **Spray-Applied Fire Resistive Material*** — (Required for Configurations B and C) - As specified in the D700 Series Floor-Ceiling Design. After installation of ceiling runners (Item 3), the steel floor unit area immediately above the ceiling runner is to be completely filled with spray-applied fire resistive material. Material in flutes to extend 5/8 or 1-1/4 in. (16 or 32 mm) beyond each side of the ceiling runner so as to be approx flush with each surface of the finished wall. No Spray-applied material shall be applied to the flanges of the ceiling runner.

ISOLATEK INTERNATIONAL — Type 300

W R GRACE & CO - CONN — Type MK-6/HY

2. **Shaft Wall Assembly** — The 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Steel Floor and Ceiling Runners** — Floor runner U-shaped, sized to accommodate steel studs (Item 2B), fabricated from 24 ga galv steel. Ceiling runner positioned with slotted leg toward finished side of wall. Runners attached to floor with steel fasteners located not greater than 2 in. from ends and not greater than 24 in OC. The ceiling runners are provided with a fill, void or cavity material and are described in Item 3.

B. **Studs** — "C-T", "I", or "C-H" shaped steel studs to be min 2 1/2 in. (64 mm) wide and formed of min 24 ga galv steel. Studs cut 1 to 1-1/4 in (25 to 32 mm) less in length than assembly height with bottom nesting in and secured to floor runner. Steel studs secured to slotted leg of ceiling runner on finished side with No. 8 by 1/2 (13 mm) long wafer head steel screws at mid-height of exposed slot. Studs spaced max 24 in. (610 mm) OC.

C. **Gypsum Board*** — 1 in. (25 mm) thick by max 24 in. (610 mm) wide gypsum board liner panels. Panels cut 1 in. less in length than floor to ceiling height. Vertical edges inserted into "T" shaped section of "C-T" studs, into holding tabs of "I" studs or into "H"-shaped section of "C-H" studs. A nominal 3-5/8 in. (92 mm) wide rip of gypsum board covering the leg of the ceiling runner attached a max of 3/8 in. (10 mm) below the track web and a max of 8 in. (203 mm) O.C. to ceiling runner on the non-finished side of wall.

D. **Gypsum Board*** — Gypsum board 1/2 or 5/8 in. (13 or 16 mm) thick, applied on finished side of wall as specified in the individual Wall and Partition Design. The boards cut a max 1/2" in. less in length than the floor to ceiling height. The screws attaching the gypsum board layer(s) to the "C-T", "I", or "C-H" studs shall be located 4 to 5 in. (102 to 127 mm) down from deck at time of installation.

E. **Steel Attachment Clips** — (Required for Configurations B and C, Not for use on Configuration A) - Z-shaped clips formed of min 20 ga galv steel. Clips sized to extend through the thickness of the spray-applied fire resistive material on the bottom of the steel deck with 1-1/2 in. (38 mm) long upper and lower legs. Legs of clips fastened to bottom of the deck (prior to application of spray-applied fire-resistive materials) and top of ceiling runner with steel fasteners or welds. Clips spaced max 24in. (610 mm) OC. For Configuration C the clips are to extend a min of 1-1/2 in. (38 mm) onto the valley of the deck on either side of the wall.

The hourly fire rating of the joint system is equal to the hourly fire rating of the wall.

3. **Joint System** — Max separation between bottom of floor and top of gypsum board (at time of installation) is 1/2 in. (13 mm). The joint system is designed to accommodate a max 100 percent compression or extension from its installed width.

A. **Forming Material*** — Min 4 pcf (64 kg/m³) mineral wool insulation cut to the shape of the fluted steel floor units, approx 33% larger than the area of the flutes. Pieces compressed and inserted into the flutes above the top ceiling runner flush with the finished wall surface.

B. **Forming Material*** — Min 2 in. thick min 4 pcf (64 kg/m³) mineral wool batt insulation cut to the width of the ceiling runner and compressed 50 percent in thickness, installed into ceiling runner between leg of track and gypsum liner board.

C. **Fill, Void or Cavity Material*** — Nom 20 ga U-shaped track having 3 in (76 mm) legs with a nom 1-1/4 in. (32 mm) wide intumescent strip affixed to the top of the leg overlapping on to top surface a min of 1/4 in. (6 mm) facing the finished side of wall. Gypsum board to overlap a min of 1/2 in. (13 mm) over the intumescent strip. Track to be secured to bottom side of floor assembly with min 2 in. (51 mm) steel masonry or powder actuated fasteners spaced at a max of 24 in. (610 mm) OC. For Configurations B and C the track is to be secured to the clips (Item 2E) with steel fasteners or welds spaced max 24 in. (610 mm) OC

CALIFORNIA EXPANDED METAL PRODUCTS CO — FAS SHAFT Track

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XHBN.HW-D-0557 Joint Systems

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Joint Systems

[See General Information for Joint Systems](#)

System No. HW-D-0557

April 06, 2009

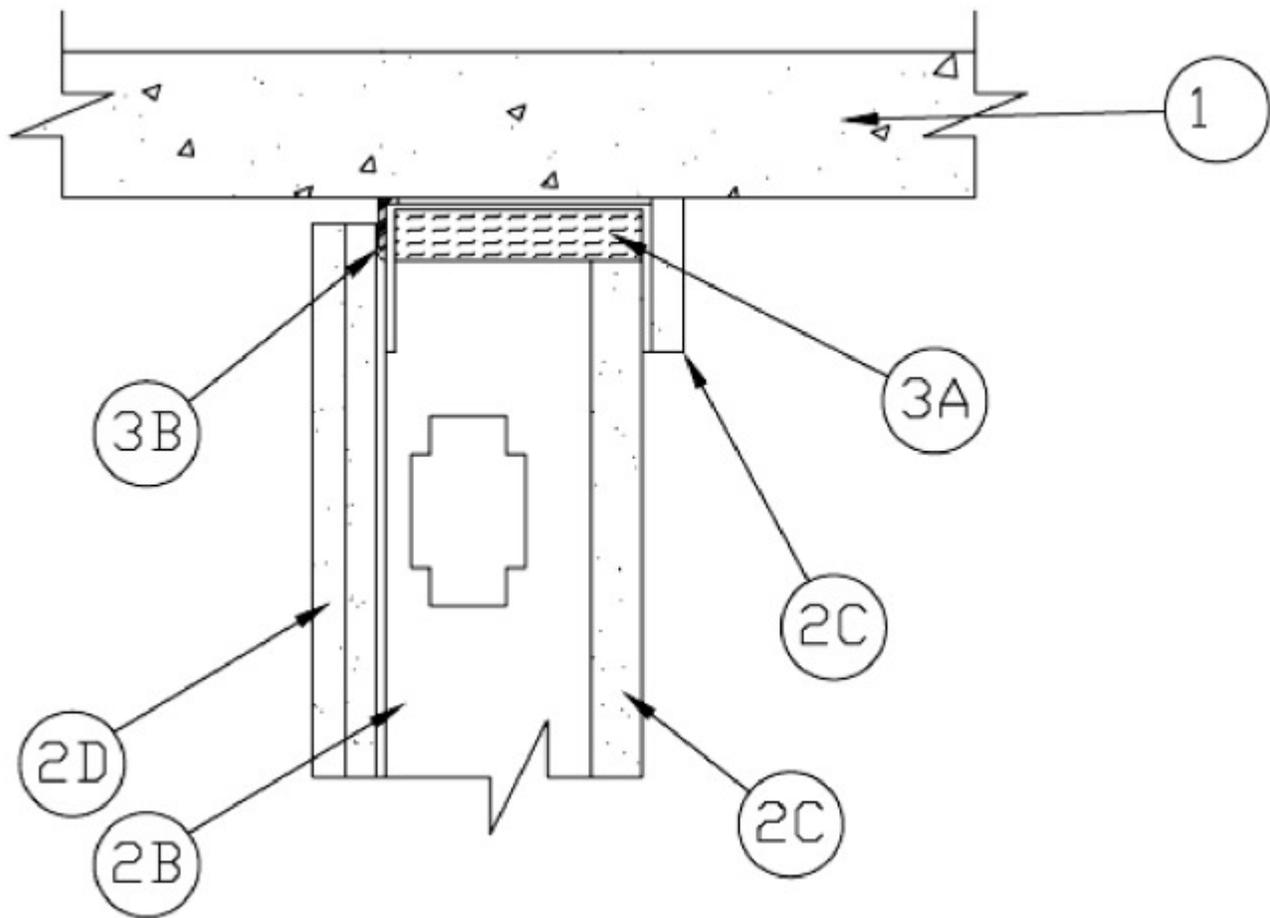
Assembly Ratings —2 HR

Nominal Joint Width — 1/2 in.

L Rating at Ambient —2.1 CFM/Lin Ft

L Rating at 400°F —1.33 CFM/Lin Ft

Class II and III Movement Capabilities — 100% Compression or Extension



1. **Floor Assembly** — Concrete — Min 2-1/2 in. (64 mm) thick reinforced concrete.

2. **Shaft Wall Assembly** — The 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Steel Floor and Ceiling Runners** — Floor runner U-shaped, sized to accommodate steel studs (Item 2B), fabricated from min 24 ga galv steel. Runners attached to floor with steel fasteners located not greater than 2 in. from ends and not greater than 24 in OC. The ceiling runners are provided with a fill, void or cavity material and are described in Item 3.

B. **Studs** — "C-T", "I", or "C-H" shaped steel studs to be min 2 1/2 in. (64 mm) wide and formed of min 24 ga galv steel. Studs cut 1 to 1-1/4 in (25 to 32 mm) less in length than assembly height with bottom nesting in and secured to floor runner. Steel studs secured to slotted leg of ceiling runner on finished side with No. 8 by 1/2 (13 mm) long wafer head steel screws at mid-height of exposed slot. Studs spaced max 24 in. (610 mm) OC.

C. **Gypsum Board*** — 1 in. (25 mm) thick by max 24 in. (610 mm) wide gypsum board liner panels. Panels cut 1 in. less in length than floor to ceiling height. Vertical edges inserted into "T" shaped section of "C-T" studs, into holding tabs of "I" studs or into "H"-shaped section of "C-H" studs. A nominal 3-5/8 in. (92 mm) wide rip of gypsum board covering the leg of the ceiling runner attached a max of 3/8 in. (10 mm) below the track web and a max of 8 in. (203 mm) O.C. to ceiling runner on the non-finished side of wall.

D. **Gypsum Board*** — Gypsum board 1/2 or 5/8 in. (13 or 16 mm) thick, applied on finished side of wall as specified in the individual Wall and Partition Design. The boards cut a max 1/2" in. less in length than the floor to ceiling height. The screws attaching the gypsum board layer(s) to the "C-T", "I", or "C-H" studs shall be located between 4 and 5 in. (102 -127 mm) down from ceiling surface.

The hourly fire rating of the joint system is equal to the hourly fire rating of the wall.

3. **Joint System** — Max separation between bottom of floor and top of gypsum board (at time of installation) is 1/2 in. (13 mm). The joint system is designed to accommodate a max 100 percent compression or extension from its installed width.

A. **Forming Material*** — Min 2 in. thick min 4 pcf (64 kg/m³) mineral wool batt insulation cut to the width of the ceiling runner and compressed 50 percent in thickness, installed into ceiling runner between leg of track and gypsum liner board.

B. **Fill, Void or Cavity Material*** — Nom 20 ga U-shaped track having 3 in. (76 mm) legs with a nom 1-

1/4 in. (32 mm) wide intumescent strip affixed to the top of the leg overlapping on to top surface a min of 1/4 in. (6 mm) facing the finished side of wall. Gypsum board to overlap a min of 5/8 in. (16 mm) over the intumescent strip. Track to be secured to bottom side of floor assembly with steel masonry or powder actuated fasteners spaced at a max of 24 in. (610 mm) OC.

CALIFORNIA EXPANDED METAL PRODUCTS CO — FAS SHAFT Track

*Bearing the UL Classification Mark

Last Updated on 2009-04-06

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XHBN.HW-D-0559 Joint Systems

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Joint Systems

[See General Information for Joint Systems](#)

System No. HW-D-0559

August 05, 2009

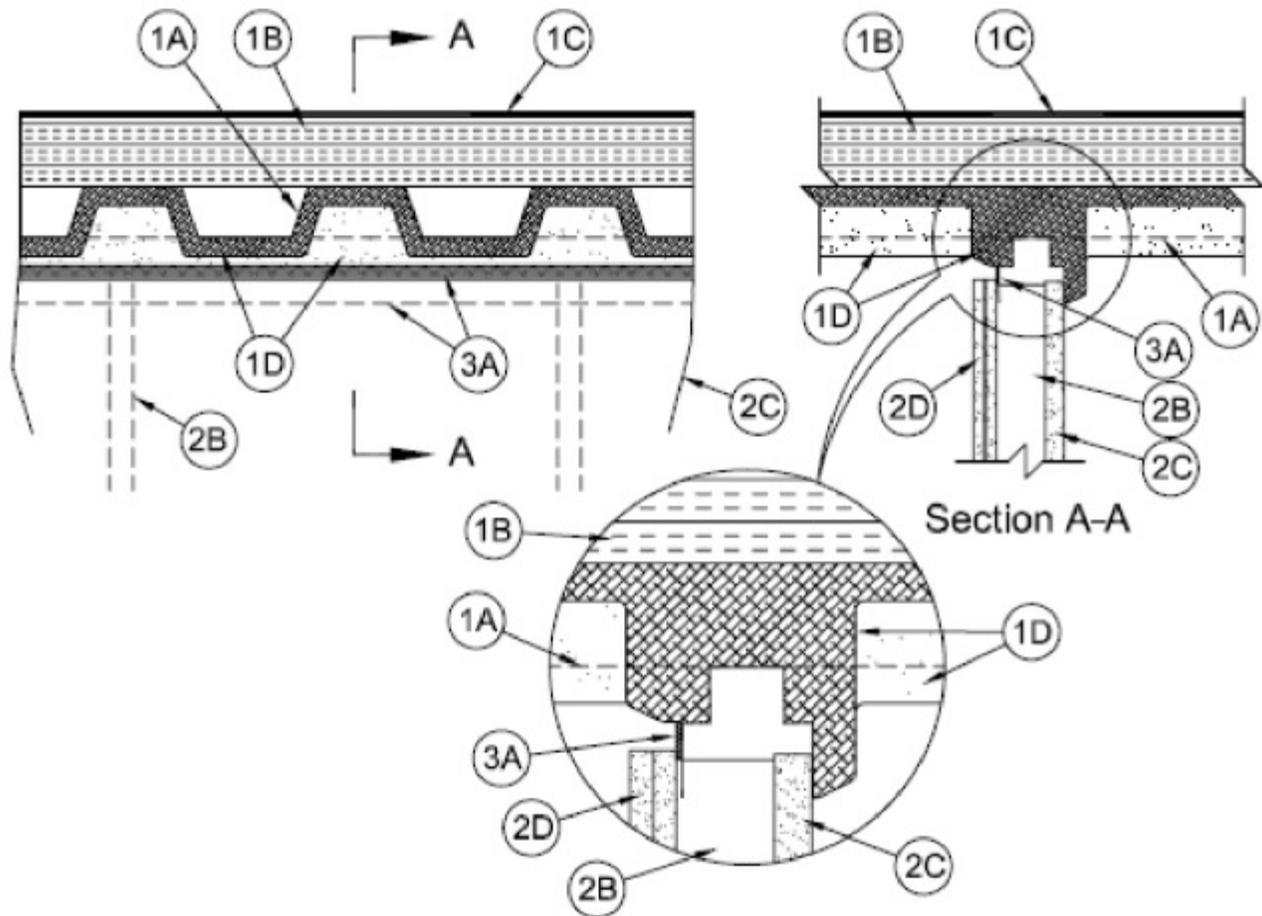
Assembly Ratings — 1 and 2 Hr (See Item 2)

L Rating At Ambient — Less Than 1 CFM/LIN Ft

L Rating At 400 F — Less Than 1 CFM/LIN Ft

Maximum Joint Width — 3/4 to 1-1/2 in.

Class II and III Movement Capabilities — 100% Compression



1. **Roof Assembly** — The fire-rated fluted steel deck roof assembly shall be constructed of the materials and in the manner described in the individual P700 or P800 Series Roof-Ceiling designs in the UL Fire Resistance Directory. The hourly rating of the roof assembly shall be equal to or greater than the hourly rating of the wall assembly (Item 2). The roof assembly shall include the following construction features:

A. **Steel Roof Deck** — Max 3 in. deep galv steel fluted roof deck.

B. **Roof Insulation** — Roof insulation to consist of **Mineral and Fiber Boards*** or **Foamed Plastic*** boards which are applied in one or more layers directly over steel deck or over gypsum board sheathing as specified in the individual design.

C. **Roof Covering*** — Consisting of hot mopped or cold application materials compatible with roof insulation (Item 2B) and which provide Class A, B or C coverings. See Roofing Materials and Systems Directory-Roof Covering Materials (TEVT).

D. **Spray-Applied Fire Resistive Material*** — As specified in the P700 or P800 Series Roof-Ceiling Design. After installation of the ceiling runners (Item 3A), the steel roof deck and structural supports are to be sprayed with the thickness and density of material specified in the individual P700 or P800 Series Roof-Ceiling Design. The steel roof deck area above the track web and the offset legs as well as the upper recess inside the ceiling runner (Item 3A) are to be completely filled with the spray applied fire resistive material. Lower leg of ceiling runner on unfinished side of wall to be coated with a min 1 in. (25 mm) thickness of material. Lower leg of ceiling runner and intumescent strip on finished side of wall to be scraped clean after spray application.

ISOLATEK INTERNATIONAL — Type 300

W R GRACE & CO - CONN — Type MK-6/HY

2. **Wall Assembly** — The 1 hr or 2 hr fire rated gypsum board/steel stud shaft wall assembly shall be constructed of the materials and in the manner described in the individual U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Steel Floor Runners** — (Not Shown) - The J-shaped or U-shaped steel channel floor runners are to be sized to accommodate steel studs (Item 2B) and attached to floor with steel fasteners located not greater than 2 in. (51 mm) from ends and not greater than 24 in. (610 mm) OC.

B. **Studs** — "C-T", "I", or "C-H" shaped steel studs to be min 2 1/2 in. (64 mm) wide and formed of min

24 ga galv steel. Studs cut not less than the nom joint width and 3/4 in. to 1-1/2 in. (19 to 38 mm) less in length than floor-to-ceiling height as measured to shoulder of ceiling runner (Item 3A) with bottom nesting in and secured to floor runner. Studs to nest in ceiling runner (Item 3A) without attachment. Studs spaced max 24 in. (610 mm) OC.

C. **Gypsum Board*** — Nom 1 in. (25 mm) thick by max 24 in. (610 mm) wide gypsum board liner panels applied on unfinished side of wall. Panels cut not less than nom joint width and 3/4 in. to 1-1/2 in. (19 to 38 mm) less in length than floor-to-ceiling height as measured to shoulder of ceiling runner (Item 3A). Vertical edges inserted into "T" shaped section of "C-T" studs, into holding tabs of "I" studs or into "H"-shaped section of "C-H" studs.

D. **Gypsum Board*** — Nom 1/2 or 5/8 in. (13 or 16 mm) thick gypsum board sheets applied on finished side of wall as specified in the individual Wall and Partition Design. Boards cut a max of 3/4 in. (19 mm) to 1-1/2 in. (38 mm) less in length than the floor to ceiling height below **Spray Applied Fire Resistive Material***. The screws attaching the gypsum board layer(s) to the "C-T", "I", or "C-H" studs shall be located 1-1/2 to 2-1/2 in. (38 to 64 mm) below the bottom of the ceiling runner legs. No gypsum board attachment screws shall be driven into the ceiling runner.

The hourly fire rating of the joint system is equal to the hourly fire rating of the wall.

3. Joint System — Max separation between bottom of Spray Applied Fire Resistive Material on steel deck and top of gypsum board on finished side of wall (at time of installation) is 3/4 to 1-1/2 in. (19 to 38 mm). The joint system is designed to accommodate a max 100 percent compression from its installed width.

A. **Fill, Void or Cavity Material*** — For nom 3/4 in. (19 mm) joints, a stepped-leg galv steel channel track having unequal legs with the height of the upper portion of track legs equal to or greater than the required thickness of **Spray Applied Fire Resistive Material*** on steel roof deck. Lower portion of shorter track leg is provided with a nom 1 in. (25 mm) wide intumescent strip and is to be located on the finished side of wall. Track to be secured to steel deck with steel fasteners or welds spaced a max of 24 in. (610 mm) OC. Gypsum board to overlap bottom of intumescent strip a min of 1/4 in. (6 mm).

JAK INNOVATIONS — BlazeFrame OJR1 series

A1. **Fill, Void or Cavity Material*** — For nom 1 in. (25 mm) joints, a stepped-leg galv steel channel track having unequal legs with the height of the upper portion of track legs equal to or greater than the required thickness of **Spray Applied Fire Resistive Material*** on steel roof deck. Lower portion of shorter track leg is provided with a nom 1-1/4 in. (32 mm) wide intumescent strip and is to be located on the finished side of wall. Track to be secured to steel deck with steel fasteners or welds spaced a max of 24 in. (610 mm) OC. Gypsum board to overlap bottom of intumescent strip a min of 1/4 in. (6 mm).

JAK INNOVATIONS — BlazeFrame OJRW1 series

A2. **Fill, Void or Cavity Material*** — For nom 1-1/2 in. (38 mm) joints, a stepped-leg galv steel channel track having unequal legs with the height of the upper portion of track legs equal to or greater than the required thickness of **Spray Applied Fire Resistive Material*** on steel roof deck. Lower portion of shorter track leg is provided with a nom 1-3/4 in. (44 mm) wide intumescent strip and is to be located on the finished side of wall. Track to be secured to steel deck with steel fasteners or welds spaced a max of 24 in. (610 mm) OC. Gypsum board to overlap bottom of intumescent strip a min of 1/4 in. (6 mm).

JAK INNOVATIONS — BlazeFrame OJRX1 series

*Bearing the UL Classification Mark

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Joint Systems

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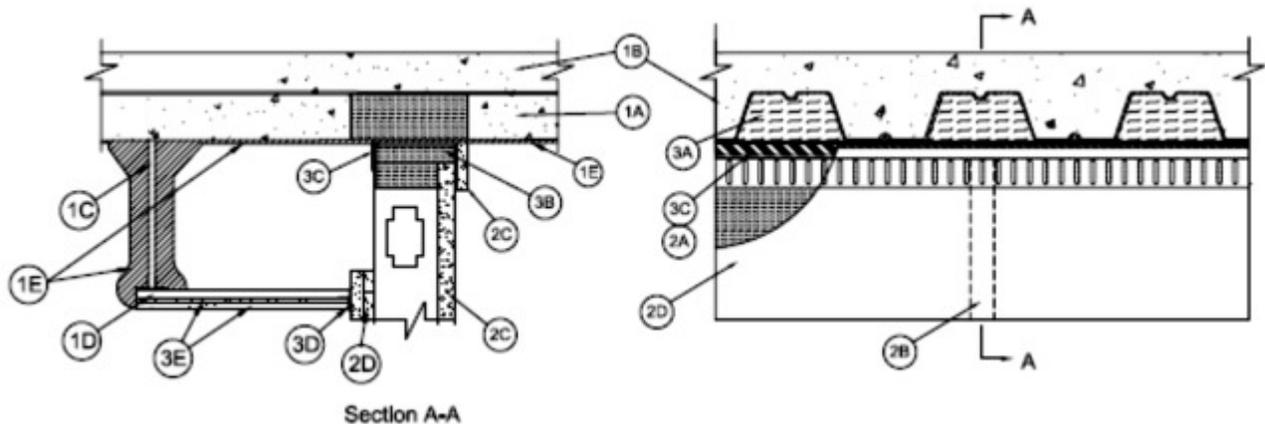
System No. HW-D-0563

May 21, 2009

Assembly Rating — 2 Hr

Nominal Joint Width — 1/2 in.

Class II and III Movement Capabilities — 100% Compression or Extension)



1. **Floor Assembly** — The fire-rated fluted steel deck/concrete floor assembly shall be constructed of the materials and in the manner described in the individual D700 Series Floor-Ceiling Design in the UL Fire Resistance Directory and shall include the following construction features:

- A. **Steel Floor And Floor Units*** — Max 3 in. (76 mm) deep galv steel fluted floor units.
- B. **Concrete** — Min 2-1/2 in. (64 mm) thick reinforced concrete, as measured from the top plane of the floor units.
- C. **Structural Steel Support** — Steel beam, as specified in the individual D700 Series Floor-Ceiling Design, used to support steel floor units. Structural steel support oriented parallel to and 1 to 7 in. (25 to 178 mm) from wall assembly.
- D. **Steel Attachment Clips** — Z-shaped clips formed from 1 in. (25 mm) wide strips of min 20 ga galv

steel. Clips to be sized to extend through the thickness of the spray-applied fire-resistive material on the bottom flange of the steel beam with 1-1/2 in. (38 mm) long upper and lower legs. Legs of clips fastened to bottom of beam (prior to application of spray-applied fire-resistive materials) with steel fasteners or welds. Clips spaced max 16 in. (406 mm) OC and extend to within 1/4 to 3/4 in. (6 to 19 mm) from the surface of the wall.

E. Spray-Applied Fire Resistive Material* — After installation of the steel attachment clips, structural steel support and the steel floor units to be sprayed with the min thickness of material specified in the individual D700 Series Design. The flutes of the steel floor units are to be filled with material across the entire top flange of the steel beam. In addition, the flutes of the steel floor units immediately above the wall are to be filled with material to the full thickness of the wall. The remainder of the steel floor units shall be sprayed as specified in the individual D700 design.

ISOLATEK INTERNATIONAL — Type 300

W R GRACE & CO - CONN — Type MK-6/HY

1A. Roof Assembly — (Not Shown) — As an alternate to the floor assembly, a fire-rated fluted steel deck roof assembly may be used. The roof assembly shall be constructed of the materials and in the manner described in the individual P700 Series Roof-Ceiling Design in the UL Fire Resistance Directory. The roof assembly shall include the following construction features:

A. Steel Roof Deck — Max 3 in. (76 mm) deep galv steel fluted roof deck.

B. Roof Insulation — Min 2-1/4 in. (57 mm) thick poured insulating concrete, as measured from the top plane of the roof deck.

C. Spray-Applied Fire Resistive Material* — After installation of the steel attachment clips, structural steel support and the steel deck to be sprayed with the min thickness of material specified in the individual P700 Series Design. The flutes of the steel deck are to be filled with material across the entire top flange of the steel beam. In addition, the flutes of the steel deck immediately above the wall are to be filled with material to the full thickness of the wall. The remainder of the steel floor units shall be sprayed when specified in the individual P700 design.

ISOLATEK INTERNATIONAL — Type 300

W R GRACE & CO - CONN — Type MK-6/HY

2. Shaft Wall Assembly — The 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

A. Steel Floor and Ceiling Runners — Floor runner U-shaped, sized to accommodate steel studs (Item 2B), fabricated from 24 ga galv steel. Ceiling runner positioned with slotted leg toward finished side of wall. Runners attached to floor through spray-applied fire resistive material with steel masonry fasteners located not greater than 2 in. (51 mm) from ends and not greater than 12 in (205 mm) OC. The ceiling runners are provided with a fill, void or cavity material and are described in Item 3.

B. Studs — "C-T", "I", or "C-H" shaped steel studs to be min 2 1/2 in. (64 mm) wide and formed of min 24 ga galv steel. Studs cut 1 to 1-1/4 in (25 to 32 mm) less in length than assembly height with bottom nesting in and secured to floor runner. Steel studs secured to slotted leg of ceiling runner on finished side with No. 8 by 1/2 (13 mm) long wafer head steel screws at mid-height of exposed slot. Studs spaced max 24 in. (610 mm) OC.

C. Gypsum Board* — 1 in. (25 mm) thick by max 24 in. (610 mm) wide gypsum board liner panels. Panels cut 1 in. (25 mm) less in length than floor to ceiling height. Vertical edges inserted into "T" shaped section of "C-T" studs, into holding tabs of "I" studs or into "H"-shaped section of "C-H" studs. A nominal 3-5/8 in. (92 mm) wide strip of gypsum board covering the leg of the ceiling runner attached a max of 3/8 in. (10 mm) below the track web and a max of 8 in. (203 mm) O.C. to ceiling runner on the non-finished side of wall.

D. Gypsum Board* — Gypsum board 1/2 or 5/8 in. (13 or 16 mm) thick, applied on finished side of wall as specified in the individual Wall and Partition Design. The boards cut a max 1/2 in. (13 mm) less in length than the floor to ceiling height. The screws attaching the gypsum board layer(s) to the "C-T", "I", or "C-H" studs shall be located 4 to 5 in. (102 to 127 mm) down from deck at time of installation. Board to extend a min of 3 in. (76 mm) above top surface of Z clips.

The hourly fire rating of the joint system is equal to the hourly fire rating of the wall.

3. Joint System — Max separation between bottom of spray-applied fire resistive material on steel floor or roof unit and top of wall (at time of installation of joint system) is 1/2 in. (13 mm). The joint system is designed to accommodate a max 100 percent compression or extension from its installed width.

A. **Forming Material*** — Min 4 pcf (64 kg/m³) mineral wool insulation cut to the shape of the fluted steel floor units, approx 33% larger than the area of the flutes. Pieces compressed and inserted into the flutes above the top ceiling runner flush with the finished wall surface. As an option, the spray-applied fire resistive material described in Item 1 can be used in place of the packing material.

B. **Forming Material*** — Min 4-1/2 in. (114 mm) thick strips of min 4 pcf (64 kg/m³) mineral wool batt insulation cut to the width of the ceiling runner, compressed 33 percent in thickness and installed into ceiling runner between leg of track and gypsum liner board to completely fill cavity within ceiling runner..

C. **Fill, Void or Cavity Material*** — Nom 20 ga U-shaped track having 3 in (76 mm) legs with a nom 1-1/4 in. (32 mm) wide intumescent strip affixed to the top of the leg overlapping on to top surface a min of 1/4 in. (6 mm) facing the finished side of wall. Track to be secured through spray-applied fire resistive material to bottom side of floor assembly with min 2 in. (51 mm) steel masonry fasteners spaced at a max of 24 in. (610 mm) OC.

CALIFORNIA EXPANDED METAL PRODUCTS CO — FAS SHAFT Track

D. **Fill, Void or Cavity Material*** — A nom 20 gauge steel angle provided with a nom 1 in. (25 mm) wide intumescent strip on one leg. Angle to be secured to the steel attachment clips (Item 1D) with min No. 8 steel sheet metal screws such that the intumescent strip is flat against the outer surface of the wall.

CALIFORNIA EXPANDED METAL PRODUCTS CO — Firestik FS1

E. **Gypsum Board*** — Gypsum board sheets installed on underside of steel attachment clips (Item 1D) to a min total 5/8 in. (16 mm) or 1-1/4 in. (32 mm) thickness for 1 and 2 hr fire rated assemblies, respectively. Gypsum boards installed to completely cover the gap between steel beam and wall and secured to each steel attachment clips with a minimum of two steel drywall screws approximately 1 to 2 in. (25 to 51 mm) from each end of the clip.

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Joint Systems

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System No. HW-D-0584

October 15, 2009

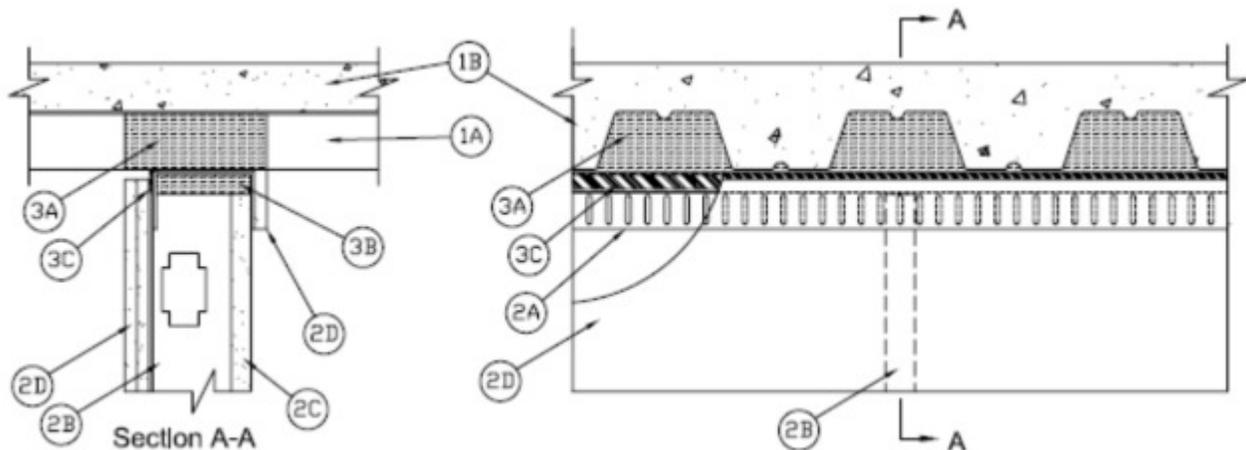
Assembly Rating — 2 Hr

L Rating at Ambient -2.1 CFM/Lin ft

L Rating at 400° F -1.33 CFM/Lin ft

Nominal Joint Width — 1-1/16 in.

Class II and III Movement Capabilities —94%Compression or 100% Extension



1. **Floor Assembly** — The fire-rated fluted steel deck/concrete floor assembly shall be constructed of the materials and in the manner described in the individual D900 Series Floor-Ceiling Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Steel Floor and Form Units*** — Max 3 in. (76 mm) deep galv steel fluted floor units.

B. **Concrete** — Min 2-1/2 in. (64 mm) thick reinforced concrete, as measured from the top plane of the floor units.

1A. **Roof Assembly** — (Not Shown) - As an alternate to the floor assembly, a fire rated fluted steel deck roof assembly may be used. The roof shall be constructed of the materials and in the manner described in the individual P900-Series Roof-Ceiling designs in the UL Fire Resistance Directory. The hourly rating of the roof assembly shall be equal to or greater than the hourly rating of the wall assembly. The roof assembly shall include the following construction features:

A. **Steel Roof Deck** — Max 3 in. deep galv steel fluted roof deck.

B. **Roof Insulation** — Roof insulation to consist of min 2-1/4 in. (57 mm) thick poured insulating concrete, as measured from the top plane of the roof deck.

2. **Shaft Wall Assembly** — The 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Steel Floor and Ceiling Runners** — Floor runner U-shaped, sized to accommodate steel studs (Item 2B), fabricated from 24 ga galv steel. Ceiling runner positioned with slotted leg toward finished side of wall. Runners attached to floor with steel fasteners located not greater than 2 in. from ends and not greater than 24 in OC. The ceiling runners are provided with a fill, void or cavity material and are described in Item 3.

B. **Studs** — "C-T", "I", or "C-H" shaped steel studs to be min 2 1/2 in. (64 mm) wide and formed of min 24 ga galv steel. Studs cut 2-2-1/4 (51 to 57 mm) less in length than assembly height with bottom nesting in and secured to floor runner. Steel studs secured to slotted leg of ceiling runner on finished side with No. 8 by 1/2 (13 mm) long wafer head steel screws at mid-height of exposed slot. Studs spaced max 24 in. (610 mm) OC.

C. **Gypsum Board*** — 1 in. (25 mm) thick by max 24 in. (610 mm) wide gypsum board liner panels. Panels cut 1-1/4 to 1-1/2 in. (32 to 38 mm) less in length than floor to ceiling height. Vertical edges inserted into "T" shaped section of "C-T" studs, into holding tabs of "I" studs or into "H"-shaped section of "C-H" studs. A nominal 3-5/8 in. (92 mm) wide rip of gypsum board covering the leg of the ceiling runner attached a max of 3/8 in. (10 mm) below the track web and a max of 8 in. (203 mm) O.C. to ceiling runner on the non-finished side of wall.

D. **Gypsum Board*** — Gypsum board 1/2 or 5/8 in. (13 or 16 mm) thick, applied on finished side of wall as specified in the individual Wall and Partition Design. The boards cut a max 1-1/4 to 1-1/2 in. (32 to 38 mm) less in length than the floor to ceiling height. The screws attaching the gypsum board layer(s) to the "C-T", "I", or "C-H" studs shall be located 4 to 5 in. (102 to 127 mm) down from deck at time of installation.

The hourly fire rating of the joint system is equal to the hourly fire rating of the wall.

3. **Joint System** — Max separation between bottom of floor and top of gypsum board (at time of installation) is 1-1/16 in. (27 mm). The joint system is designed to accommodate a max 94 percent compression or 100 percent extension from its installed width.

A. **Forming Material*** — Min 4 pcf (64 kg/m³) mineral wool insulation cut to the shape of the fluted steel floor units, approx 33% larger than the area of the flutes. Pieces compressed and inserted into the flutes above the top ceiling runner flush with the finished wall surface.

B. **Forming Material*** — Min 2 in. thick min 4 pcf (64 kg/m³) mineral wool batt insulation cut to the width of the ceiling runner and compressed approximately 47 percent in thickness, installed into ceiling runner between leg of track and gypsum liner board.

C. **Fill, Void or Cavity Material*** — Nom 20 ga U-shaped track having 3-1/4 in (83 mm) legs with a nom 2-1/2 in. (64 mm) wide intumescent strip affixed to the top of the leg overlapping on to top surface a min of 1/4 in. (6 mm) facing the finished side of wall. Gypsum board to overlap a min of 1 in. (25 mm) over the intumescent strip. Track to be secured to bottom side of floor assembly with min 2 in. (51 mm) steel fasteners spaced at a max of 24 in. (610 mm) OC.

CALIFORNIA EXPANDED METAL PRODUCTS CO — FAS SHAFT Track DL2

*Bearing the UL Classification Mark

Last Updated on 2009-10-15

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XHBN.HW-D-0585 Joint Systems

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Joint Systems

[See General Information for Joint Systems](#)

System No. HW-D-0585

October 15, 2009

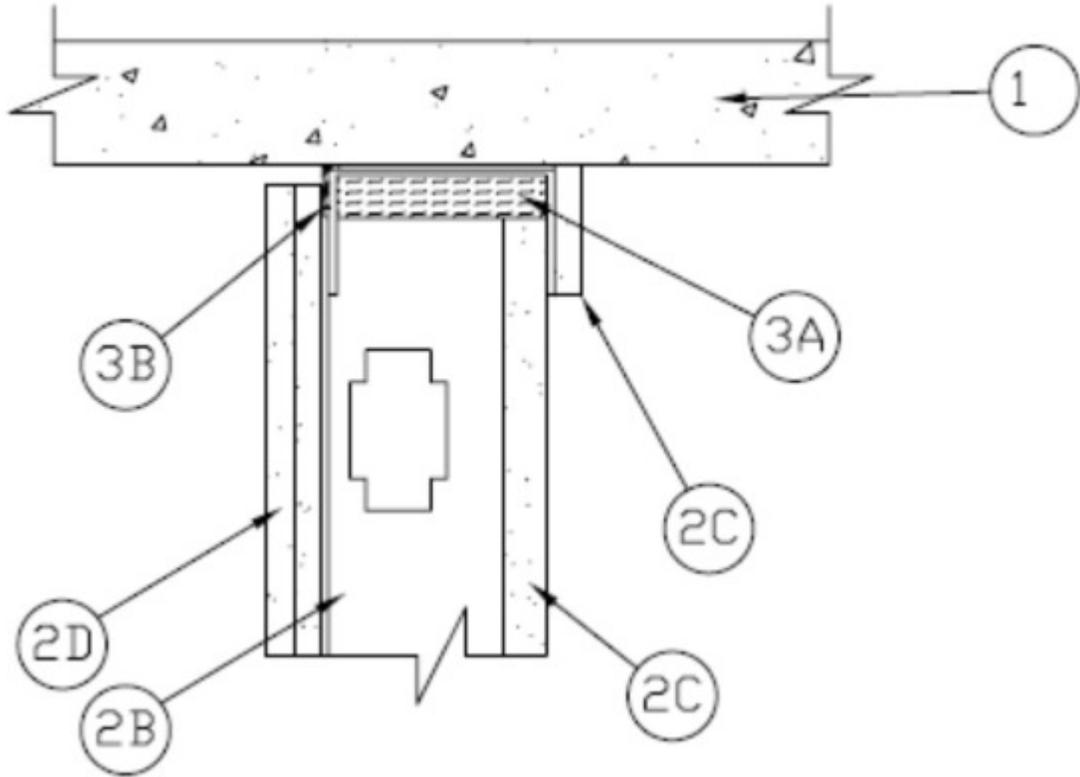
Assembly Ratings —2 Hr

Nominal Joint Width — 1-1/16 in.

L Rating at Ambient —2.1 CFM/Lin Ft

L Rating at 400°F —1.33 CFM/Lin Ft

Class II and III Movement Capabilities — 94% Compression or 100% Extension



1. **Floor Assembly** — Concrete — Min 2-1/2 in. (64 mm) thick reinforced concrete.

2. **Shaft Wall Assembly** — The 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Steel Floor and Ceiling Runners** — Floor runner U-shaped, sized to accommodate steel studs (Item 2B), fabricated from min 24 ga galv steel. Runners attached to floor with steel fasteners located not greater than 2 in. from ends and not greater than 24 in OC. The ceiling runners are provided with a fill, void or cavity material and are described in Item 3.

B. **Studs** — "C-T", "I", or "C-H" shaped steel studs to be min 2 1/2 in. (64 mm) wide and formed of min 24 ga galv steel. Studs cut 2-2-1/4 (51 to 57mm) less in length than assembly height with bottom nesting in and secured to floor runner. Studs spaced max 24 in. (610 mm) OC.

C. **Gypsum Board*** — 1 in. (25 mm) thick by max 24 in. (610 mm) wide gypsum board liner panels. Panels cut 1-1/4 to 1-1/2 in. (32 to 38 mm) less in length than floor to ceiling height. Vertical edges inserted into "T" shaped section of "C-T" studs, into holding tabs of "I" studs or into "H"-shaped section of "C-H" studs. A nominal 3-5/8 in. (92 mm) wide rip of gypsum board covering the leg of the ceiling runner attached a max of 3/8 in. (10 mm) below the track web and a max of 8 in. (203 mm) O.C. to ceiling runner on the non-finished side of wall.

D. **Gypsum Board*** — Gypsum board 1/2 or 5/8 in. (13 or 16 mm) thick, applied on finished side of wall as specified in the individual Wall and Partition Design. The boards cut a max 1-1/4 to 1-1/2 in. (32 to 38 mm) less in length than the floor to ceiling height. The screws attaching the gypsum board layer(s) to the "C-T", "I", or "C-H" studs shall be located between 4 and 5 in. (102 -127 mm) down from ceiling surface.

The hourly fire rating of the joint system is equal to the hourly fire rating of the wall.

3. **Joint System** — Max separation between bottom of floor and top of gypsum board (at time of installation) is 1-1/16 in. (27 mm). The joint system is designed to accommodate a max 94 percent compression or 100 percent extension from its installed width.

A. **Forming Material*** — Min 2 in. thick min 4 pcf (64 kg/m³) mineral wool batt insulation cut to the width of the ceiling runner and compressed 47 percent in thickness, installed into ceiling runner between leg of track and gypsum liner board.

B. **Fill, Void or Cavity Material*** — Nom 20 ga U-shaped track having 3 in. (76 mm) legs with a nom 2-1/2 in. (64 mm) wide intumescent strip affixed to the top of the leg overlapping on to top surface a min

of 1/4 in. (6 mm) facing the finished side of wall. Gypsum board to overlap a min of 1-1/4 in. (32 mm) over the intumescent strip. Track to be secured to bottom side of floor assembly with steel fasteners spaced at a max of 24 in. (610 mm) OC.

CALIFORNIA EXPANDED METAL PRODUCTS CO — FAS SHAFT Track DL2

*Bearing the UL Classification Mark

Last Updated on 2009-10-15

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- When field issues arise, it is recommended the first contact for assistance be the technical service staff provided by the product manufacturer noted for the design. Users of fire resistance assemblies are advised to consult the general Guide Information for each product category and each group of assemblies. The Guide Information includes specifics concerning alternate materials and alternate methods of construction.
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Joint Systems

[See General Information for Joint Systems](#)

System No. HW-D-0586

August 03, 2009

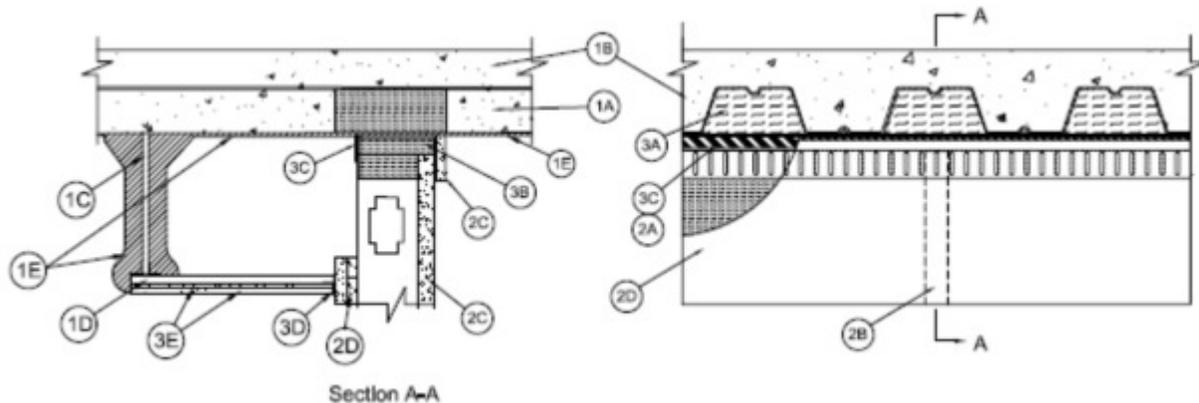
Assembly Rating — 2 Hr

Nominal Joint Width — 1-1/16 in.

L Rating at Ambient -2.1 CFM/Lin ft

L Rating at 400° F -1.33 CFM/Lin ft

Class II and III Movement Capabilities — 94% Compression or 100 %Extension



1. **Floor Assembly** — The fire-rated fluted steel deck/concrete floor assembly shall be constructed of the materials and in the manner described in the individual D700 Series Floor-Ceiling Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Steel Floor And Floor Units*** — Max 3 in. (76 mm) deep galv steel fluted floor units.

B. **Concrete** — Min 2-1/2 in. (64 mm) thick reinforced concrete, as measured from the top plane of the floor units.

C. **Structural Steel Support** — Steel beam, as specified in the individual D700 Series Floor-Ceiling Design, used to support steel floor units. Structural steel support oriented parallel to and 1 to 7 in. (25 to 178 mm) from wall assembly.

D. **Steel Attachment Clips** — Z-shaped clips formed from 1 in. (25 mm) wide strips of min 20 ga galv steel. Clips to be sized to extend through the thickness of the spray-applied fire-resistive material on the bottom flange of the steel beam with 1-1/2 in. (38 mm) long upper and lower legs. Legs of clips fastened to bottom of beam (prior to application of spray-applied fire-resistive materials) with steel fasteners or welds. Clips spaced max 16 in. (406 mm) OC and extend to within 1/4 to 3/4 in. (6 to 19 mm) from the surface of the wall.

E. **Spray-Applied Fire Resistive Material*** — After installation of the steel attachment clips, structural steel support and the steel floor units to be sprayed with the min thickness of material specified in the individual D700 Series Design. The flutes of the steel floor units are to be filled with material across the entire top flange of the steel beam. In addition, the flutes of the steel floor units immediately above the wall are to be filled with material to the full thickness of the wall. The remainder of the steel floor units shall be sprayed as specified in the individual D700 design.

ISOLATEK INTERNATIONAL — Type 300

W R GRACE & CO - CONN — Type MK-6/HY

1A. **Roof Assembly** — (Not Shown) — As an alternate to the floor assembly, a fire-rated fluted steel deck roof assembly may be used. The roof assembly shall be constructed of the materials and in the manner described in the individual P700 Series Roof-Ceiling Design in the UL Fire Resistance Directory. The roof assembly shall include the following construction features:

A. **Steel Roof Deck** — Max 3 in. (76 mm) deep galv steel fluted roof deck.

B. **Roof Insulation** — Min 2-1/4 in. (57 mm) thick poured insulating concrete, as measured from the top plane of the roof deck.

C. **Spray-Applied Fire Resistive Material*** — After installation of the steel attachment clips, structural steel support and the steel deck to be sprayed with the min thickness of material specified in the individual P700 Series Design. The flutes of the steel deck are to be filled with material across the entire top flange of the steel beam. In addition, the flutes of the steel deck immediately above the wall are to be filled with material to the full thickness of the wall. The remainder of the steel floor units shall be sprayed when specified in the individual P700 design.

ISOLATEK INTERNATIONAL — Type 300

W R GRACE & CO - CONN — Type MK-6/HY

2. **Shaft Wall Assembly** — The 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Steel Floor and Ceiling Runners** — Floor runner U-shaped, sized to accommodate steel studs (Item 2B), fabricated from 24 ga galv steel. Ceiling runner positioned with slotted leg toward finished side of wall. Runners attached to floor through spray-applied fire resistive material with steel masonry fasteners located not greater than 2 in. (51 mm) from ends and not greater than 12 in (205 mm) OC. The ceiling runners are provided with a fill, void or cavity material and are described in Item 3.

B. **Studs** — "C-T", "I", or "C-H" shaped steel studs to be min 2 1/2 in. (64 mm) wide and formed of min 24 ga galv steel. Stud cut 2-2-1/4 (51 to 57 mm) less in length than assembly height with bottom nesting in and secured to floor runner. Studs spaced max 24 in. (610 mm) OC.

C. **Gypsum Board*** — 1 in. (25 mm) thick by max 24 in. (610 mm) wide gypsum board liner panels. Panels cut 1-1/4 to 1-1/2 in. (32 to 38 mm) less in length than floor to ceiling height. Vertical edges inserted into "T" shaped section of "C-T" studs, into holding tabs of "I" studs or into "H"-shaped section of "C-H" studs. A nominal 3-5/8 in. (92 mm) wide strip of gypsum board covering the leg of the ceiling runner attached a max of 3/8 in. (10 mm) below the track web and a max of 8 in. (203 mm) O.C. to ceiling runner on the non-finished side of wall.

D. **Gypsum Board*** — Gypsum board 1/2 or 5/8 in. (13 or 16 mm) thick, applied on finished side of wall as specified in the individual Wall and Partition Design. The boards cut a max 1 in. (13 mm) less in length than the floor to ceiling height. The screws attaching the gypsum board layer(s) to the "C-T", "I", or "C-H" studs shall be located 4 to 5 in. (102 to 127 mm) down from deck at time of installation. Board to extend a min of 3 in. (76 mm) above top surface of Z clips.

The hourly fire rating of the joint system is equal to the hourly fire rating of the wall.

3. **Joint System** — Max separation between bottom of spray-applied fire resistive material on steel floor or roof unit and top of wall (at time of installation of joint system) is 1-1/16 in. (27 mm). The joint system is designed to accommodate a max 94 percent compression or 100 percent extension from its installed width.

A. **Forming Material*** — Min 4 pcf (64 kg/m³) mineral wool insulation cut to the shape of the fluted steel floor units, approx 33% larger than the area of the flutes. Pieces compressed and inserted into the flutes above the top ceiling runner flush with the finished wall surface. As an option, the spray-applied fire resistive material described in Item 1 can be used in place of the packing material.

B. **Forming Material*** — Min 4-1/2 in. (114 mm) thick strips of min 4 pcf (64 kg/m³) mineral wool batt insulation cut to the width of the ceiling runner, compressed 33 percent in thickness and installed into ceiling runner between leg of track and gypsum liner board to completely fill cavity within ceiling runner.

C. **Fill, Void or Cavity Material*** — Nom 20 ga U-shaped track having 3 in (76 mm) legs with a nom 2-1/2 in. (64 mm) wide intumescent strip affixed to the top of the leg overlapping on to top surface a min of 1/4 in. (6 mm) facing the finished side of wall. Track to be secured through spray-applied fire resistive material to bottom side of floor assembly with min 2 in. (51 mm) steel fasteners spaced at a max of 24 in. (610 mm) OC.

CALIFORNIA EXPANDED METAL PRODUCTS CO — FAS SHAFT Track DL2

D. **Fill, Void or Cavity Material*** — A nom 20 gauge steel angle provided with a nom 1 in. (25 mm) wide intumescent strip on one leg. Angle to be secured to the steel attachment clips (Item 1D) with min No. 8 steel sheet metal screws such that the intumescent strip is flat against the outer surface of the wall.

CALIFORNIA EXPANDED METAL PRODUCTS CO — Firestik FS1

E. **Gypsum Board*** — Gypsum board sheets installed on underside of steel attachment clips (Item 1D) to a min total 5/8 in. (16 mm) or 1-1/4 in. (32 mm) thickness for 1 and 2 hr fire rated assemblies, respectively. Gypsum boards installed to completely cover the gap between steel beam and wall and secured to each steel attachment clips with a minimum of two steel drywall screws approximately 1 to 2 in. (25 to 51 mm) from each end of the clip.

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Last Updated on 2009-08-03

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XHBN.HW-D-0598 Joint Systems

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Joint Systems

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System No. HW-D-0598

September 22, 2010

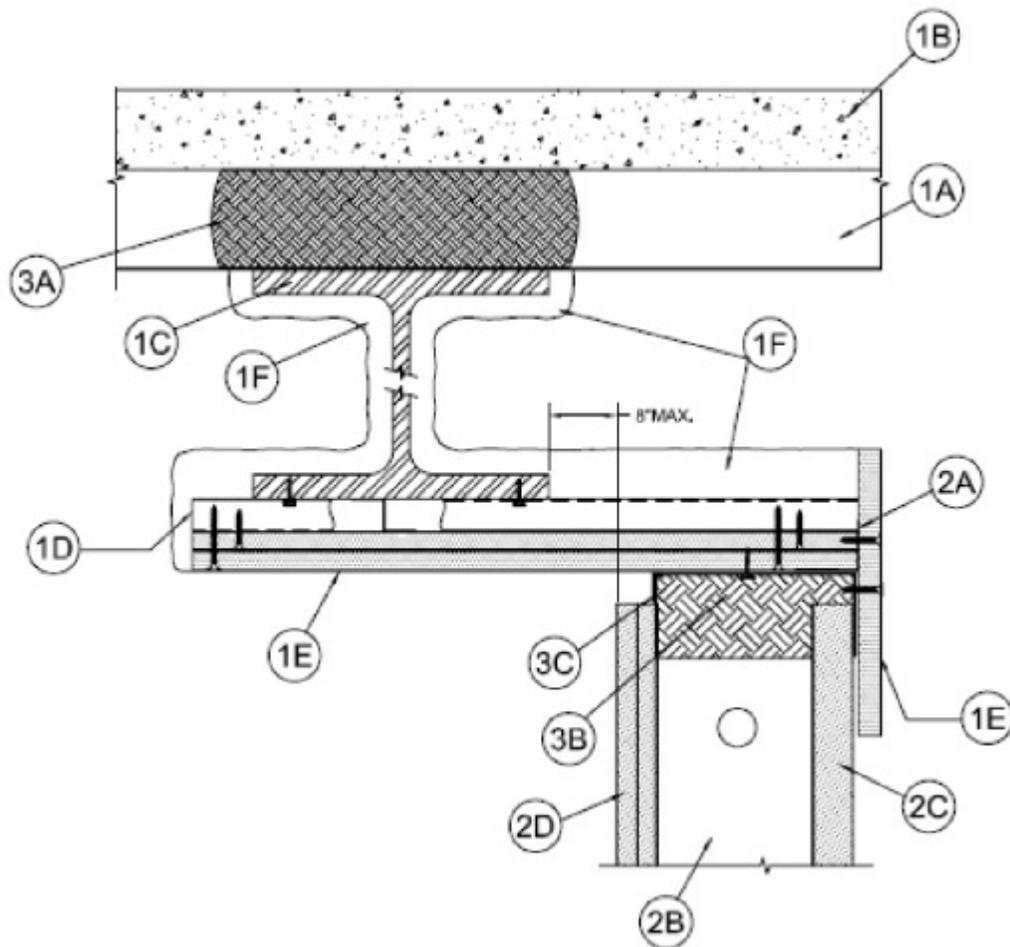
Assembly Rating — 2 Hr

Nominal Joint Width — 1/2 in.

Class II and III Movement Capabilities — 100% Compression or Extension

L Rating at Ambient — Less than 1 CFM/Lin Ft

L Rating at 400°F — Less than 1 CFM/Lin Ft



1. **Floor Assembly** — The fire-rated fluted steel deck/concrete floor assembly shall be constructed of the materials and in the manner described in the individual D700 or D900 Series Floor-Ceiling Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Steel Floor And Floor Units*** — Max 3 in. (76 mm) deep galv steel fluted floor units.

B. **Concrete** — Min 2-1/2 in. (64 mm) thick reinforced concrete, as measured from the top plane of the floor units.

C. **Structural Steel Support** — Steel beam, as specified in the individual D700 or D900 Series Floor-Ceiling Design, used to support steel floor units. Structural steel support oriented parallel to and 8 in. (203 mm) max from wall assembly.

D. **Steel Attachment Clips** — 1 in. (25 mm) wide Z-shaped clips or channels formed from min 16 ga galv or painted steel. Clips to be sized to extend through the thickness of the spray-applied fire-resistive material on the bottom flange of the steel beam with 1-1/2 in. (38 mm) long upper and lower legs. Legs of clips fastened to bottom of beam (prior to application of spray-applied fire-resistive materials) with steel fasteners or welds and to ceiling runner of wall with bolts or screws. Clips spaced max 16 in. (406 mm) OC and extend from steel support beam to flush with non-beam face of wall.

E. **Gypsum Board*** — Two layers of 5/8 in. (16 mm) thick glass mat faced (moisture resistant) gypsum board applied to bottom of steel attachment clips. The boards are cut to the length of steel attachment clips and secured to each clip. Base layer attached to the clips using 1 in. (25 mm) long Type S bugle-head steel screws spaced 12 in. (305 mm) OC, 1 in. (25 mm) max from ends. Outer layer attached to the clips using 1-5/8 in. (41 mm) long Type S bugle-head steel screws spaced 12 in. (305 mm) OC, 1 in. (25 mm) max from ends. Butted joints are centered over clips and joints in base and outer layers to be offset. Joints and screw heads in outer layer covered with two coats of joint compound.

See **Gypsum Board** (CKNX) Category for names of Classified Companies of 5/8 in. (16 mm) thick board.

F. **Spray-Applied Fire Resistive Material*** — After installation of the steel attachment clips, structural steel support, and steel floor units (as applicable), to be sprayed with the min thickness of material specified in the individual D700 or D900 Series Design. Each steel attachment clip to be fully covered with spray applied fire resistive material to the minimum thickness of material required on the flanges of the steel beam and the spaces between the clips shall also be fully filled from beam and over the entire thickness of the wall. Additional material shall be applied to the web of steel beam on each side of wall. The min total thickness of material applied to each side of steel beam web shall be 1-1/2 in. (38 mm). When Item 3A is not used, the flutes of the steel floor units are to be filled with material across the entire top flange of the steel beam. For D700 floors, the remainder of the steel floor units shall be sprayed as

specified in the individual D700 design.

ISOLATEK INTERNATIONAL — Type 300

W R GRACE & CO - CONN — Type MK-6/HY

1A. Roof Assembly — (Not Shown) — As an alternate to the floor assembly, a fire-rated fluted steel deck roof assembly may be used. The roof assembly shall be constructed of the materials and in the manner described in the individual P700 or P900 Series Roof-Ceiling Design in the UL Fire Resistance Directory. The roof assembly shall include the following construction features:

A. **Steel Roof Deck** — Max 3 in. (76 mm) deep galv steel fluted roof deck.

B. **Roof Insulation** — Min 2-1/4 in. (57 mm) thick poured insulating concrete, as measured from the top plane of the roof deck.

C. **Structural Steel Support** — Steel beam, as specified in the individual P700 or P900 Series Design, used to support steel floor units. Structural steel support oriented parallel to and 8 in. (203 mm) max from wall assembly.

D. **Steel Attachment Clips** — 1 in. (25 mm) wide Z-shaped clips or channels formed from min 16 ga galv or painted steel. Clips to be sized to extend through the thickness of the spray-applied fire-resistive material on the bottom flange of the steel beam with 1-1/2 in. (38 mm) long upper and lower legs. Legs of clips fastened to bottom of beam (prior to application of spray-applied fire-resistive materials) with steel fasteners or welds and to ceiling runner of wall with bolts or screws. Clips spaced max 16 in. (406 mm) OC and extend from steel support beam to flush with non-beam face of wall.

E. **Gypsum Board*** — Two layers of 5/8 in. (16 mm) thick glass mat faced (moisture resistant) gypsum board applied to bottom of steel attachment clips. The boards are cut to the length of steel attachment clips and secured to each clip. Base layer attached to the clips using 1 in. (25 mm) long Type S bugle-head steel screws spaced 12 in. (305 mm) OC, 1 in. (25 mm) max from ends. Outer layer attached to the clips using 1-5/8 in. (41 mm) long Type S bugle-head steel screws spaced 12 in. (305 mm) OC, 1 in. (25 mm) max from ends. Butted joints are centered over clips and joints in base and outer layers to be offset. Joints and screw heads in outer layer covered with two coats of joint compound. An additional nominal 9 in. (229 mm) wide strip of gypsum board covering the exposed leg of the ceiling runner attached to the ceiling runner and to the 1-1/2 by 1-1/2 in. (38 by 38 mm) galv steel angle (see Item 2A) with min 1 in. (25 mm) long fasteners spaced a max of 12 in. (305 mm) on center and 1 in. (25 mm) max from ends along track and angle on the non-finished side of wall. This strip of gypsum shall extend above the ceiling track to be flush with top of spray applied fire resistive material on steel attachment clips, and the strip shall extend down min 1-1/2 in. (38 mm) below the exposed leg of ceiling track.

See **Gypsum Board** (CKNX) Category for names of Classified Companies of 5/8 in. (16 mm) thick board.

F. **Spray-Applied Fire Resistive Material*** — After installation of the steel attachment clips, structural steel support, and roof deck (as applicable), to be sprayed with the min thickness of material specified in the individual P700 or P900 Series Design. Each steel attachment clip to be fully covered with spray applied fire resistive material to the minimum thickness of material required on the flanges of the steel beam and the spaces between the clips shall also be fully filled from beam and over the entire thickness of the wall. Additional material shall be applied to the web of steel beam on each side. The min total thickness of material applied to each side of steel beam web shall be 1-1/2 in. (38 mm). When Item 3A is not used, the flutes of the roof deck are to be filled with material across the entire top flange of the steel beam. For P700 roof-ceiling assemblies, the remainder of the roof deck shall be sprayed as specified in the individual P700 design.

ISOLATEK INTERNATIONAL — Type 300

W R GRACE & CO - CONN — Type MK-6/HY

1B. Floor Assembly — (Not Shown) — Min 4-1/2 in. thick reinforced lightweight or normal weight (100 to 150 pcf) structural concrete.

2. Shaft Wall Assembly — The 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Steel Floor and Ceiling Runners** — Floor runner U-shaped, sized to accommodate steel studs (Item 2B), fabricated from 25 ga galv steel. Ceiling runner positioned with slotted leg toward finished side of wall. Runners attached to steel attachment clips through gypsum board (Item 1E) with min 2 in. (51 mm) long steel fasteners, minimum one fastener per clip. The ceiling runners are provided with a fill, void or cavity material and are described in Item 3. A 1-1/2 by 1-1/2 in. (38 x 38 mm) galvanized steel angle shall be attached to top of ceiling runner on non-beam side of wall with No. 8 sheet metal screws

spaced 16 in. (406 mm) max on center and 1 in. (25 mm) max from ends.

B. **Studs** — "C-T", "I", or "C-H" shaped steel studs to be min 2 1/2 in. (64 mm) wide and formed of min 25 ga galv steel. Studs cut 1 to 1-1/4 in (25 to 32 mm) less in length than assembly height with bottom nesting in and secured to floor runner. Steel studs secured to slotted leg of ceiling runner on finished side with No. 8 by 1/2 (13 mm) long wafer head steel screws at mid-height of exposed slot. Studs spaced max 24 in. (610 mm) OC.

C. **Gypsum Board*** — 1 in. (25 mm) thick by max 24 in. (610 mm) wide gypsum board liner panels. Panels cut 1-1/2 in. (38 mm) less in length than floor to ceiling height. Vertical edges inserted into "T" shaped section of "C-T" studs, into holding tabs of "I" studs or into "H"-shaped section of "C-H" studs.

D. **Gypsum Board*** — Gypsum board 1/2 or 5/8 in. (13 or 16 mm) thick, applied on finished side of wall as specified in the individual Wall and Partition Design. The boards cut a max 1/2 in. (13 mm) less in length than the floor to ceiling height. The screws attaching the gypsum board layer(s) to the "C-T", "I", or "C-H" studs shall be located 4 to 5 in. (102 to 127 mm) down from deck at time of installation.

3. Joint System — Max separation between bottom of floor or roof deck or spray-applied fire resistive material on steel floor or roof unit and top of wall (at time of installation of joint system) is 1/2 in. (13 mm). The joint system is designed to accommodate a max 100 percent compression or extension from its installed width.

A. **Forming Material*** — Min 4 pcf (64 kg/m³) mineral wool insulation cut to the shape of the fluted steel floor or roof deck units, approx 33% larger than the area of the flutes. Pieces compressed and inserted into and completely filling the flutes above the structural support member. As an option, the spray-applied fire resistive material described in Item 1 can be used in place of the packing material.

B. **Forming Material*** — Min 4 in. (102 mm) thick strips of min 4 pcf (64 kg/m³) mineral wool batt insulation cut to the width of the ceiling runner and tightly friction fit into ceiling runner between leg of track and gypsum liner board to completely fill cavity within ceiling runner.

C. **Fill, Void or Cavity Material*** — Nom 20 ga U-shaped track having 3 in (76 mm) legs with a nom 1-1/4 in. (32 mm) wide intumescent strip affixed to the top of the leg overlapping on to top surface a min of 1/4 in. (6 mm) facing the finished side of wall. Track to be secured through gypsum board material to steel attachment clips with min 2 in. (51 mm) long steel fasteners spaced at a max of 16 in. (406 mm) OC (min one fastener into each clip).

CALIFORNIA EXPANDED METAL PRODUCTS CO — FAS SHAFT Track

*Bearing the UL Classification Mark

Last Updated on 2010-09-22

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XHBN.HW-D-0599 Joint Systems

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Joint Systems

[See General Information for Joint Systems](#)

System No. HW-D-0599

September 22, 2010

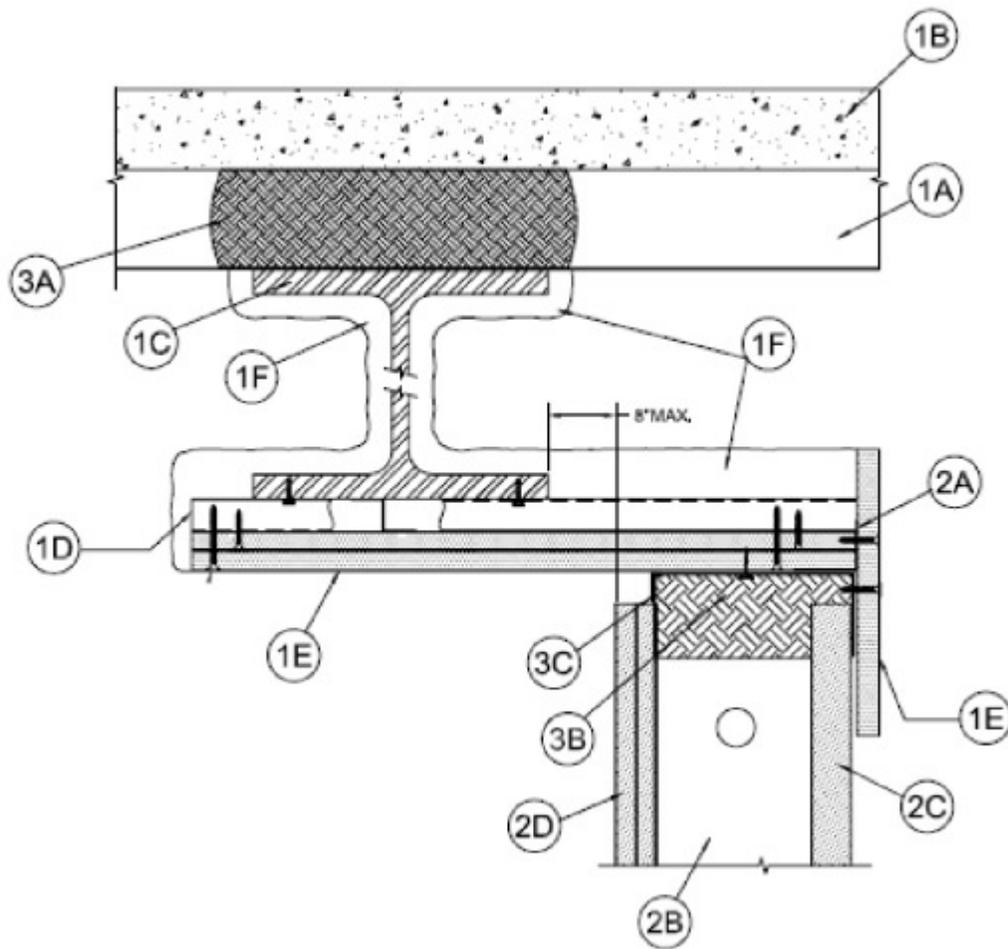
Assembly Rating — 2 Hr

Nominal Joint Width — 1 in.

Class II and III Movement Capabilities — 100% Compression or Extension

L Rating at Ambient — Less than 1 CFM/Lin Ft

L Rating at 400°F — Less than 1 CFM/Lin Ft



1. **Floor Assembly** — The fire-rated fluted steel deck/concrete floor assembly shall be constructed of the materials and in the manner described in the individual D700 or D900 Series Floor-Ceiling Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Steel Floor And Floor Units*** — Max 3 in. (76 mm) deep galv steel fluted floor units.

B. **Concrete** — Min 2-1/2 in. (64 mm) thick reinforced concrete, as measured from the top plane of the floor units.

C. **Structural Steel Support** — Steel beam, as specified in the individual D700 or D900 Series Floor-Ceiling Design, used to support steel floor units. Structural steel support oriented parallel to and 8 in. (203 mm) max from wall assembly.

D. **Steel Attachment Clips** — 1 in. (25 mm) wide Z-shaped clips or channels formed from min 16 ga galv or painted steel. Clips to be sized to extend through the thickness of the spray-applied fire-resistive material on the bottom flange of the steel beam with 1-1/2 in. (38 mm) long upper and lower legs. Legs of clips fastened to bottom of beam (prior to application of spray-applied fire-resistive materials) with min two steel fasteners or welds and to ceiling runner of wall with bolts or screws. Clips spaced max 16 in. (406 mm) OC and extend from steel support beam to flush with non-beam face of wall.

E. **Gypsum Board*** — Two layers of 5/8 in. (16 mm) thick glass mat faced (moisture resistant) gypsum board applied to bottom of steel attachment clips. The boards are cut to the length of steel attachment clips and secured to each clip. Base layer attached to the clips using 1 in. (25 mm) long Type S bugle-head steel screws spaced 12 in. (305 mm) OC, 1 in. (25 mm) max from ends. Outer layer attached to the clips using 1-5/8 in. (41 mm) long Type S bugle-head steel screws spaced 12 in. (305 mm) OC, 1 in. (25 mm) max from ends. Butted joints are centered over clips and joints in base and outer layers to be offset. Joints and screw heads in outer layer covered with two coats of joint compound.

See **Gypsum Board** (CKNX) Category for names of Classified Companies of 5/8 in. (16 mm) thick board.

F. **Spray-Applied Fire Resistive Material*** — After installation of the steel attachment clips, structural steel support, and steel floor units (as applicable), to be sprayed with the min thickness of material specified in the individual D700 or D900 Series Design. Each steel attachment clip to be fully covered with spray applied fire resistive material to the minimum thickness of material required on the flanges of the steel beam and the spaces between the clips shall also be fully filled from beam and over the entire thickness of the wall. Additional material shall be applied to the web of steel beam on each side of wall. The min total thickness of material applied to each side of steel beam web shall be 1-1/2 in. (38 mm). When Item 3A is not used, the flutes of the steel floor units are to be filled with material across the entire top flange of the steel beam. For D700 floors, the remainder of the steel floor units shall be sprayed as

specified in the individual D700 design.

ISOLATEK INTERNATIONAL — Type 300

W R GRACE & CO - CONN — Type MK-6/HY

1A. Roof Assembly — (Not Shown) — As an alternate to the floor assembly, a fire-rated fluted steel deck roof assembly may be used. The roof assembly shall be constructed of the materials and in the manner described in the individual P700 or P900 Series Roof-Ceiling Design in the UL Fire Resistance Directory. The roof assembly shall include the following construction features:

A. **Steel Roof Deck** — Max 3 in. (76 mm) deep galv steel fluted roof deck.

B. **Roof Insulation** — Min 2-1/4 in. (57 mm) thick poured insulating concrete, as measured from the top plane of the roof deck.

C. **Structural Steel Support** — Steel beam, as specified in the individual P700 or P900 Series Design, used to support steel floor units. Structural steel support oriented parallel to and 8 in. (203 mm) max from wall assembly.

D. **Steel Attachment Clips** — 1 in. (25 mm) wide Z-shaped clips or channels formed from min 16 ga galv or painted steel. Clips to be sized to extend through the thickness of the spray-applied fire-resistive material on the bottom flange of the steel beam with 1-1/2 in. (38 mm) long upper and lower legs. Legs of clips fastened to bottom of beam (prior to application of spray-applied fire-resistive materials) with min two steel fasteners or welds and to ceiling runner of wall with bolts or screws. Clips spaced max 16 in. (406 mm) OC and extend from steel support beam to flush with non-beam face of wall.

E. **Gypsum Board*** — Two layers of 5/8 in. (16 mm) thick glass mat faced (moisture resistant) gypsum board applied to bottom of steel attachment clips. The boards are cut to the length of steel attachment clips and secured to each clip. Base layer attached to the clips using 1 in. (25 mm) long Type S bugle-head steel screws spaced 12 in. (305 mm) OC, 1 in. (25 mm) max from ends. Outer layer attached to the clips using 1-5/8 in. (41 mm) long Type S bugle-head steel screws spaced 12 in. (305 mm) OC, 1 in. (25 mm) max from ends. Butted joints are centered over clips and joints in base and outer layers to be offset. Joints and screw heads in outer layer covered with two coats of joint compound. An additional nominal 9 in. (229 mm) wide strip of gypsum board covering the exposed leg of the ceiling runner attached to the ceiling runner and to the 1-1/2 by 1-1/2 in. (38 by 38 mm) galv steel angle (see Item 2A) with min 1 in. (25 mm) long fasteners spaced a max of 12 in. (305 mm) on center and 1 in. (25 mm) max from ends along track and angle on the non-finished side of wall. This strip of gypsum shall extend above the ceiling track to be flush with top of spray applied fire resistive material on steel attachment clips, and the strip shall extend down min 1-1/2 in. (38 mm) below the exposed leg of ceiling track.

See **Gypsum Board** (CKNX) Category for names of Classified Companies of 5/8 in. (16 mm) thick board.

F. **Spray-Applied Fire Resistive Material*** — After installation of the steel attachment clips, structural steel support, and roof deck (as applicable), to be sprayed with the min thickness of material specified in the individual P700 or P900 Series Design. Each steel attachment clip to be fully covered with spray applied fire resistive material to the minimum thickness of material required on the flanges of the steel beam and the spaces between the clips shall also be fully filled from beam and over the entire thickness of the wall. Additional material shall be applied to the web of steel beam on each side. The min total thickness of material applied to each side of steel beam web shall be 1-1/2 in. (38 mm). When Item 3A is not used, the flutes of the roof deck are to be filled with material across the entire top flange of the steel beam. For P700 roof-ceiling assemblies, the remainder of the roof deck shall be sprayed as specified in the individual P700 design.

ISOLATEK INTERNATIONAL — Type 300

W R GRACE & CO - CONN — Type MK-6/HY

1B. Floor Assembly — (Not Shown) — Min 4-1/2 in. thick reinforced lightweight or normal weight (100 to 150 pcf) structural concrete.

2. Shaft Wall Assembly — The 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Steel Floor and Ceiling Runners** — Floor runner U-shaped, sized to accommodate steel studs (Item 2B), fabricated from 25 ga galv steel. Ceiling runner positioned with slotted leg toward finished side of wall. Runners attached to steel attachment clips through gypsum board (Item 1E) with min 2 in. (51 mm) long steel fasteners, minimum one fastener per clip. The ceiling runners are provided with a fill, void or cavity material and are described in Item 3. A nom 1-1/2 by 1-1/2 in. (38 by 38 mm) galvanized steel angle shall be attached to top of ceiling runner on non-beam side of wall with No. 8 sheet metal

screws spaced 16 in. (406 mm) max on center and 1 in. (25 mm) max from ends.

B. **Studs** — "C-T", "I", or "C-H" shaped steel studs to be min 2 1/2 in. (64 mm) wide and formed of min 25 ga galv steel. Studs cut 1 to 1-1/4 in (25 to 32 mm) less in length than assembly height with bottom nesting in and secured to floor runner. Steel studs secured to slotted leg of ceiling runner on finished side with No. 8 by 1/2 (13 mm) long wafer head steel screws at mid-height of exposed slot. Studs spaced max 24 in. (610 mm) OC.

C. **Gypsum Board*** — 1 in. (25 mm) thick by max 24 in. (610 mm) wide gypsum board liner panels. Panels cut 1-1/2 in. (38 mm) less in length than floor to ceiling height. Vertical edges inserted into "T" shaped section of "C-T" studs, into holding tabs of "I" studs or into "H"-shaped section of "C-H" studs.

D. **Gypsum Board*** — Gypsum board 1/2 or 5/8 in. (13 or 16 mm) thick, applied on finished side of wall as specified in the individual Wall and Partition Design. The boards cut a max 1 in. (25 mm) less in length than the floor to ceiling height. The screws attaching the gypsum board layer(s) to the "C-T", "I", or "C-H" studs shall be located 4 to 5 in. (102 to 127 mm) down from deck at time of installation.

3. Joint System — Max separation between bottom of floor or roof deck or spray-applied fire resistive material on steel floor or roof unit and top of wall (at time of installation of joint system) is 1 in. (25 mm). The joint system is designed to accommodate a max 100 percent compression or extension from its installed width.

A. **Forming Material*** — Min 4 pcf (64 kg/m³) mineral wool insulation cut to the shape of the fluted steel floor or roof deck units, approx 33% larger than the area of the flutes. Pieces compressed and inserted into and completely filling the flutes above the structural support member. As an option, the spray-applied fire resistive material described in Item 1 can be used in place of the packing material.

B. **Forming Material*** — Min 4 in. (102 mm) thick strips of min 4 pcf (64 kg/m³) mineral wool batt insulation cut to the width of the ceiling runner and tightly friction fit into ceiling runner between leg of track and gypsum liner board to completely fill cavity within ceiling runner.

C. **Fill, Void or Cavity Material*** — Nom 20 ga U-shaped track having 3 in (76 mm) legs with a nom 2-1/2 in. (64 mm) wide intumescent strip affixed to the top of the leg overlapping on to top surface a min of 1/4 in. (6 mm) facing the finished side of wall. Track to be secured through gypsum board material to steel attachment clips with min 2 in. (51 mm) long steel fasteners spaced at a max of 16 in. (406 mm) OC (min one fastener into each clip).

CALIFORNIA EXPANDED METAL PRODUCTS CO — FAS SHAFT Track DL2

*Bearing the UL Classification Mark

Last Updated on 2010-09-22

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XHBN.HW-D-0602 Joint Systems

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Joint Systems

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System No. HW-D-0602

January 27, 2010

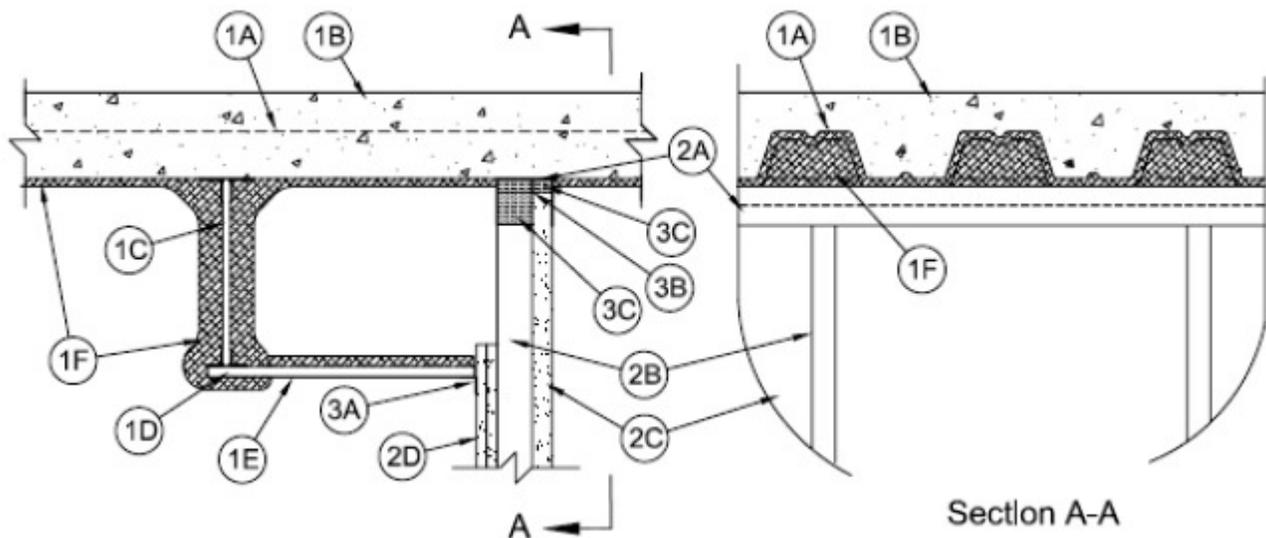
Assembly Ratings — 1 and 2 Hr (See Item 2)

L Rating at Ambient — Less Than 1 CFM/Lin ft

L Rating at 400° F —Less Than 1 CFM/Lin ft

Nominal Joint Width — 1 in.

Class II and III Movement Capabilities — 33% Compression or 66% Extension



1. **Floor Assembly** — The fire-rated fluted steel deck/concrete floor assembly shall be constructed of the materials and in the manner described in the individual D700 Series Floor-Ceiling Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Steel Floor And Floor Units*** — Max 3 in. (76 mm) deep galv steel fluted floor units.

B. **Concrete** — Min 2-1/2 in. (64 mm) thick reinforced concrete, as measured from the top plane of the floor units.

C. **Structural Steel Support** — Steel beam, as specified in the individual D700 Series Floor-Ceiling Design, used to support steel floor units. Structural steel support oriented parallel to and 1 to 7 in. (25 to 178 mm) from wall assembly.

D. **Steel Attachment Clips** — Z-shaped clips formed from 1-1/2 in. (38 mm) wide strips of min 20 ga galv steel. Clips to be sized to extend through the thickness of the spray-applied fire-resistive material on the bottom flange of the steel beam with 1-1/2 in. (38 mm) long upper and lower legs. Legs of clips fastened to bottom of beam (prior to application of spray-applied fire-resistive materials) with steel fasteners or welds. Clips spaced max 16 in. (406 mm) OC and extend to within 1/4 to 3/4 in. (6 to 19 mm) from the surface of the wall.

E. **Steel Plate** — Min 22 ga. galv steel plate, sized to extend from beam to within 1/4 in. (6 mm) of wall surface. Plate is secured to bottom surface of each Z clip with min No. 8 steel sheet metal screws spaced a max 2in. (51 mm) from edges of plate and a max 4 in. (102 mm) OC.

F. **Spray-Applied Fire Resistive Material*** — After installation of the steel attachment clips, structural steel and ceiling runners, support to be sprayed with the min thickness of material specified in the individual D700 Series Design. The flutes of the steel floor units are to be filled with material across the entire top flange of the ceiling runner. The area on top of steel plate and in between Z clips is to be filled to the height of the Z clips plus an additional min 1 in. (25 mm) thickness.

ISOLATEK INTERNATIONAL — Type 300

W R GRACE & CO - CONN — Type MK-6/HY

2. **Shaft Wall Assembly** — The 1 or 2 hr fire rated shaft wall assembly shall be constructed of the materials and in the manner described in the individual U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory. The wall shall include the following construction features:

A. **Floor and Ceiling Runners** — "J"-shaped runner, min 2-1/2 in. (64 mm) wide with unequal legs of min 1-1/2 in. (32 mm) and 2 in. (52 mm), fabricated from min 24 MSG galv steel. Attached to steel deck with steel fasteners or welds spaced max 24 in. (610 mm) OC.

A1. **Light Gauge Framing* — Slotted Ceiling Track** — (Not Shown) - As an alternate to the "J"-shaped runner in Item 2A, a ceiling track consisting of galv steel channel with slotted flanges may be used. Slotted ceiling track sized to accommodate steel "C-T", "I" or "C-H" studs (Item 2C). Attached to steel deck with steel fasteners or welds spaced max 24 in. (610 mm) OC.

BRADY CONSTRUCTION INNOVATIONS INC,

DBA SLIPTRACK SYSTEMS — SLP-TRK

CALIFORNIA EXPANDED METAL PRODUCTS CO — CST

CLARKWESTERN BUILDING SYSTEMS INC — Type SLT, SLT-H

METAL-LITE INC — The System

SCAFCO STEEL STUD MANUFACTURING CO — Slotted Track

B. **Steel Studs** — "C-T", "I" or "C-H"-shaped steel studs to be min 2-1/2 in. (64 mm) wide and formed of min 24 MSG galv steel. Studs cut 1/2 to 3/4 in. (13 to 19 mm) less in length than assembly height with bottom nesting in and resting on floor runner and with top nesting in "J"-shaped runner or slotted ceiling track. Studs spaced max 24 in. (610 mm) OC. After installation of gypsum board liner panels (Item 2D), studs secured to flange of floor runner on finished side of wall only with No. 6 by 1/2 in. (13 mm) long self-drilling, self-tapping steel screws. If slotted ceiling track (Item 2A1) is used, studs secured to flange of slotted ceiling track on finished side of wall only with No. 8 by 1/2 in. (13 mm) long self-drilling, self-tapping wafer head steel screws at slot mid-height.

C. **Gypsum Board*** — 1 in. (25 mm) thick by max 24 in. (610 mm) wide gypsum board liner panels. Panels cut max 1/2 in. (13 mm) less in length than floor to ceiling height. Vertical edges inserted into "T"-shaped section of "C-T" studs, into holding tabs of "I" studs or into "H"-shaped section of "C-H" studs.

D. **Gypsum Board*** — Gypsum board, 1/2 or 5/8 in. (13 or 16 mm) thick, applied on finished side of wall as specified in the individual Wall and Partition Design. The boards to extend a min 3 in. (76 mm) above the bottom of Z clips. The screws attaching the gypsum board layer(s) to the "C-T", "I" or "C-H" studs shall be located a max of 2 in. (51 mm) below the bottom of the Z clips.

The hourly fire rating of the joint system is equal to the hourly fire rating of the wall.

3. **Joint System** — Max separation between spray-applied material on bottom of floor and top of wall (at time of installation of joint system) is 1 in. (25 mm). The joint system is designed to accommodate a max 33 percent compression or max 66% extension from its installed width.

A. **Fill, Void or Cavity Material*** — A nom 20 gauge steel angle provided with a nom 1 in. (25 mm) wide intumescent strip on one leg to be secured to the bottom leg of each z clip with the intumescent strip against the outer face of gypsum board on finished side of wall with min No. 8 steel sheet metal screws such that the intumescent strip is flat against the outer surface of the wall.

CALIFORNIA EXPANDED METAL PRODUCTS CO — Firestik FS1 or FS2

B. **Fill, Void or Cavity Material* - Sealant** — A min 1/8 in. (3 mm) wet thickness (min 1/16 in. or 1.6 mm dry thickness) of fill material applied on inside of stud cavity to completely cover mineral wool forming material and to overlap min 1/2 in. (13 mm) onto wall and top inside surface of slotted ceiling track (Item 2B) prior to installation of gypsum board sheets on finished side of wall.

SPECIFIED TECHNOLOGIES INC — SpecSeal ES Elastomeric Sealant., or SpecSeal AS200 Elastomeric Spray

C. **Forming Material*** — 1-1/2 in. (38 mm) thick by 1-1/2 in. (38 mm) wide sections of mineral wool batt insulation compressed 30 percent and installed cut edge first to fill the 1 in. (25 mm) gap between the top of gypsum board and bottom of the steel floor units. After the sealant (Item 3B) is applied an additional min 4-1/2 in. (114 mm) thick strips of min 4 pcf (64 kg/m³) mineral wool batt insulation cut to the width of the ceiling runner, compressed 33 percent in thickness and installed into ceiling runner between leg of track and gypsum liner board to completely fill cavity within ceiling runner.

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XHBN.HW-D-0621 Joint Systems

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Joint Systems

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System No. HW-D-0621

August 11, 2010

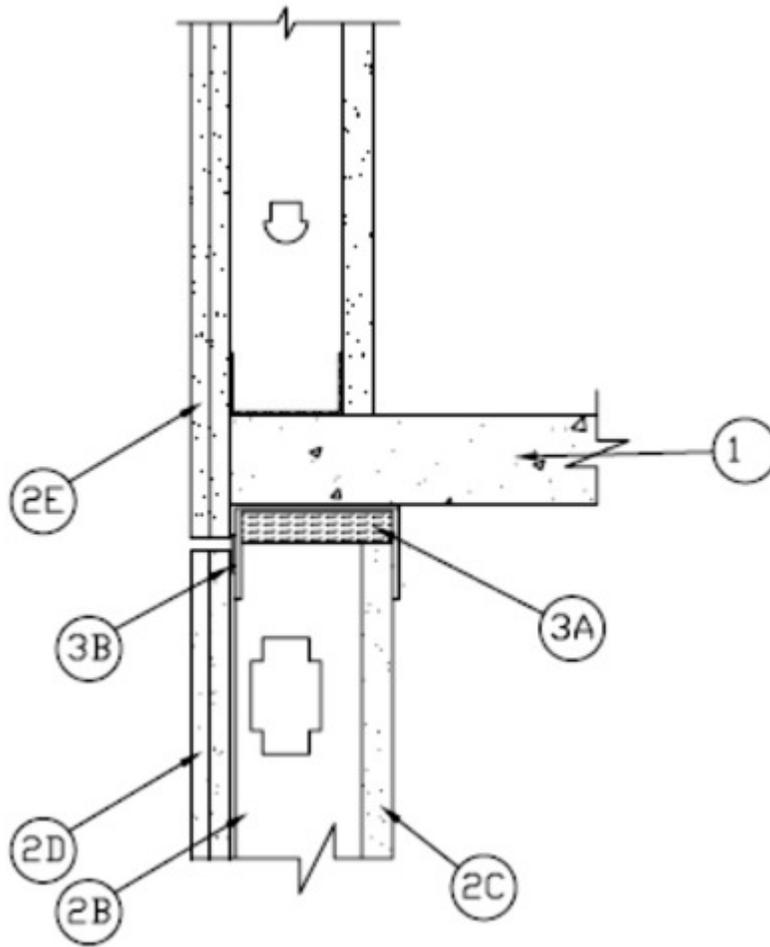
Assembly Ratings - 1 and 2 Hr (See Item 2)

Nominal Joint Width - 1/2 in.

L Rating at Ambient — 2.1 CFM/Lin Ft

L Rating at 400°F — 1.33 CFM/Lin Ft

Class II and III Movement Capabilities - 100% Compression or Extension



1. **Floor Assembly** — Min 4-1/2 in. (114 mm) thick steel reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) structural concrete. Floor may also be constructed of any min 6 in. (152 mm) thick UL Classified hollow-core **Precast Concrete Units***.

See **Precast Concrete Units** (CFTV) category in the Fire Resistance Directory for names manufacturers.

The hourly fire rating of the floor assembly shall be equal or greater than the hourly fire rating of the wall assembly

2. **Shaft Wall Assembly** — The 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Steel Floor and Ceiling Runners** — Floor runner U-shaped, sized to accommodate steel studs (Item 2B), fabricated from min 24 ga galv steel. Runners attached to floor with steel fasteners located not greater than 2 in. from ends and not greater than 24 in OC. The ceiling runners are provided with a fill, void or cavity material and are described in Item 3.

B. **Studs** — "C-T", "I", or "C-H" shaped steel studs to be min 2 1/2 in. (64 mm) wide and formed of min 24 ga galv steel. Studs cut 1 to 1-1/4 in (25 to 32 mm) less in length than assembly height with bottom nesting in and secured to floor runner. Steel studs secured to slotted leg of ceiling runner on finished side with No. 8 by 1/2 (13 mm) long wafer head steel screws at mid-height of exposed slot. Studs spaced max 24 in. (610 mm) OC.

C. **Gypsum Board*** — 1 in. (25 mm) thick by max 24 in. (610 mm) wide gypsum board liner panels. Panels cut 1 in. less in length than floor to ceiling height. Vertical edges inserted into "T" shaped section of "C-T" studs, into holding tabs of "I" studs or into "H"-shaped section of "C-H" studs.

D. **Gypsum Board*** — Gypsum board 1/2 or 5/8 in. (13 or 16 mm) thick, applied on finished side of wall as specified in the individual Wall and Partition Design. The boards cut a max 1/2 in. less in length than the floor to ceiling height. The screws attaching the gypsum board layer(s) to the "C-T", "I", or "C-H" studs shall be located between 4 and 5 in. (102 -127 mm) down from ceiling surface.

E. **Gypsum Board*** — Gypsum board sheets installed to a min total 5/8 in. (16 mm) or 1 -1/4 in. (32 mm) thickness on each side of wall for 1 and 2 hr fire rated assemblies, respectively. Wall to be constructed as specified in the individual U400 or V400 Series Design in the UL Fire Resistance Directory except shaft side gypsum board to extends below the upper floor line overlapping the ceiling runner (Item 3) so that gypsum board overlaps intumescent strip and attached with typical steel fasteners to the

ceiling runner (Item 3) of the lower level a min of 1/8 in. (3 mm).

The hourly fire rating of the joint system is equal to the hourly fire rating of the wall.

3. **Joint System** — Max separation between bottom of floor and top of wall sheathing (non-shaft side) and gypsum board panels (shaft side) at time of installation is 1/2 in. (13 mm). The joint system is designed to accommodate a max 100 percent compression or extension from its installed width.

A. **Forming Material*** — Min 2 in. (51 mm) thick min 4 pcf (64 kg/m³) mineral wool batt insulation cut to the width of the ceiling runner and compressed 50 percent in thickness, installed into ceiling runner between leg of track and gypsum liner board.

B. **Fill, Void or Cavity Material*** — Nom 20 ga U-shaped track having 3-1/4 in. (83 mm) legs with a nom 1-1/4 in. (32 mm) wide intumescent strip affixed to the leg facing the finished side of wall located 1 in. (25 mm) up from the bottom of the leg on the finished side of the wall. Gypsum board (Item 2D) to overlap a min of 5/8 in. (16 mm) up over the intumescent strip. Gypsum board (Item 2E) to overlap a min of 1/8 in. (3 mm) down over the intumescent strip. Track to be secured to bottom side of floor assembly with steel masonry or powder actuated fasteners spaced at a max of 24 in. (610 mm) OC.

CALIFORNIA EXPANDED METAL PRODUCTS CO — FAS SHAFT Track BP

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XHBN.HW-D-0622 Joint Systems

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Joint Systems

[See General Information for Joint Systems](#)

System No. HW-D-0622

August 12, 2010

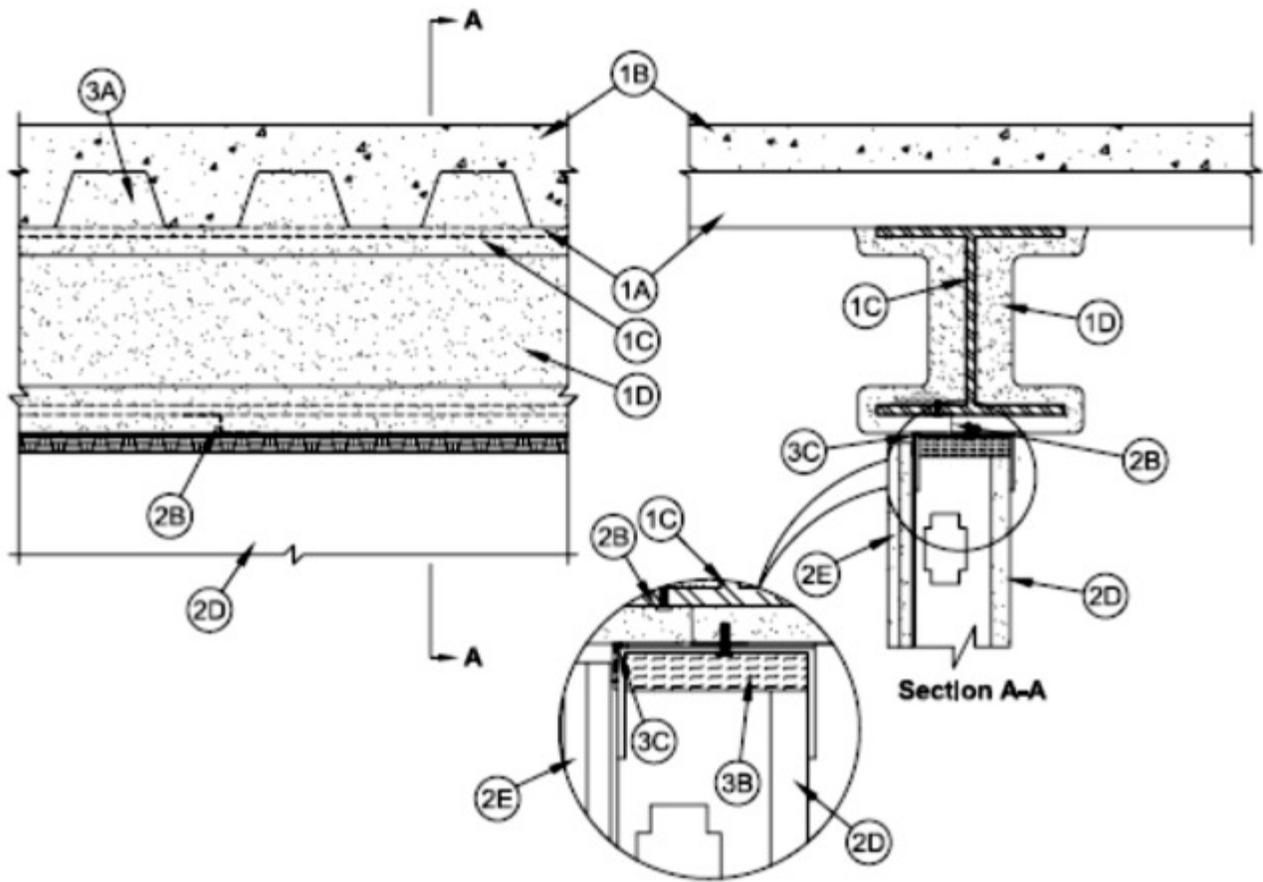
Assembly Ratings —1 and 2 HR

L Rating At Ambient — 2.1 CFM/LIN Ft

L Rating At 400 F — 1.33 CFM/LIN Ft

Nominal Joint Width —1/4, 1/2 or 1 in. (See Item 3)

Class II and III Movement Capabilities — 100% Compression or Extension



1. **Floor Assembly** — The fire-rated fluted steel deck/concrete floor assembly shall be constructed of the materials and in the manner described in the individual D700 or D900 Series Floor-Ceiling Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Steel Floor And Form Units*** — Max 3 in. (76 mm) deep galv steel fluted floor units.

B. **Concrete** — Min 2-1/2 in. (64 mm) thick reinforced concrete, as measured from the top plane of the floor units.

C. **Structural Steel Support** — Steel beam, as specified in the individual D700 or D900 Series Floor-Ceiling Design, used to support steel floor units. Steel Beam centered over and parallel with wall assembly.

D. **Spray-Applied Fire Resistive Material*** — After installation of the steel attachment clips (Item 2B), steel floor units, and ceiling runner (Item 3), all surfaces of the steel floor units and structural steel support to be sprayed with the thickness of material specified in the individual D700 or D900 Series Floor-Ceiling Design. The flutes of the steel floor units are to be filled with material across the entire top flange of the steel beam. The areas between the bottom flange of the structural support and top of the ceiling runner are to be filled entirely with material. Additional material shall be applied to the web of the steel beam on each side of the wall. The thickness of material applied to each side of the steel beam web shall be 2 in. (51 mm).

ISOLATEK INTERNATIONAL — Type 300

W R GRACE & CO - CONN — — Type MK-6/HY

1A. **Roof Assembly** — (Not Shown) - As an alternate to the floor assembly, a fire rated fluted steel deck roof assembly may be used. The roof shall be constructed of the materials and in the manner described in the individual P700 or P900-Series Roof-Ceiling designs in the UL Fire Resistance Directory. The hourly rating of the roof assembly shall be equal to or greater than the hourly rating of the wall assembly. The roof assembly shall include the following construction features:

A. **Steel Roof Deck** — Max 3 in. (76 mm) deep galv steel fluted roof deck.

B. **Roof Insulation** — Roof insulation to consist of min 2-1/4 in. (57 mm) thick poured insulating concrete, as measured from the top plane of the roof deck.

C. **Structural Steel Support** — Steel Beam, as specified in the individual P700 or P900 Series Floor-Ceiling Design, used to support steel floor units. Steel Beam centered over and parallel with wall

assembly.

D. Spray-Applied Fire Resistive Material* — After installation of the steel attachment clips (Item 2B), steel floor units, and ceiling runner (Item 3), all surfaces of the steel floor units and structural steel support to be sprayed with the thickness of material specified in the individual P700 or P900 Series Floor-Ceiling Design. The flutes of the steel floor units are to be filled with material across the entire top flange of the steel beam. The areas between the bottom flange of the structural support and top of the ceiling runner are to be filled entirely with material. Additional material shall be applied to the web of the steel beam on each side of the wall. The thickness of material applied to each side of the steel beam web shall be 2 in. (51 mm).

ISOLATEK INTERNATIONAL — Type 300

W R GRACE & CO - CONN — — Type MK-6/HY

2. **Wall Assembly** — The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

A. Steel Floor and Ceiling Runners — Floor runner U-shaped, sized to accommodate steel studs (Item 2C), fabricated from 24 ga galv steel. Ceiling runner positioned with slotted leg toward finished side of wall. Runners attached to floor with steel fasteners located not greater than 2 in. from ends and not greater than 24 in OC. The ceiling runners are provided with a fill, void or cavity material and are described in Item 3.

B. Steel Attachment Clips — Z-shaped clips formed from 1 in. (25 mm) wide strips of min 20 ga galv steel. Clips sized to extend through the thickness of the spray-applied fire resistive material on the bottom flange of the steel beam with 1-1/2 in. (38 mm) long upper and lower legs. Legs of clips fastened to bottom of beam (prior to application of spray-applied fire-resistive materials) and top of ceiling runner with steel fasteners or welds. Clips spaced max 16 in. (406 mm) OC.

C. Studs — "C-T", "I", or "C-H" shaped steel studs to be min 2 1/2 in. (64 mm) wide and formed of min 24 ga galv steel. Studs cut 1/2 to 1-1/4 in (13 to 32 mm) less in length than assembly height for 1/2 in. or 1 in. joint respectively with bottom nesting in and secured to floor runner. Steel studs secured to slotted leg of ceiling runner on finished side with No. 8 by 1/2 (13 mm) long wafer head steel screws at mid-height of exposed slot. Studs spaced max 24 in. (610 mm) OC

D. Gypsum Board* — 1 in. (25 mm) thick by max 24 in. (610 mm) wide gypsum board liner panels. Panels cut 1 in. less in length than floor to ceiling height. Vertical edges inserted into "T" shaped section of "C-T" studs, into holding tabs of "I" studs or into "H"-shaped section of "C-H" studs.

E. Gypsum Board* — Gypsum board 1/2 or 5/8 in. (13 or 16 mm) thick, applied on finished side of wall as specified in the individual Wall and Partition Design. The boards cut a max 1/2" in. less in length than the floor to ceiling height. The screws attaching the gypsum board layer(s) to the "C-T", "I", or "C-H" studs shall be located 4 to 5 in. (102 to 127 mm) down from deck at time of installation.

3. **Joint System** — Max separation between spray applied material and top of gypsum board (at time of installation) is 1/4, 1/2 or 1 in. (6,13 or 25 mm). The joint system is designed to accommodate a max 100 percent compression or extension from its installed width. For nom 1/4 in. (6 mm) joint see item 3C1, for nom 1/2 in. (13 mm) joint see Item 3C2 for nom 1 in. (25 mm) joint see Item 3C3.

A. Forming Material* — Min 4 pcf (64 kg/m³) mineral wool insulation cut to the shape of the fluted steel floor units, approx 33% larger than the area of the flutes. Pieces compressed and inserted into the flutes above the top ceiling runner flush with the finished wall surface.

B. Forming Material* — Min 2 in. thick min 4 pcf (64 kg/m³) mineral wool batt insulation cut to the width of the ceiling runner and compressed 50 percent in thickness, installed into ceiling runner between leg of track and gypsum liner board.

C1. Fill, Void or Cavity Material* — Nom 20 ga J-shaped track having a 3" in. and a 2 in. leg (83 and 51 mm) legs with a nom 1/2 in. (13 mm) wide intumescent strip affixed to the top of the leg overlapping on to top surface a min of 1/4 in. (6 mm) facing the finished side of wall. Track to be secured to bottom side of floor assembly with steel masonry or powder actuated fasteners spaced at a max of 24 in. (610 mm) OC.

CALIFORNIA EXPANDED METAL PRODUCTS CO — FAS SHAFT Track 500

C2. Fill, Void or Cavity Material* — (For Nom 1/2 in. Joint) Nom 20 ga U-shaped track having 3 in (76 mm) legs with a nom 1-1/4 in. (32 mm) wide intumescent strip affixed to the top of the leg overlapping on to top surface a min of 1/4 in. (6 mm) facing the finished side of wall. Gypsum board to overlap a min of 1/2 in. (13 mm) over the intumescent strip. Track to be secured to bottom side of floor assembly with min 2 in. (51 mm) steel masonry or powder actuated fasteners spaced at a max of 24 in. (610 mm) OC.

C3. **Fill, Void or Cavity Material*** — (for Nom 1 in. Joint) Nom 20 ga U-shaped track having 3-1/4 in (83 mm) legs with a nom 2-1/2 in. (64 mm) wide intumescent strip affixed to the top of the leg overlapping on to top surface a min of 1/4 in. (6 mm) facing the finished side of wall. Gypsum board to overlap a min of 1 in. (25 mm) over the intumescent strip. Track to be secured to bottom side of floor assembly with min 2 in. (51 mm) steel fasteners spaced at a max of 24 in. (610 mm) OC.

CALIFORNIA EXPANDED METAL PRODUCTS CO — FAS SHAFT Track DL2

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XHBN.HW-D-0623 Joint Systems

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Joint Systems

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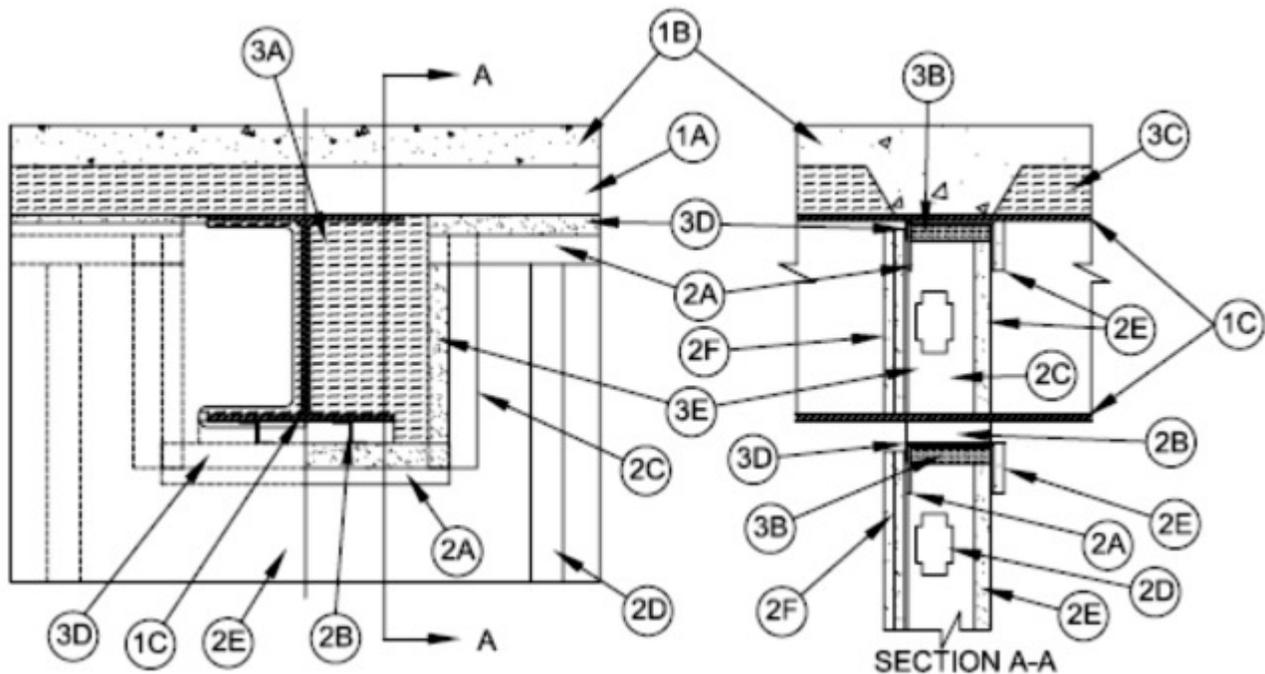
System No. HW-D-0623

August 12, 2010

Assembly Ratings — 1 and 2 Hr (See Item 2)

Nominal Joint Width — 1/2 or 1 in. (See Item 3)

Class II and III Movement Capabilities — 100% Compression or Extension



1. **Floor Assembly** — The fire-rated fluted steel deck/concrete floor assembly shall be constructed of the materials and in the manner described in the individual D700 or D900 Series Floor-Ceiling Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Steel Floor And Form Units*** — Max 3 in. (76 mm) deep galv steel fluted floor units.

B. **Concrete** — Min 2-1/2 in. (64 mm) thick reinforced concrete, as measured from the top plane of the floor units.

C. **Structural Steel Support** — Steel Beam or open web steel joist, as specified in the individual D900 Series Floor-Ceiling Design, used to support steel floor units. Structural steel support oriented perpendicular to wall assembly.

D. **Spray-Applied Fire Resistive Material*** — (Not shown) - As specified in the D700 or D900 Series Floor-Ceiling Design after installation of the steel floor units, ceiling runner (Item 3), attachment clips (Item 2B), and track frame (Item 2C), all surfaces of the structural steel support to be sprayed with the thickness of material specified in the individual design. The area between the structural steel support, track frame (Item 2C), and surrounding both sides of the attachment clips (Item 2B) are to be filled with material to a combined thickness of the wall framing when forming material (Item 3A) is not used.

ISOLATEK INTERNATIONAL — Type 300

W R GRACE & CO - CONN — Type MK-6/HY

1A. **Roof Assembly** — (Not Shown) - As an alternate to the floor assembly, a fire rated fluted steel deck roof assembly may be used. The roof shall be constructed of the materials and in the manner described in the individual P700 or P900-Series Roof-Ceiling designs in the UL Fire Resistance Directory. The hourly rating of the roof assembly shall be equal to or greater than the hourly rating of the wall assembly. The roof assembly shall include the following construction features:

A. **Steel Roof Deck** — Max 3 in. (76 mm) deep galv steel fluted roof deck.

B. **Roof Insulation** — Roof insulation to consist of min 2-1/4 in. (57 mm) thick poured insulating concrete, as measured from the top plane of the roof deck.

C. **Structural Steel Support** — Steel Beam, as specified in the individual P900 Series Roof-Ceiling Design, used to support steel floor units. Steel Beam oriented perpendicular to wall assembly.

D. **Spray-Applied Fire Resistive Material*** — As specified in the individual P700 or P900 Series Floor-Ceiling Design after installation of the ceiling runner (Item 3C), attachment clips (Item 2B), track frame (Item 2C), all surfaces of the structural steel support to be sprayed with the thickness of material as specified in the individual design. The area between the structural steel support, track frame (Item 2C), and surrounding both sides of the attachment clips (Item 2B) are to be filled with material to a combined thickness of the wall framing when forming material (Item 3A) is not used.

ISOLATEK INTERNATIONAL — Type 300

W R GRACE & CO - CONN — Type MK-6/HY

2. **Wall Assembly** — The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Steel Floor and Ceiling Runners** — Floor and ceiling runners of wall assembly shall consist of min No. 25 ga galv steel channels sized to accommodate steel studs (Item 2D). Floor and ceiling runner to be provided with min 1-1/4 in. (32mm) legs with slotted leg toward finished side of wall. The floor or ceiling runners are provided with a fill, void or cavity material and are described in Item 3C. Floor or ceiling runner to be attached to steel deck (after spray-applied fire resistive material is applied, if used) with steel fasteners spaced a max of 24 in. (610 mm) O.C. Ceiling runner to be attached to steel attachment clips (Item 2B) with steel fasteners or welds spaced a max of 6 in. O.C.

B. **Steel Attachment Clips** — Min two Z-shaped clips formed from min 20 ga galv steel. Clips are to be attached along the bottom flange of beam (prior to application of spray-applied fire-resistive materials) with steel fasteners or welds.

C. **Steel Track Frame** — Length of Flexible track (Item 3E) shaped to profile the structural steel support such that the horizontal section is located max 3 1/2in. (89 mm) from any point of the structural steel support. Track is to be fastened to ceiling runners on floor /ceiling assembly and runner attached to bottom of structural steel support with sheet metal fasteners. Steel track frame are provided with a fill, void or cavity material and are described in Item 3E.

D. **Studs** — "C-T", "I", or "C-H" shaped steel studs to be min 2 1/2 in. (64 mm) wide and formed of min 24 ga galv steel. Stud cut1 to 1-1/4 or 2-2-1/4 (25 to 32 or 51 to 57 mm) less in length than assembly height for joint widths of 1/2 or 1 in. (13 or 25 mm) respectively with bottom nesting in and secured to floor runner. Steel studs secured to slotted leg of ceiling runner on finished side with No. 8 by 1/2 (13 mm) long wafer head steel screws at mid-height of exposed slot. Studs spaced max 24 in. (610 mm) OC.

E. **Gypsum Board*** — 1 in. (25 mm) thick by max 24 in. (610 mm) wide gypsum board liner panels. Panels cut 1-1/4 to 1-1/2 in. (32 to 38 mm) less in length than floor to ceiling height. Vertical edges inserted into "T" shaped section of "C-T" studs, into holding tabs of "I" studs or into "H"-shaped section of "C-H" studs. The gypsum board shall be cut to profile the structural steel support with a maximum separation of 1/2 in. (13 mm) between the lowest surface point of the spray applied material on the steel. A nominal 3-5/8 in. (92 mm) wide rip of gypsum board covering the leg of the ceiling runner attached a max of 3/8 in. (10 mm) below the track web and a max of 8 in. (203 mm) O.C. to ceiling runner on the non-finished side of wall.

F. **Gypsum Board*** — Gypsum board sheets installed to a min total 5/8in. (16 mm) or 1-1/4 in. (32 mm) thickness on each side of wall for 1 and 2 hr fire rated assemblies, respectively. Wall to be constructed as specified in the individual U400 or V400 Series Design in the UL Fire Resistance Directory except that a max 1/2 in. or 1 in. (13 mm or 25) gap shall be maintained between the top of the gypsum board, the steel floor units. The gypsum board shall be cut to profile the structural steel support with a maximum separation of 1/2 in. (13 mm) between the lowest surface point of the spray applied material on the steel. The screws attaching the gypsum board layer(s) to the "C-T", "I", or "C-H" studs shall be located 4 to 5 in. (102 to 127 mm) down from deck at time of installation. No gypsum board attachment screws shall be driven into the ceiling runner or the steel track frame (Item 2D).

The hourly fire rating of the joint system is equal to the hourly fire rating of the wall.

3. **Joint System** — Max separation between steel floor unit, spray applied material on bottom flange of structural support, and top of gypsum board (at time of installation) is 1/2 in. (13mm) or 1 in. (25 mm). The joint system is designed to accommodate a max 100 percent compression or extension from its installed width.

A. **Forming Material*** — Nom 4 pcf mineral wool batt insulation cut into strips having a thickness of the wall stacked to maintain a sufficient 50 percent compression between the structural steel support web and the steel track frame (Item 2D). Mineral wool to cover entire area between the structural steel support and the steel track frame.

FIBREX INSULATIONS INC — FBX Safing Insulation

IIG MINWOOL L L C — MinWool-1200 Safing

ROCK WOOL MANUFACTURING CO — Delta Board

ROXUL INC — SAFE

THERMAFIBER INC — SAF

B. **Forming Material*** — Min 2 in. thick min 4 pcf (64 kg/m³) mineral wool batt insulation cut to the width of the ceiling runner and compressed 50 percent in thickness, installed into ceiling runner between leg of track and gypsum liner board.

C. **Forming material*** — Nom 4 pcf mineral wool batt insulation cut to the shape of the fluted steel floor units, approx 33% larger than the area of the flutes. Pieces compressed and inserted into the flutes above the top ceiling runner flush with the finished wall surface.

D. **Fill, Void or Cavity Material*** — For nom 1/2 in. (13 mm) joints, nom 20 ga U-shaped track having 3-1/4 in. (83 mm) legs with a nom 1-1/4 in. (32 mm) wide intumescent strip affixed to the top of both legs. Gypsum board to overlap a min of 1/2in. (13 mm) over the intumescent strip. Track to be secured to bottom side of floor assembly with min 2 in. (51 mm) steel fasteners spaced a max of 24 in. (610 mm) OC.

CALIFORNIA EXPANDED METAL PRODUCTS CO — FAS Shaft Track

D1. **Fill, Void or Cavity Material*** — For nom 1 in. (25 mm) joints, nom 20 ga U-shaped track having 3-1/4 in. (83 mm) legs with a nom 2-1/2 in. (64 mm) wide intumescent strip affixed to the top of both legs. Gypsum board to overlap a min of 1-1/4 in. (32 mm) over the intumescent strip. Track to be secured to bottom side of floor assembly with min 2 in. (51 mm) steel fasteners spaced a max of 24 in. (610 mm) OC.

CALIFORNIA EXPANDED METAL PRODUCTS CO — FAS Shaft Track DL2

E. **Fill, Void or Cavity Material*** — for use on nom 1/2 in or 1 in. joints. Nom 20 ga U-shaped track having 2-1/2 in. (64 mm) or 3-1/4 (83 mm) legs respectively with intumescent strips affixed to the top of both legs. Gypsum board (Item 2F) to overlap a min of 1/2 or 1 in. (13 or 25 mm) over the intumescent strip for 1/2 and 1 in. (13 and 25 mm) joints respectively. Track to be secured to floor runners on deck

and to ceiling runner on the bottom flange of the structural steel support with sheet metal fasteners.

CALIFORNIA EXPANDED METAL PRODUCTS CO — FAS Track DL, FAS Track DL2

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XHBN.HW-D-0625 Joint Systems

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Joint Systems

[See General Information for Joint Systems](#)

System No. HW-D-0625

August 12, 2010

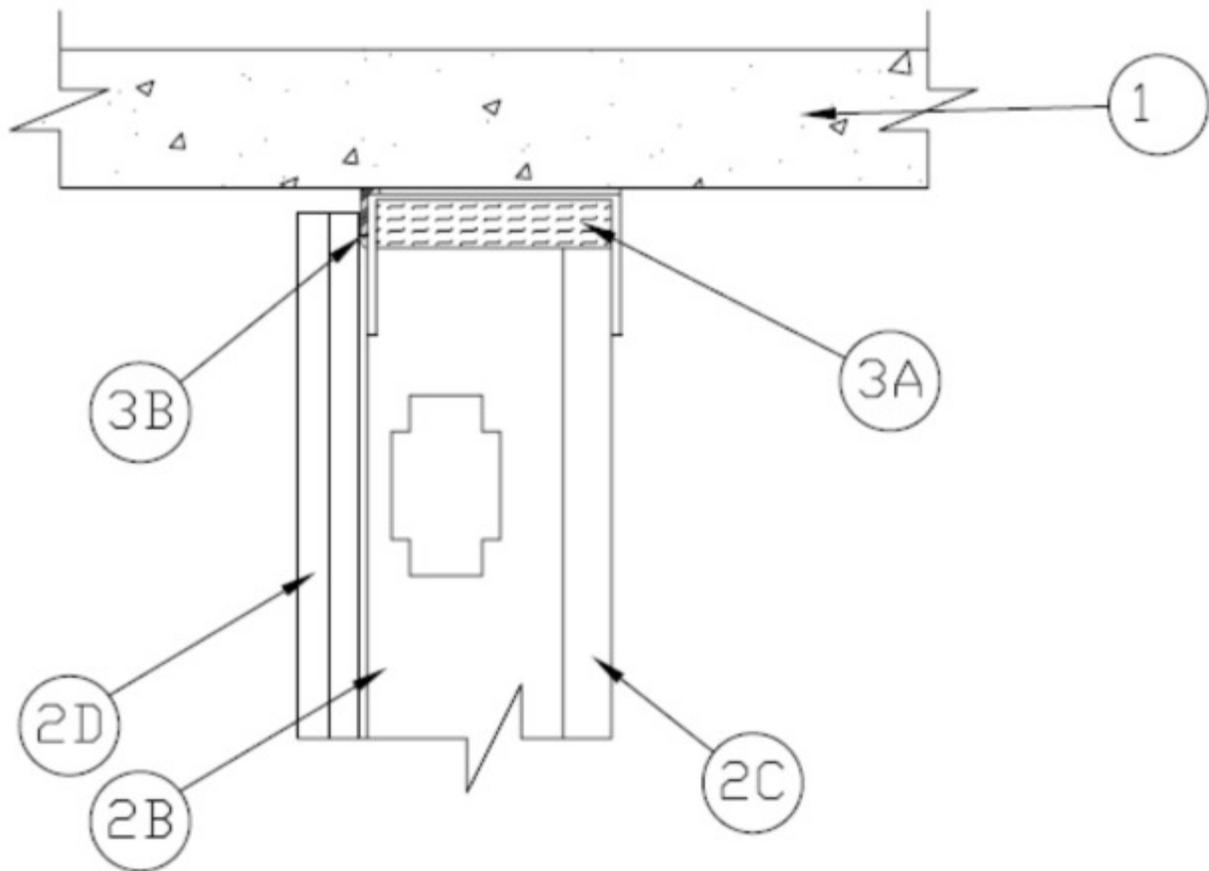
Assembly Ratings —2 Hr

Nominal Joint Width — 1/4 in.

L Rating at Ambient —Less than 1 CFM/Lin Ft

L Rating at 400° F —less than 1 CFM/Lin Ft

Class II and III Movement Capabilities — 100% Compression or Extension



1. **Floor Assembly** — Min 4 1/2 in. (114 mm) thick steel reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) structural concrete. Floor may also be constructed of any min 6 in. thick UL Classified hollow-core Precast Concrete Units*.

See **Precast Concrete Units** (CFTV) category in the Fire Resistance Directory for names manufacturers.

The hourly fire rating of the floor assembly shall be equal or greater than the hourly fire rating of the wall assembly.

2. **Shaft Wall Assembly** — The 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Steel Floor and Ceiling Runners** — Floor runner U-shaped, sized to accommodate steel studs (Item 2B), fabricated from min 24 ga galv steel. Runners attached to floor with steel fasteners located not greater than 2 in. from ends and not greater than 24 in OC. The ceiling runners are provided with a fill, void or cavity material and are described in Item 3.

B. **Studs** — "C-T", "I" or "C-H" shaped steel studs to be min 2 1/2 in. (64 mm) wide and formed of min 24 ga galv steel. Studs cut 1 to 1-1/4 in (25 to 32 mm) less in length than assembly height with bottom nesting in and secured to floor runner. Steel studs secured to slotted leg of ceiling runner on finished side with No. 8 by 1/2 (13 mm) long wafer head steel screws at mid-height of exposed slot. Studs spaced max 24 in. (610 mm) OC.

C. **Gypsum Board*** — 1 in. (25 mm) thick by max 24 in. (610 mm) wide gypsum board liner panels. Panels cut 1/4 in. (6 mm) less in length than floor to ceiling height. Vertical edges inserted into "T" shaped section of "C-T" studs, into holding tabs of "I" studs or into "H"-shaped section of "C-H" studs.

D. **Gypsum Board*** — Gypsum board 1/2 or 5/8 in. (13 or 16 mm) thick, applied on finished side of wall as specified in the individual Wall and Partition Design. The boards cut a max 1/4 in. (6 mm) less in length than the floor to ceiling height. The screws attaching the gypsum board layer(s) to the "C-T", "I" or "C-H" studs shall be located between 3 and 4 in. (76 -102 mm) down from ceiling surface.

The hourly fire rating of the joint system is equal to the hourly fire rating of the wall.

3. **Joint System** — Max separation between bottom of floor and top of gypsum board (at time of installation) is 1/4 in. (6 mm). The joint system is designed to accommodate a max 100 percent compression or extension from its installed width.

A. **Forming Material*** — Min 3 in. thick min 4 pcf (64 kg/m³) mineral wool batt insulation cut to the width of the ceiling runner and compressed 50 percent in thickness, installed into ceiling runner between leg of track and gypsum liner board.

B. **Fill, Void or Cavity Material*** — Nom 20 ga U-shaped track having a 3 in. and a 2 in. leg (83 and 51 mm) legs with a nom 1/2 in. (13 mm) wide intumescent strip affixed to the top of the leg overlapping on to top surface a min of 1/4 in. (6 mm) facing the finished side of wall. Track to be secured to bottom side of floor assembly with steel masonry or powder actuated fasteners spaced at a max of 24 in. (610 mm) OC.

CALIFORNIA EXPANDED METAL PRODUCTS CO — FAS SHAFT Track 500

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XHBN.HW-D-0631 Joint Systems

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 - When field issues arise, it is recommended the first contact for assistance be the technical service staff provided by the product manufacturer noted for the design. Users of fire resistance assemblies are advised to consult the general Guide Information for each product category and each group of assemblies. The Guide Information includes specifics concerning alternate materials and alternate methods of construction.
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Joint Systems

[See General Information for Joint Systems](#)

System No. HW-D-0631

September 16, 2010

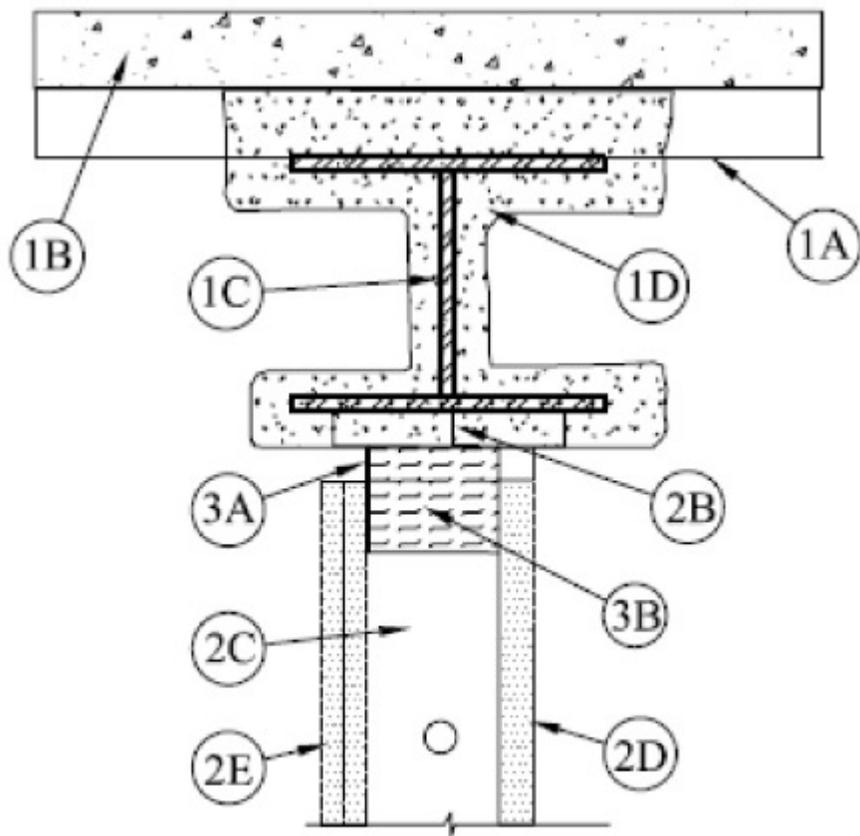
Assembly Rating - 1 and 2 Hr (See Item 2)

Nominal Joint Width - 1/2 to 1 in.

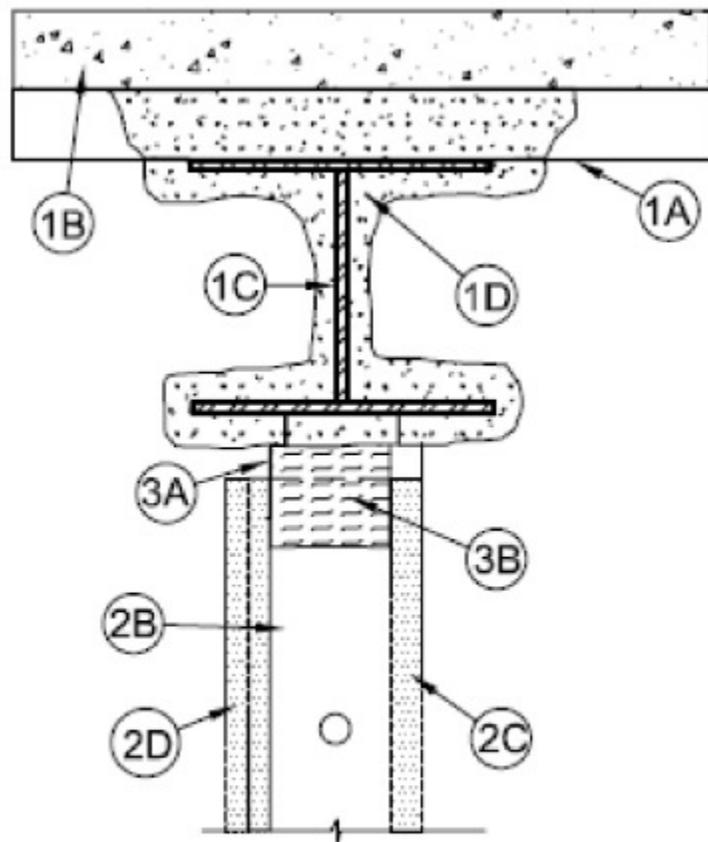
L Rating At Ambient — Less than 1 CFM/Lin Ft

L Rating At 400°F — Less Than 1 CFM/Lin Ft

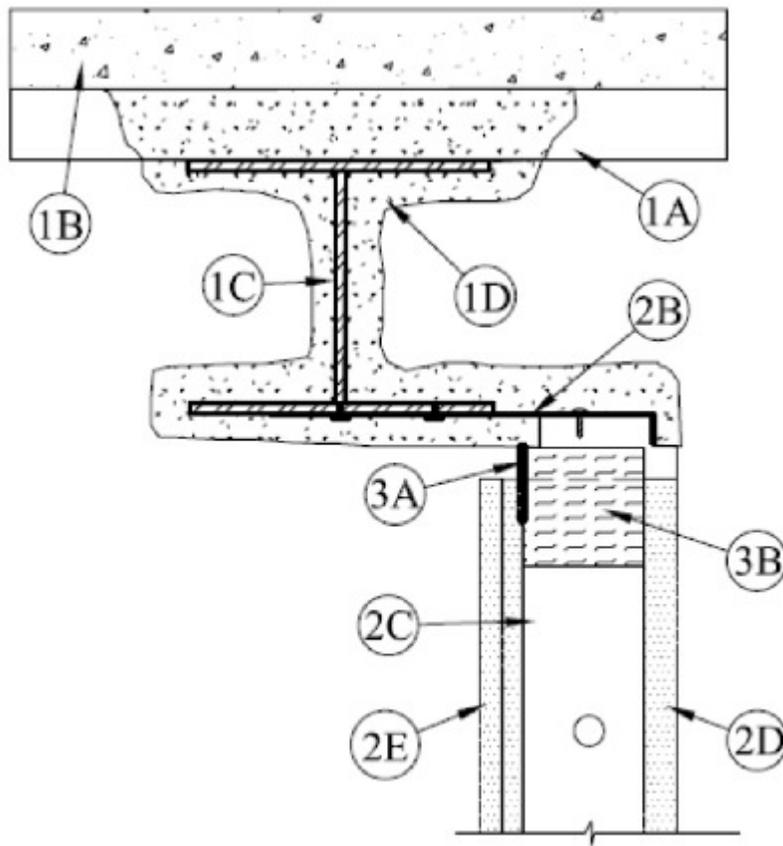
Class II and III Movement Capabilities — 100% Compression or Extension



Configuration A



Configuration B



Configuration C

1. **Floor Assembly** — The fire-rated fluted steel deck/concrete floor assembly shall be constructed of the materials and in the manner described in the individual D700 or D900 Series Floor-Ceiling Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Steel Floor And Form Units*** — Max 3 in. (76 mm) deep galv steel fluted floor units.

B. **Concrete** — Min 2-1/2 in. (64 mm) thick reinforced concrete, as measured from the top plane of the floor units.

C. **Structural Steel Support** — Steel beam, as specified in the individual D700 or D900 Series Floor-Ceiling Design, used to support steel floor units. Steel Beam installed parallel with wall assembly.

D. **Spray-Applied Fire Resistive Material*** — After installation of the steel attachment clips (Item 2B, Configuration A) or Steel Plate (Item 2C, Configuration C), steel floor units and ceiling runner (Item 3), all surfaces of the structural steel support to be sprayed with the thickness of material specified in the individual D700 or D900 Series Floor-Ceiling Design. The flutes of the steel floor units are to be filled with material across the entire top flange of the steel beam. The areas between the bottom flange of the structural support and top of the ceiling runner are to be filled entirely with material and when steel plate (Item 2C) is used the top and bottom surfaces of steel plate to be sprayed with the min thickness of material specified in the individual N700 Series Design. The area above the stepped track legs are to be completely filled with the spray applied fire resistive material. Lower legs of ceiling runner and intumescent strips to be scraped clean after spray application. Additional material shall be applied to the web of the steel beam on each side of the wall. The thickness of material applied to each side of the steel beam web shall be 2 in. (51 mm).

ISOLATEK INTERNATIONAL — Type 300

W R GRACE & CO - CONN — Type MK-6/HY

Firestop Configuration A

2. **Wall Assembly** — The 1 hr or 2 hr fire rated gypsum board/steel stud shaft wall assembly shall be constructed of the materials and in the manner described in the individual U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Steel Floor Runners** — (Not Shown) - The J-shaped or U-shaped steel channel floor runners are to

be sized to accommodate steel studs (Item 2B) and attached to floor with steel fasteners located not greater than 2 in. (51 mm) from ends and not greater than 24 in. (610 mm) OC.

B. Steel Attachment Clips — Z-shaped clips formed from 1 in. (25 mm) wide strips of min 20 ga galv steel. Clips sized to extend through the thickness of the spray-applied fire resistive material on the bottom flange of the steel beam with 1-1/2 in. (38 mm) long upper and lower legs. Legs of clips fastened to bottom of beam (prior to application of spray-applied fire-resistive materials) and top of ceiling runner with steel fasteners or welds. Clips spaced max 16 in. (406 mm) OC.

C. Studs — "C-T", "I", or "C-H" shaped steel studs to be min 2 1/2 in. (64 mm) wide and formed of min 24 ga galv steel. Studs cut 1/2 in. to 3/4 in. (13 to 19 mm) less in length than floor-to-ceiling height as measured to shoulder of ceiling runner (Item 3A) with bottom nesting in and secured to floor runner. Studs to nest in ceiling runner (Item 3A) without attachment. Studs spaced 24 in. (610 mm) OC.

D. Gypsum Board* — Nom 1 in. (25 mm) thick by 24 in. (610 mm) wide gypsum board liner panels applied on unfinished side of wall. Panels cut 1 in. to 1-1/2 in. (25 to 38 mm) less in length than floor-to-ceiling height as measured to shoulder of ceiling runner (Item 3A). Vertical edges inserted into "T" shaped section of "C-T" studs, into holding tabs of "I" studs or into "H"-shaped section of "C-H" studs.

E. Gypsum Board* — Nom 1/2 or 5/8 in. (13 or 16 mm) thick gypsum board sheets applied on finished side of wall as specified in the individual Wall and Partition Design. Boards cut 3/8 in. (10 mm) to 3/4 in. (19 mm) less in length than the floor to ceiling height below **Spray Applied Fire Resistive Material***. The screws attaching the gypsum board layer(s) to the "C-T", "I", or "C-H" studs shall be located 1-1/2 in. (38 mm) below the bottom of the ceiling runner legs. No gypsum board attachment screws shall be driven into the ceiling runner.

The hourly fire rating of the joint system is equal to the hourly fire rating of the wall.

3. Joint System — Max separation between bottom of Spray Applied Fire Resistive Material on steel deck and top of gypsum board on finished side of wall (at time of installation) is 3/8 to 3/4 in. (10 to 19 mm). The joint system is designed to accommodate a max 100 percent compression from its installed width.

A1. Fill, Void or Cavity Material* — For nom 3/8 in. (10 mm) joints, a nom 20 ga J-shaped track having one solid 2 in. leg and one solid 3 in (51 and 76 mm) leg or a nom 20 ga J-shaped track having one 2 in. (51 mm) solid leg and one 3 in. (76 mm) slotted leg with a nom 1 in. (25 mm) wide intumescent strip is to be located on the finished side of wall. Gypsum board to overlap a min of 5/8 in. (16 mm) over the intumescent strip. Ceiling runner attached to steel clips (Item 2B) with steel fasteners or welds spaced max 24 in. (610 mm) OC.

JAK INNOVATIONS — BlazeFrame JR1 or SL1 series.

A2. Fill, Void or Cavity Material* — For nom 1/2 in. (13 mm) joints, a nom 20 ga J-shaped track having one solid 2 in. leg and one solid 3 in (51 or 76 mm) leg or a nom 20 ga J-shaped track having one 2 in. (51 mm) solid leg and one 3 in. (76 mm) slotted leg, with a nom 1-1/4 in. (32 mm) wide intumescent strip and is to be located on the finished side of wall. Gypsum board to overlap min 3/4 in. (19 mm) over the intumescent strip. Ceiling runner attached to steel clips (Item 2B) with steel fasteners or welds spaced a max 24 in. (610 mm) OC.

JAK INNOVATIONS — BlazeFrame JRW1 or SLW1 series

A3. Fill, Void or Cavity Material* — For nom 3/4 in. (19 mm) joints, a nom 20 ga J-shaped track having one solid 2 in. leg and one solid 3 in (51 or 76 mm) leg or a nom 20 ga J-shaped track having one 2 1/2 in. (63 mm) solid leg and one 4 in. (102 mm) slotted leg, with a nom 1-3/4 in. (44 mm) wide intumescent strip, is to be located on the finished side of wall. Gypsum board to overlap min 1 in. (25 mm) over the intumescent strip. Ceiling runner attached to steel clips (Item 2B) with steel fasteners or welds spaced a max 24 in. (610 mm) OC.

JAK INNOVATIONS — BlazeFrame JRX1 or SLX1

B. Forming Material — Min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m³) mineral wool batt insulation cut to the width of the ceiling runner and compressed 33 percent in thickness, installed into ceiling runner between leg of track and gypsum liner board.

FIBREX INSULATIONS INC — FBX Safing Insulation

IIG MINWOOL L L C — MinWool-1200 Safing

ROCK WOOL MANUFACTURING CO — Delta Board

ROXUL INC — Safe

THERMAFIBER INC — SAF

Firestop Configuration B

2. **Wall Assembly** — The 1 hr or 2 hr fire rated gypsum board/steel stud shaft wall assembly shall be constructed of the materials and in the manner described in the individual U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Steel Floor Runners** — (Not Shown) - The J-shaped or U-shaped steel channel floor runners are to be sized to accommodate steel studs (Item 2B) and attached to floor with steel fasteners located not greater than 2 in. (51 mm) from ends and not greater than 24 in. (610 mm) OC.

B. **Studs** — "C-T", "I", or "C-H" shaped steel studs to be min 2 1/2 in. (64 mm) wide and formed of min 24 ga galv steel. Studs cut 1/2 in. to 3/4 in. (13 to 19 mm) less in length than floor-to-ceiling height as measured to shoulder of ceiling runner (Item 3A) with bottom nesting in and secured to floor runner. Studs to nest in ceiling runner (Item 3A) without attachment. Studs spaced 24 in. (610 mm) OC.

C. **Gypsum Board*** — Nom 1 in. (25 mm) thick by 24 in. (610 mm) wide gypsum board liner panels applied on unfinished side of wall. Panels cut 1 in. to 1-1/2 in. (25 to 38 mm) less in length than floor-to-ceiling height as measured to shoulder of ceiling runner (Item 3A). Vertical edges inserted into "T" shaped section of "C-T" studs, into holding tabs of "I" studs or into "H"-shaped section of "C-H" studs.

D. **Gypsum Board*** — Nom 1/2 or 5/8 in. (13 or 16 mm) thick gypsum board sheets applied on finished side of wall as specified in the individual Wall and Partition Design. Boards cut 3/8 in. (10 mm) to 3/4 in. (19 mm) less in length than the floor to ceiling height below **Spray Applied Fire Resistant Material***. The screws attaching the gypsum board layer(s) to the "C-T", "I", or "C-H" studs shall be located 1-1/2 in. (38 mm) below the bottom of the ceiling runner legs. No gypsum board attachment screws shall be driven into the ceiling runner.

The hourly fire rating of the joint system is equal to the hourly fire rating of the wall.

3. **Joint System** — Max separation between bottom of Spray Applied Fire Resistant Material on steel deck and top of gypsum board on finished side of wall (at time of installation) is 3/8 to 3/4 in. (10 to 19 mm). The joint system is designed to accommodate a max 100 percent compression from its installed width.

A1. **Fill, Void or Cavity Material*** — For nom 3/8 in. (10 mm) joints, a stepped-leg galv steel channel track having unequal legs with the height of the upper portion of track legs equal to or greater than the required thickness of **Spray Applied Fire Resistant Material*** on steel roof deck. Lower portion of shorter track leg is provided with a nom 1 in. (25 mm) wide intumescent strip and is to be located on the finished side of wall. Gypsum board (Item 2C) to overlap min 5/8 in. (16 mm) over the lower edge of the intumescent strips. Track attached to steel beam with steel fasteners or welds spaced a max of 24 in. (610 mm) OC.

JAK INNOVATIONS — BlazeFrame OJR1 series

A2. **Fill, Void or Cavity Material*** — For nom 1/2 in. (13 mm) joints, a stepped-leg galv steel channel track having unequal legs with the height of the upper portion of track legs equal to or greater than the required thickness of **Spray Applied Fire Resistant Material*** on steel roof deck. Lower portion of shorter track leg is provided with a nom 1-1/4 in. (32 mm) wide intumescent strip and is to be located on the finished side of wall. Gypsum board (Item 2C) to overlap min 3/4 in. (19 mm) over the lower edge of the intumescent strips. Track attached to steel beam with steel fasteners or welds spaced a max of 24 in. (610 mm) OC.

JAK INNOVATIONS — BlazeFrame OJRW1 series

A3. **Fill, Void or Cavity Material*** — For nom 3/4 in. (19 mm) joints, a stepped-leg galv steel channel track having unequal legs with the height of the upper portion of track legs equal to or greater than the required thickness of **Spray Applied Fire Resistant Material*** on steel roof deck. Lower portion of shorter track leg is provided with a nom 1-3/4 in. (45 mm) wide intumescent strip and is to be located on the finished side of wall. Gypsum board (Item 2C) to overlap min 1 in. (25 mm) over the lower edge of the intumescent strips. Track attached to steel beam with steel fasteners or welds spaced a max of 24 in. (610 mm) OC.

JAK INNOVATIONS — BlazeFrame OJRX1 series

B. **Forming Material** — Min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m³) mineral wool batt

insulation cut to the width of the ceiling runner and compressed 33 percent in thickness, installed into ceiling runner between leg of track and gypsum liner board.

FIBREX INSULATIONS INC — FBX Safing Insulation

IIG MINWOOL L L C — MinWool-1200 Safing

ROCK WOOL MANUFACTURING CO — Delta Board

ROXUL INC — Safe

THERMAFIBER INC — SAF

Firestop Configuration C

2. **Wall Assembly** — The 1 hr or 2 hr fire rated gypsum board/steel stud shaft wall assembly shall be constructed of the materials and in the manner described in the individual U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Steel Floor Runners** — (Not Shown) - The J-shaped or U-shaped steel channel floor runners are to be sized to accommodate steel studs (Item 2B) and attached to floor with steel fasteners located not greater than 2 in. (51 mm) from ends and not greater than 24 in. (610 mm) OC.

B. **Steel Plate** — Min 14ga (0.067 in or 1.7 mm thick) steel plate lapping min 1 1/2 in. (38 mm) onto bottom of steel beam flange and fastened to beam with typical steel fasteners or welds max 16 in. (406 mm) OC. Angle to extend beyond one side of beam for attachment of stepped ceiling runner (Item 3) with typical steel fasteners. Innermost flange of stepped ceiling runner to be parallel with and located max 8 in. (203 mm) from the edge of the steel beam flange.

C. **Studs** — "C-T", "I", or "C-H" shaped steel studs to be min 2 1/2 in. (64 mm) wide and formed of min 24 ga galv steel. Studs cut 1/2 in. to 3/4 in. (13 to 19 mm) less in length than floor-to-ceiling height as measured to shoulder of ceiling runner (Item 3A) with bottom nesting in and secured to floor runner. Studs to nest in ceiling runner (Item 3A) without attachment. Studs spaced max 24 in. (610 mm) OC.

D. **Gypsum Board*** — Nom 1 in. (25 mm) thick by 24 in. (610 mm) wide gypsum board liner panels applied on unfinished side of wall. Panels cut 1 in. to 1-1/2 in. (25 to 38 mm) less in length than floor-to-ceiling height as measured to shoulder of ceiling runner (Item 3A). Vertical edges inserted into "T" shaped section of "C-T" studs, into holding tabs of "I" studs or into "H"-shaped section of "C-H" studs.

E. **Gypsum Board*** — Nom 1/2 or 5/8 in. (13 or 16 mm) thick gypsum board sheets applied on finished side of wall as specified in the individual Wall and Partition Design. Boards cut 3/8 in. (10 mm) to 3/4 in. (19 mm) less in length than the floor to ceiling height below **Spray Applied Fire Resistive Material***. The screws attaching the gypsum board layer(s) to the "C-T", "I", or "C-H" studs shall be located 1-1/2 in. (38 mm) below the bottom of the ceiling runner legs. No gypsum board attachment screws shall be driven into the ceiling runner.

The hourly fire rating of the joint system is equal to the hourly fire rating of the wall.

3. **Joint System** — Max separation between bottom of Spray Applied Fire Resistive Material on steel deck and top of gypsum board on finished side of wall (at time of installation) is 3/8 to 3/4 in. (10 to 19 mm). The joint system is designed to accommodate a max 100 percent compression from its installed width.

A1. **Fill, Void or Cavity Material*** — For nom 3/8 in. (10 mm) joints, a stepped-leg galv steel channel track having unequal legs with the height of the upper portion of track legs equal to or greater than the required thickness of **Spray Applied Fire Resistive Material*** on steel roof deck. Lower portion of shorter track leg is provided with a nom 1 in. (25 mm) wide intumescent strip and is to be located on the finished side of wall. Gypsum board (Item 2C) to overlap min 5/8 in. (16 mm) over the lower edge of the intumescent strips. Track attached to steel plate with steel fasteners or welds spaced a max of 24 in. (610 mm) OC.

JAK INNOVATIONS — BlazeFrame OJR1 series

A2. **Fill, Void or Cavity Material*** — For nom 1/2 in. (13 mm) joints, a stepped-leg galv steel channel track having unequal legs with the height of the upper portion of track legs equal to or greater than the required thickness of **Spray Applied Fire Resistive Material*** on steel roof deck. Lower portion of shorter track leg is provided with a nom 1-1/4 in. (32 mm) wide intumescent strip and is to be located on the finished side of wall. Gypsum board (Item 2C) to overlap min 3/4 in. (19 mm) over the lower edge of the intumescent strips. Track attached to steel plate with steel fasteners or welds spaced a max of 24 in.

(610 mm) OC.

JAK INNOVATIONS — BlazeFrame OJRW1 series

A3. **Fill, Void or Cavity Material*** — For nom 3/4 in. (19 mm) joints, a stepped-leg galv steel channel track having unequal legs with the height of the upper portion of track legs equal to or greater than the required thickness of **Spray Applied Fire Resistive Material*** on steel roof deck. Lower portion of shorter track leg is provided with a nom 1-3/4 in. (45 mm) wide intumescent strip and is to be located on the finished side of wall. Gypsum board (Item 2C) to overlap min 1 in. (25 mm) over the lower edge of the intumescent strips. Track attached to steel plate with steel fasteners or welds spaced a max of 24 in. (610 mm) OC.

JAK INNOVATIONS — BlazeFrame OJRX1 series

B. **Forming Material** — Min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m³) mineral wool batt insulation cut to the width of the ceiling runner and compressed 33 percent in thickness, installed into ceiling runner between leg of track and gypsum liner board.

FIBREX INSULATIONS INC — FBX Safing Insulation

IIG MINWOOL L L C — MinWool-1200 Safing

ROCK WOOL MANUFACTURING CO — Delta Board

ROXUL INC — Safe

THERMAFIBER INC — SAF

*Bearing the UL Classification Mark

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 - When field issues arise, it is recommended the first contact for assistance be the technical service staff provided by the product manufacturer noted for the design. Users of fire resistance assemblies are advised to consult the general Guide Information for each product category and each group of assemblies. The Guide Information includes specifics concerning alternate materials and alternate methods of construction.
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Joint Systems

[See General Information for Joint Systems](#)

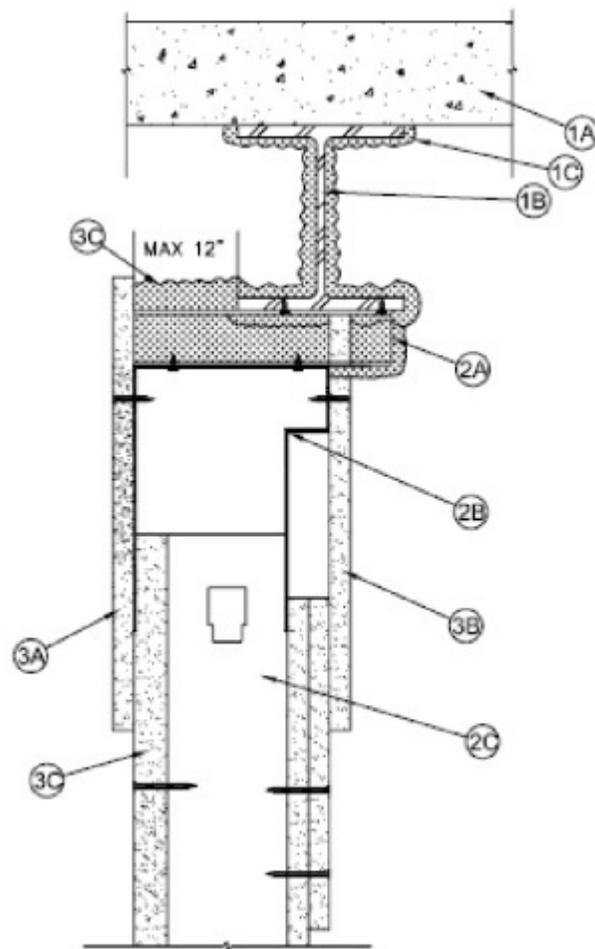
System No. HW-D-1081

August 21, 2009

Assembly Ratings — 1 or 2 HR (See Item 2)

Nominal Joint Width — 2-3/4 or 5-1/2 in. (See Item 3)

Class II and III Movement Capabilities — 100% Compression or Extension or 100% compression (See Item 3)



1. **Floor Assembly** — The 1 or 2 hr fire-rated concrete floor assembly shall be constructed of the materials and in the manner described in the individual J700, J800 or J900 Series Floor-Ceiling Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Concrete** — Min 4-1/2 in. (114 mm) thick steel reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) structural concrete. Floor may also be constructed of any min 6 in. (152. mm) thick UL Classified hollow-core **Precast Concrete Units***.

See **Precast Concrete Units** (CFTV) category in the Fire Resistance Directory for names manufacturers.

B. **Structural Steel Support** — Steel beam, as specified in the individual J700 J800 or J900 Series Floor-Ceiling Design, used to support floor.

C. **Spray-Applied Fire Resistive Material*** — After installation of the steel attachment clips (Item 2A), steel floor units, all surfaces of the steel floor units, steel attachment clips and structural steel support to be sprayed with the thickness of material specified in the individual J700, J800 or J900 Series Floor-Ceiling Design. Additional material shall be applied to the web of the steel beam on each side of the wall and on top of the offset attachment clip. The thickness of material applied to each side of the steel beam web shall be 2 in. (51 mm).

W R GRACE & CO - CONN — Type MK-6/HY, MK 6/HYES, MK6s or RG

2. **Wall Assembly** — The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Steel Attachment Clips** — C-shaped clips formed from min 4 in. (102 mm) wide channels of min 16 ga galv steel. Clips to be sized to extend through the thickness of the spray-applied fire-resistive material required on the structural steel support (Item 1C) with 2 in. (51 mm) long legs. Top of attachment clip is to be attached perpendicular to structural steel support prior to application of spray-applied fire-resistive materials (Item 3C) with steel fasteners or welds. Clips spaced max 24 in. (610 mm) OC. Steel clips may extend a max of 12 in. (305 mm) from the bottom flange of the steel support (Item 1C)

B. **Light Gauge Framing* — Deflection Track** — Deflection track of wall assembly shall consist of min No. 25 gauge galv steel channels sized to accommodate steel studs (Item 2C) and with offset legs to accommodate wall cladding (Item 3A and 3B). Deflection track installed parallel to steel beam and secured to steel attachment clips with No. 8. by 5/8 in. (16 mm) long or equivalent steel fasteners.

C. **Studs** — "C-T", "I", or "C-H" shaped steel studs to be min 2 1/2 in. (64 mm) wide and formed of min 24 ga galv steel. Studs cut 2-3/4 in. or 5-1/2 in (70 or 140 mm) less in length than assembly height with bottom nesting in and secured to floor runner. Steel studs secured to slotted leg of ceiling runner on finished side with No. 8 by 1/2 (13 mm) long wafer head steel screws at mid-height of exposed slot. Studs spaced max 24 in. (610 mm) OC.

D. **Gypsum Board*** — 1 in. (25 mm) thick by max 24 in. (610 mm) wide gypsum board liner panels. Panels cut 2-3/4 in. or 5-1/2 in. (70 or 140 mm) less in length than floor to runner step height. Vertical edges inserted into "T" shaped section of "C-T" studs, into holding tabs of "I" studs or into "H"-shaped section of "C-H" studs.

E. **Gypsum Board*** — Gypsum board 1/2 or 5/8 in. (13 or 16 mm) thick, applied on finished side of wall as specified in the individual Wall and Partition Design. The boards cut a max 2-3/4 in. or 5-1/2 in. (70 or 140 mm) less in length than the floor to runner step height.

The hourly fire rating of the joint system is equal to the hourly fire rating of the wall.

3. **Joint System** — Max separation between step of deflection runner (Item 2B) and top of gypsum board (at time of installation) is 2-3/4 in. (70 mm) or 5-1/2 in (140 mm). The joint system is designed to accommodate a max 100 percent compression or extension from its installed width of 2-3/4 (70 mm) or 100 percent compression form its installed with of 5-1/2 (140 mm). The joint system consists of wall cladding (Item 3A and 3B)and spray applied fire resistive material (Item 3B), as follows:

A. **Wall Cladding** — Min 15 in. (279 mm) wide strips of gypsum board (Item 2D) attached to the deflection track. Board type and thickness and fastener type shall be as specified for the gypsum board in the individual Wall and Partition Design in the UL Fire Resistance Directory. Fasteners shall be max spaced 3 in. (76 mm) OC. The top of the wall cladding shall be flush with the top of the spray applied material (Item 1D).

B. **Wall Cladding** — Min 11 in. (279 mm) wide strips of gypsum board (Item 2E) attached to the deflection track. The number of layers, board type and thickness and fastener type shall be as specified for the gypsum board in the individual Wall and Partition Design in the UL Fire Resistance Directory. Fasteners shall be max spaced 3 in. (76 mm) OC. The top of the wall cladding shall be flush with the top edge of the deflection track (Item 2B). For one hour rated walls an additional 11 in (279 mm) wide strip of gypsum board installed flush with the top of the gypsum board (Item 2E).

C. **Spray-Applied Fire Resistive Material*** — Additional material shall be applied to the top of the wall, the bottom flange of the steel beam and the attachment clips with the thickness specified in the individual D700 or D900 Series Floor-Ceiling Design. Material is to be applied to wall on each side of the wall to overlap of min of 1/2 in (13 mm) on to wall cladding (Item 3A and 3B).

W R GRACE & CO - CONN — Type MK-6/HY, MK 6/HYES, MK6s or RG

*Bearing the UL Classification Mark

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-

Joint Systems

[See General Information for Joint Systems](#)

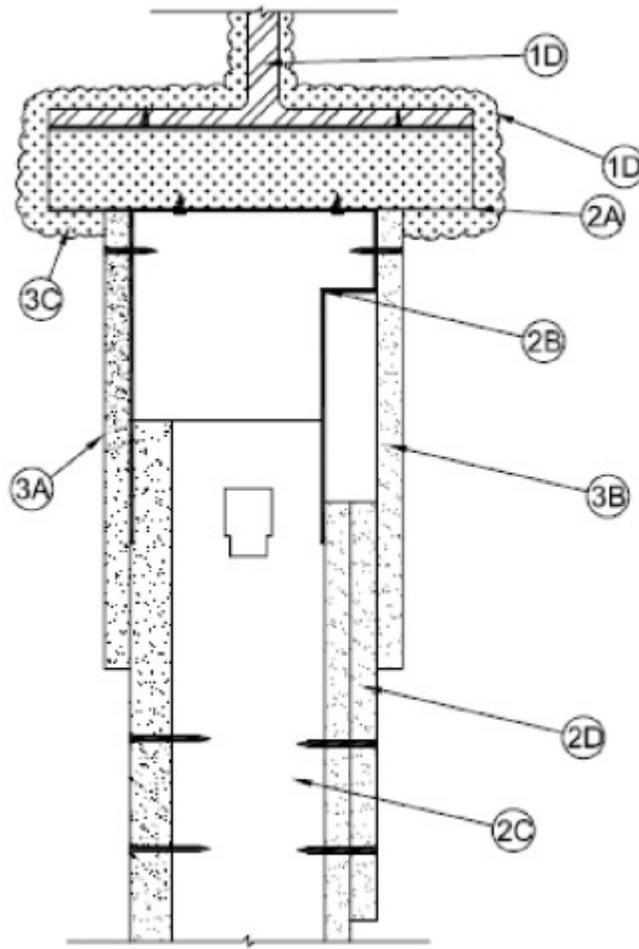
System No. HW-D-1085

August 21, 2009

Assembly Ratings — 1 or 2 HR (See Item 2)

Nominal Joint Width — 2-3/4 or 5-1/2 in. (See Item 3)

Class II and III Movement Capabilities — 100% Compression or Extension or 100% compression (See Item 3)



1. **Floor Assembly** — The 1 or 2 hr fire-rated fluted steel deck/concrete floor assembly shall be constructed of the materials and in the manner described in the individual D700 or D900 Series Floor-Ceiling Design in the UL Fire Resistance Directory and shall include the following construction features:

- A. **Steel Floor And Form Units*** — Max 3 in. (76 mm) deep galv steel fluted floor units.
- B. **Concrete** — Min 2-1/2 in. (64 mm) thick reinforced concrete, as measured from the top plane of the floor units.
- C. **Structural Steel Support** — Steel beam, as specified in the individual D700 or D900 Series Floor-Ceiling Design, used to support steel floor units. Steel Beam centered over and parallel with wall assembly.
- D. **Spray-Applied Fire Resistive Material*** — After installation of the steel attachment clips (Item 2A), steel floor units, all surfaces of the steel floor units, steel attachment clips and structural steel support to be sprayed with the thickness of material specified in the individual D700 or D900 Series Floor-Ceiling Design. The flutes of the steel floor units are to be filled with material across the entire top flange of the steel beam. Additional material shall be applied to the web of the steel beam on each side of the wall. The thickness of material applied to each side of the steel beam web shall be 2 in. (51 mm).

W R GRACE & CO - CONN — Type MK-6/HY, MK 6/HYES, MK6s or RG

1A. **Roof Assembly** — (Not Shown) - As an alternate to the floor assembly, a fire rated fluted steel deck roof assembly may be used. The roof shall be constructed of the materials and in the manner described in the individual P700 or P900-Series Roof-Ceiling designs in the UL Fire Resistance Directory. The hourly rating of the roof assembly shall be equal to or greater than the hourly rating of the wall assembly. The roof assembly shall include the following construction features:

- A. **Steel Roof Deck** — Max 3 in. (76 mm) deep galv steel fluted roof deck.
- B. **Roof Insulation** — Roof insulation to consist of min 2-1/4 in. (57 mm) thick poured insulating concrete, as measured from the top plane of the roof deck.
- C. **Structural Steel Support** — Steel Beam, as specified in the individual P700 or P900 Series Floor-Ceiling Design, used to support steel floor units. Steel Beam centered over and parallel with wall assembly.

D. **Spray-Applied Fire Resistive Material*** — After installation of the steel attachment clips (Item 2A), steel floor units, all surfaces of the steel floor units, steel attachment clips and structural steel support to be sprayed with the thickness of material specified in the individual D700 or D900 Series Floor-Ceiling Design. The flutes of the steel floor units are to be filled with material across the entire top flange of the steel beam. Additional material shall be applied to the web of the steel beam on each side of the wall. The thickness of material applied to each side of the steel beam web shall be 2 in. (51 mm).

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2. **Wall Assembly** — The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Steel Attachment Clips** — C-shaped clips formed from min 4 in. (102 mm) wide channels of min 16 ga galv steel. Clips to be sized to extend through the thickness of the spray-applied fire-resistive material required on the structural steel support (Item 1C) with 2 in. (51 mm) long legs. Top of attachment clip is to be attached perpendicular to structural steel support prior to application of spray-applied fire-resistive materials (Item 3C) with steel fasteners or welds. Clips spaced max 24 in. (610 mm) OC.

B. **Light Gauge Framing* — Deflection Track** — Deflection track of wall assembly shall consist of min No. 25 gauge galv steel channels sized to accommodate steel studs (Item 2C) and with offset legs to accommodate wall cladding (Item 3A and 3B). Deflection track installed parallel to steel beam and secured to steel attachment clips with No. 8. 5/8 in. (16 mm) or equivalent steel fasteners.

FIRE TRAK CORP — Cavity Shadowline

C. **Studs** — "C-T", "I", or "C-H" shaped steel studs to be min 2 1/2 in. (64 mm) wide and formed of min 24 ga galv steel. Studs cut 2 to 2-1/2 in (51 to 64 mm) less in length than assembly height with bottom nesting in and secured to floor runner. Steel studs secured to slotted leg of ceiling runner on finished side with No. 8 by 1/2 (13 mm) long wafer head steel screws at mid-height of exposed slot. Studs spaced max 24 in. (610 mm) OC.

D. **Gypsum Board*** — 1 in. (25 mm) thick by max 24 in. (610 mm) wide gypsum board liner panels. Panels cut 2-3/4 in. (70 mm) or 5-1/2 in. (140 mm) less in length than floor to ceiling height. Vertical edges inserted into "T" shaped section of "C-T" studs, into holding tabs of "I" studs or into "H"-shaped section of "C-H" studs.

E. **Gypsum Board*** — Gypsum board 1/2 or 5/8 in. (13 or 16 mm) thick, applied on finished side of wall as specified in the individual Wall and Partition Design. The boards cut a max 2-3/4 in. (70 mm) or 5-1/2 in. (140 mm) less in length than the floor to ceiling height.

The hourly fire rating of the joint system is equal to the hourly fire rating of the wall.

3. **Joint System** — Max separation between step of deflection runner (Item 2B) and top of gypsum board (at time of installation) is 2-3/4 in. (70 mm) or 5-1/5 in (140 mm). The joint system is designed to accommodate a max 100 percent compression or extension from its installed width of 2-3/4 (70 mm) or 100 percent compression from its installed width of 5-1/2 (140 mm). The joint system consists of wall cladding (Item 3A) and spray applied fire resistive material (Item 3B), as follows:

A. **Wall Cladding** — Min 11 in. (279 mm) wide strips of gypsum board (Item 2D) attached to the deflection track. Board type and thickness and fastener type shall be as specified for the gypsum board in the individual Wall and Partition Design in the UL Fire Resistance Directory. Fasteners shall be max spaced 3 in. (76 mm) OC. The top of the wall cladding shall be flush with the top edge of the deflection track (Item 2B).

B. **Wall Cladding** — Min 11 in. (279 mm) wide strips of gypsum board (Item 2E) attached to the deflection track. The number of layers, board type and thickness and fastener type shall be as specified for the gypsum board in the individual Wall and Partition Design in the UL Fire Resistance Directory. Fasteners shall be max spaced 3 in. (76 mm) OC. The top of the wall cladding shall be flush with the top edge of the deflection track (Item 2B). For one hour rated walls an additional 11 in (279 mm) wide strip of gypsum board installed flush with the top of the gypsum board (Item 2E).

C. **Spray-Applied Fire Resistive Material*** — Additional material shall be applied to the top of the wall, the bottom flange of the steel beam and the attachment clips with the thickness specified in the individual D700 or D900 Series Floor-Ceiling Design. Material is to be applied to wall on each side of the wall to overlap of min of 1/2 in (13 mm) on to wall cladding (Item 3A and 3B).

W R GRACE & CO - CONN — Type MK-6/HY, MK 6/HYES, MK6s or RG

*Bearing the UL Classification Mark

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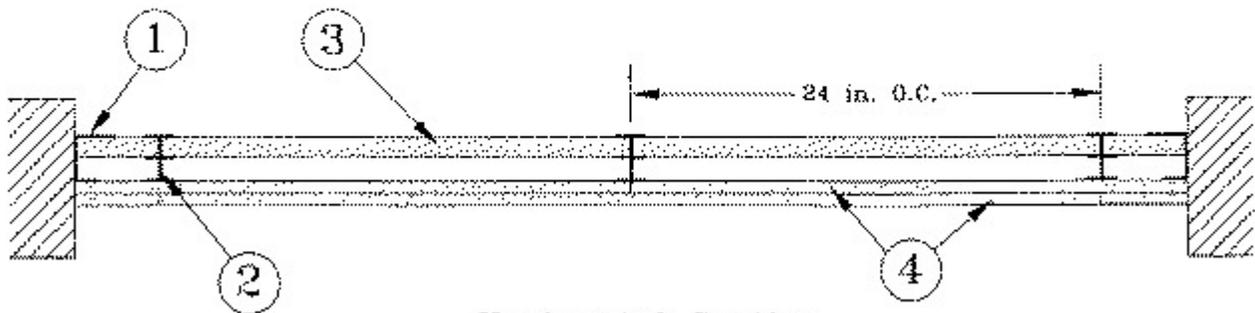
See General Information for Fire Resistance Ratings - ANSI/UL 263

Design No. U417

September 15, 2010

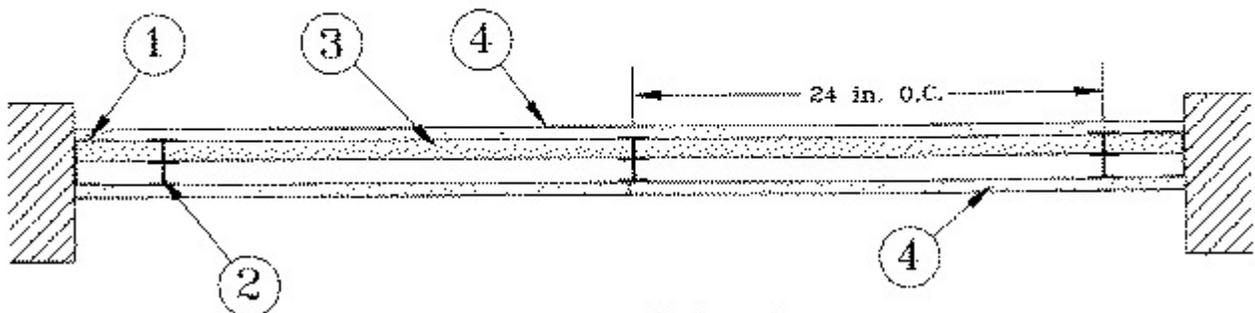
Nonbearing Wall Ratings — 1, 2 or 3 Hr

System A - 2 Hr.



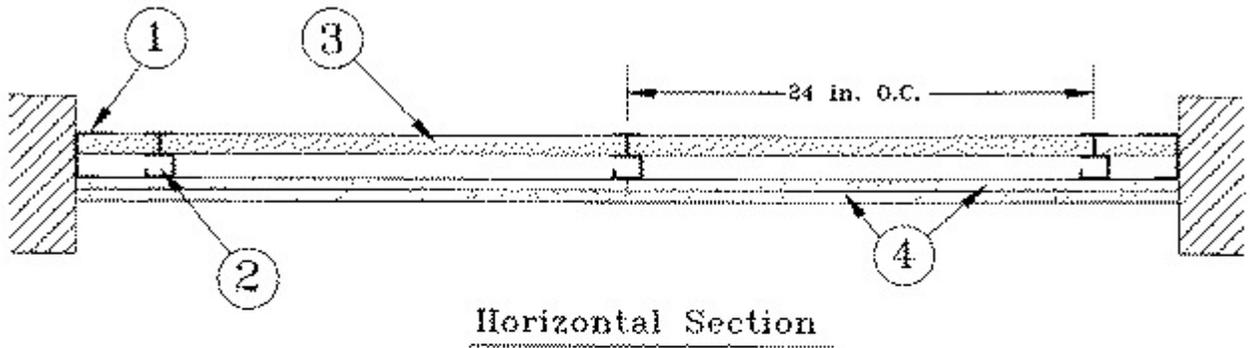
Horizontal Section

System B - 2 Hr.

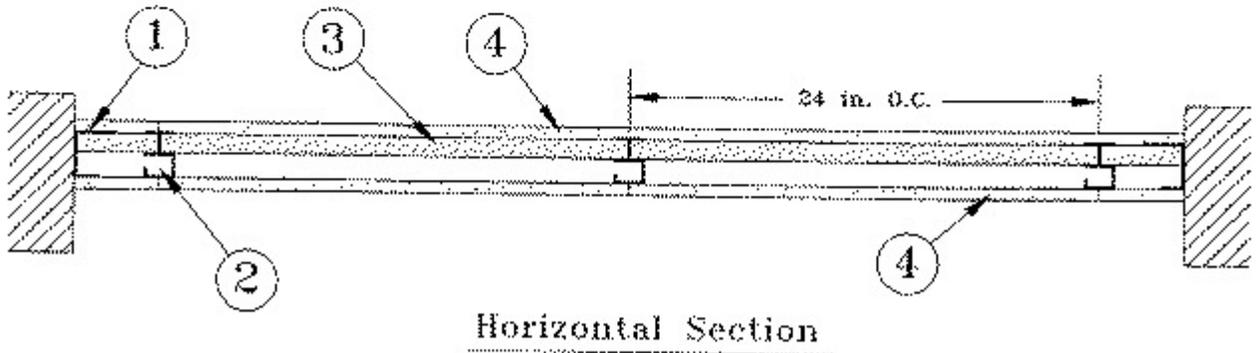


Horizontal Section

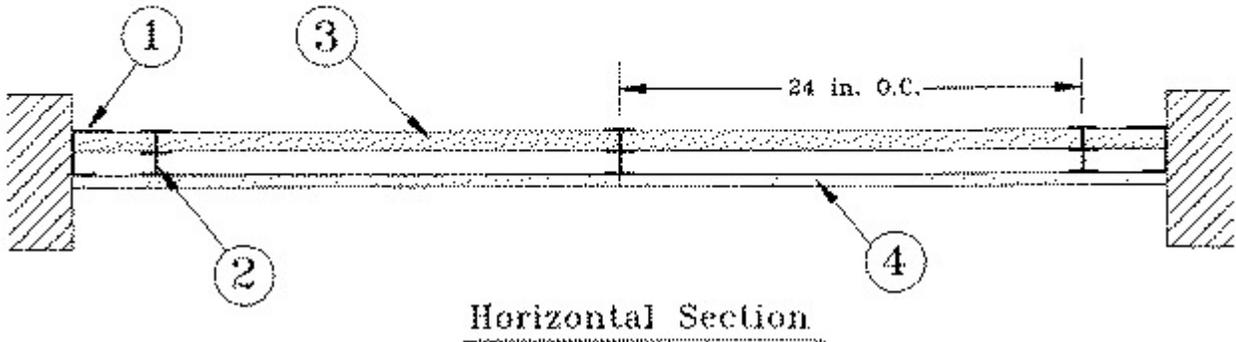
System C - 2 Hr.



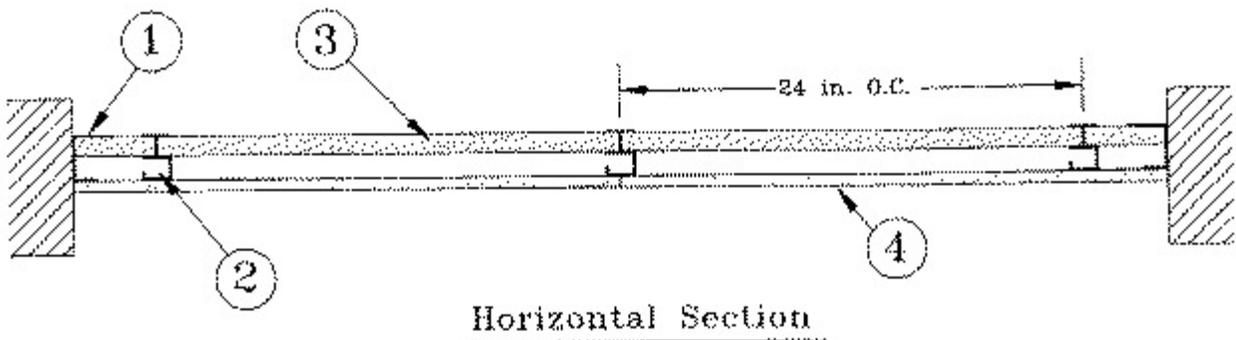
System D - 2 Hr.



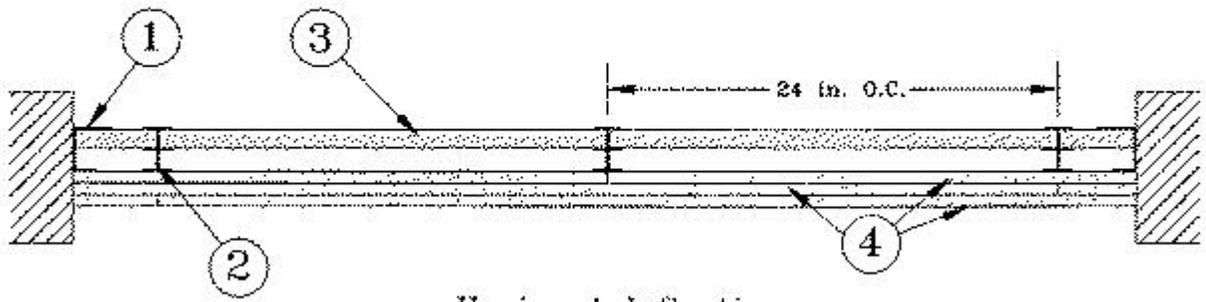
System E - 1 Hr.



System F - 1 Hr.

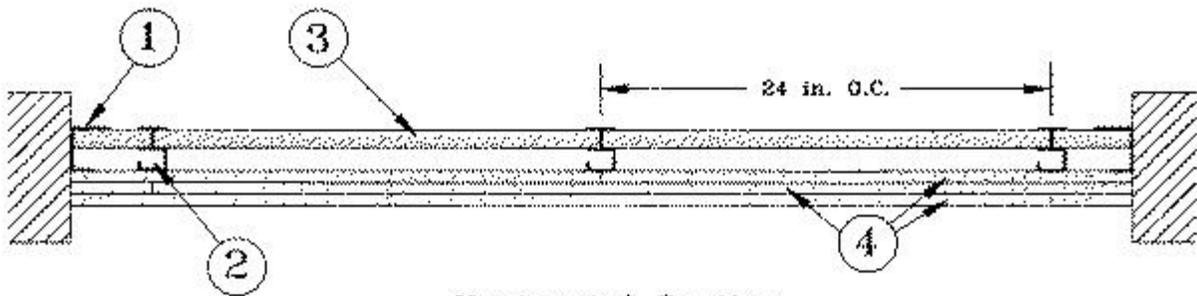


System G - 3 Hr.



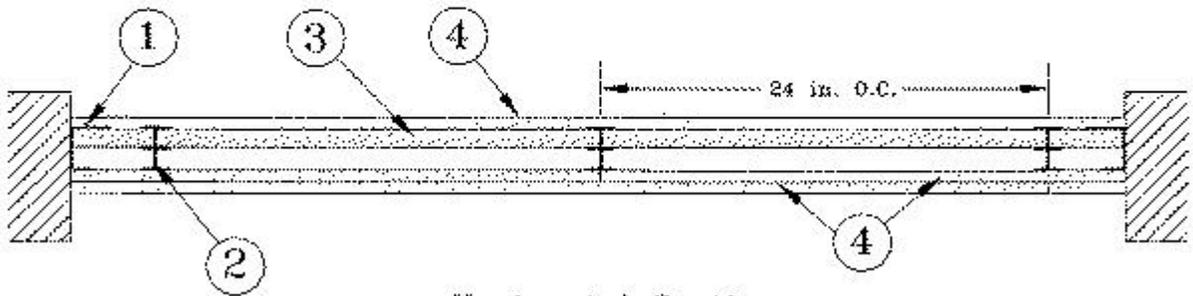
Horizontal Section

System H - 3 Hr.



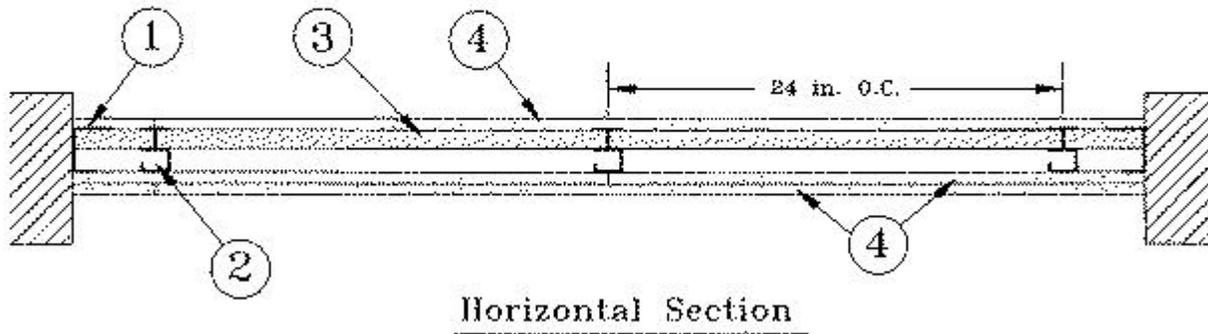
Horizontal Section

System I - 3 Hr.



Horizontal Section

System J - 3 Hr.



1. **Floor, Side and Ceiling Runners** — "J" -shaped runner, min 2-1/2 in. deep, with unequal legs of 1-1/8 in. and 2-1/8 in., fabricated from min 25 MSG galv steel. Runners positioned with short leg toward finished side of wall. Runners attached to structural supports with steel fasteners located not greater than 2 in. from ends and not greater than 24 in. OC.

2. **Steel Studs** —

Systems A, B, E, G and I

"I" -shaped studs fabricated from min 25 MSG galv steel, min 2-1/2 in. deep, 1-1/2 in. wide. Studs contain 3/4 in. wide by 2-1/4 in. high holding tabs spaced 2-3/4 in. OC. Cut to lengths 5/8 in. less than floor-to-ceiling height and spaced 24 in.

Systems C, D, F, H and J

"C-T" -shaped studs, min 2-1/2 in. deep, 1-1/2 in. wide, fabricated from min 25 MSG galv steel. Cut to lengths 5/8 in. less than floor-to-ceiling height and spaced 24 in. or

"C-H" - shaped studs, min 2-1/2 in. deep, fabricated from min 25 MSG galv steel. Cut to lengths 5/8 in. less than floor-to-ceiling height and spaced 24 in. OC.

3. **Gypsum Board*** — Gypsum liner panels, nom 1 in. thick, 24 in. wide. Panels cut max 1 in. less in length than floor to ceiling height. Vertical edges inserted in "T" -shaped section of "C-T" studs, the "H"-shaped section of "C-H" studs or tabs holding tabs of "I" studs. Free edge of end panels attached to long leg of "J" -runners with 1-5/8 in. long Type S self-drilling, self-tapping bugle head steel screws spaced not greater than 12 in. OC.

CERTAINTED GYPSUM INC — Types ProRoc Shaftliner, EGRG Shaftliner, GlasRoc Shaftliner. Types EGRG and GlasRoc Shaftliner limited to 1 and 2 hour systems.

4. **Gypsum Board*** —

Systems A and C

For use with **Type ProRoc Shaftliner** liner panels - Gypsum panels, nom 1/2 or 5/8 in. thick, 48 in. wide, applied in one of the following methods. Method 1 — Base layer installed horizontally to steel studs with 1 in. long Type S self-drilling, self-tapping bugle head steel screws spaced 24 in. OC. Face layer installed vertically to steel studs with 1-5/8 in. long Type S self-drilling, self-tapping bugle head steel screws spaced 24 in. OC, staggered 12 in. from base layer screws. Method 2 — Base layer installed vertically to steel studs with 1 in. long Type S self-drilling, self-tapping bugle head steel screws spaced 24 in. OC. Face layer installed horizontally to steel studs with 1-5/8 in. long Type S self-drilling, self-tapping bugle head steel screws spaced 24 in. OC, staggered 12 in. from base layer screws. Additionally, Type G screws to be installed at the center of each stud cavity, 1-1/2 in. from both sides of the horizontal joint. For the 1/2 in. thick and 5/8 in. thick boards, the Type G screw length shall be 1-1/4 in. and 1-1/2 in. long, respectively.

For use with **Type EGRG or GlasRoc Shaftliner** liner panels - Gypsum panels, nom 1/2 or 5/8 in. thick, 48 in. wide, applied in one of the following methods. Method 1 — Base layer installed horizontally to steel studs with 1 in. long Type S self-drilling, self-tapping bugle head steel screws spaced 24 in. OC. with the 1st screws installed 12 in. from the board edge. Face layer installed vertically to steel studs with 1-5/8 in. long Type S self-drilling, self-tapping bugle head steel screws spaced 12 in. OC. with the 1st and 2nd screws spaced 3/4 in. and 6-3/4 in. from the board edge, staggered 12 in. from base layer screws. Method 2 — Base layer installed vertically to steel studs with 1 in. long Type S self-drilling, self-tapping bugle head steel screws spaced 24 in. OC. with the 1st screws installed 12 in. from the board edge. Face layer installed horizontally to steel studs with 1-5/8 in. long Type S self-drilling, self-tapping bugle head steel screws spaced 24 in. OC., with the 1st and 2nd screws installed 3/4 in. and 6-3/4 in. from the board edge, staggered 12 in. from base layer screws. Additionally, Type G screws to be installed at the center of each stud cavity, spaced 12 in. OC., 1-1/2 in. from both sides of the horizontal joint. For the 1/2 in. thick and 5/8 in. thick boards, the Type G screw length shall be 1-1/4 in. and 1-1/2 in. long, respectively.

CERTAINTED GYPSUM INC — 1/2 in. thick ProRoc Type C, 5/8 in. thick ProRoc Type C or 5/8 in. thick ProRoc Type X

CERTAINTED GYPSUM CANADA INC — ProRoc Type X or ProRoc Type Abuse-Resistant

Systems B and D

Gypsum panels, nom 1/2 or 5/8 in. thick, 48 in. wide, applied vertically to steel studs with 1 in. long Type S self-drilling, self-tapping bugle head steel screws spaced 12 in. OC. Vertical joints on opposite sides of wall staggered a min of 24 in.

CERTAINTED GYPSUM INC — 1/2 in. thick ProRoc Type C, 5/8 in. thick ProRoc Type C or 5/8 in. thick ProRoc Type X

CERTAINTED GYPSUM CANADA INC — ProRoc Type X or ProRoc Type Abuse-Resistant

Systems E and F

Gypsum panels, nom 5/8 in. thick, 48 in. wide, applied vertically with edges centered over studs, with 1 in. long Type S self-drilling, self-tapping bugle head steel screws spaced 12 in. OC.

CERTAINTED GYPSUM INC — ProRoc Type X, SilentFX or ProRoc Type C

CERTAINTED GYPSUM CANADA INC — ProRoc Type X or ProRoc Type Abuse-Resistant

Systems G and H

Gypsum panels, nom 5/8 in. thick, 48 in. wide applied in three layers to one side of the assembly. Base layer applied vertically, remaining layers applied vertically or horizontally. Base layer attached to studs with 1 in. long Type S steel screws spaced 24 in. OC. Middle layer attached to studs with 1-5/8 in. long Type S steel screws spaced 24 in. OC when installed vertically or 16 in. OC when installed horizontally. Face layer attached to studs with 2-1/4 in. long Type S steel screws spaced 16 in. OC when installed vertically or 12 in. OC when installed horizontally. Screws offset 6 in. from layer below. Horizontal joints on adjacent layers staggered a min of 12 in. When applied horizontally, 1-1/2 in. long Type G screws to be installed at the center of each stud cavity, 1-1/2 in. from both sides of the horizontal joint. Vertical joints centered over studs and staggered 24 in. on adjacent layers.

CERTAINTED GYPSUM INC — ProRoc Type C

Systems I and J

Gypsum panels, nom 5/8 in. thick, 48 in. wide applied in two layers to one side of the assembly and one layer to the other side. On the two layer side, base layer applied vertically, face layer applied vertically or horizontally. Base layer attached to studs with 1 in. long Type S steel screws spaced 24 in. OC. Face layer attached to studs with 1-5/8 in. long Type S steel screws spaced 24 in. OC when installed vertically or 16 in. OC when installed horizontally. Screws offset 6 in. from layer below. When applied horizontally, 1-1/2 in. long Type G screws to be installed at the center of each stud cavity, 1-1/2 in. from both sides of the horizontal joint. Vertical joints centered over studs and staggered 24 in. on adjacent layers. On the one layer side, panels applied vertically and attached to studs with 1 in. long Type S steel screws spaced 12 in. OC. Vertical joints on opposite sides of wall staggered min 24 in. OC.

CERTAINTED GYPSUM INC — ProRoc Type C

5. Joint Tape and Compound —

(Not shown) — Joints covered with joint compound and paper or mesh tape. Screw heads covered with joint compound.

*Bearing the UL Classification Mark

Last Updated on 2010-09-15

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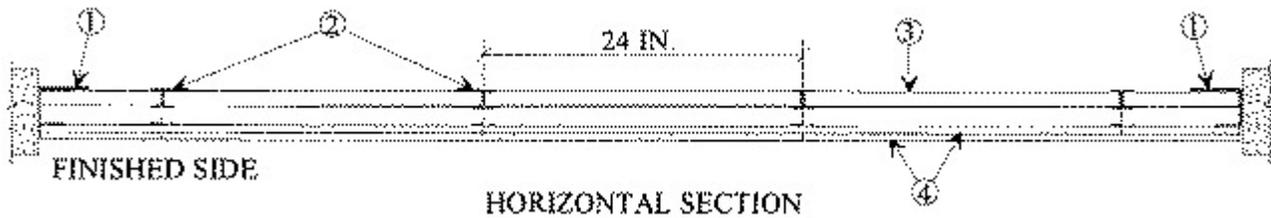
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[See General Information for Fire Resistance Ratings - ANSI/UL 263](#)

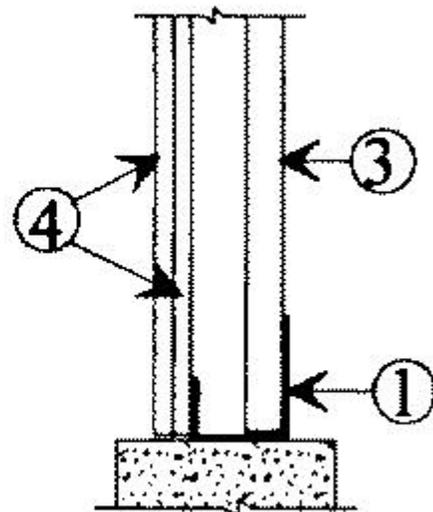
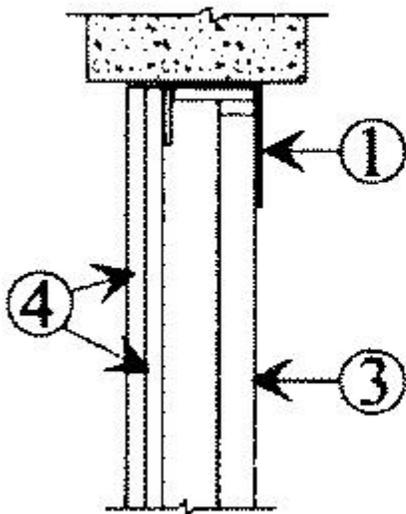
Design No. U497

July 01, 2010

Nonbearing Wall Rating — 2 Hr



CEILING



FLOOR

1. **Channel Track** — "J" -shaped channel, 2-1/2 in. deep with unequal legs of 1 in. and 2 in., fabricated from No. 25 MSG galv steel. Channel positioned with short leg toward finished side of wall. Channel attached to structural supports with steel fasteners located not greater than 2 in. from ends and not greater than 24 in. OC.

2. **Steel Studs** — "I" -shaped studs, min 2-1/2 in. deep by 1-1/2 in. wide, fabricated from min 25 MSG galv steel. Cut to lengths 1/2 in. less than floor to ceiling height and spaced 24 in. OC.

2A. **Steel Studs** — (Not Shown) — "C-H" -shaped studs, min 2-1/2 in. deep by 1-1/2 in. wide, fabricated from min 25 MSG galv steel. Cut to lengths 1/2 in. less than floor to ceiling height and spaced 24 in. OC.

2B. **Steel Studs** — (Not Shown) — "C-T" -shaped studs, min 2-1/2 in. deep by 1-1/2 in. wide, fabricated from min 25 MSG galv steel. Cut to lengths 1/2 in. less than floor to ceiling height and spaced 24 in. OC.

2C. **Furring Channels** — (Optional, not shown) - Resilient furring channels fabricated from min. 25 MSG corrosion protected steel, installed horizontally, and spaced vertically a max. 24 in. OC. Flange portion of channel attached to each intersecting stud on side of stud opposite the 1 in. liner panels with 1/2 in. long Type S or S-12 pan-head steel screws. When furring channels are used, wallboard to be installed vertically.

3. **Gypsum Board*** — 1 in. thick gypsum wallboard liner panels, supplied in nom 24 in. widths. Panels cut 1 in. less in length than floor to ceiling heights. Vertical edges inserted in "I" studs. Free edge of end panels attached to long leg of channel track with 1-5/16 in. long Type S self-drilling, self-tapping bugle head steel screws spaced 1 in. in from both edges.

NATIONAL GYPSUM CO — Types FSW, FSW-B, FSW-7.

4. **Gypsum Board*** — 1/2 in. thick, 4 ft wide wallboard applied vertically in two layers. Inner or base layer attached to studs with 1 in. long Type S self-drilling, self-tapping bugle head steel screws spaced 24 in. OC along the edges and in the field of the boards. Outer or face layer attached to studs and channel track with 1-5/8 in. long Type S self-drilling, self-tapping bugle head steel screws spaced 12 in. along the edges and in the field of the boards, staggered from screws in inner layer. When Furring Channels (Item 2C) are used, inner or base layer attached to furring channels with 1 in. long Type S self-drilling, self-tapping bugle head steel screws. Outer or face layer attached to furring channels with 1-5/8 in. long Type S self-drilling, self-tapping bugle head steel screws spaced 12 in. OC and staggered 12 in. from base layer screws. Joints between inner and outer layers staggered. Outer layer joints covered with paper tape and joint compound. Exposed screw heads covered with joint compound.

AMERICAN GYPSUM CO — Type AG-C

CERTAINTED GYPSUM INC — ProRoc Type C.

CERTAINTED GYPSUM CANADA INC — ProRoc Type C.

CANADIAN GYPSUM COMPANY — Types C, IP-X2, IPC-AR.

GEORGIA-PACIFIC GYPSUM L L C — Type DAPC

LAFARGE NORTH AMERICA INC — Types LGFC-C, LGFC-C/A.

NATIONAL GYPSUM CO — Types FSK-C, FSW-G, FSW-C, FSMR-C.

PANEL REY S A — Type PRC

TEMPLE-INLAND — Type TG-C

UNITED STATES GYPSUM CO — Types C, IP-X2, IPC-AR.

USG MEXICO S A DE C V — Types C, IP-X2, IPC-AR.

4A. **Gypsum Board*** — (As an alternate to Item 4) — 5/8 in. thick. Two layers installed as described in Item 4.

NATIONAL GYPSUM CO — Types FSMR-C, FSK, FSK-C, FSK-G, FSW-C, FSW-G, FSW, FSW-3, FSW-5 and and FSW-6.

5. **Batts and Blankets*** — (Optional, not shown)-Mineral wool or glass fiber batts partially or completely filling stud cavity. Any mineral wool or glass fiber batt bearing the UL Classification Marking as to Fire Resistance. See **Batts and Blankets** (BZJZ) category for names of Classified companies.

*Bearing the UL Classification Mark

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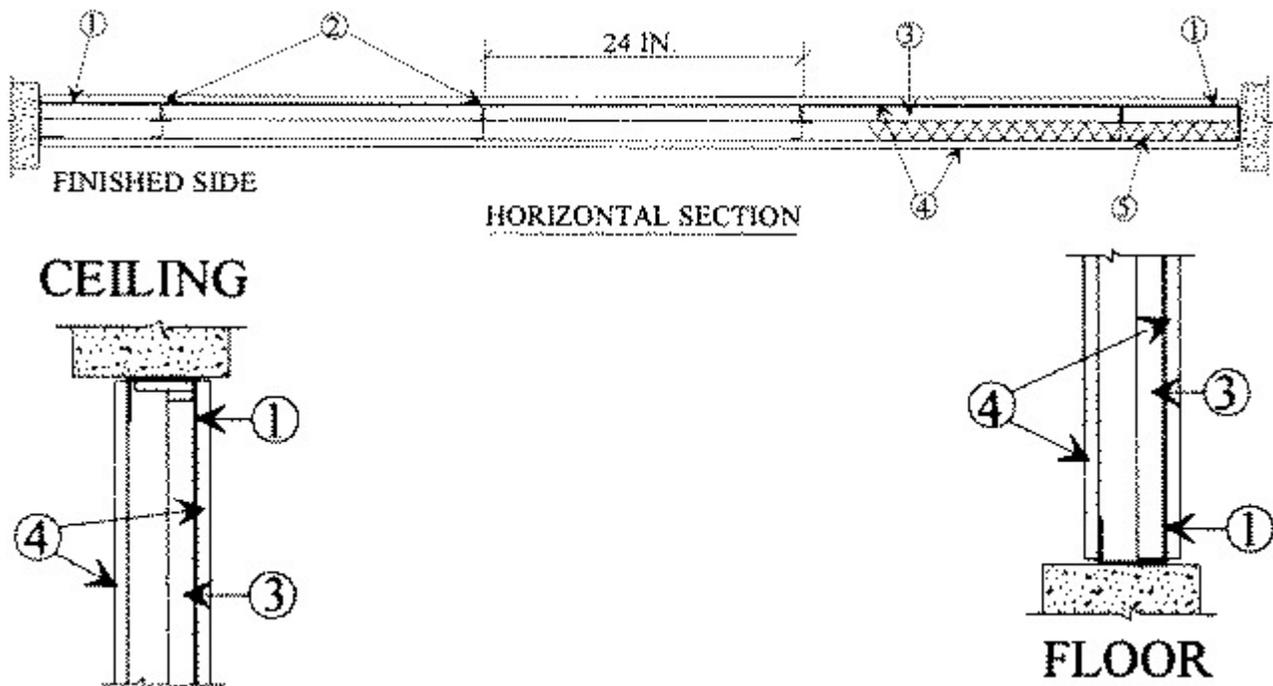
Fire Resistance Ratings - ANSI/UL 263

See General Information for Fire Resistance Ratings - ANSI/UL 263

Design No. U498

March 03, 2010

Nonbearing Wall Rating — 2 Hr



1. **Channel Track** — "J" shaped channel, 2-1/2 in. wide with unequal legs of 1 in. and 2 in., fabricated from 25 MSG galv steel channel attached to structural supports with steel fasteners located not greater than 2 in. from ends and not greater than 24 in. OC.

2. **Steel Studs** — "I" shaped studs, min 2-1/2 in. deep by 1-1/2 in. wide, fabricated from min 25 MSG galv steel, spaced 24 in. OC. Vertically restrained walls require studs to be cut 1/2 in. less than floor to ceiling height.

2A. **Steel Studs** — (Not Shown) — "C-H" -shaped studs, min 2-1/2 in. deep by 1-1/2 in. wide, fabricated from min 25 MSG galv steel, spaced 24 in. OC. Vertically restrained walls require studs to be cut 1/2 in. less than floor to ceiling height.

2B. **Steel Studs** — (Not Shown) — "C-T" - shaped studs, min 2-1/2 in. deep by 1-1/2 in. wide, fabricated from min 25 MSG galv steel, spaced 24 in. OC. Vertically restrained walls require studs to be cut 1/2 in. less than floor to ceiling height.

2C. **Furring Channels** — (Optional, not shown) - Resilient furring channels fabricated from min. 25 MSG corrosion protected steel, installed horizontally, and spaced vertically a max. 24 in. OC. Flange portion of channel attached to each intersecting stud on side of stud opposite the

3. **Gypsum Board*** — 1 in. thick gypsum wallboard liner panels, supplied in nominal 24 in. widths. Vertical edges inserted in "I" studs. Free edge of end panels attached to long leg of channel track with 1-5/16 in. long Type S self-drilling, self-tapping bugle head steel screws spaced 1 in. from both ends.

NATIONAL GYPSUM CO — Types FSW , FSW-B, FSW-7.

4. **Gypsum Board*** — 1/2 in. thick, 4 ft wide applied either horizontally or vertically and attached to studs and runners with 1 in. long Type S steel screws spaced 12 in. OC. When Furring Channels (Item 2C) are used, gypsum board attached vertically to furring channels with 1 in. long Type S steel screws spaced 12 in. OC. Outer layer joints covered with paper tape and joint compound. Exposed screw heads covered with joint compound.

When used in widths other than 48 in., gypsum board to be installed horizontally.

NATIONAL GYPSUM CO — Types FSK-C, FSW-G, FSW-C, FSMR-C.

4A. **Gypsum Board*** — (As an alternate to Item 4) — 5/8 in. thick. Installed as described in Item 4.

NATIONAL GYPSUM CO — Types FSMR-C, FSK, FSK-C, FSK-G, FSW-C, FSW-G, FSW, FSW-3, FSW-5 and FSW-6.

5. **Batts and Blankets*** — (Optional) — Mineral wool or glass fiber batts partially or completely filling stud cavity. Any mineral wool or glass fiber batt bearing the UL Classification Marking as to Fire Resistance. See Batts and blankets (BZJZ)Category For Names of Classified Companies.

5A. **Fiber, Sprayed*** — As an alternate to Batts and Blankets (Item 5) — Spray applied cellulose material. The fiber is applied with water to completely fill the enclosed cavity in accordance with the application instructions supplied with the product. Nominal dry density of 3.0 lb/ft³. Alternate application method: The fiber is applied with U.S. Greenfiber LLC Type AD100 hot melt adhesive at a nominal ratio of one part adhesive to 6.6 parts fiber to completely fill the enclosed cavity in accordance with the application instructions supplied with the product. Nominal dry density of 2.5 lb/ft³.

U S GREENFIBER L L C — Cocoon2 Stabilized or Cocoon-FRM (Fire Rated Material)

5B. **Fiber, Sprayed*** — As an alternate to Batts and Blankets (Item 5) and Item 5A - Spray applied cellulose insulation material. The fiber is applied with water to interior surfaces in accordance with the application instructions supplied with the product. Applied to completely fill the enclosed cavity. Minimum dry density of 4.3 pounds per cubic ft.

NU-WOOL CO INC — Cellulose Insulation

5C. **Fiber, Sprayed*** — As an alternate to Batts and Blankets (Item 5) - Spray applied cellulose fiber. The fiber is applied with water to completely fill the enclosed cavity in accordance with the application instructions supplied with the product. The minimum dry density shall be 4.30 lbs/ft³.

INTERNATIONAL CELLULOSE CORP — Celbar-RL

*Bearing the UL Classification Mark

Last Updated on 2010-03-03

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BXUV.U499 Fire Resistance Ratings - ANSI/UL 263

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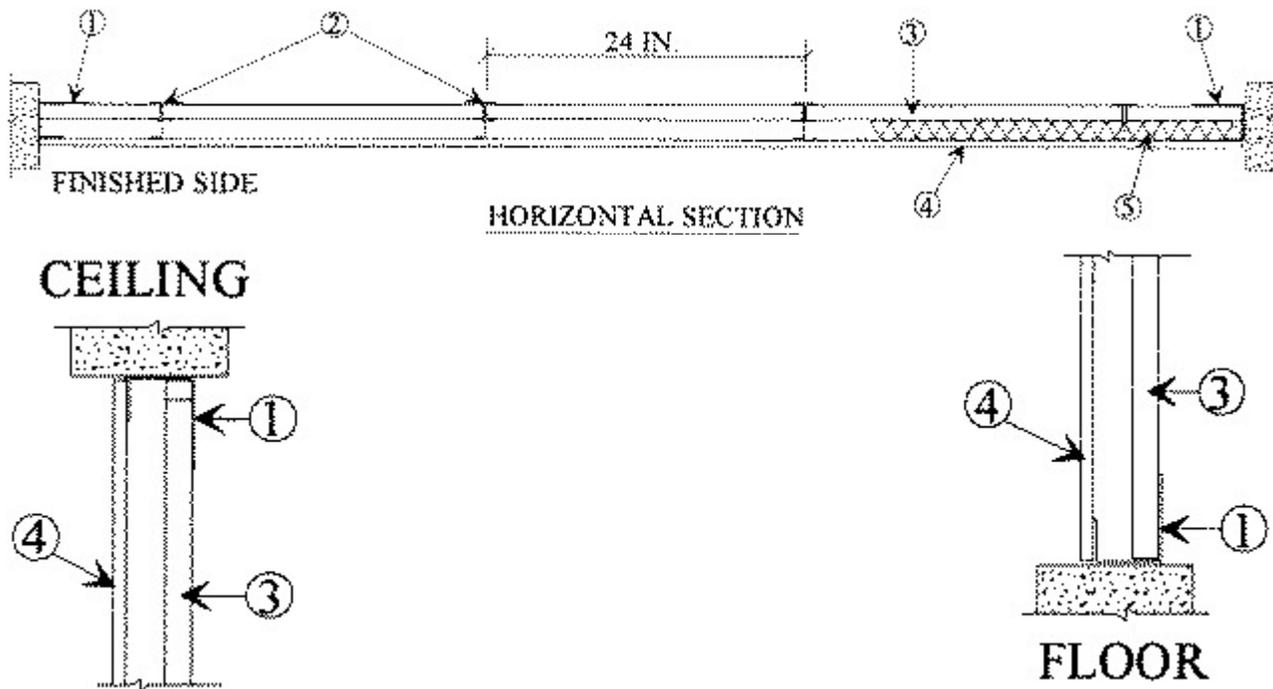
Fire Resistance Ratings - ANSI/UL 263

See General Information for Fire Resistance Ratings - ANSI/UL 263

Design No. U499

April 26, 2010

Nonbearing Wall Rating — 1 Hr.



1. **Channel Track** — "J" -shaped channel, 2-1/2 in. deep with unequal legs of 1 in. and 2 in., fabricated from No. 25 MSG galv steel. Channels attached to structural supports with steel fasteners located not greater than 2 in. from ends and not greater than 24 in. OC.

2. **Steel Studs** — "I" shaped studs, min 2-1/2 in. deep by 1-1/2 in. wide, fabricated from min 25 MSG galv steel, spaced 24 in. OC. Vertically restrained walls require studs to be cut 1/2 in. less than floor to ceiling height.

2A. **Steel Studs** — (Not Shown) — "C-H" -shaped studs, min 2-1/2 in. deep by 1-1/2 in. wide, fabricated from min 25 MSG galv steel, spaced 24 in. OC. Vertically restrained walls require studs to be cut 1/2 in. less than floor to ceiling height.

2B. **Steel Studs** — (Not Shown) — "C-T" - shaped studs, min 2-1/2 in. deep by 1-1/2 in. wide, fabricated from min 25 MSG galv steel, spaced 24 in. OC. Vertically restrained walls require studs to be cut 1/2 in. less than floor to ceiling height.

2C. **Furring Channels** — (Optional, not shown) - Resilient furring channels fabricated from min. 25 MSG corrosion protected steel, installed horizontally, and spaced vertically a max. 24 in. OC. Flange portion of channel attached to each intersecting stud on side of stud opposite the 1 in. liner panels with 1/2 in. long Type S or S-12 pan-head steel screws. When furring channels are used, wallboard to be installed vertically only.

3. **Gypsum Board*** — 1 in. thick gypsum wallboard liner panels, supplied in nominal 24 in. widths. Vertical edges inserted in "I" studs. Free edge of end panels attached to long leg of "J" runners with 1-5/8 in. long Type S self-drilling, self-tapping bugle head steel screws spaced not greater than 24 in. OC.

NATIONAL GYPSUM CO — Types FSW, FSW-B, FSW-7.

4. **Gypsum Board*** — 5/8 in. thick, 4 ft wide, applied horizontally or vertically and attached to studs with 1 in. long Type S steel screws spaced 12 in. OC along the edges and in the field of the boards. When Furring Channels (Item 2C) are used, gypsum board attached vertically to furring channels with 1 in. long Type S steel screws spaced 12 in. OC.

NATIONAL GYPSUM CO — Types FSK-C, FSW, FSW-5, FSW-C, FSW-6.

4A. **Gypsum Board*** — 5/8 in. thick, 4 ft wide, applied vertically and attached to studs with 1 in. long Type S steel screws spaced 12 in. OC along the edges and in the field of the boards. When Furring Channels (Item 2C) are used, gypsum board attached vertically to furring channels with 1 in. long Type S steel screws spaced 12 in. OC.

NATIONAL GYPSUM CO — Types FSW-3, FSMR-C.

4B. **Gypsum Board*** — (As an alternate to Items 4 through 4A) - Installed as described in Item 4. 5/8 in. thick, 4 ft. wide, paper surfaced, applied vertically and fastened to the studs with 1 in. long Type S steel screws spaced 8 in. OC.

NATIONAL GYPSUM CO — SoundBreak XP Type X Gypsum Board

5. **Batts and Blankets*** — (Optional) — Mineral wool or glass fiber batts partially or completely filling stud cavity. Any mineral wool or glass fiber batt bearing the UL Classification Marking as to Fire Resistance. See Batt and Blankets (BZJZ) Category For Names Of Classified Companies.

5A. **Fiber, Sprayed*** — As an alternate to Batts and Blankets (Item 5) — Spray applied cellulose material. The fiber is applied with water to completely fill the enclosed cavity in accordance with the application instructions supplied with the product. Nominal dry density of 3.0 lb/ft³. Alternate application method: The fiber is applied with U.S. Greenfiber LLC Type AD100 hot melt adhesive at a nominal ratio of one part adhesive to 6.6 parts fiber to completely fill the enclosed cavity in accordance with the application instructions supplied with the product. Nominal dry density of 2.5 lb/ft³.

U S GREENFIBER L L C — Cocoon2 Stabilized or Cocoon-FRM (Fire Rated Material)

5B. **Fiber, Sprayed*** — As an alternate to Batts and Blankets (Item 5) and Item 5A - Spray applied cellulose insulation material. The fiber is applied with water to interior surfaces in accordance with the application instructions supplied with the product. Applied to completely fill the enclosed cavity. Minimum dry density of 4.3 pounds per cubic ft.

NU-WOOL CO INC — Cellulose Insulation

5C. **Fiber, Sprayed*** — As an alternate to Batts and Blankets (Item 5) - Spray applied cellulose fiber. The fiber is applied with water to completely fill the enclosed cavity in accordance with the application instructions supplied with the product. The minimum dry density shall be 4.30 lbs/ft³.

INTERNATIONAL CELLULOSE CORP — Celbar-RL

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Last Updated on 2010-04-26

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BXUV.V451 Fire Resistance Ratings - ANSI/UL 263

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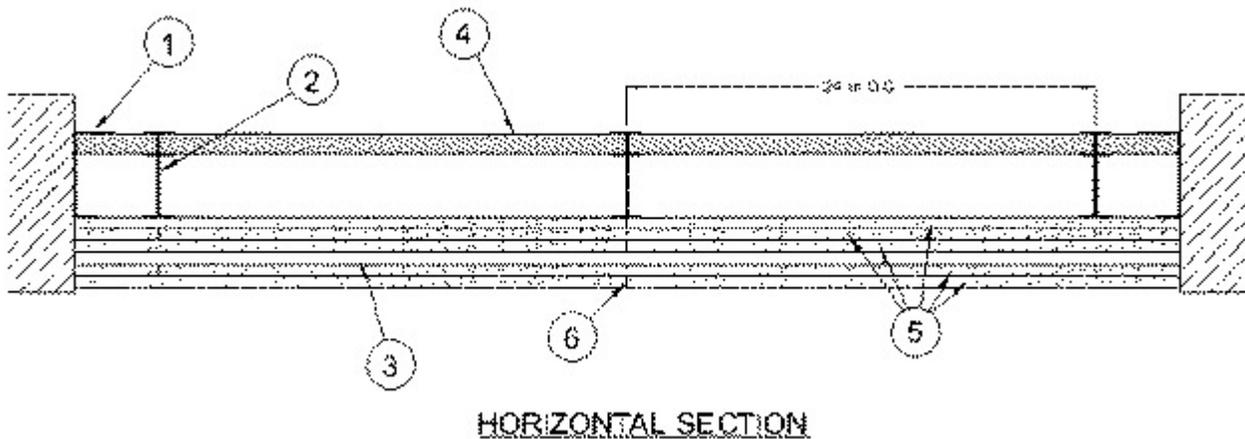
Fire Resistance Ratings - ANSI/UL 263

See General Information for Fire Resistance Ratings - ANSI/UL 263

Design No. V451

March 18, 2009

Nonbearing Wall Rating — 4 Hr



1. **Floor, Side and Ceiling Runners** — "J" shaped channel, min 4 in. deep, with unequal legs of 1 in. and 2 in., fabricated from min 25 MSG galv steel. Runners positioned with short leg toward finished side of wall. Runners attached to structural supports with steel fasteners located not greater than 2 in. from ends and not greater than 24 in. OC.

2. **Steel Studs** — "I" shaped studs, min 4 in. deep by 1-1/2 in. wide, fabricated from min 25 MSG galv steel. Cut to lengths 3/4 in. less than floor-to-ceiling height and spaced 24 in OC.

2A. **Steel Studs** — (Not Shown) — "C-H" shaped studs, min 4 in. deep by 1-1/2 in. wide, fabricated from min 25 MSG galv steel. Cut to lengths 3/4 in. less than floor-to-ceiling height and spaced 24 in. OC

2B. **Steel Studs** — (Not Shown) — "C-T"- shaped studs, min 4 in. deep by 1-1/2 in. wide, fabricated from min 25 MSG galv steel. Cut to lengths 3/4 in. less than floor-to-ceiling height and spaced 24 in. OC.

3. **Furring Channels** — "Hat" shaped, min. 22 MSG galv steel furring channels attached directly over the three inner layers of wallboard to each stud with 2-1/4 in. long Type S bugle head steel screws. Screws alternate from top flange to bottom flange at each stud intersection. Furring channels spaced vertically max 16 in. OC.

4. **Gypsum Board*** — 1 in. thick gypsum wallboard liner panels, supplied in nominal 24 in. widths. Vertical edges inserted in "I"

studs. Free edge of end panels attached to long leg of channel track with 1-5/8 in. long Type S self-drilling, self-tapping bugle-head steel screws spaced not greater than 12 in. OC.

NATIONAL GYPSUM CO — Types FSW, FSW-7

5. **Gypsum Board*** — 5/8 in. thick, 4 ft wide wallboard applied vertically in five layers. Vertical joints centered over steel studs (Item 2) and staggered min 24 in. First layer secured to studs with 1-1/8 in. long Type S self-drilling, self-tapping bugle-head steel screws spaced 12 in. OC at the perimeter and in the field. Second layer secured to studs with 1-5/8 in. long Type S self-drilling, self-tapping bugle-head steel screws spaced 12 in. OC at the perimeter and in the field. Horizontal butt joints in second layer shall be secured to first layer of gypsum board with 1-1/2 in. long Type G screws spaced 8 in. OC on both sides of the joint and in joint corners. Third layer secured to studs with 2-1/4 in. long Type S self-drilling, self-tapping bugle-head steel screws spaced 12 in. OC at the perimeter and in the field. Third layer also secured to inner layers with 1-1/2 in. long Type G screws spaced 12 in. OC vertically and centered between the Type S screws in the studs. Horizontal butt joints in third layer shall be secured to inner layers of gypsum board with 1-1/2 in. long Type G screws spaced 8 in. OC on both sides of the joint and in joint corners. Fourth layer secured to the furring channels (Item 3) with 1-1/8 in. long Type S self-drilling, self-tapping bugle-head steel screws spaced 12 in. OC. Horizontal butt joints in fourth layer shall be centered over furring channels (Item 3) and secured to furring channels with 1-1/8 in. long Type S self-drilling, self-tapping bugle-head steel screws spaced 8 in. OC on both sides of the joint. Fifth layer secured to furring channels with 1-5/8 in. long Type S self-drilling, self-tapping bugle-head steel screws spaced 12 in. OC. Fifth layer also secured to fourth layer with 1-1/2 in. long Type G screws spaced 16 in. OC along the vertical joints and centered between the Type S screws in the furring channels. Horizontal butt joints in fifth layer shall be centered over furring channels (Item 3) and secured to furring channels with 1-5/8 in. long Type S self-drilling, self-tapping bugle-head steel screws spaced 8 in. OC on both sides of the joint. Screws and horizontal butt joints staggered between layers.

NATIONAL GYPSUM CO — Type FSW-C

6. **Joint Tape and Compound** — (Not Shown) — Joints on outer layer of gypsum board (Item 5) covered with paper tape and joint compound. Exposed screw heads covered with joint compound.

*Bearing the UL Classification Mark

Last Updated on 2009-03-18

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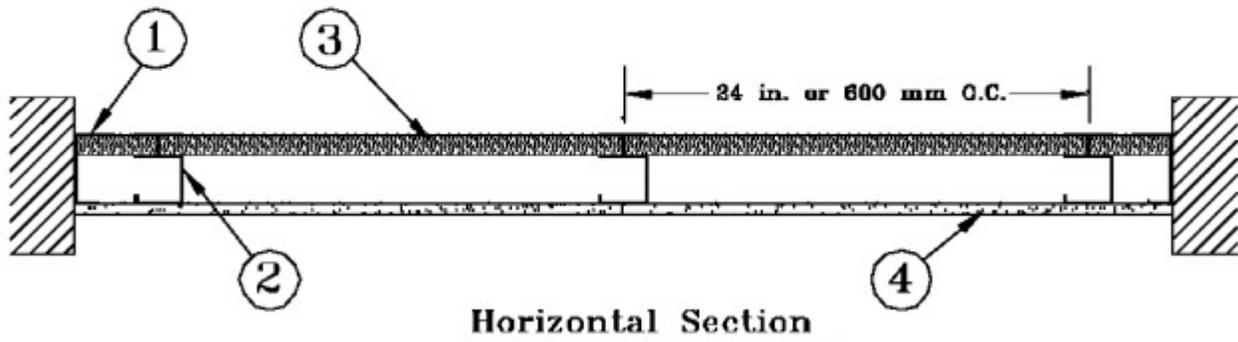
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Design No. V455

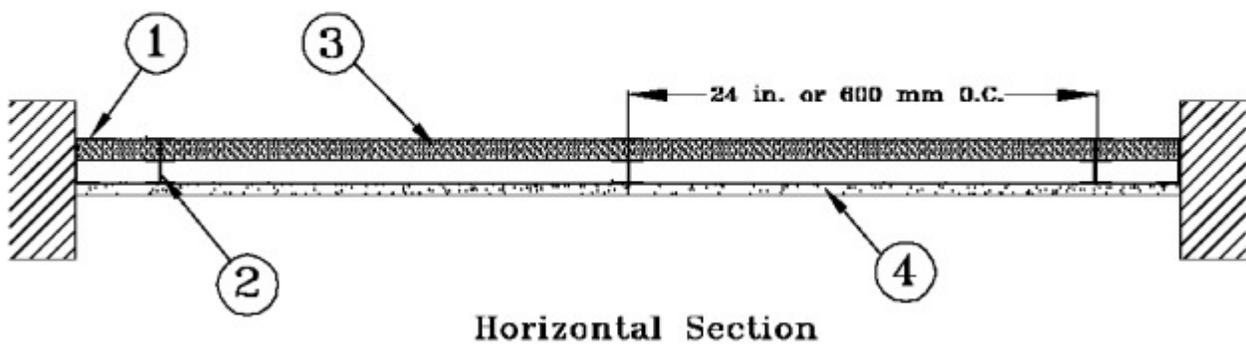
March 03, 2010

Nonbearing Wall Rating — 1 and 2 Hr

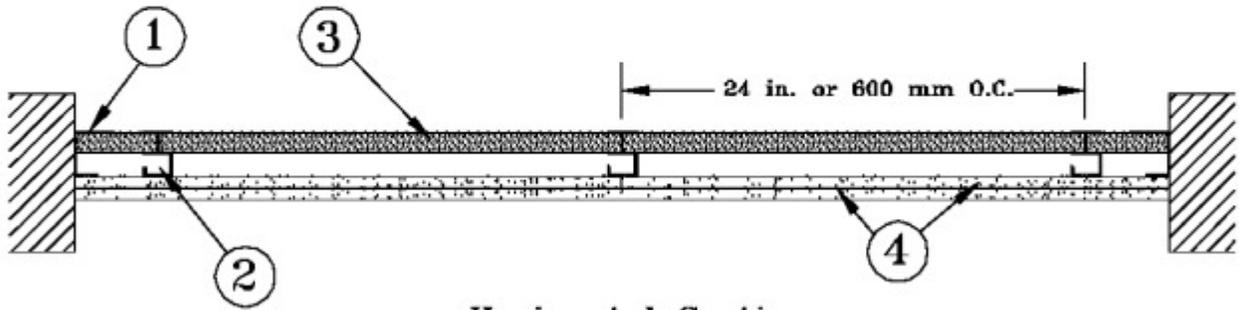
System A - 1 Hr.



System A - 1 Hr.

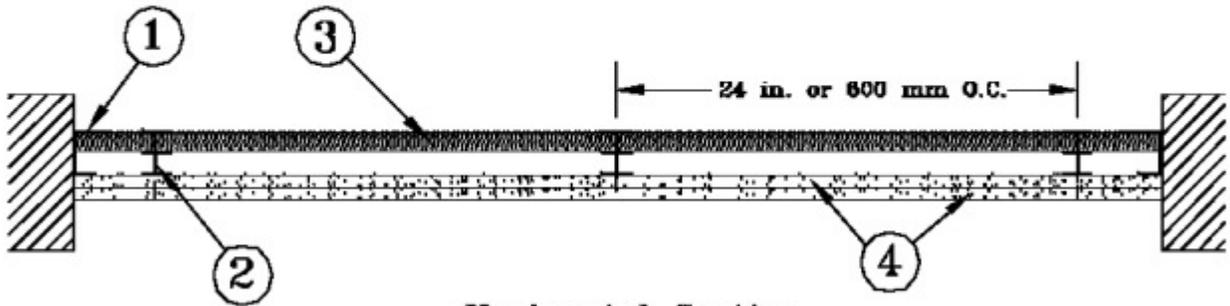


System B - 2 Hr.



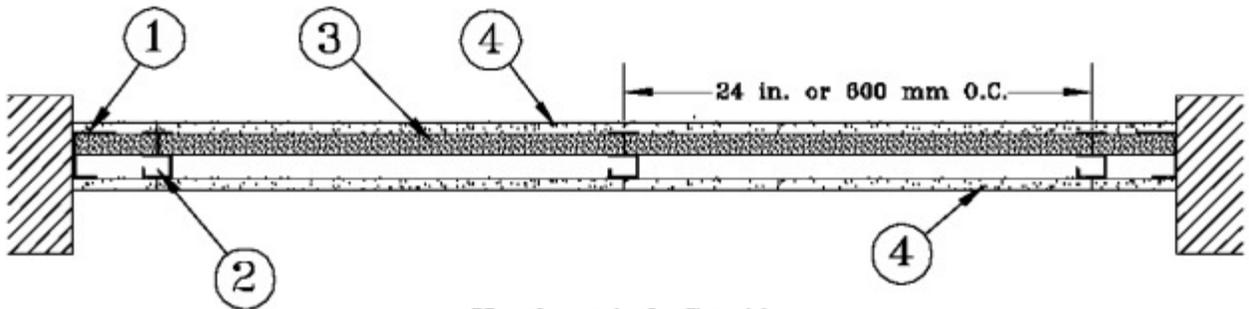
Horizontal Section

System B - 2 Hr.



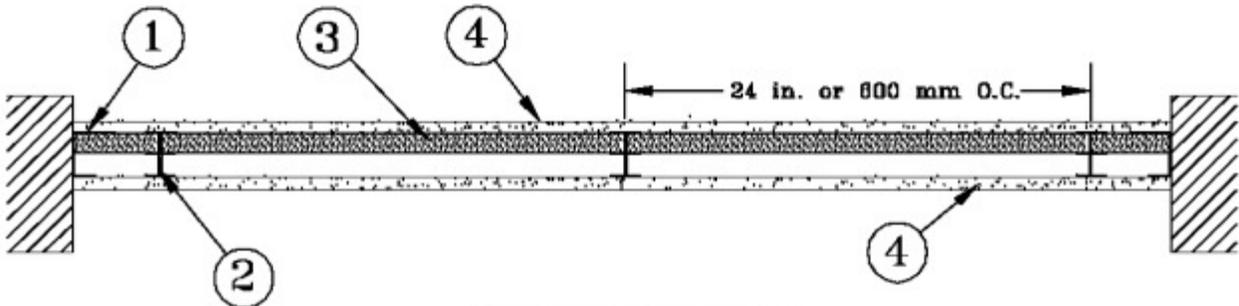
Horizontal Section

System C - 2 Hr.



Horizontal Section

System C - 2 Hr.



Horizontal Section

1. **Floor, Side and Ceiling Runners** — "J" -shaped runner, min 2-1/2 in. deep, with unequal legs of 1 in. and 2-1/8 in., fabricated from min 25 MSG galv steel. Runners positioned with short leg toward finished side of wall. Runners attached to structural supports with steel fasteners located not greater than 2 in. from ends and not greater than 24 in. OC.

2. **Steel Studs** — "I", "C-H, or "C-T" shaftwall studs. "C-T" or "C-H" -shaped studs, min 2-1/2 in. deep, 1-1/2 in. wide, fabricated from min 25 MSG galv steel. Cut to lengths 5/8 in. less than floor-to-ceiling height and spaced 24 in. Or, "I" -shaped studs fabricated from min 25 MSG galv steel, min 2-1/2 in. deep, 1-1/2 in. wide. Studs contain 3/4 in. wide by 2-1/4 in. high holding tabs spaced 2-3/4 in. OC. Cut to lengths 5/8 in. less than floor-to-ceiling height and spaced 24 in.

2A. **Furring Channels** — (Optional, not shown) — Resilient furring channels fabricated from min 25MSG corrosion protected steel, installed horizontally, and spaced vertically a max 24 in. OC. Flange portion of channel attached to each intersecting "C-H" or "E" stud on side of stud opposite the 1 in. liner panels with 1/2 in. long Type S or S-12 pan-head steel screws.

3. **Gypsum Board*** — Gypsum liner panels, nom 1 in. thick, 24 in. wide. Panels cut max 1 in. less in length than floor to ceiling height. Vertical edges inserted in "T" -shaped section of "C-T" studs, Vertical edges inserted in "H" -shaped section of "C-H" studs, or holding tabs of "I" studs. Free edge of end panels attached to long leg of "J" -runners with 1-5/8 in. long Type S bugle head steel screws spaced not greater than 12 in. OC.

AMERICAN GYPSUM CO — Type AG-S

4. **Gypsum Board*** —

System A

Gypsum panels, nom 5/8 in. thick, 48 in. wide, applied vertically with edges centered over studs, with 1 in. long Type S bugle head steel screws spaced 12 in. OC.

AMERICAN GYPSUM CO — Types AGX-1, AG-C

System B

1/2 or 5/8 in. thick, 4 ft wide, applied in two layers. Base layer attached horizontally to studs and side "J" runners with 1 in. long Type S self-tapping steel screws starting at 2 in. from the floor and ceiling runners and spaced a maximum 24 in. OC along the vertical edges and in the field of the boards.

Face layer applied vertically to studs and side "J" runners and attached with 1-5/8 in. long Type S self-tapping steel screws, starting at 3 in. from the floor and ceiling runners and spaced a maximum 12 in. OC along the vertical edges and in the field of the boards. Face layer joints covered with paper tape and two coats of joint compound. Exposed screw heads covered with two coats of joint compound.

AMERICAN GYPSUM CO — 1/2 or 5/8 in. Type AG-C, 5/8 in. Type AGX-1

System C

1/2 or 5/8 in. thick, 4 ft wide, applied vertically and attached to studs and runners with 1 in. long Type S steel screws starting at 2 in. from the top and the bottom, and spaced at 12 in. OC. Vertical joints are offset one stud space each side. Outer layer joints covered with paper tape and two coats of joint compound. Exposed screw heads covered with two coats of joint compound.

AMERICAN GYPSUM CO — 1/2 or 5/8 in. Type AG-C, 5/8 in. Type AGX-1

5. **Joint Tape and Compound** — (Not shown) — Joints covered with joint compound and paper or mesh tape. Screw heads covered with joint compound.

6. **Batts and Blankets*** — (Optional- Not Shown) — Mineral wool or glass fiber batts partially or completely filling stud cavity. Any mineral wool or glass fiber batt mineral bearing the UL Classification Marking as to Fire Resistance. See Batt and Blankets (BZJZ) category for names of Classified Companies.

6A. **Fiber, Sprayed*** — As an alternate to Batts and Blankets (Item 6) — Spray applied cellulose material. The fiber is applied with water to completely fill the enclosed cavity in accordance with the application instructions supplied with the product. Nominal dry density of 3.0 lb/ft³. Alternate application method: The fiber is applied with U.S. Greenfiber LLC Type AD100 hot melt adhesive at a nominal ratio of one part adhesive to 6.6 parts fiber to completely fill the enclosed cavity in accordance with the application instructions supplied with the product. Nominal dry density of 2.5 lb/ft³.

U S GREENFIBER L L C — Cocoon2 Stabilized or Cocoon-FRM (Fire Rated Material)

6B. **Fiber, Sprayed*** — As an alternate to Batts and Blankets (Item 6) - Spray applied cellulose insulation material. The fiber is applied with water to interior surfaces in accordance with the application instructions supplied with the product. Applied to completely fill the enclosed cavity. Minimum dry density of 4.3 pounds per cubic ft.

NU-WOOL CO INC — Cellulose Insulation

6C. **Fiber, Sprayed*** — As an alternate to Batts and Blankets (Item 6) - Spray applied cellulose fiber. The fiber is applied with water to completely fill the enclosed cavity in accordance with the application instructions supplied with the product. The minimum dry density shall be 4.30 lbs/ft³.

INTERNATIONAL CELLULOSE CORP — Celbar-RL

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Fire Resistance Ratings - ANSI/UL 263

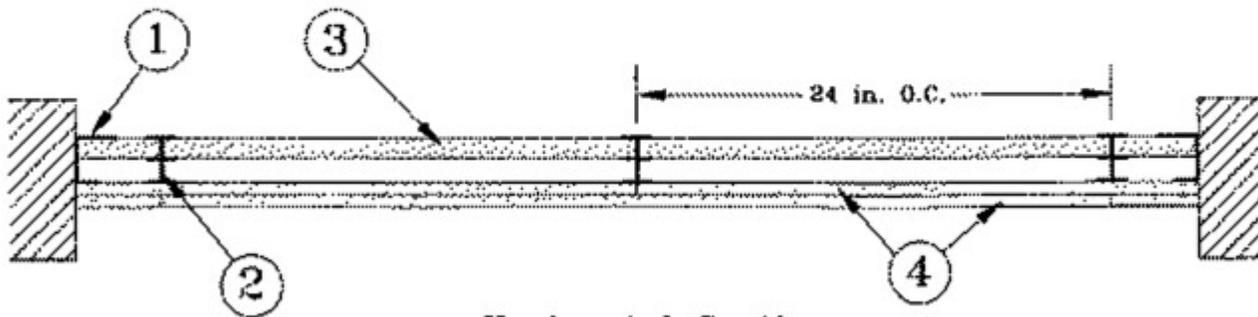
See General Information for Fire Resistance Ratings - ANSI/UL 263

Design No. V470

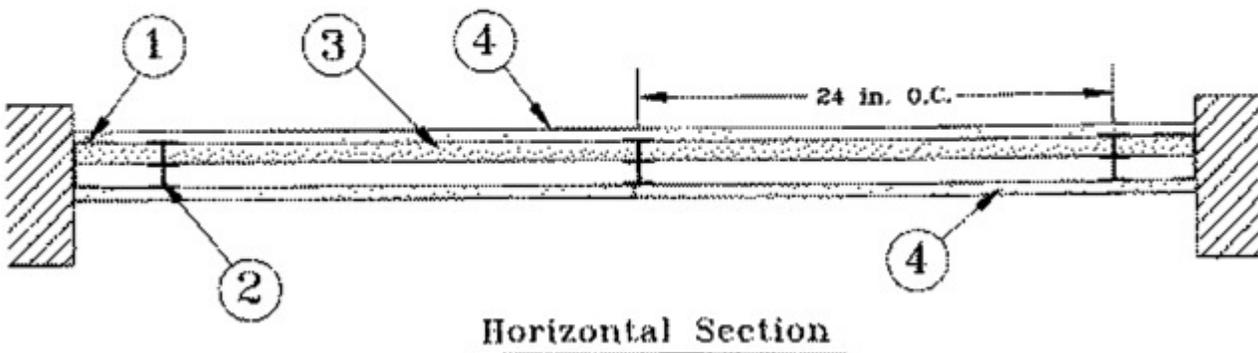
December 09, 2009

Nonbearing Wall Ratings — 1, 2 or 3 Hr

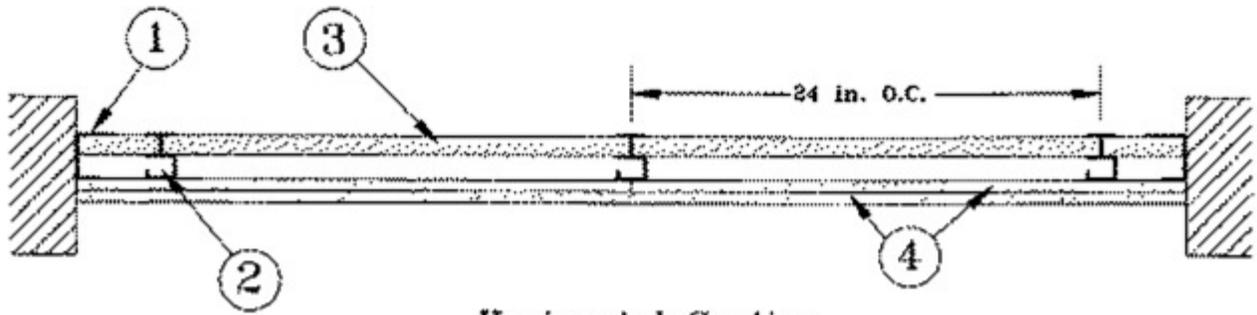
System A - 2 Hr.



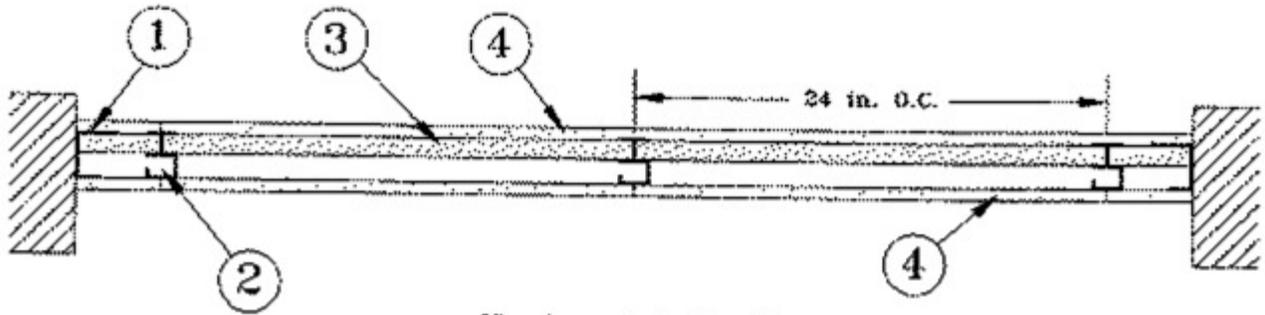
Horizontal Section System B - 2 Hr.



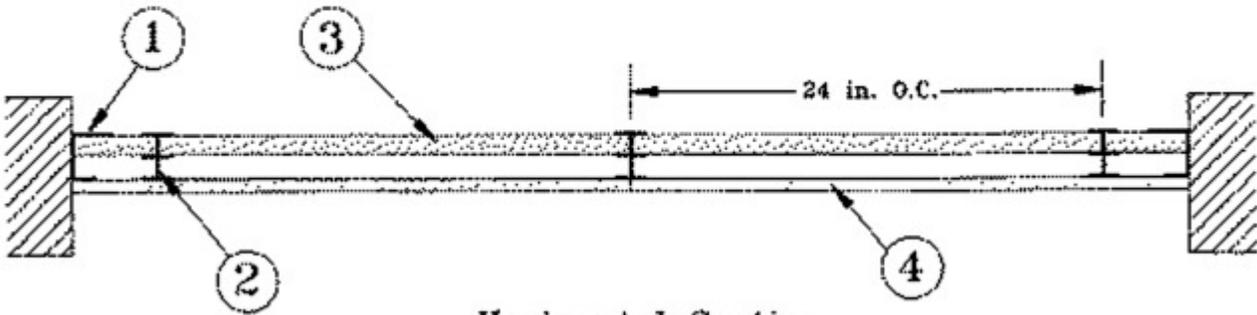
System C - 2 Hr.



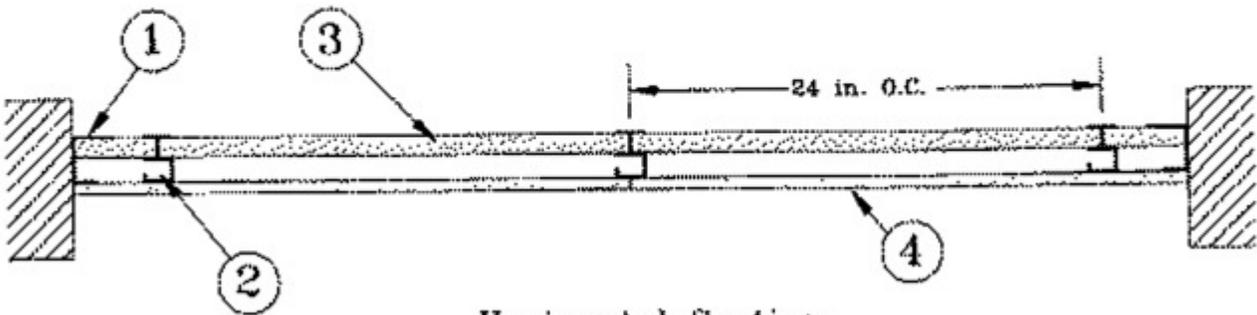
Horizontal Section
System D - 2 Hr.



Horizontal Section
System E - 1 Hr.



Horizontal Section
System F - 1 Hr.

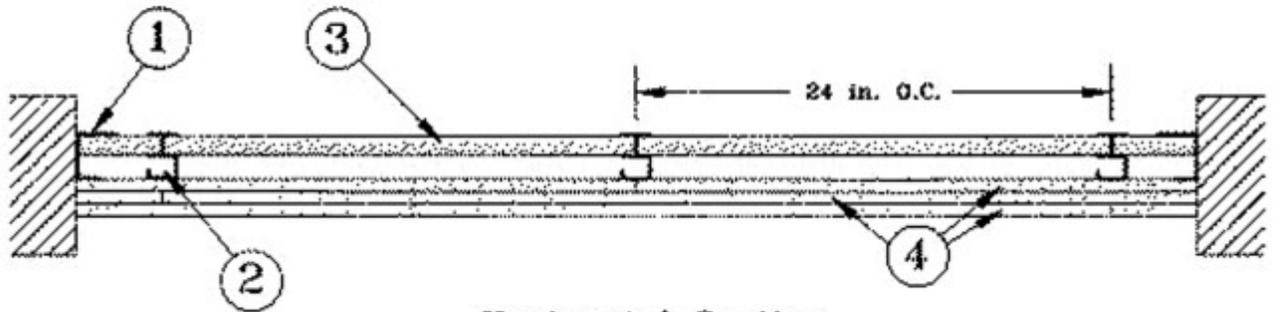


Horizontal Section

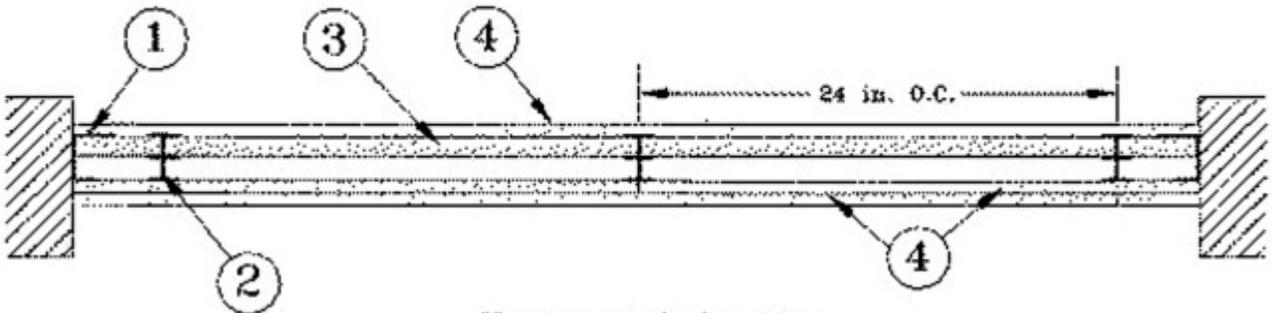
System G - 3 Hr.



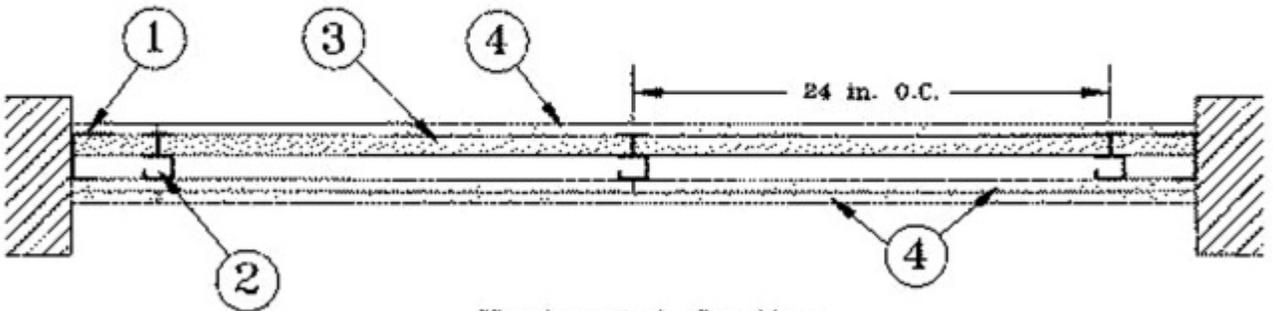
Horizontal Section
System H - 3 Hr.



Horizontal Section
System I - 3 Hr.



Horizontal Section
System J - 3 Hr.



Horizontal Section

1. **Floor, Side and Ceiling Runners** — "J" -shaped runner, min 2-1/2 in. deep, with unequal legs of 1-1/8 in. and 2-1/8 in., fabricated from min 25 MSG galv steel. Runners positioned with short leg toward finished side of wall. Runners attached to structural supports with steel fasteners located not greater than 2 in. from ends and not greater than 24 in. OC.

2. **Steel Studs** —

Systems A, B, E, G and I

"I" -shaped studs fabricated from min 25 MSG galv steel, min 2-1/2 in. deep, 1-1/2 in. wide. Studs contain 3/4 in. wide by 2-1/4 in. high holding tabs spaced 2-3/4 in. OC. Cut to lengths 5/8 in. less than floor-to-ceiling height and spaced 24 in.

Systems C, D, F, H and J

"C-T" -shaped studs, min 2-1/2 in. deep, 1-1/2 in. wide, fabricated from min 25 MSG galv steel. Cut to lengths 5/8 in. less than floor-to-ceiling height and spaced 24 in.

3. **Gypsum Board*** — Gypsum liner panels, nom 1 in. thick, 24 in. wide. Panels cut max 1 in. less in length than floor to ceiling height. Vertical edges inserted in "T" -shaped section of "C-T" studs or tabs holding tabs of "I" studs. Free edge of end panels attached to long leg of "J" -runners with 1-5/8 in. long Type S self-drilling, self-tapping bugle head steel screws spaced not greater than 12 in. OC.

CERTAINTED GYPSUM INC — Type EGRG Shaftliner, GlasRoc Shaftliner.

4. Gypsum Board* —

Systems A and C

For use with **Type EGRG Shaftliner** liner panels - Gypsum panels, nom 1/2 or 5/8 in. thick, 48 in. wide, applied in one of the following methods. Method 1 — Base layer installed horizontally to steel studs with 1 in. long Type S self-drilling, self-tapping bugle head steel screws spaced 24 in. OC. with the 1st screws installed 12 in. from the board edge. Face layer installed vertically to steel studs with 1-5/8 in. long Type S self-drilling, self-tapping bugle head steel screws spaced 12 in. OC. with the 1st and 2nd screws spaced 3/4 in. and 6-3/4 in. from the board edge, staggered 12 in. from base layer screws. Method 2 — Base layer installed vertically to steel studs with 1 in. long Type S self-drilling, self-tapping bugle head steel screws spaced 24 in. OC. with the 1st screws installed 12 in. from the board edge. Face layer installed horizontally to steel studs with 1-5/8 in. long Type S self-drilling, self-tapping bugle head steel screws spaced 24 in. OC., with the 1st and 2nd screws installed 3/4 in. and 6-3/4 in. from the board edge, staggered 12 in. from base layer screws. Additionally, Type G screws to be installed at the center of each stud cavity, spaced 12 in. OC., 1-1/2 in. from both sides of the horizontal joint. For the 1/2 in. thick and 5/8 in. thick boards, the Type G screw length shall be 1-1/4 in. and 1-1/2 in. long, respectively.

CERTAINTED GYPSUM INC — 1/2 in. thick ProRoc Type C, 5/8 in. thick ProRoc Type C or 5/8 in. thick ProRoc Type X

CERTAINTED GYPSUM CANADA INC — ProRoc Type X or ProRoc Type Abuse-Resistant

Systems B and D

Gypsum panels, nom 1/2 or 5/8 in. thick, 48 in. wide, applied vertically to steel studs with 1 in. long Type S self-drilling, self-tapping bugle head steel screws spaced 12 in. OC. Vertical joints on opposite sides of wall staggered a min of 24 in.

CERTAINTED GYPSUM INC — 1/2 in. thick ProRoc Type C, 5/8 in. thick ProRoc Type C or 5/8 in. thick ProRoc Type X

CERTAINTED GYPSUM CANADA INC — ProRoc Type X or ProRoc Type Abuse-Resistant

Systems E and F

Gypsum panels, nom 5/8 in. thick, 48 in. wide, applied vertically with edges centered over studs, with 1 in. long Type S self-drilling, self-tapping bugle head steel screws spaced 12 in. OC.

CERTAINTED GYPSUM INC — ProRoc Type X or ProRoc Type C

CERTAINTED GYPSUM CANADA INC — ProRoc Type X or ProRoc Type Abuse-Resistant

Systems G and H

Gypsum panels, nom 5/8 in. thick, 48 in. wide applied in three layers to one side of the assembly. Base layer applied vertically, remaining layers applied vertically or horizontally. Base layer attached to studs with 1 in. long Type S steel screws spaced 24 in. OC. Middle layer attached to studs with 1-5/8 in. long Type S steel screws spaced 24 in. OC when installed vertically or 16 in. OC when installed horizontally. Face layer attached to studs with 2-1/4 in. long Type S steel screws spaced 16 in. OC when installed vertically or 12 in. OC when installed horizontally. Screws offset 6 in. from layer below. Horizontal joints on adjacent layers staggered a min of 12 in. When applied horizontally, 1-1/2 in. long Type G screws to be installed at the center of each stud cavity, 1-1/2 in. from both sides of the horizontal joint. Vertical joints centered over studs and staggered 24 in. on adjacent layers.

Systems I and J

Gypsum panels, nom 5/8 in. thick, 48 in. wide applied in two layers to one side of the assembly and one layer to the other side. On the two layer side, base layer applied vertically, face layer applied vertically or horizontally. Base layer attached to studs with 1 in. long Type S steel screws space 24 in. OC. Face layer attached to studs with 1-5/8 in. long Type S steel screws spaced 24 in. OC when installed vertically or 16 in. OC when installed horizontally. Screws offset 6 in. from layer below. When applied horizontally, 1-1/2 in. long Type G screws to be installed at the center of each stud cavity, 1-1/2 in. from both sides of the horizontal joint. Vertical joints centered over studs and staggered 24 in. on adjacent layers. On the one layer side, panels applied vertically and attached to studs with 1 in. long Type S steel screws spaced 12 in. OC. Vertical joints on opposite sides of wall staggered min 24 in. OC.

CERTAINTED GYPSUM INC — ProRoc Type C

5. **Joint Tape and Compound** — (Not shown) — Joints covered with joint compound and paper or mesh tape. Screw heads covered with joint compound.

*Bearing the UL Classification Mark

Last Updated on 2009-12-09

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BXUV.V481 Fire Resistance Ratings - ANSI/UL 263

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- Authorities Having Jurisdiction should be consulted before construction.
- Fire resistance assemblies and products are developed by the design submitter and have been investigated by UL for compliance with applicable requirements. The published information cannot always address every construction nuance encountered in the field.
- When field issues arise, it is recommended the first contact for assistance be the technical service staff provided by the product manufacturer noted for the design. Users of fire resistance assemblies are advised to consult the general Guide Information for each product category and each group of assemblies. The Guide Information includes specifics concerning alternate materials and alternate methods of construction.
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Fire Resistance Ratings - ANSI/UL 263

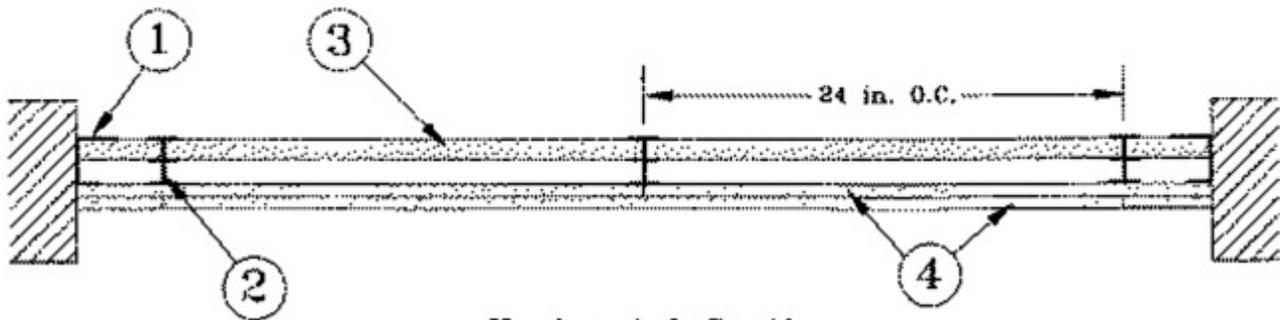
See General Information for Fire Resistance Ratings - ANSI/UL 263

Design No. V481

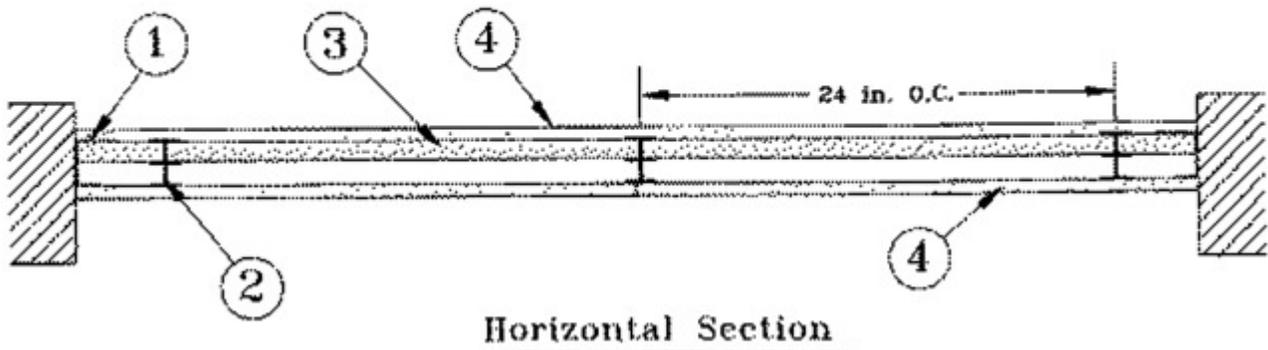
July 01, 2010

Nonbearing Wall Ratings — 1, 2 and 3 Hr (See Items 3 and 4)

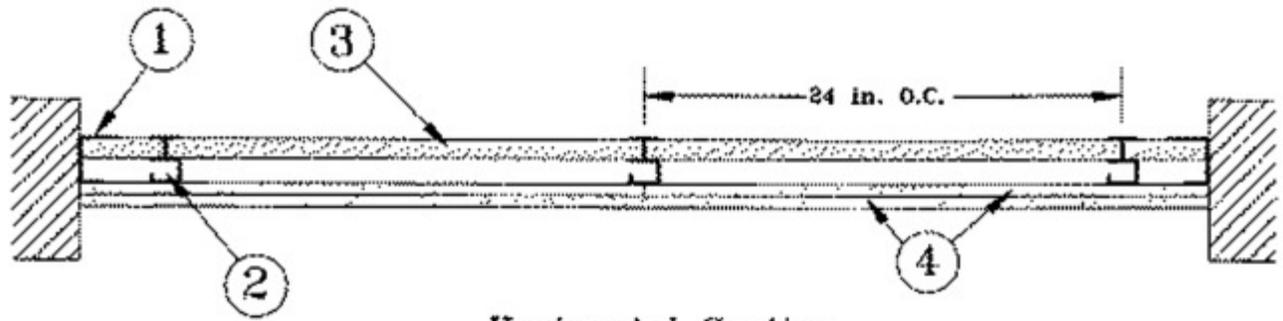
System A - 2 Hr.



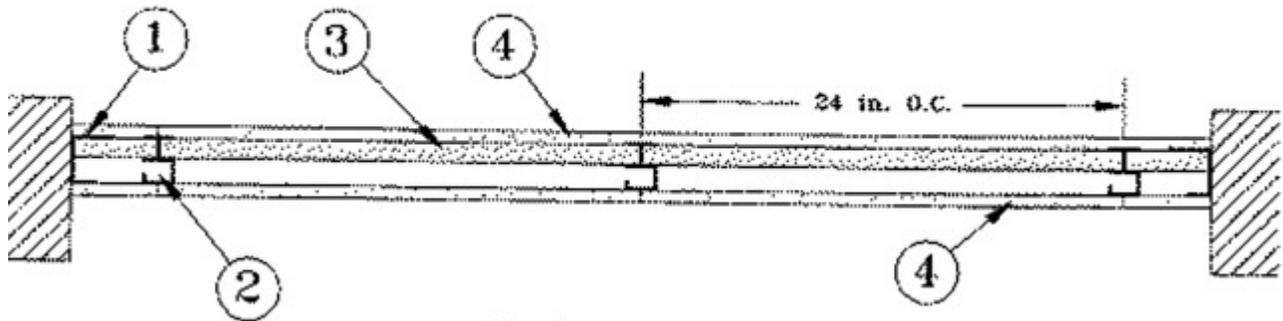
Horizontal Section System B - 2 Hr.



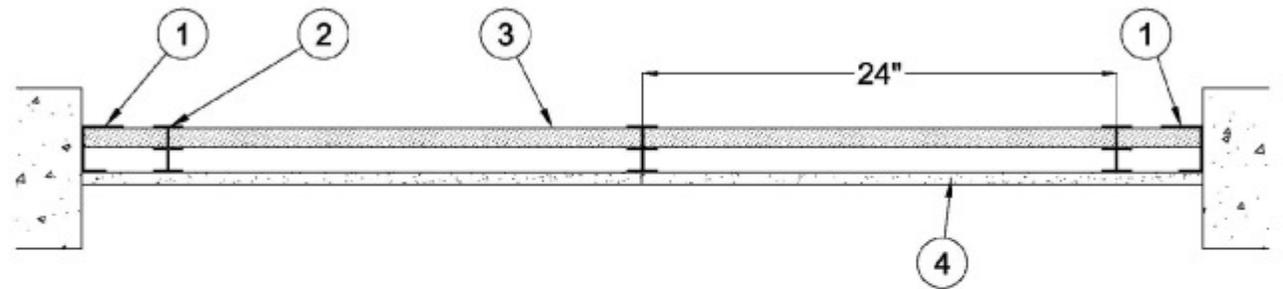
System C - 2 Hr.



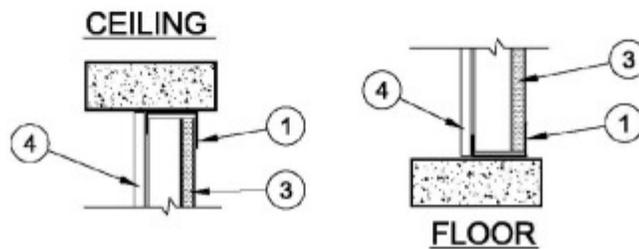
Horizontal Section
System D - 2 Hr.



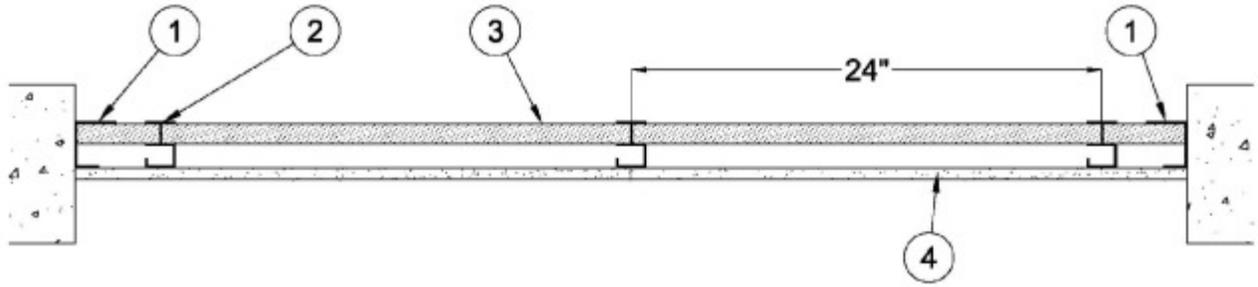
Horizontal Section
SYSTEM E - 1 HR.



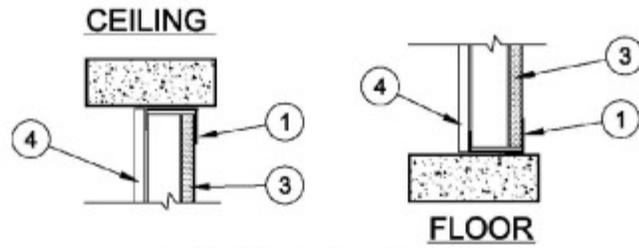
HORIZONTAL SECTION



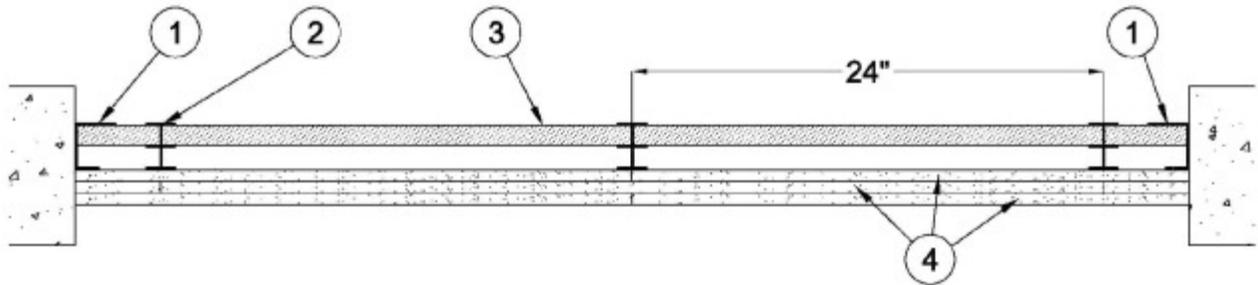
SYSTEM F - 1 HR.



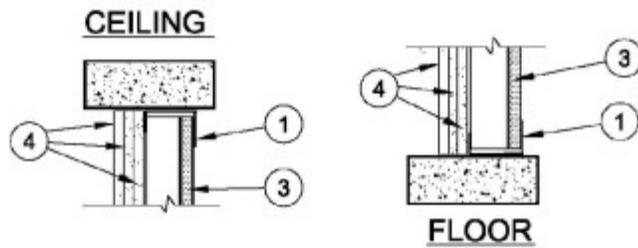
HORIZONTAL SECTION



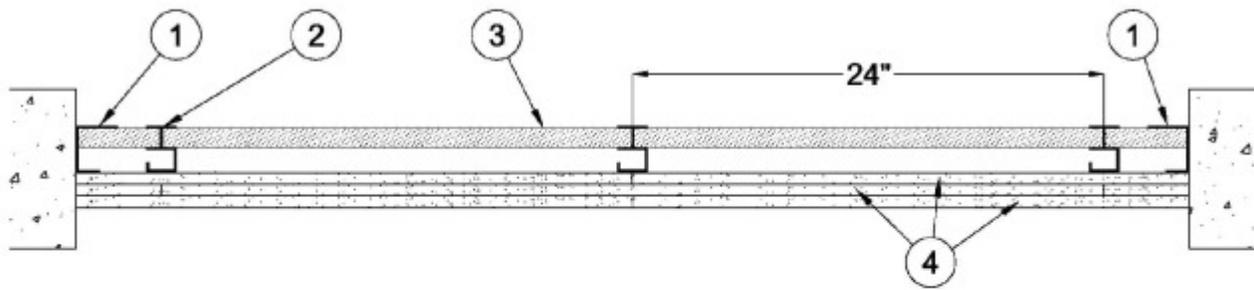
SYSTEM G - 3 HR.



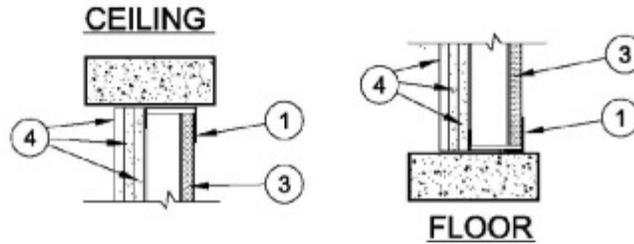
HORIZONTAL SECTION



SYSTEM H - 3 HR.



HORIZONTAL SECTION



1. **Floor, Side and Ceiling Runners** — "J" -shaped runner, min 2-1/2 in. deep, with unequal legs of 1 in. and 2 in., fabricated from min 25 MSG galv steel. Runners positioned with short leg toward finished side of wall. Runners attached to structural supports with steel fasteners located not greater than 2 in. from ends and not greater than 24 in. OC.

2. **Steel Studs** —

Systems A B , E and G

"I" -shaped studs fabricated from min 25 MSG galv steel, min 2-1/2 in. deep, 1-1/2 in. wide. Studs contain 3/4 in. wide by 2-1/4 in. high holding tabs spaced 2-3/4 in. OC. Cut to lengths 3/4 in. less than floor-to-ceiling height and spaced 24 in.

Systems C, D, F, and H

"C-T" or "C-H" -shaped studs, min 2-1/2 in. deep, 1-1/2 in. wide, fabricated from min 25 MSG galv steel. Cut to lengths 3/4 in. less than floor-to-ceiling height and spaced 24 in.

3. **Gypsum Board*** — Gypsum liner panels, nom 1 in. thick, 24 in. wide. Panels cut max 1 in. less in length than floor to ceiling height. Vertical edges inserted in "T" -shaped section of "C-T" studs or holding tabs of "I" studs. Shaftliner held in place by the tabs of the steel studs, spaced 24 in. OC.

LAFARGE NORTH AMERICA INC — Type LGFCSL

4. **Gypsum Board*** —

Systems A and C

Gypsum panels, nom 1/2 or 5/8 in. thick, 48 in. wide, applied in one of the following methods. Method 1 — Base layer installed horizontally to steel studs with 1 in. long Type S self-drilling, self-tapping bugle head steel screws spaced 24 in. OC. Face layer installed vertically to steel studs with 1-5/8 in. long Type S self-drilling, self-tapping bugle head steel screws spaced 12 in. OC. Method 2 — Base layer installed vertically to steel studs with 1 in. long Type S self-drilling, self-tapping bugle head steel screws spaced 24 in. OC. Face layer installed horizontally to steel studs with 1-5/8 in. long Type S self-drilling, self-tapping bugle head steel screws spaced 12 in. OC.

LAFARGE NORTH AMERICA INC — 1/2 in. thick Type LGFC-C/A, 5/8 in. thick Type LGFC6A

Systems B and D

Gypsum panels, nom 1/2 or 5/8 in. thick, 48 in. wide, applied vertically or horizontally to steel studs with 1 in. long Type S self-drilling, self-tapping bugle head steel screws spaced 12 in. OC.

Systems E and F

Gypsum panels, 5/8 in. thick, 48 in. wide, applied in the following method for a 1 Hour Rating — One layer installed vertically to steel studs with 1 in. long Type S self-drilling, self-tapping bugle head steel screws spaced 12 in. OC.

LAFARGE NORTH AMERICA INC — Types LGFC6A, LGFC-C/A

Systems G and H

Gypsum panels, 5/8 in. thick, 48 in. wide, applied horizontally or vertically for a 3 Hour Rating — Base layer attached to the steel studs with 1 in. long Type S self-drilling, self-tapping bugle head steel screws spaced 24 in. OC.; 2nd layer installed with 1-5/8 in long Type S self-drilling, self-tapping bugle head steel screws spaced 24 in. OC and staggered 12 in. from base layer; Face layer installed to steel studs with 2-1/4 in. long Type S self-drilling, self-tapping bugle head steel screws spaced 24 in. OC in the perimeter and 16 in. OC. in the field and staggered 12 in. from 2nd layer and 24 in. from base layer. Horizontal joints need not be backed by steel framing.

LAFARGE NORTH AMERICA INC — Type LGFC-C/A

5. **Batts and Blankets*** — (optional) — Mineral wool or glass fiber batts partially or completely filling stud cavity. Any mineral wool or glass fiber batt material bearing the UL Classification Marking as to Fire Resistance.

5A. **Fiber, Sprayed*** — As an alternate to Batts and Blankets (Item 5) — Spray applied cellulose material. The fiber is applied with water to completely fill the enclosed cavity in accordance with the application instructions supplied with the product.

Nominal dry density of 3.0 lb/ft³. Alternate application method: The fiber is applied with U.S. Greenfiber LLC Type AD100 hot melt adhesive at a nominal ratio of one part adhesive to 6.6 parts fiber to completely fill the enclosed cavity in accordance with the application instructions supplied with the product. Nominal dry density of 2.5 lb/ft³.

U S GREENFIBER L L C — Cocoon2 Stabilized or Cocoon-FRM (Fire Rated Material)

5B. **Fiber, Sprayed*** — As an alternate to Batts and Blankets (Item 5) and Item 5A - Spray applied cellulose insulation material. The fiber is applied with water to interior surfaces in accordance with the application instructions supplied with the product. Applied to completely fill the enclosed cavity. Minimum dry density of 4.3 pounds per cubic ft.

NU-WOOL CO INC — Cellulose Insulation

6. **Joint Tape and Compound** — (Not shown) — Joints covered with joint compound and paper or mesh tape. Screw heads covered with joint compound.

*Bearing the UL Classification Mark

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BXUV.V493
Fire Resistance Ratings - ANSI/UL 263

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- Authorities Having Jurisdiction should be consulted before construction.
- Fire resistance assemblies and products are developed by the design submitter and have been investigated by UL for compliance with applicable requirements. The published information cannot always address every construction nuance encountered in the field.
- When field issues arise, it is recommended the first contact for assistance be the technical service staff provided by the product manufacturer noted for the design. Users of fire resistance assemblies are advised to consult the general Guide Information for each product category and each group of assemblies. The Guide Information includes specifics concerning alternate materials and alternate methods of construction.
- Only products which bear UL's Mark are considered as Classified, Listed, or Recognized.

Fire Resistance Ratings - ANSI/UL 263

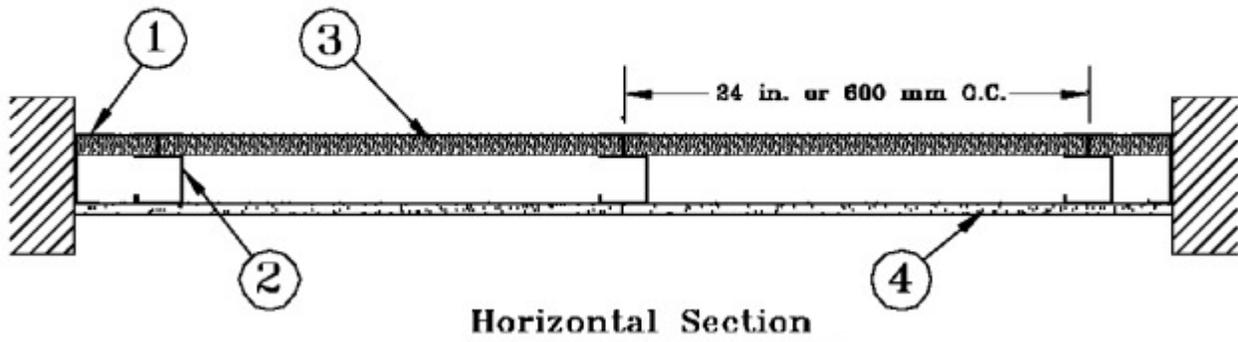
[See General Information for Fire Resistance Ratings - ANSI/UL 263](#)

Design No. V493

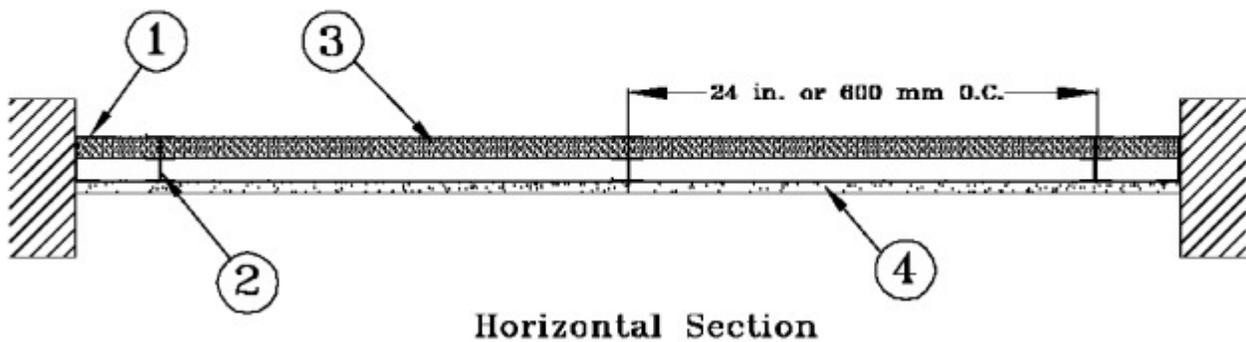
December 16, 2009

Nonbearing Wall Rating — 1 and 2 Hr

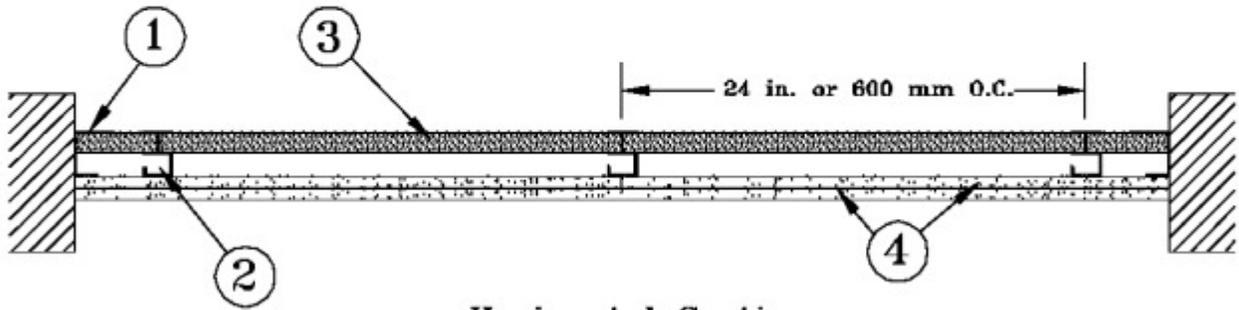
System A — 1 Hr.



System A — 1 Hr.

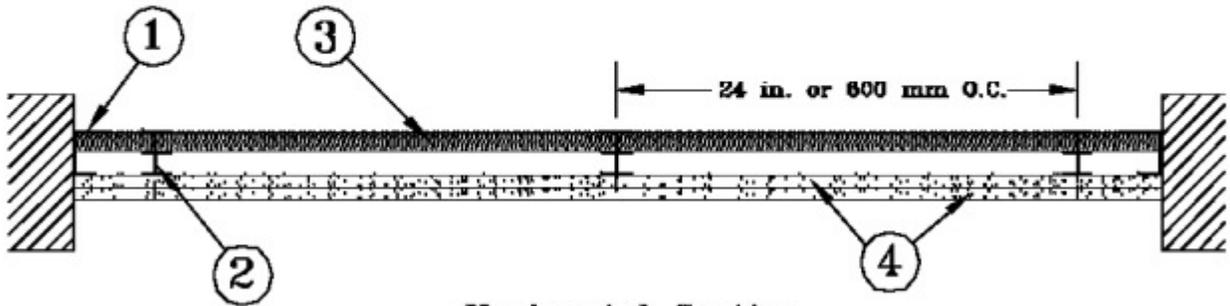


System B - 2 Hr.



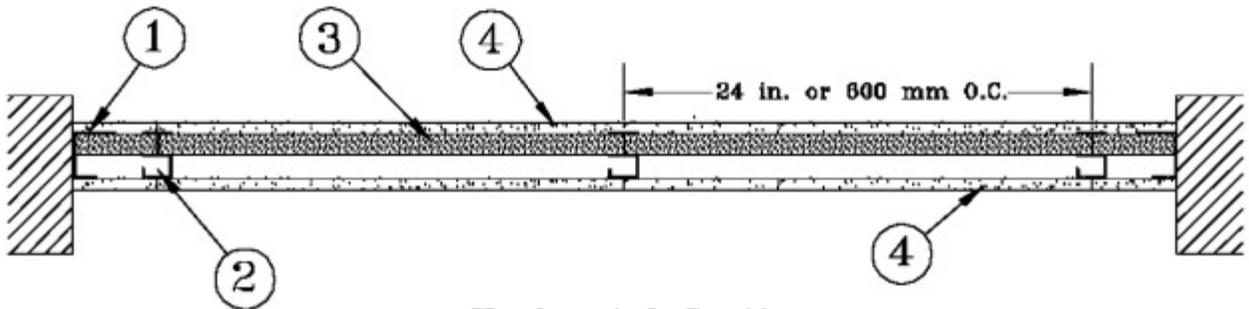
Horizontal Section

System B - 2 Hr.



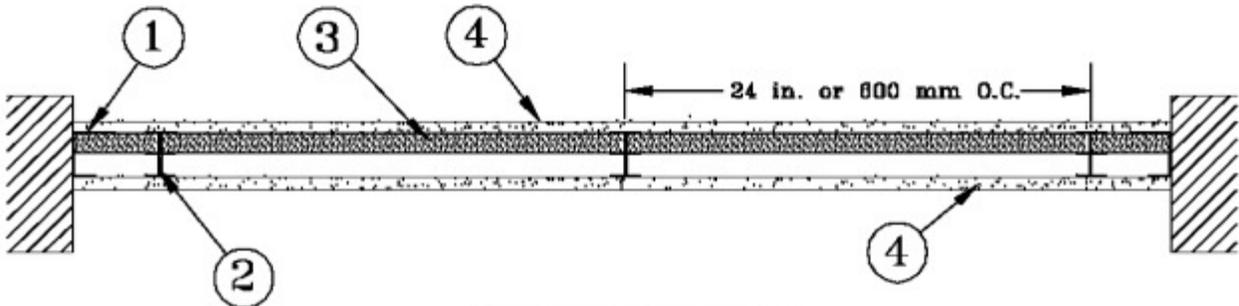
Horizontal Section

System C - 2 Hr.



Horizontal Section

System C - 2 Hr.



Horizontal Section

1. **Floor, Side and Ceiling Runners** — "J" -shaped runner, min 2-1/2 in. deep, with unequal legs of 1-1/8 in. and 2-1/8 in., fabricated from min 25 MSG galv steel. Runners positioned with short leg toward finished side of wall. Runners attached to structural supports with steel fasteners located not greater than 2 in. from ends and not greater than 24 in. OC.

2. **Steel Studs** — "I", "C-H, or "C-T" shaftwall studs. "C-T" or "C-H" -shaped studs, min 2-1/2 in. deep, 1-5/8 in. wide, fabricated from min 25 MSG galv steel. Cut to lengths 5/8 in. less than floor-to-ceiling height and spaced 24 in. Or, "I" -shaped studs fabricated from min 25 MSG galv steel, min 2-1/2 in. deep, 1-1/2 in. wide. Studs contain 3/4 in. wide by 2-1/4 in. high holding tabs spaced 2-3/4 in. OC on opposite sides of the stud and 12 in. vertically. Cut to lengths 5/8 in. less than floor-to-ceiling height and spaced 24 in.

2A. **Furring Channels** — (Optional, not shown) — Resilient furring channels fabricated from min 25MSG corrosion protected steel, installed horizontally, and spaced vertically a max 24 in. OC. Flange portion of channel attached to each intersecting "C-H", "C-T" or "I" stud on side of stud opposite the 1 in. liner panels with 1/2 in. long Type S or S-12 pan-head steel screws.

3. **Gypsum Board*** — Gypsum liner panels, nom 1 in. thick, 24 in. wide. Panels cut max 1/4 in. less in length than floor to ceiling height. Vertical edges inserted in "T" -shaped section of "C-T" studs, Vertical edges inserted in "H" -shaped section of "C-H" studs, or holding tabs of "I" studs. Free edge of end panels attached to long leg of "J" -runners with 1-5/8 in. long Type S bugle head steel screws spaced not greater than 12 in. OC.

TEMPLE-INLAND — Type TP-6

System A

4. **Gypsum Board*** — Gypsum panels, nom 5/8 in. thick, 48 in. wide, applied vertically or horizontally with edges centered over studs, with 1 in. long Type S bugle head steel screws spaced 12 in. OC when applied vertically, or 8 in. OC when applied horizontally. Type X ComfortGuard Sound Deadening Gypsum Board to be installed vertically only.

TEMPLE-INLAND — Type X, Veneer Plaster Base-Type X, Water Rated-Type X, Sheathing Type-X, Soffit-Type X, Greenglass Type X, TG-C, Type X ComfortGuard Sound Deadening Gypsum Board.

System B

1/2 or 5/8 in. thick, 4 ft wide, applied in two layers. Base layer attached horizontally to studs and side "J" runners with 1 in. long Type S self-tapping steel screws starting at 2 in. from the floor and ceiling runners and spaced a maximum 24 in. OC along the vertical edges and in the field of the boards. Type X ComfortGuard Sound Deadening Gypsum Board to be installed vertically only as described above with screws spaced a maximum 12 in. OC.

Face layer applied vertically to studs and side "J" runners and attached with 1-5/8 in. long Type S self-tapping steel screws, starting at 3 in. from the floor and ceiling runners and spaced a maximum 12 in. OC along the vertical edges and in the field of the boards. Face layer joints covered with paper tape and two coats of joint compound. Exposed screw heads covered with two coats of joint compound.

TEMPLE-INLAND — 1/2 or 5/8 in. Type TG-C, 5/8 in. Type X, Veneer Plaster Base-Type X, Water Rated-Type X, Sheathing Type-X, Soffit-Type X, Greenglass Type X, Type X ComfortGuard Sound Deadening Gypsum Board.

System C

1/2 or 5/8 in. thick, 4 ft wide, applied vertically and attached to studs and runners with 1 in. long Type S steel screws starting at 2 in. from the top and the bottom, and spaced at 12 in. OC. Vertical joints are offset one stud space each side. Outer layer joints covered with paper tape and two coats of joint compound. Exposed screw heads covered with two coats of joint compound.

TEMPLE-INLAND — 1/2 or 5/8 in. Type TG-C, 5/8 in. Type X, Veneer Plaster Base-Type X, Water Rated-Type X, Sheathing Type-X, Soffit-Type X, Greenglass Type X, Type X ComfortGuard Sound Deadening Gypsum Board.

5. **Joint Tape and Compound** — (Not shown) — Joints covered with joint compound and paper or mesh tape. Screw heads covered with joint compound.

6. **Batts and Blankets*** — (Optional- Not Shown) — Mineral wool or glass fiber batts partially or completely filling stud cavity. Any mineral wool or glass fiber batt mineral bearing the UL Classification Marking as to Fire Resistance. See Batt and Blankets (BZJZ) category for names of Classified Companies.

6A. **Fiber, Sprayed*** — As an alternate to Batts and Blankets (Item 6) — Spray applied cellulose material. The fiber is applied with water to completely fill the enclosed cavity in accordance with the application instructions supplied with the product. Nominal dry density of 3.0 lb/ft³. Alternate application method: The fiber is applied with U.S. Greenfiber LLC Type AD100 hot melt adhesive at a nominal ratio of one part adhesive to 6.6 parts fiber to completely fill the enclosed cavity in accordance with the application instructions supplied with the product. Nominal dry density of 2.5 lb/ft³.

U S GREENFIBER L L C — Cocoon2 Stabilized or Cocoon-FRM (Fire Rated Material)

6B. **Fiber, Sprayed*** — As an alternate to Batts and Blankets (Item 6) - Spray applied cellulose insulation material. The fiber is applied with water to interior surfaces in accordance with the application instructions supplied with the product. Applied to completely fill the enclosed cavity. Minimum dry density of 4.3 pounds per cubic ft.

*Bearing the UL Classification Mark

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