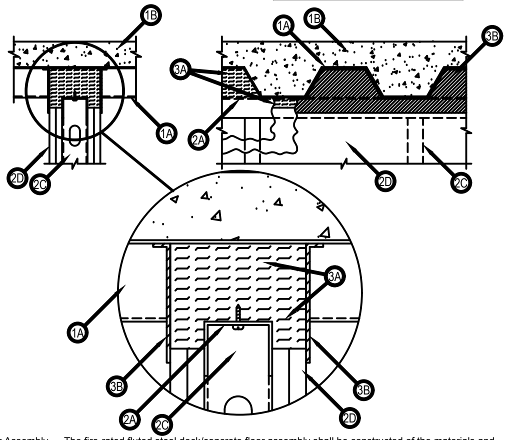
CLASSIFIED C US
Classified by Underwriters Laboratories, Inc. to UL 2079 and CAN/ULC-S115

System No. HW-D-0042

ANSI/UL2079	CAN/ULC S115
Assembly Ratings — 1 and 2 Hr (See Items 2 and 3A)	F Ratings — 1 and 2 Hr (See Items 2 and 3A)
Nominal Joint Width - 1 In.	FT Ratings — 1 and 2 Hr (See Items 2 and 3A)
Class II Movement Capabilities — 50% Compression or Extension	FH Ratings — 1 and 2 Hr (See Items 2 and 3A)
	FTH Ratings — 1 and 2 Hr (See Items 2 and 3A)
	Nominal Joint Width - 1 In.
	Class II Movement Capabilities — 50% 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 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 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 Materials* — (Optional, Not Shown)—Prior to or after the installation of the steel ceiling runners, Forming Material and Fill, Void or Cavity Material (Items 2A, 3A, 3B, respectively) the steel floor units may be sprayed with a min 5/16 in. (8 mm) to max 1-3/4 in. (45 mm) thickness of fire resistive material.
   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 P900 Series Roof-Ceiling Design 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 — Min 2-1/4 in. (57 mm) thick poured insulating concrete, as measured from the top plane of the floor units.

1B. Roof Assembly — As an alternate to Items 1 and 1A, a fire rated protected 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 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. Spray—Applied Fire Resistive Materials* — (Not Shown)—Prior to or after the installation of the steel ceiling runners, Forming Material and Fill, Void or Cavity Material (Items 2A, 3A, 3B), the roof assembly shall be sprayed with the type and thickness of fire resistive material indicated in the individual P700 Series design.

2. Wall Assembly — The 1 or 2 hr fire rated gypsum board/steel 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 galv steel channels sized to accommodate steel studs (Item 2C). Flange height of ceiling runner shall be min 1/4 in. (6 mm) greater than max extended joint width. Ceiling runner installed perpendicular to direction of fluted steel deck and secured to valleys with steel masonry anchors, steel fasteners or welds spaced max 24 in. (610 mm) OC. before or after optional spray-applied fire resistive material is used. The use of welds to secure the ceiling runner may only be used prior to the installation of the optional spray-applied material.
   A1. Light Gauge Framing*-Slotted Ceiling Runner — As an alternate to the ceiling runner in Item 2A, slotted ceiling runner to consist of galv steel channel with slotted flanges sized to accommodate steel studs (Item 2C). Slotted ceiling runner installed perpendicular to direction of fluted steel deck and secured to valleys with steel fasteners or welds spaced max 24 in. (610 mm) OC before optional spray-applied fire resistive material is used. Ceiling runner installed perpendicular to direction of fluted steel deck and secured to valleys with steel masonry anchors, steel fasteners or welds spaced max 24 in. (610 mm) OC. before or after optional spray-applied fire resistive material is used. The use of welds to secure the ceiling runner may only be used prior to the installation of the optional spray-applied material.
   BRADY CONSTRUCTION INNOVATIONS INC, DBA SLIPTRACK SYSTEMS — SLP-TRK
   CALIFORNIA EXPANDED METAL PRODUCTS CO — CST
   CLARKDIETRICH BUILDING SYSTEMS — Type SLT, SLT-H
   CONSOLIDATED FABRICATORS CORP, BUILDING PRODUCTS DIV — SDT250, SDT300
   MARINO/WARE, DIV OF WARE INDUSTRIES INC — Type SLT
   METAL-LITE INC — The System
   OLMAR SUPPLY INC — STT250, STT300
   SCAFCO STEEL STUD MANUFACTURING CO
   TELLING INDUSTRIES L L C — True-Action Deflection Track
   A2. Light Gauge Framing*-Vertical Deflection Ceiling Runner — When the nom joint width is less than or equal to 3/4 in. (19 mm), vertical deflection ceiling runner may be used as an alternate to the ceiling runners in Items 2A and 2A1. Vertical deflection ceiling runner to consist of galv steel channel with slotted vertical deflection clips mechanically fastened within runner. Slotted clips provided with step bushings for permanent fastening of steel studs. Flanges sized to accommodate steel studs (Item 2C). Vertical deflection ceiling runner installed perpendicular to direction of fluted steel deck and secured to valleys with steel masonry anchors, steel fasteners or welds spaced max 24 in. (610 mm) OC. before or after optional spray-applied fire resistive material is used. The use of welds to secure the ceiling runner may only be used prior to the installation of the optional spray-applied material.
   THE STEEL NETWORK INC — VertiTrack VTD250, VTD362, VTD400, VTD600 and VTD800
   A3. Light Gauge Framing*- Notched Ceiling Runner — As an alternate to the ceiling runners in Items 2A through 2A3, notched ceiling runners to consist of C-shaped galv steel channel with notched return flanges sized to accommodate steel studs (Item 2C). Notched ceiling runner installed perpendicular to direction of fluted steel deck and secured to valleys with steel masonry anchors, steel fasteners or welds spaced max 24 in. (610 mm) OC. before or after optional spray-applied fire resistive material is used. The use of welds to secure the ceiling runner may only be used prior to the installation of the optional spray-applied material.
   OLMAR SUPPLY INC — Type SCR
   B. Steel Attachment Clips — (Optional - Not Shown) - When spray applied fireproofing is used ceiling runner may be secured to deck with Z-shaped clips formed from min 1 in. (25 mm) long strips of min 20 ga galv steel. Length of clips should not exceed the width (thickness) of the wall. Clips to be sized to extend through the thickness of the spray-applied fire-resistive material on the bottom of the steel deck with 1-1/2 or 2 in. (38 or 51 mm) long upper and lower legs. Legs of clips fastened to valleys of steel deck (prior to application of spray-applied fire-resistive materials) and top of ceiling runner with steel masonry anchors, steel fasteners or welds. Clips spaced max 24 in. (610 mm) OC.
   C. Studs — Steel studs to be min 2-1/2 in. (64 mm) wide. 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 ceiling runner without attachment. When slotted ceiling runner (Item 2A1) is used, steel studs secured to slotted ceiling runner with No. 8 by 1/2 in. (13 mm) long wafer head steel screws at midheight of slot on each side of wall. When vertical deflection ceiling runner (Item 2A2) is used, steel studs secured to slotted vertical deflection clips, through the bushings, with steel screws at midheight of each slot. Stud spacing not to exceed 24 in. (610 mm) OC.
   D. Gypsum Board* — Gypsum board installed to a min total thickness of 5/8 in. and 1-1/4 in. (16 and 32 mm) on each side of wall for 1 and 2 hr rated assemblies, respectively. Wall to be constructed as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory, except that a max 1 in. (25 mm) gap shall be maintained between the top of the gypsum board and the bottom of the steel deck units and the top row of screws shall be installed into the studs 3-1/2 to 4 in. (89 to 102 mm) below the lower surface of the floor or roof. The hourly rating of the joint system is dependent on the hourly rating of the wall.

3. Joint System — Max separation between bottom of floor or roof and top of wall at time of installation of joint system is 1 in. (13 mm). The joint system is designed to accommodate a max 50 percent compression or extension from its installed width. The joint system consists of forming material and a fill material, as follows:
   A. Forming Material* — Nom 4 pcf (64 kg/m3) density mineral wool batt insulation cut approx 25 percent wider than the flutes and with a length approx equal to the overall thickness of the wall. Multiple pieces stacked on top of each other, as needed, and then compressed 50 percent in thickness and inserted into the flutes of the steel deck above the top of the ceiling runner. The mineral wool batt insulation is to project beyond each side of the ceiling runner, flush with wall surfaces. Additional 5/8 in. and 1-1/4 in. (16 and 32 mm) wide strips for 1 and 2 hr rated assemblies, respectively, of nom 4 pcf (64 kg/m3) mineral wool batt insulation are to be cut to fill the gap between the top of the gypsum board and bottom of the steel deck. The strips of mineral wool are compressed 50 percent and tightly packed, cut edge first, into the gap between the top of the gypsum board and bottom of the steel deck on both sides of the wall.
   ROCK WOOL MANUFACTURING CO — Delta- Board
   ROXUL INC — SAFE
   THERMAFIBER INC — Type SAF

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Hilti Firestop Systems

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System No. HW-D-0042 (cont.)

   A1. Forming Material*—Plugs — (Optional, Not Shown) Preformed mineral wool plugs, formed to the shape of the fluted floor units, friction fit to completely fill the flutes above the ceiling channel. The plugs shall project beyond each side of the ceiling runner, flush with wall surfaces. Additional forming material, described in Item 3A, to be used in conjunction with the plugs to fill the gap between the top of gypsum board and bottom of steel floor units.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP777 Speed Plugs
   A2. Forming Material* - Strips — (Optional) - Nom 5/8 in. and 1-1/4 in. (16 and 32 mm) wide by 2 in. (51 mm) high precut mineral wool strips for 1 and 2 hr rated assemblies respectively. The strips are compressed 50 percent and firmly packed, cut edge first, into the gap between the top of the gypsum board and bottom of the steel floor units on both sides of the wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 767 Speed Strips
   B. Fill, Void or Cavity Material* — Min 1/16 in. (1.6 mm) dry thickness (1/8 in. or 3.2 mm wet thickness) of fill material sprayed or troweled on each side of the wall to completely cover mineral wool forming material and to overlap a min of 1/2 in. (13 mm) onto gypsum board and steel deck on both sides of wall. When Spray-Applied Fire Resistive Material* is applied to the Steel Floor and Form Units*, the fill material is to overlap the gypsum board a min of 1/2 in. (13 mm) and the Spray-Applied Fire Resistive Material a min of 2 in. (51 mm) on both sides of wall. When spray-applied fire resistive materials are used, the CP 672 firestop spray shall overlap the wall a min 1/2 in. (13 mm) and overlap the spray-applied fire resistive material a min of 2 in. (51 mm) on both sides of the wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 672 Firestop Spray or CFS-SP WB Firestop Joint Spray

*Bearing the UL Classification Mark

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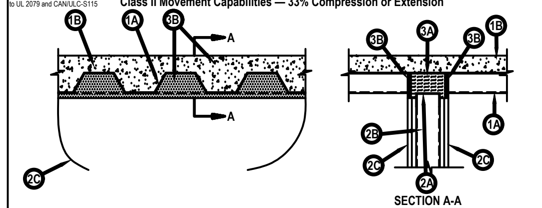
System No. HW-D-0045

Assembly Rating — 1 and 2 Hr (See Item 2)
Nominal Joint Width — 3/4 In.
Class II Movement Capabilities — 33% Compression or Extension



1. Floor Assembly — The fire-rated fluted steel floor unit/concrete floor assembly shall be constructed of the materials and in the manner described in the individual Floor-Ceiling Design in the 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 assembly shall be constructed of the materials and in the manner described in the individual P900 Series Roof-Ceiling Design 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 — Min 2-1/4 in. (57 mm) thick poured insulating concrete, as measured from the top plane of the floor units.

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 specified 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 — Steel Floor and Ceiling Runners — Floor and ceiling runners of wall assembly shall consist of galv steel channels sized to accommodate steel studs (Item 2B). Flange height of ceiling runner shall be min 1/4 in. (6 mm) greater than max extended joint width. . Ceiling runner installed perpendicular to direction of fluted steel deck and secured to valleys with steel fasteners or by welds spaced max 24 in. (610 mm) OC.
   A1. Light Gauge Framing*-Slotted Ceiling Runner — As an alternate to the ceiling runner in Item 2A, slotted ceiling runner to consist of galv steel channel with slotted flanges sized to accommodate steel studs (Item 2B). Slotted ceiling runner installed perpendicular to direction of fluted steel deck and secured to valleys 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
   CLARKDIETRICH BUILDING SYSTEMS — Type SLT, SLT-H
   MARINO/WARE, DIV OF WARE INDUSTRIES INC — Type SLT
   METAL-LITE INC — The System
   SCAFCO STEEL STUD MANUFACTURING CO
   TELLING INDUSTRIES L L C — True-Action Deflection Track
   A2. Light Gauge Framing*-Vertical Deflection Ceiling Runner — As an alternate to the ceiling runners in Item 2A and 2A1, vertical deflection ceiling runner to consist of galv steel channel with slotted vertical deflection clips mechanically fastened within runner. Slotted clips provided with step bushings for permanent fastening of steel studs. Flanges sized to accommodate steel studs (Item 2B). Vertical deflection ceiling runner installed perpendicular to direction of fluted steel deck and secured to valleys with steel fasteners or welds spaced max 24 in. (610 mm) OC.
   THE STEEL NETWORK INC — VertiTrack VTD250, VTD362, VTD400, VTD600 and VTD800
   A3. Light Gauge Framing*- Notched Ceiling Runner — As an alternate to the ceiling runners in Items 2A through 2A3, notched ceiling runners to consist of C-shaped galv steel channel with notched return flanges sized to accommodate steel studs (Item 2B). Notched ceiling runner installed perpendicular to direction of fluted steel deck and secured to valleys with steel fasteners or welds spaced max 24 in. (610 mm) OC.
   OLMAR SUPPLY INC — Type SCR
   B. Studs — Steel studs to be min 2-1/2 in. (64 mm) wide. 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 ceiling runner without attachment. When slotted ceiling runner (Item 2A1) is used, steel studs secured to slotted ceiling runner with No. 8 by 1/2 in. (13 mm) long wafer head steel screws at midheight of slot on each side of wall. When vertical deflection ceiling runner (Item 2A2) is used, steel studs secured to slotted vertical deflection clips, through the bushings, with steel screws at midheight of each slot. Stud spacing not to exceed 24 in. (610 mm) OC.
   C. Gypsum Board* — For 1 hr assembly, one layer of 5/8 in. (16 mm) thick gypsum board is required in the individual Wall and Partition Design. For 2 hr assembly, two layers of 5/8 in. (16 mm) thick gypsum board is required in the individual Wall and Partition Design. For both hourly ratings, a nominal 3/4 in. (19 mm) gap shall be maintained between the top of the gypsum board and the bottom surface of the steel floor units and the top row of screws shall be installed into the studs 3 in. (76 mm) below the valleys of the steel floor units.
   The hourly rating of the joint system is dependent on the hourly fire rating of the wall.

3. Joint System — Max separation between bottom of floor or roof and top of wall is 3/4 in. (19 mm). The joint system is designed to accommodate a max 33 percent compression or extension from its installed width. The joint system consists of a packing material and a fill material between the top of the gypsum board and the bottom of the floor or roof, as follows:
   A. Forming Material* — Nom 4 pcf (64 kg/m3) mineral wool batt insulation, cut to the shape of the fluted deck, approx 20 percent larger than the area of the flutes and compressed into the flutes of the steel deck flutes above the ceiling runner. The mineral wool insulation is to project beyond each side of the ceiling runner, recessed 1/2 in. (13 mm) from both wall surfaces . For 2 hr assembly, an additional 1-1/2 in. (38 mm) thick by 3/4 in. (19 mm) wide sections of mineral wool batt insulation compressed 50 percent and installed cut edge first to fill the 3/4 in. (19 mm) gap between the top of gypsum board and bottom of the steel deck. The forming material shall be recessed 1/2 in. (13 mm) from each side of the wall.
   ROCK WOOL MANUFACTURING CO — Delta Board
   ROXUL INC — SAFE
   THERMAFIBER INC — Type SAF
   A1. Forming Material*—Plugs — (Optional, Not Shown) - Preformed mineral wool plugs, formed to the shape of the fluted floor units, friction fit to completely fill the flutes above the ceiling channel. The plugs shall project beyond each side of the ceiling runner and shall be recessed 1/2 in. (13 mm) from both wall surfaces. Additional forming material, described in Item 3A, to be used in conjunction with the plugs to fill the gap between the top of gypsum board and bottom of steel deck.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP777 Speed Plugs
   B. Fill, Void or Cavity Material* — Sealant — Min 1/2 in. (13 mm) thickness of fill material installed on each side of the wall in the flutes of the steel deck and between the top of the gypsum board and the bottom of the steel deck, flush with each surface of the wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP606 Flexible Firestop Sealant

*Bearing the UL Classification Mark

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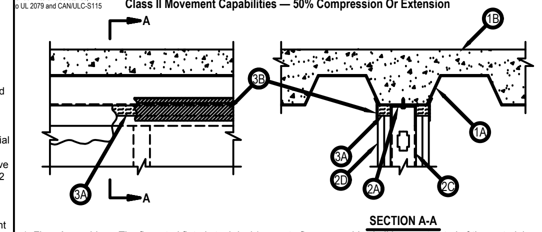
System No. HW-D-0049

Assembly Ratings — 1 and 2 Hr (See Items 2 and 3B)
Nominal Joint Width — 1 In.
Class II Movement Capabilities — 50% 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 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 Materials* — (Optional) - (Not Shown)—Prior to or after the installation of the steel ceiling runners, Forming Material and Fill, Void or Cavity Material (Items 2A, 3A, 3B) the steel floor units may be sprayed with a min 5/16 in. (8 mm) to max 1-3/4 in. (44 mm) thickness of fire resistive material.
   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 P900 Series Roof-Ceiling Design 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 — Min 2-1/4 in. (57 mm) thick poured insulating concrete, as measured from the top plane of the floor units.

1B. Roof Assembly — As an alternate to Items 1 and 1A, a fire rated protected 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 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. Spray—Applied Fire Resistive Materials* — (Not Shown)—Prior to or after the installation of the steel ceiling runners, Forming Material and Fill, Void or Cavity Material (Items 2A, 3A, 3B), the roof assembly shall be sprayed with the type and thickness of fire resistive material indicated in the individual P700 Series design.

2. Wall Assembly — The 2 hr fire rated gypsum board /steel 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 25 ga galv steel channels sized to accommodate steel studs (Item 2C). Flange height of ceiling runner shall be min 1/4 in. (6 mm) greater than max extended joint width. Ceiling runner installed parallel to direction of fluted steel deck, centered beneath valley, and secured with steel masonry anchors, steel fasteners or welds spaced max 24 in. (610 mm) OC. before or after optional spray-applied fire resistive material is used. The use of welds to secure the ceiling runner may only be used prior to the installation of the optional spray-applied material.
   A1. Light Gauge Framing*-Slotted Ceiling Runner — As an alternate to the ceiling runner in Item 2A, slotted ceiling runner to consist of galv steel channel with slotted flanges sized to accommodate steel studs (Item 2C). Slotted ceiling runner installed parallel to direction of fluted steel deck, centered beneath valley, and secured with steel masonry anchors, steel fasteners or welds spaced max 24 in. (610 mm) OC. before or after optional spray-applied fire resistive material is used. The use of welds to secure the ceiling runner may only be used prior to the installation of the optional spray-applied material.
   BRADY CONSTRUCTION INNOVATIONS INC, DBA SLIPTRACK SYSTEMS — SLP-TRK
   CALIFORNIA EXPANDED METAL PRODUCTS CO — CST
   CLARKDIETRICH BUILDING SYSTEMS — Type SLT, SLT-H
   MARINO/WARE, DIV OF WARE INDUSTRIES INC — Type SLT
   METAL-LITE INC — The System
   SCAFCO STEEL STUD MANUFACTURING CO
   STEELER INC — Steeler Slotted Ceiling Runner
   TELLING INDUSTRIES L L C — True-Action Deflection Track
   A2. Light Gauge Framing*-Vertical Deflection Ceiling Runner — As an alternate to the ceiling runners in Items 2A and 2A1, vertical deflection ceiling runner to consist of galv steel channel with slotted vertical deflection clips mechanically fastened within runner. Slotted clips, provided with step bushings, for permanent fastening of steel studs. Flanges sized to accommodate steel studs (Item 2C). Vertical deflection ceiling runner installed parallel to direction of fluted steel deck, centered beneath deck, and secured with steel masonry anchors, steel fasteners or welds spaced max 24 in. (610 mm) OC. before or after optional spray-applied fire resistive material is used. The use of welds to secure the ceiling runner may only be used prior to the installation of the optional spray-applied material.
   THE STEEL NETWORK INC — VertiTrack VTD250, VTD362, VTD400, VTD600 and VTD800
   A3. Light Gauge Framing —Floor and Ceiling Runners — As an alternate to the ceiling and floor runners in Item 2A, 2A1, 2A2 and 2A3, floor and ceiling runners to consist of galv steel channel sized to accommodate the Light Gauge Framing* Slotted Stud (Item 2C1) or Light Gauge Framing* Slider C-Clip System (Item 2C2). Floor and ceiling runners to be provided with min 1-1/4 in. (32 mm) and 3 in. (76 mm) flanges, respectively. Ceiling runner installed parallel to direction of fluted steel deck, centered beneath deck, and secured with steel masonry anchors, steel fasteners or welds spaced max 24 in. (610 mm) OC. before or after optional spray-applied fire resistive material is used. The use of welds to secure the ceiling runner may only be used prior to the installation of the optional spray-applied material.
   STEELER INC — Floor and Ceiling Runners
   A4. Light Gauge Framing*- Notched Ceiling Runner — As an alternate to the ceiling runners in Items 2A through 2A4, notched ceiling runners to consist of C-shaped galv steel channel with notched return flanges sized to accommodate steel studs (Item 2C). Notched ceiling runner installed parallel to direction of fluted steel deck, centered beneath valley, and secured with steel masonry anchors, steel fasteners or welds spaced max 24 in. (610 mm) OC. before or after optional spray-applied fire resistive material is used. The use of welds to secure the ceiling runner may only be used prior to the installation of the optional spray-applied material.
   OLMAR SUPPLY INC — Type SCR
   B. Steel Attachment Clips — (Optional - Not Shown) - When spray applied fireproofing is used ceiling runner may be secured to deck with Z-shaped clips formed from min 1 in. (25 mm) long strips of min 20 ga galv steel. Length of clips should not exceed the width (thickness) of the wall. Clips to be sized to extend through the thickness of the spray-applied fire-resistive material on the bottom of the steel deck with 1-1/2 or 2 in. (38 or 51 mm) long upper and lower legs. Legs of clips fastened perpendicular to valleys of steel deck (prior to application of spray-applied fire-resistive materials) and top of ceiling runner with steel fasteners or welds. Clips spaced max 24 in. (610 mm) OC.
   C. Studs — Steel studs to be min 2-1/2 in. (64 mm) wide. 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 ceiling runner without attachment. When slotted ceiling runner (Item 2A1) is used, steel studs secured to slotted ceiling runner with No. 8 by 1/2 in. (13 mm) long wafer head steel screws at midheight of slot on each side of wall. Stud spacing not to exceed 24 in. (610 mm) OC. When vertical deflection ceiling runner (Item 2A2) is used, steel studs secured to slotted vertical deflection clips, through the bushings, with steel screws at midheight of each slot. Stud spacing not to exceed 24 in. (610 mm) OC.
   C1. Light Gauge Framing* —Slotted Studs — Slotted steel stud to be used in conjunction with Light Gauge Framing* —Floor and Ceiling Runners (Item 2A4). Slotted steel studs to be min 2-1/2 in. (64 mm) wide. Slotted steel studs cut 1 in. less in length than assembly height with bottom nesting in and secured to both ceiling and floor runners. Ceiling runner secured to preformed slot within steel stud by means of No. 10 by 3/4 in. (19 mm) long low profile head steel screw. Floor runner attached to bottom of steel stud by means of No. 8 by 1/2 in. (13 mm) long pan head steel screw. Slotted steel stud spacing not to exceed 24 in. (610 mm) OC.
   STEELER INC — Slotted Stud
   C2. Light Gauge Framing* —Slider C-Clip System — As an alternate to the Light Gauge Framing* —Slotted Steel Studs (Item 2C1), a Slider C-Clip System consisting of a C shaped steel clip with a slotted opening and a steel stud to be used in conjunction with Light Gauge Framing —Floor and Ceiling Runners (Item 2A4). Steel clips and studs to be min 2-1/2 in. (64 mm) wide. Steel clip inserted into inside flange of steel stud without attachment. Total length of steel stud cut 1 in. (25 mm) less than assembly height with bottom of steel stud nesting in and secured to floor runner. Floor runner attached to bottom of steel stud by means of No. 8 by 1/2 in. (13 mm) long pan head steel screw. Ceiling runner secured to steel C-Clip by means of No. 10 by 3/4 in. (19 mm) long pan head steel screw located 3/8 in. (10 mm) below top of ceiling runner. Top row of gypsum board screws shall be centered within the preformed slot of the C-Clip. Steel stud and steel clips spacing not to exceed 24 in. (610 mm) OC.
   STEELER INC — Slider C Clip System
   D. Gypsum Board* — Gypsum board installed to a min total thickness of 5/8 in. (16 mm) and 1-1/4 in. (32 mm) on each side of wall for 1 and 2 Hr rated assemblies respectively. Wall to be constructed as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory, except that a nom 1 in. (25 mm) gap shall be maintained between the top of the gypsum board and the bottom of the steel floor units and the top row of screws shall be installed into the studs 3-1/2 (89 mm) to 4 in. (102 mm) below the lower surface of the floor. The hourly 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 1 in. (25 mm). The joint system is designed to accommodate a max 50 percent compression or extension from its installed width. The joint system consists of forming material and a fill material, as follows:
   A. Forming Material* — Nom 5/8 in. (16 mm) and 1-1/4 in. (32 mm) wide strips of min 4 pcf (64 kg/m3) mineral wool batt insulation for 1 and 2 hr rated assemblies respectively, cut to thickness, compressed 50 percent in thickness and firmly packed into the gap between the top of the gypsum board and bottom of the steel floor units on both sides of the wall. Adjoining lengths of strips to be tightly butted with butted seams spaced min 48 in. (1.2 m) apart along the length of the joint.
   ROCK WOOL MANUFACTURING CO — Delta- Board
   ROXUL INC — SAFE
   THERMAFIBER INC — Type SAF
   A1. Forming Material* - Strips — (Optional) - Nom 5/8 in. (16 mm) and 1-1/4 in. (32 mm) wide precut mineral wool strips for 1 and 2 hr rated assemblies respectively. The strips are compressed 50 percent in thickness and firmly packed into the gap between the top of the gypsum board and bottom of the steel floor units on both sides of the wall. Adjoining lengths of strips to be tightly butted with butted seams spaced min 48 in. (1.2 m) apart along the length of the joint.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 767 Speed Strips
   B. Fill, Void or Cavity Material* — Min 1/16 in. (1.6 mm) dry thickness (min 1/8 in. or 3.2 mm wet thickness) of fill material sprayed or troweled on each side of the wall to completely cover mineral wool forming material and to overlap a min of 1/2 in. (13 mm) onto gypsum board and steel deck on both sides of wall. When spray-applied fire resistive material is applied to the steel floor and form units, the fill material is to overlap the gypsum board a min of 1/2 in. (13 mm) and the spray-applied fire resistive material a min of 2 in. (51 mm) on both sides of wall. When spray-applied fire resistive materials are used, the CP672 firestop spray shall overlap the wall a min 1/2 in. (13 mm) and overlap the spray-applied fire resistive material a min of 2 in. (51 mm) on both sides of the wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP672 Firestop Spray or CFS-SP WB Firestop Joint Spray

*Bearing the UL Classification Mark

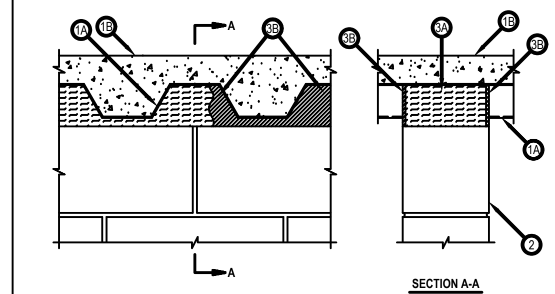
HILTI
Hilti Firestop Systems

Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. January 11, 2013

CLASSIFIED C US
Classified by Underwriters Laboratories, Inc. to UL 2079 and CAN/ULC-S115

System No. HW-D-0080

Assembly Rating - 2 Hr
Nominal Joint Width - 3/4 In.
Class II Movement Capabilities - 33% Compression or Extension



1. Floor Assembly — The fire-rated fluted steel floor unit/concrete floor assembly shall be constructed of the materials and in the manner described in the individual D700 or D900 Floor-Ceiling Design in the Fire Resistance Directory and shall include the following construction features:
   A. Steel Floor and Form Units* — Max 3 in. deep galv steel fluted floor units.
   B. Concrete — Min 2-1/2 in. thick reinforced concrete, as measured from the top plane of the floor units.
   C. Spray-Applied Fire Resistive Materials — (Optional, Not Shown) — Prior to the installation of the Forming Material and Fill, Void or Cavity Materials (Items 3A, 3B, respectively), the steel floor units may be sprayed with a min 5/16 in. thickness to a max 11/16 in. thickness of fire resistive material.
   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 P900 Series Roof-Ceiling Design 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 — Min 2-1/4 in. thick poured insulating concrete, as measured from the top plane of the floor units.

1B. Roof Assembly — As an alternate to Items 1 and 1A, a fire rated protected 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 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. Spray—Applied Fire Resistive Materials* — (Not Shown)—Prior to the installation of the steel ceiling runners, Forming Material and Fill, Void or Cavity Material (Items 2A, 3A, 3B), the roof assembly shall be sprayed with the type and thickness of fire resistive material indicated in the individual P700 Series design.

2. Wall Assembly — Min 5 in. thick steel reinforced lightweight or normal weight (100-150 pcf) concrete. Wall may also be constructed of a UL Classified Concrete Blocks*.
   See Concrete Block (CAZT) category in the Fire Resistance Directory for names of manufacturers.

3. Joint System — Max separation between bottom of or roof floor and top of wall is 3/4 in. The joint system is designed to accommodate a max 33 percent compression or extension from its installed width. The joint system consists of a packing material and a fill material between the top of the wall and the bottom of the floor or roof, as follows:
   A. Forming Material — Min 4-1/2 in. thickness of 4 pcf density mineral wool batt insulation was cut to the shape of the fluted deck, approximately 20 percent larger than the area of the flutes and compressed into the flutes of the steel deck above the wall assembly. The forming material shall be recessed 1/4 in. from each side of the wall. Additional pieces of forming material, compressed min 50 percent, in thickness and installed edge first into joint opening between bottom of steel deck and top of wall, parallel with joint direction. Compressed batt sections recessed 1/4 in. from both wall surfaces. Adjoining lengths of batt to be tightly butted with butted seams spaced min 48 in. apart along the length of the joint.
   A1. Forming Material*—Plugs — (Optional-Not Shown) Performed mineral wool plugs, formed to the shape of the steel deck units, friction fit to completely fill the flutes. The plugs shall be recessed 1/4 in. from both wall surfaces. Additional forming material, described in Item 3A, to be used in conjunction with the plugs to fill the gap between the top of the wall and bottom of steel deck.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP777 Speed Plugs
   B. Fill, Void or Cavity Material* - Sealant — Min 1/4 in. thickness of fill material installed on each side of the wall in the flutes of the steel deck and between the top of the wall and the bottom of the steel deck, flush with each surface of the wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP601S Elastomeric Firestop Sealant

*Bearing the UL Classification Mark

HILTI
Hilti Firestop Systems

Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. December 14, 2012

Notes:

1. *Refer to section 07840 of the specifications. For Quality Control requirements, refer to the Quality Control portion of the specification.*
2. *Details shown are typical details. If field conditions do not match requirements of typical details, approved alternate details shall be utilized. Field conditions and dimensions need to be verified for compliance with the details, including but not limited to the following:*
   * *Minimum and maximum Width of Joints*
   * *Type and thickness of fire-rated construction. The minimum assembly rating of the firestop assembly shall meet or exceed the highest rating of the adjacent construction.*
3. *If alternate details matching the field conditions are not available, Manufacturer's engineering judgment drawings are acceptable. Drawings shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.*
4. *References:*
   * *Underwriter's Laboratories Fire Resistance Directory*
   * *Intertek Directory of Listed Products*
   * *NFPA 101 Life Safety Code*
   * *All governing local and regional building codes*

5. *Firestop System installation must meet requirements of UL 2079 tested assemblies that provide the required assembly rating.*
6. *All rated assemblies shall be prominently labeled with the following information:*
   * *ATTENTION: Fire Rated Assembly*
   * *UL System #*
   * *Product(s) used*
   * *Hourly Rating (Assembly Rating)*
   * *Installation Date*

<Notes to designer (delete this note after reading and replace with title block information)>
1. Any modification to these details could result in an application/system not meeting the UL or Intertek Classification or the intended temperature or fire ratings.
2. Details shown are up to date as of February 2015.
3. For additional information on the details, refer to the most current "Underwriter's Laboratories Fire Resistance Directory (volume 2.)"

JOB NUMBER:

DRAWN:

CHECKED:

ISSUE DATE:

REVISIONS:

TYPICAL FIRESTOP JOINT DETAILS

SHEET NAME:

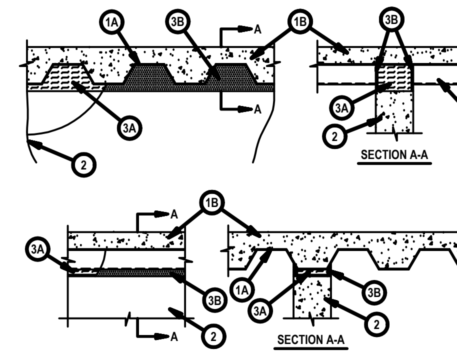
SHEET NUMBER:

A.1.7

System No. HW-D-0081

Classified by Underwriters Laboratories, Inc. to UL 2079 and CAN/ULC-S115

Assembly Rating - 2 Hr
Nominal Joint Width - 3/4 in.
Class II Movement Capabilities - 33% Compression or Extension



1. Floor Assembly — The fire-rated fluted steel floor unit/concrete floor assembly shall be constructed of the materials and in the manner described in the individual D700 or D900 Floor-Ceiling Design in the Fire Resistance Directory and shall include the following construction features:
  A. Steel Floor and Form Units* — Max 3 in. deep galv steel fluted floor units.
  B. Concrete — Min 2-1/2 in. 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 assembly shall be constructed of the materials and in the manner described in the individual P900 Series Roof-Ceiling Design 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 — Min 2-1/4 in. thick poured insulating concrete, as measured from the top plane of the floor units.
2. Wall Assembly — Min 5 in. thick steel reinforced lightweight or normal weight (100-150 pcf) concrete. Wall may also be constructed of an UL Classified Concrete Blocks* .
  See Concrete Block (CAZT) category in the Fire Resistance Directory for names of manufacturers.
3. Joint System — Max separation between bottom of floor or roof and top of wall is 3/4 in. The joint system is designed to accommodate a max 33 percent compression or extension from its installed width. The joint system consists of a packing material and a fill material between the top of the wall and the bottom of the floor or roof, as follows:

Configuration A
  A. Forming Material — Min 4 in. thickness of 4 pcf density mineral wool batt insulation was cut to the shape of the fluted deck, approximately 20 percent larger than the area of the flutes and compressed into the flutes of the steel deck above the wall assembly. The forming material shall be recessed 1/2 in. from each side of the wall. Additional pieces of forming material, compressed min 50 percent in thickness and installed edge first into joint opening between bottom of steel deck and top of wall, parallel with joint direction. Compressed batt sections recessed 1/2 in. from both wall surfaces. Adjoining lengths of batt to be tightly butted with butted seams spaced min 48 in. apart along the length of the joint.
  FIBREX INSULATIONS INC — FBX Safing Insulation
  A1. Forming Material*—Plugs — (Optional-Not Shown) Performed mineral wool plugs, formed to the shape of the fluted deck, friction fit to completely fill the flutes. The plugs shall be recessed 1/2 in. from both wall surfaces. Additional forming material, described in Item 3A, to be used in conjunction with the plugs to fill the gap between the top of the wall and bottom of steel deck.
  HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP777 Speed Plugs
  B. Fill, Void or Cavity Material* - Sealant — Min 1/2 in. thickness of fill material installed on each side of the wall in the flutes of the steel deck and between the top of the wall and the bottom of the steel deck, flush with each surface of the wall.
  HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP606 Flexible Firestop Sealant

Configuration B
  A. Forming Material — Min 4 in. thickness of 4 pcf density mineral wool batt insulation compressed min 50 percent in thickness and installed edge first into joint opening between bottom of steel deck and top of wall, parallel with joint direction. Compressed batt sections recessed 1/2 in. from both wall surfaces. Adjoining lengths of batt to be tightly butted with butted seams spaced min 48 in. apart along the length of the joint.
  FIBREX INSULATIONS INC — FBX Safing Insulation
  B. Fill, Void or Cavity Material* - Sealant — Min 1/2 in. thickness of fill material installed on each side of the wall between the top of the wall and the bottom of the steel deck, flush with each surface of the wall.
  HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP606 Flexible Firestop Sealant

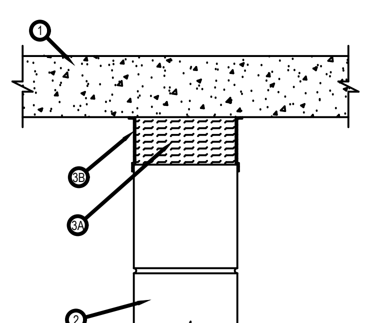
*Bearing the UL Classification Mark

Hilti Firestop Systems

System No. HW-D-0097

Classified by Underwriters Laboratories, Inc. to UL 2079 and CAN/ULC-S115

Assembly Rating — 2 Hr
Nominal Joint Width — 2 In.
Class II Movement Capabilities — 14% Compression or Extension



1. Floor Assembly — Min 4-1/2 in. thick steel-reinforced lightweight or normal weight (100-150 pcf) structural concrete.
2. Wall Assembly — Min 8 in. thick steel-reinforced lightweight or normal weight (100-150 pcf) structural concrete. Wall may also be constructed of any UL Classified Concrete Blocks*.
  See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.
3. Joint System — Max width of joint (at time of installation of joint system) is 2 in. The joint system is designed to accommodate a max 14 percent compression or extension from its installed width. The joint system shall consist of the following:
  A. Forming Material — Min 4.0 pcf mineral wool batt insulation installed in joint opening as a permanent form. Batt cut to min width of 8 in. and installed cut edge-first into joint opening, parallel with joint direction, such that batt sections are compressed min 50 percent in thickness and such that the compressed batt sections are flush with both surfaces of wall. Adjoining lengths of batt to be tightly butted with butted seams spaced min 48 in. apart along the lengths of the joint.
  ROCK WOOL MANUFACTURING CO — Delta Board
  B. Fill, Void or Cavity Material* — Min 1/8 in. wet thickness of fill material sprayed or trowelled on each side of wall to completely cover mineral wool forming material and to overlap a min 1/2 in. onto concrete floor and concrete wall.
  HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP672 Firestop Spray or CFS-SP WB Firestop Joint Spray

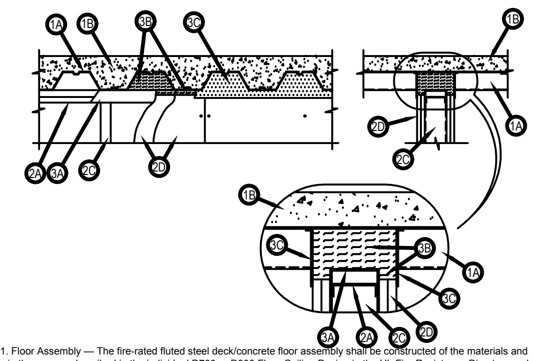
*Bearing the UL Classification Mark

Hilti Firestop Systems

System No. HW-D-0087

Classified by Underwriters Laboratories, Inc. to UL 2079 and CAN/ULC-S115

Assembly Rating — 1 And 2 Hr (See Items 2 And 3B)
Nominal Joint Width — 2 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 — 20% Compression Or Extension, or
Class II Movement Capabilities — 20% Compression and 12.5% Extension (See Item 1C)



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 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 Materials* — Prior to or after the installation of the deflection channel, Forming Material and Fill, Void or Cavity Material (Items 3A, 3B, 3C) the steel floor units may be sprayed with a min 5/16 in. (8 mm) to max 1-3/4 in. (44 mm) thickness of fire resistive material.
  W R GRACE & CO - CONN — Type MK-6-HY
  ISOLATEK INTERNATIONAL — Type 300
  When Type 300 spray is used, the movement cycling for the joint is Class II Movement Capabilities with 20% Compression and 12.5% Extension.
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 P900 Series Roof-Ceiling Design 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 — Min 2-1/4 in. (57 mm) thick poured insulating concrete, as measured from the top plane of the floor units.
1B. Roof Assembly — As an alternate to Items 1 and 1A, a fire rated protected 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 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. Spray—Applied Fire Resistive Materials* — (Not Shown)—Prior to or after the installation of the steel ceiling runners, Forming Material and Fill, Void or Cavity Material (Items 2A, 3A, 3B), the roof assembly shall be sprayed with the type and thickness of fire resistive material indicated in the individual P700 Series design.
2. Wall Assembly — The 1 or 2 hr fire rated gypsum board/steel 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 galv steel channels sized to accommodate steel studs (Item 2C). Ceiling runner to be provided with 1 in. (25 mm) flanges. Ceiling runner installed within the U-shaped deflection channel (Item 3A) with a 1-1/2 in. (38 mm) gap maintained between the top of ceiling runner and top of deflection plate.
  A1. Light Gauge Framing*-Slotted Ceiling Runner — (For use in applications where the nominal joint width does not exceed 1-1/2 in. or 38 mm) - As an alternate to the ceiling runner in Item 2A, slotted ceiling runner to consist of galv steel channel with slotted flanges sized to accommodate steel studs (Item 2C). Slotted ceiling runner installed perpendicular to direction of fluted steel deck before or after fireproofing and secured to valleys with steel masonry anchors, steel fasteners or welds spaced max 24 in. (610 mm) OC. The use of welds to secure the ceiling runner may only be used prior to the installation of the optional spray-applied material.When slotted ceiling runner is used, deflection channel (Item 3A) shall not be used. When optional spray-applied material is used on the steel deck, slotted ceiling runner secured through spray-applied material to each valley of the steel deck with min 3/16 in. (5 mm) diam steel fasteners,steel masonry anchors spaced max 24 in. (610 mm) OC.
  BRADY CONSTRUCTION INNOVATIONS INC, DBA SLIPTRACK SYSTEMS — SLP-TRK
  CALIFORNIA EXPANDED METAL PRODUCTS CO — CST
  CLARKDIETRICH BUILDING SYSTEMS — Type SLT, SLT-H
  MARINO/WARE, DIV OF WARE INDUSTRIES INC — Type SLT
  METAL-LITE INC — The System
  SCAFCO STEEL STUD MANUFACTURING CO
  TELLING INDUSTRIES L L C — True-Action Deflection Track
  A2. Light Gauge Framing*-Vertical Deflection Ceiling Runner — (For use in applications where the nominal joint width does not exceed 1 in. or 25 mm) - As an alternate to the ceiling runners in Items 2A and 2A1, vertical deflection ceiling runner to consist of galv steel channel with slotted vertical deflection clips mechanically fastened within runner. Slotted clips provided with step bushings for permanent fastening of steel studs. Flanges sized to accommodate steel studs (Item 2C). Vertical deflection ceiling runner installed perpendicular to direction of fluted steel deck and secured before or after spray-applied materials to valleys with steel masonry anchors,steel fasteners or welds spaced max 24 in. (610 mm) OC. The use of welds to secure the ceiling runner may only be used prior to the installation of the optional spray-applied material. When vertical deflection ceiling runner is used, deflection channel (Item 3A) shall not be used. When optional spray-applied material is used on the steel deck, vertical deflection ceiling runner secured through spray-applied material to each valley of the steel deck with min 3/16 in. (5 mm) diam steel fasteners or steel masonry anchors spaced max 24 in. (610 mm) OC.
  THE STEEL NETWORK INC — VertiTrack VTD250, VTD362, VTD400, VTD600 and VTD800
  A3. Light Gauge Framing* - Notched Ceiling Runner — As an alternate to the ceiling runners in Items 2A through 2A3, notched ceiling runners to consist of C-shaped galv steel channel with notched return flanges sized to accommodate steel studs (Item 2C). Notched ceiling runner installed perpendicular to direction of fluted steel deck and secured before or after spray-applied materials to valleys with steel masonry anchors, steel fasteners or welds spaced max 24 in. (610 mm) OC. The use of welds to secure the ceiling runner may only be used prior to the installation of the optional spray-applied material. When notched ceiling runner is used, deflection channel (Item 3A) shall not be used. When optional spray-applied material is used on the steel deck, notched ceiling runner secured through spray-applied material to each valley of steel deck with min 3/16 in. (5 mm) diam steel fasteners spaced max 24 in. (610 mm) OC.
  OLMAR SUPPLY INC — Type SCR
  B. Steel Attachment Clips — (Optional - Not Shown) - When spray applied fireproofing is used ceiling runner may be secured to deck with Z-shaped clips formed from min. 1 in. (25 mm) long strips of min 20 ga galv steel. Length of clips should not exceed the width (thickness) of the wall. Clips to be sized to extend through the thickness of the spray-applied fire-resistive material on the bottom of the steel deck with 1-1/2 or 2 in. (38 or 51 mm) long upper and lower legs. Legs of clips fastened to valleys of steel deck (prior to application of spray-applied fire-resistive materials) and top of ceiling runner with steel fasteners or welds. Clips spaced max 24 in. (610 mm) OC.
  C. Studs — Steel studs to be min 2-1/2 in. (64 mm) wide. 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 ceiling runner without attachment. When slotted ceiling runner (Item 2A1) is used, steel studs secured to slotted ceiling runner with No. 8 by 1/2 in. (13 mm) long wafer head steel screws at midheight of slot on each side of wall. When vertical deflection ceiling runner (Item 2A2) is used, steel studs secured to slotted vertical deflection clips, through the bushings, with steel screws at midheight of each slot. Stud spacing not to exceed 24 in. (610 mm) OC.
  D. Gypsum Board* — Gypsum board installed to a min total thickness of 5/8 in. (16 mm) or 1-1/4 in. (32 mm) on each side of wall for 1 and 2 hr rated assemblies, respectively. Wall to be constructed as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory, except that a nom 2 in. (51 mm) gap shall be maintained between the top of the gypsum board and the bottom of the steel deck and the top row of screws shall be installed into the studs 4 to 4-1/2 in. (102 to 114 mm) below the lower surface of the floor or roof. The hourly rating of the joint system is dependent on the hourly 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 2 in. (51 mm). The joint system is designed to accommodate a max 20 or 12.5 percent (see Item 1C) compression or extension from its installed width. The joint system consists of a deflection channel, forming material and a fill material as follows:
  A. Deflection Channel — A nom 3-5/8 in. (92 mm) wide by 3 in. (76 mm) deep min No. 22 gauge steel U-shaped channel. Deflection channel installed perpendicular to direction of fluted steel deck and secured to valleys with masonry anchors, steel fasteners or welds spaced max 24 in. (610 mm) OC before or after optional spray-applied fire resistive material is used. The ceiling runner (Item 2A) is installed within the deflection channel to maintain a 1-1/2 in. (38 mm) gap between the top of the ceiling runner and the top of the deflection channel. The ceiling runner is not fastened to the deflection channel.
  B. Forming Material* — Nom 4 pcf (64 kg/m3) density mineral wool batt insulation cut approx 25 percent wider than the flutes and with a length approx equal to the overall thickness of the wall. Multiple pieces stacked on top of each other, as needed, and then compressed 50 percent in thickness and inserted into the flutes of the steel deck above the top of the ceiling runner. The mineral wool batt insulation is to project beyond each side of the ceiling runner, flush with wall surfaces. Additional 5/8 in. (16 mm) and 1-1/4 in. (32 mm) wide strips for 1 and 2 hr rated assemblies, respectively, of nom 4 pcf (64 kg/m3) mineral wool batt insulation are to be cut to fill the gap between the top of the gypsum board and bottom of the steel deck. The strips of mineral wool are compressed 50 percent and tightly packed, cut edge first, into the gap between the top of the gypsum board and bottom of the steel deck on both sides of the wall.
  ROCK WOOL MANUFACTURING CO — Delta Board
  ROXUL INC — SAFE
  THERMAFIBER INC — Type SAF
  B1. Forming Material*—Plugs (For use with 3-1/2 in. or 89 mm deep studs or larger) — (Optional-Not Shown) - Preformed mineral wool plugs, formed to the shape of the fluted floor units, friction fit to completely fill the flutes above the ceiling runner. The plugs shall project beyond each side of the ceiling runner, flush with wall surfaces. Additional forming material, described in Item 3B, to be used in conjunction with the plugs to fill the gap between the top of gypsum board and the bottom of plug .
  HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP777 Speed Plugs

Hilti Firestop Systems

System No. HW-D-0087 (cont.)

Classified by Underwriters Laboratories, Inc. to UL 2079 and CAN/ULC-S115

  B2. Forming Material* - Strips — (Optional) - Nom 5/8 in. (16 mm) and 1-1/4 in. (32 mm) wide by 4 in. (102 mm) thick precut mineral wool strips for 1 and 2 hr rated assemblies, respectively. The strips are compressed 50 percent in thickness and firmly packed into the gap between the top of the gypsum board and bottom of the steel floor units on both sides of the wall.
  HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 767 Speed Strips
  C. Fill, Void or Cavity Material* — Min 1/16 in. (1.6 mm) dry thickness (min 1/8 in. or 3.2 mm wet thickness) of fill material sprayed or troweled on each side of the wall to completely cover mineral wool forming material and to overlap a min of 1/2 in. (13 mm) onto gypsum board and steel deck on both sides of wall. When spray-applied fire resistive material is applied to the steel deck, the fill material is to overlap the gypsum board a min of 1/2 in. (13 mm) and the spray-applied fire resistive material a min of 2 in. (51 mm) on both sides of wall. When spray-applied fire resistive materials are used, the CP672 firestop spray shall overlap the wall a min 1/2 in. (13 mm) and overlap the spray-applied fire resistive material a min of 2 in. (51 mm) on both sides of the wall.
  HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP672 Firestop Spray or CFS-SP WB Firestop Joint Spray

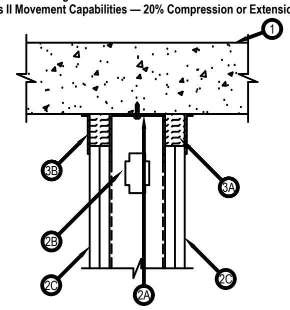
*Bearing the UL Classification Mark

Hilti Firestop Systems

System No. HW-D-0106

Classified by Underwriters Laboratories, Inc. to UL 2079 and CAN/ULC-S115

Assembly Ratings — 1 and 2 Hr (See items 2 and 3)
Nominal Joint Width — 2 in.
L Rating At Ambient — Less Than 1 CFM/Lin Ft
L Rating At 400°F — Less Than 1 CFM/Lin Ft
Class II Movement Capabilities — 20% 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 6 in. (152 mm) thick UL Classified hollow-core Precast Concrete Units*.
  See Precast Concrete Units category in the Fire Resistance Directory for names of manufactures.
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 specified 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 gauge galv steel channels sized to accommodate steel studs (Item 2B). Flange height of ceiling runner shall be min 1/4 in. (6 mm) greater than max extended joint width. Ceiling runner secured to concrete floor slab with steel masonry anchors or steel fasteners spaced 24 in. (610 mm) OC.
  A1. Light Gauge Framing*-Slotted Ceiling Runner — (For use in applications where the nominal joint width does not exceed 1-1/2 in. or 38 mm) - As an alternate to the ceiling runner in Item 2A, slotted ceiling runner to consist of galv steel channel with slotted flanges sized to accommodate steel studs (Item 2B). Slotted ceiling runner secured to concrete floor slab with steel masonry anchors or steel fasteners spaced max 24 in. (610 mm) OC.
  BRADY CONSTRUCTION INNOVATIONS INC, DBA SLIPTRACK SYSTEMS — SLP-TRK
  CALIFORNIA EXPANDED METAL PRODUCTS CO — CST
  CLARKDIETRICH BUILDING SYSTEMS — Type SLT, SLT-H
  MARINO/WARE, DIV OF WARE INDUSTRIES INC — Type SLT
  METAL-LITE INC — The System
  SCAFCO STEEL STUD MANUFACTURING CO
  TELLING INDUSTRIES L L C — True-Action Deflection Track
  A2 . Light Gauge Framing*-Vertical Deflection Ceiling Runner — (For use in applications where the nominal joint width does not exceed 1 in. or 25 mm) - As an alternate to the ceiling runners in Items 2A and 2A1, vertical deflection ceiling runner to consist of galv steel channel with slotted vertical deflection clips mechanically fastened within runner. Slotted clips provided with step bushings for permanent fastening of steel studs. Flanges sized to accommodate steel studs (Item 2B). Vertical deflection ceiling runner masonry anchors or steel fasteners with steel masonry anchors spaced max 24 in. (610 mm) OC.
  THE STEEL NETWORK INC — VertiTrack VTD250, VTD362, VTD400, VTD600 and VTD800
  A3. Light Gauge Framing*- Notched Ceiling Runner — As an alternate to the ceiling runners in Items 2A through 2A3, notched ceiling runners to consist of C-shaped galv steel channel with notched return flanges sized to accommodate steel studs (Item 2B). Notched ceiling runner secured to concrete floor slab with steel masonry anchors or steel fasteners spaced max 24 in. (610 mm) OC.
  OLMAR SUPPLY INC — Type SCR
  B. Studs — Steel studs to be min 2-1/2 in. (64 mm) wide. 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 ceiling runner without attachment. When slotted ceiling runner (Item 2A1) is used, steel studs secured to slotted ceiling runner with No. 8 by 1/2 in. (13 mm) long wafer head steel screws at midheight of slot on each side of wall. . When vertical deflection ceiling runner (Item 2A2) is used, steel studs secured to slotted vertical deflection clips, through the bushings, with steel screws at midheight of each slot. Stud spacing not to exceed 24 in. (610 mm) OC .
  C. Gypsum Board* — Gypsum board installed to a min total thickness of 5/8 or 1-1/4 in. (16 or 32 mm) on each side of wall, for 1 or 2 hr fire resistance rated walls, respectively. Wall to be constructed as specified in the individual U400 or V400 Series Design in the UL Fire Resistance Directory, except that a nominal 2 in. (51 mm) gap shall be maintained between the top of the gypsum board and the bottom of concrete floor. The screws attaching the gypsum board to the studs at the top of the first layer shall be located 4 in. (102 mm) from the floor assembly. The screws attaching the second layer to the steel studs shall be located 3-1/2 in. (89 mm) from the floor assembly. The hourly fire rating of the joint system is dependent on the hourly rating of the wall.
3. Joint System — Max width of joint (at time of installation of joint system) is 2 in. (51 mm). The joint system is designed to accommodate a max 20 percent compression or extension from its installed width. The joint system shall consist of the following:
  A. Forming Material * — Nom 5/8 or 1-1/4 in. (16 or 32 mm) thick strips of min 4 pcf (64 kg/m3) mineral wool batt insulation, for 1 and 2 Hr rated assemblies, respectively, cut to width, compressed 33 percent in width and firmly packed into gap between top of the gypsum board and bottom of the floor assembly, flush with both surfaces of the wall. Adjoining lengths of batt to be tightly butted with butted seams spaced min 48 in. (1.2 m) apart along the length of the joint.
  ROCK WOOL MANUFACTURING CO — Delta Board
  ROXUL INC — SAFE
  THERMAFIBER INC — Type SAF
  A1. Forming Material* - Strips — (Optional) - Nom 5/8 in. (16 mm) and 1-1/4 in. (32 mm) wide precut mineral wool strips for 1 and 2 hr rated assemblies, respectively. The strips are cut to thickness, compressed 50 percent in thickness and firmly packed into the gap between the top of the gypsum board and bottom of the floor assembly, flush with both surfaces of the wall. Adjoining lengths of strips to be tightly butted with butted seams spaced min 48 in. (1.2 m) apart along the length of the joint.
  HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 767 Speed Strips
  B. Fill, Void or Cavity Material* — Min 1/16 in. (1.6 mm) dry thickness (min 1/8 in. or 3.2 mm wet thickness) of fill material sprayed or troweled on each side of the wall to completely cover mineral wool forming material and to overlap min 1/2 in. (13 mm) onto the gypsum board and concrete floor assembly.
  HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP672 Firestop Spray or CFS-SP WB Firestop Joint Spray

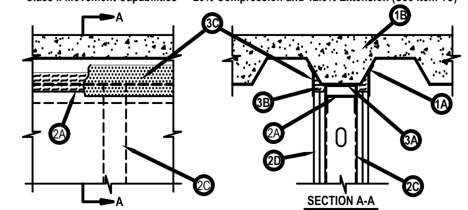
*Bearing the UL Classification Mark

Hilti Firestop Systems

System No. HW-D-0089

Classified by Underwriters Laboratories, Inc. to UL 2079 and CAN/ULC-S115

Assembly Ratings — 1 and 2 Hr (See Items 2 and 3)
Nominal Joint Width 2 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—20% Compression or Extension, or
Class II Movement Capabilities — 20% Compression and 12.5% Extension (See Item 1C)



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 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 Materials* — (Optional, Not Shown)—Prior to or after the installation of the deflection channel, Forming Material and Fill, Void or Cavity Material (Items 3A, 3B, 3C) the steel floor units may be sprayed with a min 5/16 in. to max 1-3/4 in. thickness of fire resistive material.
  W R GRACE & CO - CONN — Type MK-6-HY
  ISOLATEK INTERNATIONAL — Type 300
  When Type 300 spray is used, the movement cycling for the joint is Class II Movement Capabilities with 20% Compression and 12.5% Extension.
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 P900 Series Roof-Ceiling Design 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 — Min 2-1/4 in. (57 mm) thick poured insulating concrete, as measured from the top plane of the floor units.
1B. Roof Assembly — As an alternate to Items 1 and 1A, a fire rated protected 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 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. Spray—Applied Fire Resistive Materials* — (Not Shown)—Prior to or after the installation of the steel ceiling runners, Forming Material and Fill, Void or Cavity Material (Items 2A, 3A, 3B), the roof assembly shall be sprayed with the type and thickness of fire resistive material indicated in the individual P700 Series design.
2. Wall Assembly — The 1 or 2 hr fire rated gypsum board /steel stud wall assembly shall be constructed of the materials and in the manner described in the individual U400 or V400 Series Wall or 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 galv steel channels sized to accommodate steel studs (Item 2C). Ceiling runner to be provided with 1 in. (25 mm) flanges. Ceiling runner installed within the U-shaped deflection channel (Item 3A) with a 1-1/2 in. (38 mm) gap maintained between the top of ceiling runner and top of deflection plate.
  A1. Light Gauge Framing*-Slotted Ceiling Runner — (For use in applications where the nom joint width does not exceed 1-1/2 in. or 38 mm) - As an alternate to the ceiling runner in Item 2A, slotted ceiling runner to consist of galv steel channel with slotted flanges sized to accommodate steel studs (Item 2C). Slotted ceiling runner installed parallel to direction of fluted steel deck, centered beneath valley, and secured with steel masonry anchors, steel fasteners or welds spaced max 24 in. (610 mm) OC before or after optional spray-applied material. The use of welds to secure the ceiling runner may only be used prior to the installation of the optional spray-applied material. When slotted ceiling runner is used, deflection channel (Item 3A) shall not be used. When optional spray-applied fire resistive material is used on the steel deck, slotted ceiling runner secured through spray-applied material to valley of the steel deck with min 3/16 in. (5 mm) diam steel masonry anchors, steel fasteners spaced max 24 in. (610 mm) OC.
  BRADY CONSTRUCTION INNOVATIONS INC, DBA SLIPTRACK SYSTEMS — SLP-TRK
  CALIFORNIA EXPANDED METAL PRODUCTS CO — CST
  CLARKDIETRICH BUILDING SYSTEMS — Type SLT, SLT-H
  MARINO/WARE, DIV OF WARE INDUSTRIES INC — Type SLT
  METAL-LITE INC — The System
  SCAFCO STEEL STUD MANUFACTURING CO
  TELLING INDUSTRIES L L C — True-Action Deflection Track
  A2. Light Gauge Framing*-Vertical Deflection Ceiling Runner — (For use in applications where the nom joint width does not exceed 1 in. or 25 mm) - As an alternate to the ceiling runners in Items 2A and 2A1, vertical deflection ceiling runner to consist of galv steel channel with slotted vertical deflection clips mechanically fastened within runner. Slotted clips provided with step bushings for permanent fastening of steel studs. Flanges sized to accommodate steel studs (Item 2C). Vertical deflection ceiling runner installed parallel to direction of fluted steel deck, centered beneath valley, and secured with steel masonry anchors, steel fasteners or welds spaced max 24 in. (610 mm) OC before or after spray-applied materials. The use of welds to secure the ceiling runner may only be used prior to the installation of the optional spray-applied material.When vertical deflection ceiling runner is used, deflection channel (Item 3A) shall not be used. When optional spray-applied fire resistive material is used on the steel deck, vertical deflection ceiling runner secured through spray-applied material to valley of the steel deck with min 3/16 in. (5 mm) diam steel masonry anchors or steel fasteners spaced max 24 in. (610 mm) OC.
  THE STEEL NETWORK INC — VertiTrack VTD250, VTD362, VTD400, VTD600 and VTD800
  A3. Light Gauge Framing* - Notched Ceiling Runner — As an alternate to the ceiling runners in Items 2A through 2A3, notched ceiling runners to consist of C-shaped galv steel channel with notched return flanges sized to accommodate steel studs (Item 2C). Notched ceiling runner installed parallel to direction of fluted steel deck, centered beneath valley, and secured with steel masonry anchors, steel fasteners or welds spaced max 24 in. (610 mm) OC befor or after spray-applied materials. The use of welds to secure the ceiling runner may only be used prior to the installation of the optional spray-applied material. When notched ceiling runner is used, deflection channel (Item 3A) shall not be used. When optional spray-applied fire resistive material is used on the steel deck, notched ceiling runner secured through spray-applied material to valley of deck with min 3/16 in. (5 mm) diam steel fasteners spaced max 24 in. (610 mm) OC.
  OLMAR SUPPLY INC — Type SCR
  B. Steel Attachment Clips — (Optional - Not Shown) - When spray applied fireproofing is used ceiling runner may be secured to deck with Z-shaped clips formed from min. 1 in. (25 mm) long strips of min 20 ga galv steel. Length of clips should not exceed the width (thickness) of the wall. Clips to be sized to extend through the thickness of the spray-applied fire-resistive material on the bottom of the steel deck with 1-1/2 or 2 in. (38 or 51 mm) long upper and lower legs. Legs of clips fastened to valleys of steel deck (prior to application of spray-applied fire-resistive materials) and top of ceiling runner with steel fasteners or welds. Clips spaced max 24 in. (610 mm) OC.
  C. Studs — Steel studs to be min 2-1/2 in. (64 mm) wide. 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 ceiling runner without attachment. When slotted ceiling runner (Item 2A1) is used, steel studs secured to slotted ceiling runner with No. 8 by 1/2 in. (13 mm) long wafer head steel screws at midheight of slot on each side of wall. When slotted ceiling runner (Item 2A1) is used, steel studs secured to slotted ceiling runner with No. 8 by 1/2 in. (13 mm) long wafer head steel screws at midheight of slot on each side of wall. When vertical deflection ceiling runner (Item 2A2) is used, steel studs secured to slotted vertical deflection clips, through the bushings, with steel screws at midheight of each slot. Stud spacing not to exceed 24 in. (610 mm) OC.
  D. Gypsum Board* — Gypsum board installed to a min total thickness of 5/8 in. (16 mm) or 1-1/4 in. (32 mm) on each side of wall for 1 and 2 hr rated assemblies, respectively. Wall to be constructed as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory, except that a nom 2 in. (51 mm) gap shall be maintained between the top of the gypsum board and the bottom of the steel deck and the top row of screws shall be installed into the studs 4 to 4-1/2 in. (102 to 114 mm) below the lower surface of the floor or roof.
3. Joint System — Max separation between bottom of floor or roof and top of wall at time of installation of joint system is 2 in. (51 mm). The joint system is designed to accommodate a max 20 or 12.5 percent (see Item 1C) compression or extension from its installed width. The joint system consists of a deflection channel, forming material and a fill material, as follows:
  A. Deflection Channel — A nom 3-5/8 in. (92 mm) wide by 3 in. (76 mm) deep min No. 22 gauge steel U-shaped channel. Deflection channel installed parallel to direction of fluted steel deck, centered beneath valley, and secured to valley of steel deck with steel fasteners or by welds spaced max 24 in. (610 mm) OC. before or after optional spray-applied fire resistive material is used. The ceiling runner (Item 2A) is installed within the deflection channel to maintain a 1-1/2 in. (38 mm) gap between the top of the ceiling runner and the top of the deflection channel. The ceiling runner is not fastened to the deflection channel.
  B. Forming Material* — Nom 5/8 in. (16 mm) and 1-1/4 in. (32 mm) thick strips of min 4 pcf mineral wool batt insulation, for 1 and 2 hr rated assemblies respectively, cut to wide, compressed 33 percent in width and firmly packed into the gap between the top of the gypsum board and bottom of the steel deck, flush with both surfaces of the wall. Adjoining lengths of strips to be tightly butted with butted seams spaced min 48 in. (1.2 m) apart along the length of the joint.
  ROCK WOOL MANUFACTURING CO — Delta Board
  ROXUL INC — SAFE
  THERMAFIBER INC — Type SAF
  B1. Forming Material* - Strips — (Optional) - Nom 5/8 in.(16 mm) and 1-1/4 in. (32 mm) wide by 4 in. (102 mm) thick precut mineral wool strips for 1 and 2 hr rated assemblies respectively. The strips are cut to thickness, compressed 50 percent in thickness and firmly packed into the gap between the top of the gypsum board and bottom of the steel floor units, flush with on both sides of the wall. Adjoining lengths of strips to be tightly butted with butted seams spaced min 48 in. (1.2 m) apart along the length of the joint.
  HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 767 Speed Strips
  C. Fill, Void or Cavity Material* — Min 1/16 in. (1.6 mm) dry thickness (min 1/8 in. or 3.2 mm wet thickness) of fill material sprayed or troweled on each side of the wall to completely cover mineral wool forming material and to overlap a min of 1/2 in. (13 mm) onto gypsum board and steel deck on both sides of wall. When spray-applied fire resistive material is applied to the steel deck, the fill material is to overlap the gypsum board a min of 1/2 in. (13 mm) and the spray-applied fire resistive material a min of 2 in. (51 mm) on both sides of wall. When spray-applied fire resistive materials are used, the CP672 firestop spray shall overlap the wall a min 1/2 in. (13 mm) and overlap the spray-applied fire resistive material a min of 2 in. (51 mm) on both sides of the wall.
  HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP672 Firestop Spray or CFS-SP WB Firestop Joint Spray

*Bearing the UL Classification Mark

Hilti Firestop Systems

Notes:

1. Refer to section 07840 of the specifications. For Quality Control requirements, refer to the Quality Control portion of the specification.
2. Details shown are typical details. If field conditions do not match requirements of typical details, approved alternate details shall be utilized. Field conditions and dimensions need to be verified for compliance with the details, including but not limited to the following:
  ** Minimum and maximum Width of Joints*
  ** Type and thickness of fire-rated construction. The minimum assembly rating of the firestop assembly shall meet or exceed the highest rating of the adjacent construction.*
3. If alternate details matching the field conditions are not available, Manufacturer's engineering judgment drawings are acceptable. Drawings shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.
4. References:
  ** Underwriter's Laboratories Fire Resistance Directory*
  ** Intertek Directory of Listed Products*
  ** NFPA 101 Life Safety Code*
  ** All governing local and regional building codes*
5.Firestop System installation must meet requirements of UL 2079 tested assemblies that provide the required assembly rating.
6. All rated assemblies shall be prominently labeled with the following information:
  ** ATTENTION: Fire Rated Assembly*
  ** UL System #*
  ** Product(s) used*
  ** Hourly Rating (Assembly Rating)*
  ** Installation Date*

<Notes to designer (delete this note after reading and replace with title block information)>
1. Any modification to these details could result in an application/system not meeting the UL or Intertek Classification or the intended temperature or fire ratings.
2. Details shown are up to date as of February 2015.
3. For additional information on the details, refer to the most current "Underwriter's Laboratories Fire Resistance Directory (volume 2.)"

JOB NUMBER:

DRAWN:

CHECKED:

ISSUE DATE:

REVISIONS:

TYPICAL FIRESTOP JOINT DETAILS

SHEET NAME:

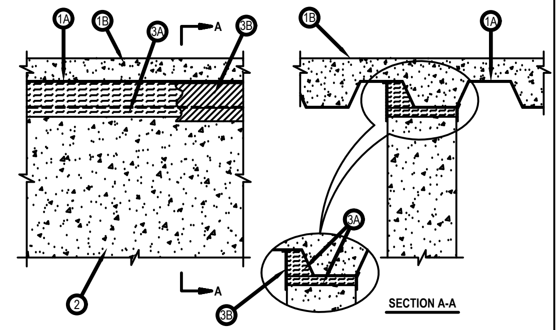
SHEET NUMBER:

A.2.7

System No. HW-D-0181

C US
Classified by
Underwriters Laboratories, Inc.
to UL 2079 and CAN/ULC-S115

Assembly Rating — 2 Hr
Nominal Joint Width— 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— 12.5% Compression



1. Floor Assembly — The 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 Floor-Ceilng 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 Materials* — (Optional)—(Not Shown)—Prior to the installation of the forming material and fill, void or cavity material (Item 3A, 3B) the steel floor units may be sprayed with a min 5/16 in. (8 mm) to max 1-3/4 in. (44 mm) thickness of fire resistive material in accordance with the specifications in the individual D700 Series Design.
   W R GRACE & CO - CONN — Type MK-6-HY
   ISOLATEK INTERNATIONAL — Type 300
2. Wall Assembly — Min 8 in. (203 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. Wall shall be installed parallel with the flutes of the steel floor and form units (Item 1A). Wall may also be constructed of any UL Classified 2 hr fire rated Concrete Blocks*. When wall is constructed of concrete blocks, the top course of block shall be filled with concrete, grout or mortar.
   See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.
3. Joint System — Max separation between bottom of spray-applied fire resistive and top of the wall at time of installation of joint system is 1 in. (25 mm). The joint system is designed to accommodate a max 12.5 percent compression or extension from its installed width. The joint system consists of the following:
   A. Forming Material* — Min 4 pcf (64 kg/m3) mineral wool batt insulation cut into strips with a width approx equal to the overall thickness of the wall. Strips compressed 33 percent in thickness and inserted into the gap between the top of the wall and the bottom of the floor units. When the void beneath the protected steel deck is located entirely above the wall, the void shall be completely filled with mineral wool insulation compressed 33 percent in thickness. When void beneath the steel deck is located in part above the wall, that portion of the void above the wall shall be packed with additional strips of mineral wool batt insulation compressed 33 percent in thickness.
   ROCK WOOL MANUFACTURING CO — Delta Board
   B. Fill, Void or Cavity Material* — Min 1/8 in. (3.2 mm) wet thickness of fill material sprayed or troweled on each side of the wall to completely cover mineral wool forming material and to overlap a min of 1/2 in. (13 mm) onto wall and steel deck on both sides of wall. When spray-applied fire resistive material* is applied to the steel floor and form units, the fill material is to overlap the wall a min of 1/2 in. (13 mm) and to overlap the spray-applied fire resistive material a min of 2 in. (51 mm) on both sides of the wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP672 Firestop Spray or CFS-SP WB Firestop Joint Spray

*Bearing the UL Classification Mark

Hilti Firestop Systems

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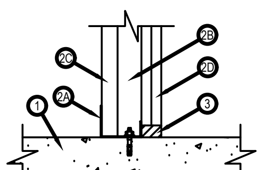
Underwriters Laboratories, Inc.
December 14, 2012

System No. BW-S-0023

C US
Classified by
Underwriters Laboratories, Inc.
to UL 1479 and CAN/ULC-S115

Assembly Ratings — 1 and 2 Hr (See Item 2)
Joint Width — 1 in. Max



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. Wall Assembly — The 1 or 2 hr fire rated gypsum board/steel stud shaft wall assembly shall be constructed of the materials and in the manner specified in the individual U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory. In addition, the wall may incorporate a head-of-wall joint system constructed as specified in the HW Series Joint Systems in the UL Fire Resistance Directory. The wall shall include the following construction features:
   A. Floor and Ceiling Runners — J-shaped runner, 2-1/2 in. (64 mm) wide with unequal legs of min 1-1/4 in. (32 mm) and 2 in. (51 mm), fabricated from min 24 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. (51 mm) from ends and not greater than 24 in. (610 mm) OC.
   B. Steel Studs — C-H-shaped studs, 2-1/2 in. (64 mm) wide by 1-1/2 in. (38 mm) deep, fabricated from min 25 MSG galv steel, cut to lengths 3/8 to 1/2 in. (10 to 13 mm) less than floor to ceiling height and spaced 24 in. (610 mm) OC. Studs nest in floor runner at bottom and J runner or slotted ceiling track at top. After installation of gypsum board liner panels (Item 2C), 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. 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 24 in. (610 mm) wide gypsum board liner panels as specified in the individual U400 or V400-Series design. Panels cut 1 in. (25 mm) less in length than floor to ceiling height. Vertical edges inserted in "H"-shaped section of "C-H" studs. At the ends of the assembly, the free edge of the end panels are attached to the long leg of vertical J-runners (Item 2A) with 1-5/8 in. (41 mm) long Type S steel screws spaced max 12 in. (305 mm) OC.
   D. Gypsum Board* — Gypsum board sheets, 1/2 or 5/8 in. (13 or 16 mm) thick, applied vertically or horizontally in two layers on finished side of wall as specified in the individual U400 or V400-Series design. A max 1 in. (25 mm) gap shall be maintained between the bottom of the gypsum board and the top surface of the concrete floor. The screws attaching the gypsum board layers to the C-H studs shall be located 1 in. (25 mm) above the top of the J-runner or slotted ceiling track. No gypsum board attachment screws are to penetrate the ceiling J-runner and slotted ceiling track.
   The hourly fire rating of the joint system is equal to the hourly fire rating of the wall.
3. Fill, Void or Cavity Material* Sealant — Max separation between top of floor and bottom of gypsum board on the finish side is 1in. The depth of sealant to be installed to fill the linear gap between the bottom of the gypsum board sheets (Item 2D) and the top of the concrete floor shall be equal to the overall thickness of the gypsum board sheets, flush with the finished side of the wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 606

*Bearing the UL Classification Mark

Hilti Firestop Systems

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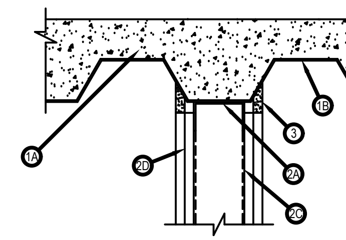
Underwriters Laboratories, Inc.
May 17, 2010

System No. HW-D-0184

C US
Underwriters Laboratories, Inc.
to UL 2079 and CAN/ULC-S115

ANSI/UL2079	CAN/ULC S115
Assembly Ratings — 1 and 2 Hr (See Item 2)	F Ratings — 1 and 2 Hr (See Item 2)
Nominal Joint Width - 3/4 In.	FT Ratings — 1 and 2 Hr (See Item 2)
Class II Movement Capabilities — 17% Compression or Extension	FH Ratings — 1 and 2 Hr (See Item 2)
L Rating At Ambient — Less Than 1 CFM/sq ft	FTH Ratings — 1 and 2 Hr (See Item 2)
L Rating At 400 F — Less Than 1 CFM/sq ft	Nominal Joint Width - 3/4 In.
	Class II Movement Capabilities — 17% Compression or Extension
	L Rating At Ambient — Less Than 1 CFM/sq ft
	L Rating At 400 F — Less Than 1 CFM/sq ft



1. Floor Assembly — The fire-rated fluted steel floor unit/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 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 Materials (Optional) — (Not Shown) — Prior to or after the installation of the ceiling runner and prior to the installation of the Fill, Void or Cavity Materials (Items 2A and 3), the steel floor units may be sprayed with a min 5/16 in. (8 mm) thickness to a max 11/16 in. (17 mm) thickness of fire resistive material.
   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 P900 Series Roof-Ceiling Design 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 — Min 2-1/4 in. (57 mm) thick poured insulating concrete, as measured from the top plane of the floor units.

1B. Roof Assembly — As an alternate to Items 1 and 1A, a fire rated protected 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 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. Spray—Applied Fire Resistive Materials* — (Not Shown)—Prior to or after the installation of the steel ceiling runners, and prior to the installation of the Forming Material and Fill, Void or Cavity Material (Items 2A, 3A, 3B), the roof assembly shall be sprayed with the type and thickness of fire resistive material indicated in the individual P700 Series design.

2. Wall Assembly — The 1 or 2 hr fire rated gypsum board/steel stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 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 gauge galv steel channels sized to accommodate steel studs (Item 2C). Flange height of ceiling runner shall be min 1/4 in. (6 mm) greater than max extended joint width. Ceiling runner installed parallel to direction of fluted steel deck, centered beneath valley, and secured with steel masonry anchors, steel fasteners or welds spaced max 24 in. (610mm) OC before or after optional spray-applied fire resistive material is used. The use of welds to secure the ceiling runner may only be used prior to the installation of the optional spray-applied material.
   A1. Light Gauge Framing* - Slotted Ceiling Runner — As an alternate to the ceiling runner in (Item 2A), slotted ceiling runner to consist of galv steel channel with slotted flanges sized to accommodate steel studs (Item 2C). Ceiling runner installed parallel to direction of fluted steel deck centered beneath valley, and secured with steel masonry anchors, steel fasteners or welds spaced max 24 in. (610mm) OC before or after optional spray-applied fire resistive material is used. The use of welds to secure the ceiling runner may only be used prior to the installation of the optional spray-applied material.
   BRADY CONSTRUCTION INNOVATIONS INC, DBA SLIPTRACK SYSTEMS — SLP-TRK
   CALIFORNIA EXPANDED METAL PRODUCTS CO — CST
   CLARKDIETRICH BUILDING SYSTEMS — Type SLT, SLT-H
   SCAFCO STEEL STUD MANUFACTURING CO
   TELLING INDUSTRIES L L C — True-Action Deflection Track
   THE STEEL NETWORK INC — VertiTrack VT, series,250VT, 362VT, 400VT, 600VT and 800VT
   A2. Light Gauge Framing* - Vertical Deflection Ceiling Runner — As an alternate to the ceiling runners in Items 2A and 2A1, vertical deflection ceiling runner to consist of galv steel channel with slotted vertical deflection clips mechanically fastened with runner. Slotted clip provided with step bushings for permanent fastening of steel studs. Flanges sized to accommodate steel studs (Item 2C). Vertical deflection ceiling runner installed parallel to direction of fluted steel deck, centered beneath valley, and secured with steel masonry anchors, steel fasteners or welds spaced max 24 in. (610mm) OC before or after optional spray-applied fire resistive material is used. The use of welds to secure the ceiling runner may only be used prior to the installation of the optional spray-applied material.
   THE STEEL NETWORK INC — VertiTrack VTD250, -362, -400, -600, -800
   A3. Light Gauge Framing*- Notched Ceiling Runner — As an alternate to the ceiling runners in Items 2A through 2A2, notched ceiling runners to consist of C-shaped galv steel channel with notched return flanges sized to accommodate steel studs (Item 2C). Notched ceiling runner installed parallel to direction of fluted steel deck, centered beneath valley, secured with steel masonry anchors, steel fasteners or welds spaced max 24 in. (610mm) OC before or after optional spray-applied fire resistive material is used. The use of welds to secure the ceiling runner may only be used prior to the installation of the optional spray-applied material.
   OLMAR SUPPLY INC — Type SCR
   B. Steel Attachment Clips — (Optional - Not Shown) - When spray applied fireproofing is used ceiling runner may be secured to deck with Z-shaped clips formed from min. 1 in. (25 mm) long strips of min 20 ga galv steel. Length of clips should not exceed the width (thickness) of the wall. Clips to be sized to extend through the thickness of the spray-applied fire-resistive material on the bottom of the steel deck with 1-1/2 or 2 in. (38 or 51 mm) long upper and lower legs. Legs of clips fastened to valleys of steel deck (prior to application of spray-applied fire-resistive materials) and top of ceiling runner with steel fasteners or welds. Clips spaced max 24 in. (610 mm) OC.
   C. Studs — Steel studs to be min 3-5/8 in. (92 mm) wide. 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 ceiling runner without attachment. When slotted ceiling runner (Item 2A1) is used steel studs secured to slotted ceiling runner with No. 8 by 1/2 in. (13 mm) long wafer head steel screws at midheight of slot on each side of wall. When vertical deflection ceiling runner (Item 2A2) is used, steel studs secured to slotted vertical deflection clips, through bushings, with steel screws at midheight of each slot. Stud spacing not to exceed 24 in. (610 mm) OC.
   D. Gypsum Board* — For 1 hr assembly, one layer of 5/8 in. (16 mm) thick gypsum board is required in the individual Wall and Partition Design. For 2 hr assembly, two layers of 5/8 in. (16 mm) thick gypsum board is required in the individual Wall and Partition Design. For both hourly ratings, a nominal 3/4 in. (19 mm) gap shall be maintained between the top of the gypsum board and the bottom surface of the steel deck and the top row of screws shall be installed into the studs 3 in. (76 mm) below the valleys of the steel floor units.
   The hourly fire rating of the joint system is equal to the hourly rating of the wall.
3. Fill, Void or Cavity Material* — Sealant - Max separation between bottom of floor or roof and top of wall is 3/4 in. (19 mm). The joint system is designed to accommodate a max 17 percent compression or extension from its installed width. Min 5/8 in. (16 mm) thickness of fill material installed on each side of the wall between the top of the gypsum board and the bottom of the steel deck, flush with each surface of wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 601S Elastomeric Firestop Sealant or CP 606 Flexible Firestop Sealant. L Ratings apply when CP 606 Sealant is used.
4. Forming Material — (Optional, Not Shown) - Mineral wool insulation, fiberglass batt insulation or polyurethane/polyethylene foam backer rod. Forming material to be recessed from both surfaces of the 2 hr fire rated wall to accommodate the required thickness of fill material.

*Bearing the UL Classification Mark

Hilti Firestop Systems

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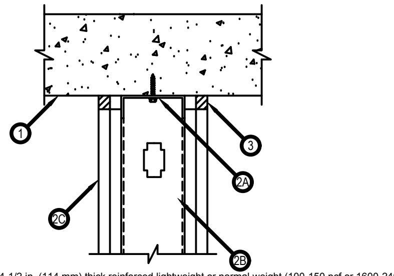
December 14, 2012

System No. HW-D-0209

C US
Classified by
Underwriters Laboratories, Inc.
to UL 2079 and CAN/ULC-S115

ANSI/UL2079	CAN/ULC S115
Assembly Ratings — 1 and 2 Hr (See Item 2)	F Ratings — 1 and 2 Hr (See Item 2)
Nominal Joint Width - 1 In.	FT Ratings — 1 and 2 Hr (See Item 2)
Class II Movement Capabilities — 19% Compression or Extension	FH Ratings — 1 and 2 Hr (See Item 2)
L Rating At Ambient — Less Than 1 CFM/sq ft (See Item 3)	FTH Ratings — 1 and 2 Hr (See Item 2)
L Rating At 400 F — Less Than 1 CFM/sq ft (See Item 3)	Nominal Joint Width - 1 In.
	Class II Movement Capabilities — 19% Compression or Extension
	L Rating At Ambient — Less Than 1 CFM/sq ft (See Item 3)
	L Rating At 400 F — Less Than 1 CFM/sq ft (See Item 3)



1. Floor Assembly — Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. Floor may also be constructed of any 6 in. (152 mm) thick UL Classified hollow-core Precast Concrete Units*.
   See Precast Concrete Units category in the Fire Resistance Directory for names of manufactures.
2. Wall Assembly — The 1 or 2 h fire rated gypsum board/steel stud wall assembly shall be constructed of the materials and in the manner specified in the individual U400, V400 or W400 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 gauge galv steel channels sized to accommodate steel studs (Item 2B).Flange height of ceiling runner shall be min 1/4 in. (6 mm) greater than max extended joint width. Ceiling runner secured with masonry anchors or steel fasteners spaced 24 in. (610 mm) OC.
   A1. Light Gauge Framing* — Slotted Ceiling Runner - As an alternate to the ceiling runner in Item 2A, slotted ceiling runner to consist of galv steel channel with slotted flanges sized to accommodate steel studs (Item 2B). Slotted ceiling runner secured to valleys lower surface of floor with steel fasteners spaced max 24 in. (610 mm) OC.
   CALIFORNIA EXPANDED METAL PRODUCTS CO — CST
   BRADY CONSTRUCTION INNOVATIONS INC, DBA SLIPTRACK SYSTEMS — SLP-TRK.
   MARINO/WARE, DIV OF WARE INDUSTRIES INC — Type SLT
   A2. Light Gauge Framing* — Vertical Deflection Ceiling Runner - As an alternate to the ceiling runners in Items 2A and 2A1, vertical deflection ceiling runner to consist of galv steel channel with slotted vertical deflection clips mechanically fastened within runner. Slotted clips provided with step bushings for permanent fastening of steel studs. Flanges sized to accommodate steel studs (Item 2B). Vertical deflection ceiling runner secured to lower surface of floor with steel fasteners spaced max 24 in. (610 mm) OC.
   THE STEEL NETWORK INC — VertiTrack VTD250, VTD362, VTD400, VTD600 and VTD800
   B. Studs — Steel studs to be min 3-1/2 in. (89 mm) wide. 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 ceiling runner without attachment. When slotted ceiling runner (Item 2A1) is used, steel studs secured to slotted ceiling runner with No. 8 by 1/2 in. (13 mm) long wafer head steel screws at midheight of slot on each side of wall. Stud spacing not to exceed 24 in. (610 mm) OC. When vertical deflection ceiling runner (Item 2A2) is used, steel studs secured to slotted vertical deflection clips, through the bushings, with steel screws at midheight of each slot. Stud spacing not to exceed 24 in. (610 mm) OC.
   C. Gypsum Board* — For 1 hr assembly, one layer of 5/8 in. (16 mm) thick gypsum board is required in the individual Wall and Partition Design. For 2 hr assembly, two layers of 5/8 in. (16 mm) thick gypsum board is required in the individual Wall and Partition Design. 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 in. (25 mm) gap shall be maintained between the top of gypsum board and bottom of concrete floor. The screws attaching the gypsum board to the studs at the top of the first layer shall be located 4 in. (102 mm) below the floor. The screws attaching the second layer to the steel studs shall be installed into the studs 3-1/2 in. (89 mm) below the floor.
   The hourly fire rating of the joint system is equql to the hourly ratings of the walls.
3. Fill, Void or Cavity Material* - Sealant — Max separation between bottom of floor and top of wall is 1 in. (25 mm). The joint system is designed to accommodate a max 17 percent compression or extension from its installed width. Min 5/8 in. (16 mm) thickness of fill material installed on each side of the wall between the top of the gypsum board and the bottom of the concrete floor, flush with each surface of the wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP601S Elastomeric Firestop Sealant or CP606 Flexible Firestop Sealant. L Ratings apply only when CP606 Sealant is used.
4. Forming Material — (Optional, Not Shown) - Mineral wool insulation, fiberglass batt insulation or polyurethane/polyethylene foam backer rod. Forming material to be recessed from both surfaces of the 2 hr fire rated wall to accommodate the required thickness of fill material.

*Bearing the UL Classification Mark

Hilti Firestop Systems

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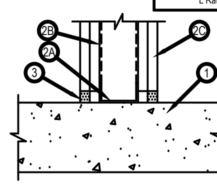
March 23, 2012

System No. BW-S-0002

C US
Classified by
Underwriters Laboratories, Inc.
to UL 2079 and CAN/ULC-S115

ANSI/UL2079	CAN/ULC S115
Assembly Ratings — 1 and 2 Hr (See Item 1)	F Ratings — 1 and 2 Hr (See Item 1)
Nominal Joint Width - 3/4 In.	FT Ratings — 1 and 2 Hr (See Item 1)
L Rating at Ambient — Less than 1 CFM/Lin Ft	FH Ratings — 1 and 2 Hr (See Item 1)
L Rating at 400° F — Less than 1 CFM/Lin Ft	FTH Ratings — 1 and 2 Hr (See Item 1)
	Nominal Joint Width - 3/4 In.
	L Rating at Ambient — Less than 1 CFM/Lin Ft
	L Rating at 400° F — Less than 1 CFM/Lin Ft



1. Floor Assembly — Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. Floor may also be constructed of any 6 in. (152 mm) thick UL Classified hollow-core Precast Concrete Units*.
   See Precast Concrete Units category in the Fire Resistance Directory for names of manufactures.
2. Wall Assembly — The 1 or 2 h fire-rated gypsum board/steel stud wall assembly shall be constructed of the materials and in the manner specified in the individual U400 or V400 Series Wall or Partition Design in the UL Fire Resistance Directory. In addition, the wall may incorporate a head-of-wall joint system as specified in the HW Series Joint Systems in the UL Fire Resistance Directory. The wall shall include the following construction features:
   A. Steel Floor Runners — Floor runners of wall assembly shall consist of min No. 25 gauge galv steel channels sized to accommodate steel studs (Item 2B). Floor runners to be provided with 1-1/4 in. (32 mm) flanges. Runners secured with steel fasteners spaced 12 in. (305 mm) OC.
   B. Studs — Steel studs to be min 3-1/2 in. (89 mm) wide. Studs cut 1/2 to 3/4 in. (13 to 19 mm) less in length than assembly height with bottom nesting in, resting on and fastened to floor runner with sheet metal screws. Stud spacing not to exceed 24 in. (610 mm) OC.
   C. Gypsum Board* — Gypsum board installed to a min total thickness of 5/8 or 1-1/4 in. (16 or 32 mm) on each side of wall for a 1 or 2 hr rated wall, 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 3/4 in. (19 mm) gap shall be maintained between the bottom of gypsum board and top of concrete floor. The hourly fire rating of the joint system is equal to the hourly fire rating of the wall.
3. Fill, Void or Cavity Material* Sealant — Max separation between top of floor and bottom of wall is 3/4 in. (19 mm). Min 5/8 in. (16 mm) thickness of fill material installed on each side of the wall between the bottom of the gypsum board and the top of the concrete floor, flush with each surface of the wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP601S Elastomeric Firestop Sealant, CP606 Flexible Firestop Sealant, CFS-S SIL GG, FS-ONE Sealant or FS-ONE MAX Intumescent Sealant

* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

Hilti Firestop Systems

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January 28, 2015

System No. HW-D-0636

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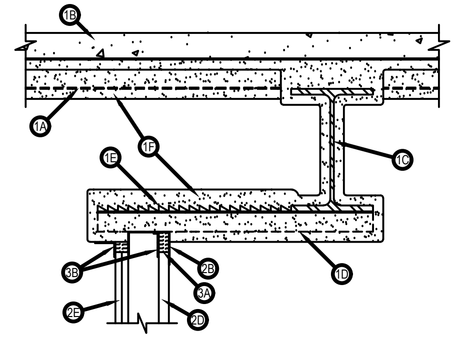
to UL 2079 and CAN/ULC-S115

Assembly Ratings — 1 and 2 Hr (See Items 1 and 2)
Maximum Joint Width - 1-1/2 In.
L Rating At Ambient — Less Than 1 CFM/Lin Ft
L Rating At 400°F — Less Than 1 CFM/Lin Ft
Class II or III Movement Capabilities - 50% 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 as noted below. The hourly fire rating of the floor assembly shall be equal to or greater than the hourly fire rating of the wall assembly. The floor assembly 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 max 12 in. (305 mm) from wall assembly.
   D. Steel Furring — Z-shaped bars or channels, located to span from steel beam to min 1 in. (25 mm) beyond face of wall and spaced max 24 in. (610 mm) on center. Z-shaped bars are nom 1-1/2 to 2 in. (38 to 51 mm) deep and formed from min 16 gauge painted or galvanized steel. Channels are nom 1-1/2 in. (38 mm) or 2 in. (51 mm) deep and formed from min 16 gauge painted or galvanized steel. Each bar or channel welded or fastened with steel fasteners to steel beam and welded, bolted or screwed to ceiling runner of wall. Each bar or channel shall be fully covered with spray applied fire resistive material to the minimum thickness of material required on the flanges of the steel beam.
   E. Steel Lath — Nom 3/8 in. (10 mm) diamond mesh expanded steel rib lath having a nom weight of 3.4 lb/yd2 (1.8 kg/m2) shall be installed over and attached to the steel furring bars or channels (Item 1D) to completely cover the exposed area from the flange tip of the steel beam to the end of the bar/channel framing extending beyond the wall surface. The lath shall be secured with steel fasteners or tie wire and shall be fully covered with spray applied fire resistive material (see Item 1F).
   F. Spray-Applied Fire Resistive Material* — After installation of ceiling runner, steel floor units and structural steel beam to be sprayed with the thickness of material specified in the individual D700 Series Design. The flutes of the steel floor units above the structural steel beam shall be filled with spray-applied fire resistive material across the entire top flange of the steel beam. Each bar or channel furring member (Item 1D) shall be fully covered with spray applied fire resistive material to the minimum thickness of material required on the flanges of the steel beam. The thickness of material applied to the expanded steel lath shall be sufficient to completely fill the spaces between the bar/channel furring above the wall. Additional spray-applied fire resistive material shall be applied to the web of the steel beam on each side of the wall. For a 1 hr Assembly Rating, the thickness of material applied to each side of the steel beam web shall be 13/16 in. (21 mm). For a 2 hr Assembly Rating, the thickness of material applied to each side of the steel beam web shall be 1-3/8 in. (35 mm). In addition, the thickness of material applied to the expanded steel lath shall cover the top surface of the lath with a minimum 1-5/8 in. (41 mm) of material for the 1 hr Assembly Rating and 2-5/8 in. (67 mm) of material for the 2 hr Assembly Rating.
   W R GRACE & CO - CONN — Type MK-6/HY, MK-6/HY ES, MK-6s, RG
   F1. Spray-Applied Fire Resistive Material* — After installation of ceiling runner, steel floor units and structural steel support to be sprayed with the min thickness of material specified in the individual D700 Series Design. The flutes of the steel floor units above the structural steel beam shall be filled with spray-applied fire resistive material across the entire top flange of the steel beam. Each bar or channel furring member (Item 1D) shall be fully covered with spray applied fire resistive material to the minimum thickness of material required on the flanges of the steel beam. The thickness of material applied to the expanded steel lath shall be sufficient to completely fill the spaces between the bar/channel furring above the wall. Additional material shall be applied to the web of the steel beam on each side of the wall. For a 1 hr Assembly Rating, the thickness of material applied to each side of the steel beam web shall be 11/16 in. (18 mm). For a 2 hr Assembly Rating, the thickness of material applied to each side of the steel beam web shall be 1-1/2 in. (38 mm). In addition, the thickness of material applied to the expanded steel lath shall cover the top surface of the lath with a minimum 1-5/8 in. (41 mm) of material for the 1 hr Assembly Rating and 2-5/8 in. (67 mm) of material for the 2 hr Assembly Rating.
   ISOLATEK INTERNATIONAL — Type 300
2. Shaft 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. The shaft wall may be installed in either direction and shall include the following construction features:
   A. Floor and Wall Runners — (Not Shown) - J-shaped runner, equal in width to steel studs (Item 2C), with unequal legs of 1 in. (25 mm) and 2 in. (51 mm), fabricated from 24 MSG galv steel. Runners positioned with short leg toward finished side of wall. Runners 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. Ceiling Runner — Ceiling runner of wall assembly shall consist of galv steel channel sized to accommodate steel studs (Item 2C). Flange height of ceiling runner shall be min 1/4 in. (6 mm) greater than max extended joint width. Ceiling runner is secured to steel furring (Item 1D) with steel fasteners or welds spaced max 24 in. (610 mm) OC. Ceiling runner to be installed parallel with structural steel support and located such that a max clearance of 12 in. (305 mm) is present between the finished wall and the flange of the steel beam (Item 1C).
   B1. Light Gauge Framing* — Slotted Ceiling Runner — As an alternate to the ceiling runner in Item 2B, slotted ceiling runner to consist of galv steel channel, sized to accommodate steel studs (Item 2C). Flange height of slotted ceiling runner shall be 3-1/4 in. (83 mm) with 2 in. (51 mm) deep slots. Slotted ceiling runner is secured to steel furring (Item 1D) with steel fasteners or welds spaced max 24 in. (610 mm) OC. Slotted ceiling runner to be installed parallel with structural steel support and located such that a max clearance of 12 in. (305 mm) is present between the finished wall and the flange of the steel beam (Item 1C).
   SCAFCO STEEL STUD MANUFACTURING CO — Slotted Track-Type SDLT
   C. Steel Studs — C-H-shaped studs, min 4 in. (102 mm) wide by 1-1/2 in. (38 mm) deep, fabricated from 25 MSG galv steel, cut to lengths 3/4 to 1 in. (19 to 25 mm) less than floor to ceiling height and spaced 24 in. (610 mm) OC. When slotted ceiling runner specified in Item 2B1 is used the C-H-shaped studs cut in lengths 3/4 to 1-3/4 in. (19 to 44 mm) less than floor to ceiling height and spaced 24 in. (610 mm) OC.
   D. Gypsum Board* — Nom 1 in. (25 mm) thick gypsum board liner panels. Panels cut 1-1/2 in. (38 mm) less in length than floor to ceiling height. Vertical edges inserted in H-shaped section of C-H studs. At the ends of the assembly, the free edge of the end panels are attached to the long leg of vertical J-runners (Item 2A) with 1-5/8 in. (41 mm) long Type S steel screws spaced max 12 in. (305 mm) OC.
   E. Gypsum Board* — Nom 5/8 in. (16 mm) thick gypsum board applied vertically in one or two layers for 1 hr and 2 hr fire rated assemblies, respectively. Panels cut such that a max 1-1/2 in. (38 mm) gap shall be maintained between the top of the gypsum board and the bottom plane of the spray applied fire resistive material on the steel furring (Item 1D). The screws attaching the gypsum board layers to the C-H studs shall be located 1 to 1-1/2 in. (25 to 38 mm) below the bottom of the ceiling runner or slotted ceiling track. No gypsum board attachment screws are to penetrate 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 plane of spray-applied fire resistive material on the steel attachment clip (Item 1D) and the top of the gypsum board is 1-1/2 in. (38 mm). The joint system is designed to accommodate a max 50 percent compression or extension from its installed width. The joint system shall consist of forming and fill materials, as follows:
   A. Fill, Void or Cavity Material* - Sealant — Min 1/16 in. (1.6 mm) dry thickness (1/8 in. or 3.2 mm wet thickness) fill material sprayed or toweled on each side of wall to completely cover mineral wool forming material and to overlap min 1/2 in. (13 mm) onto wall and min 2 in. (51 mm) onto spray-applied fire resistive material.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP672 Firestop Spray or CFS-SP WB Firestop Joint Spray
   B. Forming Material* — Min 4 pcf (64 kg/m3) density mineral wool batt insulation cut to a thickness twice larger than the distance between the top of the gypsum board and the bottom plane of the spray applied fire resistive material on the steel furring (Item 1D). Material compressed 50 percent and installed within ceiling runner above top of liner panel flush with the inside surface of the panel. Material compressed and installed on finished side of the wall between the top of the gypsum board and the bottom of the steel floor units, flush with the surface of the wall.
   ROCK WOOL MANUFACTURING CO — Delta Board
   ROXUL INC — SAFE
   THERMAFIBER INC — Type SAF
   B1. Forming Material* - Strips — As an alternate to Item 2B, the strips are stacked to a height twice larger than the distance between the top of the gypsum board and the bottom plane of the spray applied fire resistive material on the steel furring (Item 1D). Strips compressed 50 percent and installed within ceiling runner above top of liner panel flush with the inside surface of the panel. Strips compressed and installed on finished side of the wall between the top of the gypsum board and the bottom of the steel floor units, flush with the surface of the wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 767 Speed Strips
   C. Fill, Void or Cavity Material* — Min 1/16 in. (1.6 mm) dry thickness (1/8 in. or 3.2 mm wet thickness) of fill material sprayed or troweled within stud cavity and on both sides of the shaft wall to completely cover mineral wool forming material. Fill material to overlap a min of 1/2 in. (13 mm) onto gypsum board and ceiling runner within stud cavity. Fill material to overlap a min of 1/2 in. (13 mm) onto gypsum board and a min of 2 in. (51 mm) onto the spray-applied fire resistive material on finished side of wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 672 Firestop Spray or CFS-SP WB Firestop Joint Spray

*Bearing the UL Classification Mark

Hilti Firestop Systems

Reproduced by HILTI, Inc. Courtesy of
Underwriters Laboratories, Inc.
January 11, 2013

Notes:

1. Refer to section 07840 of the specifications. For Quality Control requirements, refer to the Quality Control portion of the specification.
2. Details shown are typical details. If field conditions do not match requirements of typical details, approved alternate details shall be utilized. Field conditions and dimensions need to be verified for compliance with the details, including but not limited to the following:
   ** Minimum and maximum Width of Joints*
   ** Type and thickness of fire-rated construction. The minimum assembly rating of the firestop assembly shall meet or exceed the highest rating of the adjacent construction.*
3. If alternate details matching the field conditions are not available, Manufacturer's engineering judgment drawings are acceptable. Drawings shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.
4. References:
   ** Underwriter's Laboratories Fire Resistance Directory*
   ** Intertek Directory of Listed Products*
   ** NFPA 101 Life Safety Code*
   ** All governing local and regional building codes*
5.Firestop System installation must meet requirements of UL 2079 tested assemblies that provide the required assembly rating.
6. All rated assemblies shall be prominently labeled with the following information:
   ** ATTENTION: Fire Rated Assembly*
   ** UL System #*
   ** Product(s) used*
   ** Hourly Rating (Assembly Rating)*
   ** Installation Date*

<Notes to designer (delete this note after reading and replace with title block information)>
1. Any modification to these details could result in an application/system not meeting the UL or Intertek Classification or the intended temperature or fire ratings.
2. Details shown are up to date as of February 2015.
3. For additional information on the details, refer to the most current "Underwriter's Laboratories Fire Resistance Directory (volume 2.)"

JOB NUMBER:

DRAWN:

CHECKED:

ISSUE DATE:

REVISIONS:

TYPICAL FIRESTOP JOINT DETAILS

SHEET NAME:

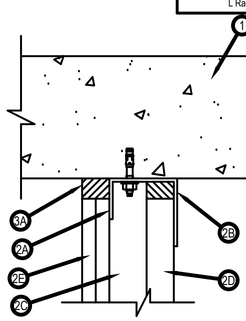
SHEET NUMBER:

A.3.7

Classified by Underwriters Laboratories, Inc. to UL 2079 and CAN/ULC-S115

System No. HW-D-0342

ANSI/UL2079	CAN/ULC S115
Assembly Rating — 2 Hr	F Rating — 2 Hr
Nominal Joint Width - 1 In.	FT Rating — 2 Hr
Class II Movement Capabilities — 8% Compression and Extension	FH Rating — 2 Hr
L Rating At Ambient — Less Than 1 CFM/lin ft	FTH Rating — 2 Hr
L Rating At 400 F — Less Than 1 CFM/lin ft	Nominal Joint Width - 1 In.
	Class II Movement Capabilities — 8% Compression and 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 — 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 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, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
   A. Floor and Ceiling Runners — J-shaped runner, 2-1/2 in. (64 mm) wide with unequal legs of min 1-1/4 in. (32 mm) and 2 in. (51 mm), fabricated from min 24 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. (51 mm) from ends and not greater than 24 in. (610 mm) OC.
   B. Light Gauge Framing* - Slotted Ceiling Track — (Optional) Slotted ceiling track shall consist of galv steel channels with slotted flanges. Slotted ceiling track sized to accommodate steel "C-H" studs (Items 2C). Attached to concrete at ceiling with steel fasteners spaced max 24 in. (610 mm) OC.
   CALIFORNIA EXPANDED METAL PRODUCTS CO — CST
   BRADY CONSTRUCTION INNOVATIONS INC, DBA SLIPTRACK SYSTEMS — SLP-TRK
   MARINO/WARE, DIV OF WARE INDUSTRIES INC — Type SLT
   B1. Light Gauge Framing Members* — (Optional Not Shown) - As an option, the steel studs (Item 2C) may incorporate vertical deflection clips for attachment to the ceiling runner (Item 2A) in accordance with the manufacturer's instructions.
   THE STEEL NETWORK INC — VertiClip SLD 150.
   C. Steel Studs — C-H-shaped studs, 2-1/2 in. (64 mm) wide by 1-1/2 in. (38 mm) deep, fabricated from min 25 MSG galv steel, cut to lengths 3/8 to 1/2 in. (10 to 13 mm) less than floor to ceiling height and spaced 24 in. (610 mm) OC. Studs nest in floor runner at bottom and J runner or slotted ceiling track at top. 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. 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.
   D. Gypsum Board* — 1 in. (25 mm) thick by 24 in. (610 mm) wide gypsum board liner panels as specified in the individual U400 or V400-Series design. Panels cut 1 in. (25 mm) less in length than floor to ceiling height. Vertical edges inserted in "H"-shaped section of "C-H" studs. At the ends of the assembly, the free edge of the end panels are attached to the long leg of vertical J-runners (Item 2A) with 1-5/8 in. (41 mm) long Type S steel screws spaced max 12 in. (305 mm) OC.
   E. Gypsum Board* — Gypsum board sheets, 1/2 or 5/8 in. (13 or 16 mm) thick, applied vertically or horizontally in two layers on finished side of wall as specified in the individual U400 or V400-Series 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 layers to the C-H studs shall be located 1 in. (25 mm) below the bottom of the J-runner or slotted ceiling track. No gypsum board attachment screws are to penetrate the ceiling J-runner and slotted ceiling track.
3. Joint System — Max separation between top of liner panel (Item 2D) and between top of gypsum board sheets (Item 2E) at time of installation of joint system is 1 in. (25 mm). The joint system is designed to accommodate a maximum 8 percent compression and extension from its installed width. The joint system consists of the following:
   A. 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 2D) and top inside surface of ceiling J-runner or slotted ceiling track prior to installation of gypsum board (ItemD2E) on finished side of wall. Min 1 in. (25 mm) depth of sealant to be installed to fill linear gap between top of gypsum board sheets (Item 2E) and bottom of concrete floor.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 606

*Bearing the UL Classification Mark

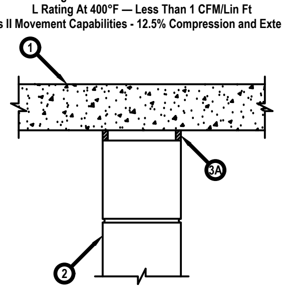
Hilti Firestop Systems

Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. March 23, 2012

Classified by Underwriters Laboratories, Inc. to UL 2079 and CAN/ULC-S115

System No. HW-D-0268

Assembly Rating - 3 Hr
Nominal Joint Width - 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 Movement Capabilities - 12.5% Compression and Extension



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. 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 of manufacturers.
2. Wall Assembly — Min 8 in. (203 mm) thick steel reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. Wall may also be constructed of any UL Classified Concrete Blocks*.
   See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.
3. Joint System — Max separation between bottom of floor assembly and top of concrete wall at time of installation is 1 in. (25 mm). The joint system is designed to accommodate a max 12.5 percent compression or extension from its installed width. The joint system shall consists of the following:
   A. Fill, Void or Cavity Material* - Sealant — A 1/2 in. (13 mm) thickness of fill material installed within the joint, flush with each surface of the wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP606 Flexible Firestop Sealant
   B. Forming Material — (Optional, Not Shown) - Mineral wool insulation or polyurethane foam backer rod. Forming material to be recessed from both surfaces of the wall as required to accommodate the required thickness of fill material.

*Bearing the UL Classification Mark

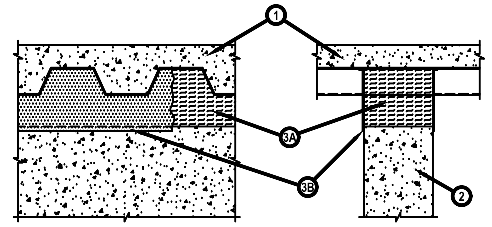
Hilti Firestop Systems

Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. June 26, 2008

Classified by Underwriters Laboratories, Inc. to UL 2079 and CAN/ULC-S115

System No. HW-D-1037

Assembly Rating - 2 Hr
Nominal Joint Width - 3-1/2 In.
Class II Movement Capabilities - 14% Compression and Extension



SECTION A-A

1. Floor Assembly — The fire-rated fluted steel floor unit/concrete floor assembly shall be constructed of the materials and in the manner described in the individual Floor-Ceiling Design in the 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 Materials* — (Optional)—(Not Shown)—Prior to the installation of the forming material and fill, void or cavity material (Items 3A, 3B) the steel floor units may be sprayed with a min 5/16 in. (8 mm) to max 1-3/4 in. (44 mm) thickness of fire resistive material.
   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 P900 Series Roof-Ceiling Design 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 — Min 2-1/4 in. (57 mm) thick poured insulating concrete, as measured from the top plane of the floor units.

1B. Roof Assembly — As an alternate to Items 1 and 1A, a fire rated protected 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 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. Spray-Applied Fire Resistive Materials* — (Not Shown) - Prior to the installation of the steel ceiling runners, Forming Material and Fill, Void or Cavity Material (Items 2A, 3A, 3B), the roof assembly shall be sprayed with the type and thickness of fire resistive material indicated in the individual P700 Series design.

2. Wall Assembly — Min 8 in. (203 mm) thick steel reinforced lightweight or normal weight (100-150 pcf) (1600 -2400 kg/m3) structural concrete. Wall may also be constructed of any UL Classified Concrete Blocks*.
   See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.
3. Joint System — Max separation between bottom of floor units and top of concrete wall at time of installation is 3-1/2 in. (89 mm). The joint system is designed to accommodate a max 14 percent compression or extension from its installed width. The joint system shall consists of the following:
   A. Forming Material* — Nom 4 in. (102 mm) thick pieces of nom 4 pcf (64 kg/m3) forming material sized to attain a min compression rate of 50 percent in the thickness direction firmly packed to completely fill the flutes. Additional pieces of batt insulation, min 8 in. (203 mm) wide, shall be compressed 50 percent in thickness and installed edge first into joint opening between bottom of fluted floor or roof units and top of concrete wall.
   THERMAFIBER INC — Type SAF
   A1. Forming Material*—Plugs — Optional-Not Shown) Performed mineral wool plugs, formed to the shape of the fluted floor units, friction fit to completely fill the flutes above the ceiling runner. The plugs shall be flush with both wall surfaces. Additional forming material, described in Item 3A, to be used in conjunction with the plugs to fill the gap between the top of the wall and the bottom of the steel floor units.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP777 Speed Plugs
   A2. Forming Material — As an alternate to Item 3A, min 6 pcf (96 kg/m3) ceramic blanket insulation installed in joint as a permanent form. Nominal 4 in (102 mm) thick pieces of nominal 6 pcf (96 kg/m3) forming material sized to attain a min compression rate of 50 percent in the thickness direction firmly packed to completely fill the flutes. Additional pieces of batt insulation, min 8 in. (203 mm) wide, shall be compressed 50 percent in thickness and installed edge first into joint opening between bottom of fluted floor or roof units and top of concrete wall.
   B. Fill, Void or Cavity Material* - Sealant — A 1/8 in. (3.2 mm) wet thickness of fill material sprayed of trowled on each side of wall to completely cover mineral wool forming material and to overlap a min 1/2 in. (13 mm) onto steel floor units and concrete wall. When spray-applied fire resistive material* is applied to the steel deck, the fill material is to overlap the wall a min ½ in. and the spray-applied fire resistive material a min of 2 in. (51 mm) on both sides of the wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP672 Firestop Spray or CFS-SP WB Firestop Joint Spray

*Bearing the UL Classification Mark

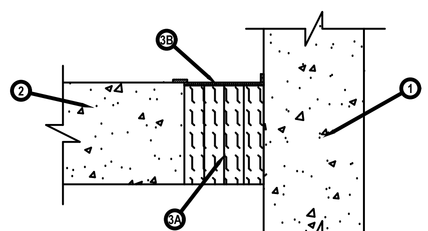
Hilti Firestop Systems

Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. December 14, 2012

Classified by Underwriters Laboratories, Inc. to UL 2079 and CAN/ULC-S115

System No. FW-D-1013

Assembly Rating - 2 Hr
Nominal Joint Width - 3-1/2 in.
Class II Movement Capabilities - 14% Compression or Extension



1. Wall Assembly — Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. Wall may also be constructed of any UL Classified Concrete Blocks*.
   See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. Floor Assembly — Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100 - 150 pcf or 1600-2400 kg/m3) structural concrete.
3. Joint System — Max separation between edge of floor and face of wall (at time of installation of joint system) is 3-1/2 in. (89 mm). The joint system is designed to accommodate a max 14 percent compression or extension from its installed width. The joint system shall consist of the following:
   A. Packing Material — Min 4 pcf (64 kg/m3) mineral wool batt insulation installed in joint opening as a permanent form. Pieces of batt cut to min width of 4-3/8 in. (117 mm) and installed edge-first into joint opening, parallel with joint direction, such that batt sections are compressed min 42 percent in thickness and that the compressed batt sections are recessed from top surface of the floor as required to accommodate the required thickness of fill material. Adjoining lengths of batt to be tightly-butted with butted seams spaced min 24 in. (610 mm) apart along the length of the joint.
   B. Fill, Void or Cavity Material* — Sealant — Min 1/8 in. (3.2 mm) wet thickness of fill material applied within the joint, flush with top surface of floor and lapping a min 1/2 in. (13 mm) onto the top surface of the floor and edge of the wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP672 Firestop Spray or CFS-SP WB Firestop Joint Spray

*Bearing the UL Classification Mark

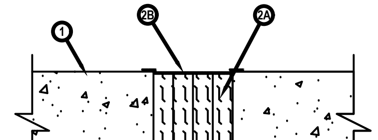
Hilti Firestop Systems

Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. June 04, 2010

Classified by Underwriters Laboratories, Inc. to UL 2079 and CAN/ULC-S115

System No. FF-D-1013

Assembly Rating - 2 Hr
Nominal Joint Width - 3-1/2 in.
Class II Movement Capabilities - 14% Compression or Extension



1. Floor Assembly — Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100 - 150 pcf or 1600 - 2400 kg/m3) structural concrete.
2. Joint System — Max width of joint (at time of installation of joint system) is 3-1/2 in. (89 mm). The joint system is designed to accommodate a max 14 percent compression or extension from its installed width. The joint system shall consist of the following:
   A. Packing Material — Min 4 pcf (64 kg/m3) mineral wool batt insulation installed in joint opening as a permanent form. Pieces of batt cut to min width of 4-3/8 in. (111 mm) and installed edge-first into joint opening, parallel with joint direction, such that batt sections are compressed min 42 percent in thickness and that the compressed batt sections are recessed from top surface of the floor as required to accommodate the required thickness of fill material. Adjoining lengths of batt to be tigthly-butted with butted seams spaced min 24 in. (610 mm) apart along the length of the joint.
   B. Fill, Void or Cavity Material* — Sealant — Min 1/8 in. (3.2 mm) wet thickness of fill material applied within the joint, flush with top surface of floor and lapping a min 1/2 in. (13 mm) onto the top surface of the floor.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP672 Firestop Spray or CFS-SP WB Firestop Joint Spray

*Bearing the UL Classification Mark

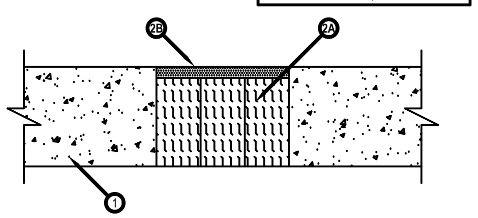
Hilti Firestop Systems

Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. June 04, 2010

Classified by UUnderwriters Laboratories, Inc. to UL 2079 and CAN/ULC-S115

System No. FF-D-1039

ANSI/UL2079	CAN/ULC S115
Assembly Rating —2 Hr	F Rating — 2 Hr
Nominal Joint Width - 6 In.	FT Rating — 2 Hr
Class II Movement Capabilities — 10% Compression or Extension	FH Rating — 2 Hr
	FTH Rating — 2 Hr
	Nominal Joint Width - 6 In.
	Class II Movement Capabilities — 10% Compression or Extension



1. Floor Assembly — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) structural concrete.
2. Joint System — Max width of joint (at time of installation of joint system) is 6 in. The joint system is designed to accommodate a max 10 percent compression or extension from its installed width. The joint system shall consist of the following:
   A. Forming Material — Min 4 pcf mineral wool batt insulation installed in joint opening as a permanent form. Pieces of batt cut to min width of 4 in. and installed edgefirst into joint opening, parallel with joint direction, such that batt sections are compressed min 50 percent in thickness and that the compressed batt sections are recessed a min of 1/2 in. from top surface of the floor to accommodate the required thickness of fill material. Adjoining lengths of batt to be tightly-butted with butted seams spaced min 24 in. apart along the length of the joint.
   THERMAFIBER INC — Type SAF
   B. Fill Void or Cavity Material* - Sealant — Min 1/2 in. thickness of fill material applied within the joint, flush with top surface of floor.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP604 Self-Leveling Firestop Sealant, CFS-S SIL GG or CFS-S SIL SL (floors only) Sealant

*Bearing the UL Classification Mark

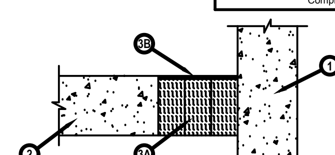
Hilti Firestop Systems

Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. December 26, 2013

Classified by Underwriters Laboratories, Inc. to UL 2079 and CAN/ULC-S115

System No. FW-D-1037

ANSI/UL2079	CAN/ULC S115
Assembly Rating — 2 Hr	F Rating — 2 Hr
Nominal Joint Width - 6In.	FT Rating — 2 Hr
Class II Movement Capabilities - 10% Compression or Extension	FH Rating — 2 Hr
	FTH Rating — 2 Hr
	Nominal Joint Width - 6 In.
	Class II Movement Capabilities - 10% Compression or Extension



1. Wall Assembly — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) structural concrete. Wall may also be constructed of any UL Classified Concrete Blocks*.
   See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufactures.
2. Floor Assembly — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) structural concrete.
3. Joint System — Max separation between edge of floor and face of wall (at time of installation of joint system) is 6 in. The joint system is designed to accommodate a max 10 percent compression or extension from its installed width. The joint system shall consist of the following:
   A. Forming Material — Min 4 pcf mineral wool batt insulation installed in joint opening as a permanent form. Pieces of batt cut to min width of 4 in. and installed edgefirst into joint opening, parallel with joint direction, such that batt sections are compressed min 50 percent in thickness and that the compressed batt sections are recessed a min of 1/2 in. from top surface of the floor to accommodate the required thickness of fill material. Adjoining lengths of batt to be tightly-butted with butted seams spaced min 24 in. apart along the length of the joint.
   THERMAFIBER INC — Type SAF
   B. Fill Void or Cavity Material* - Sealant — Min 1/2 in. thickness of fill material applied within the joint, flush with top surface of floor.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP604 Self-Leveling Firestop Sealant, CFS-S SIL GG or CFS-S SIL SL (floors only) Sealant

*Bearing the UL Classification Mark

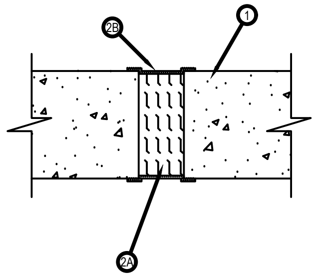
Hilti Firestop Systems

Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. December 27, 2013

Classified by Underwriters Laboratories, Inc. to UL 2079 and CAN/ULC-S115

System No. WW-D-0017

Assembly Rating — 2 Hr
Nominal Joint Width — 2 In.
L Rating At Ambient — Less Than 1 CFM/Lin Ft
L Rating At 400°F — Less Than 1 CFM/Lin Ft
Class II Movement Capabilities — 12.5% Compression or Extension



1. Wall 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. Wall may also be constructed of any UL Classified Concrete Blocks*.
2. Joint System — Max width of joint (at time of installation of joint system) is 2 in. (51 mm). The joint system is designed to accommodate a max 12.5 percent compression or extension from its installed width. The joint system shall consist of the following:
   A. Forming Material* — Min 4 pcf (64 kg/m3) mineral wool batt insulation installed in joint opening as a permanent form. Batt cut to min width of 4-1/4 in. (108 mm) and installed cut edge-first into joint opening, parallel with joint direction, such that batt sections are compressed min 50 percent in thickness and such that the compressed batt sections are recessed from both surfaces of wall to accommodate the required thickness of fill material. Adjoining lengths of batt to be tightly butted with butted seams spaced min 48 in. (1.2 m) apart along the lengths of the joint.
   ROCK WOOL MANUFACTURING CO — Delta Board
   B. Fill, Void or Cavity Material* — 1/16 in. (1.6 mm) dry thickness (min 1/8 in. or 3.2 mm wet thickness) of fill material applied within the joint, flush with both surfaces of wall and lapping 1/2 in. (13 mm) onto surfaces of wall on both sides of wall assembly.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP672 Firestop Spray or CFS-SP WB Firestop Joint Spray

*Bearing the UL Classification Mark

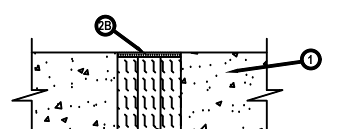
Hilti Firestop Systems

Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. June 07, 2010

Classified by Underwriters Laboratories, Inc. to UL 2079 and CAN/ULC-S115

System No. WW-D-1011

Assembly Rating - 3 Hr
Nominal Joint Width - 3-1/2"
Class II Movement Capabilities - 14% Compression or Extension



1. Wall Assembly — Min 4-3/4 in. thick reinforced lightweight or normal weight (100-150 pcf) structural concrete. Wall may also be constructed of any UL Classified Concrete Blocks*.
   See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. Joint System — Max width of joint (at time of installation of joint system) is 3-1/2 in. The joint system is designed to accommodate a max 14 percent in compression or extension from its installed width. The joint system shall consist of the following:
   A. Forming Material — Min 4 pcf mineral wool batt insulation installed in joint opening as a permanent form. Pieces of batt cut to min width of 4-1/4 in. and installed edge-first into joint opening, parallel with joint direction, such that batt sections are compressed min 42 percent in thickness and that the compressed batt sections are recessed from both surfaces of the wall as required to accommodate the required thickness of fill material. Adjoining lenghts of batt to be tightly-butted with butted seams spaced min 24 in. apart along the length of the joint.
   FIBREX INSULATIONS INC — FBX Safing Insulation
   B. Fill, Void or Cavity Material* — Sealant — Min 1/4 in. thickness of fill material applied within the joint, flush with both surfaces of wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP601s Elastomeric Firestop Sealant

*Bearing the UL Classification Mark

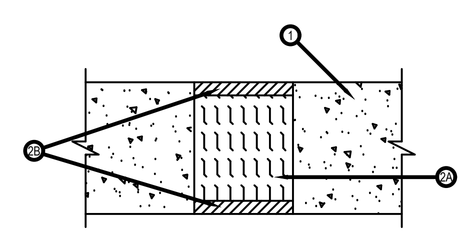
Hilti Firestop Systems

Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. July 18, 2002

Classified by Underwriters Laboratories, Inc. to UL 2079 and CAN/ULC-S115

System No. WW-D-1012

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 — 3-3/4 in.
Class II Movement Capabilities — 7% Compression Or Extension
Based On 500 Cycles At A Minimum 1 Cycle/Minute



1. Wall Assembly — Min 5 in. thick reinforced lightweight or normal weight (100-150 pcf) structural concrete. Wall may also be constructed of any UL Classified Concrete Blocks*.
   See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. Joint System — Max width of joint (at time of installation of joint system) is 3-3/4 in. The joint system is designed to accommodate a max 7 percent in compression or extension from its installed width. The joint system shall consist of the following:
   A. Forming Material — Min 4 pcf mineral wool batt insulation installed in joint opening as a permanent form. Pieces of batt cut to min width of 4 in. and installed edge-first into joint opening, parallel with joint direction, such that batt sections are compressed min 42 percent in thickness and that the compressed batt sections are recessed from both surfaces of the wall as required to accommodate the required thickness of fill material. Adjoining lengths of batt to be tightly-butted with butted seams spaced min 24 in. apart along the length of the joint.
   FIBREX INSULATIONS INC — FBX Safing Insulation
   B. Fill, Void or Cavity Material* — Sealant — Min 1/2 in. thickness of fill material applied within the joint, flush with both surfaces of wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF
   HILTI INC — CP606 Flexible Firestop Sealant

*Bearing the UL Classification Mark

Hilti Firestop Systems

Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. June 17, 2003

Notes:

1. *Refer to section 07840 of the specifications. For Quality Control requirements, refer to the Quality Control portion of the specification.*
2. *Details shown are typical details. If field conditions do not match requirements of typical details, approved alternate details shall be utilized. Field conditions and dimensions need to be verified for compliance with the details, including but not limited to the following:*
   * Minimum and maximum Width of Joints*
   * Type and thickness of fire-rated construction. The minimum assembly rating of the firestop assembly shall meet or exceed the highest rating of the adjacent construction.*
3. *If alternate details matching the field conditions are not available, Manufacturer's engineering judgment drawings are acceptable. Drawings shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.*
4. *References:*
   * Underwriter's Laboratories Fire Resistance Directory*
   * Intertek Directory of Listed Products*
   * NFPA 101 Life Safety Code*
   * All governing local and regional building codes*
5. *Firestop System installation must meet requirements of UL 2079 tested assemblies that provide the required assembly rating.*
6. *All rated assemblies shall be prominently labeled with the following information:*
   * ATTENTION: Fire Rated Assembly*
   * UL System #*
   * Product(s) used*
   * Hourly Rating (Assembly Rating)*
   * Installation Date*

<Notes to designer (delete this note after reading and replace with title block information)>
1. Any modification to these details could result in an application/system not meeting the UL or Intertek Classification or the intended temperature or fire ratings.
2. Details shown are up to date as of February 2015.
3. For additional information on the details, refer to the most current "Underwriter's Laboratories Fire Resistance Directory (volume 2.)"

JOB NUMBER:

DRAWN:

CHECKED:

ISSUE DATE:

REVISIONS:

TYPICAL FIRESTOP JOINT DETAILS

SHEET NAME:

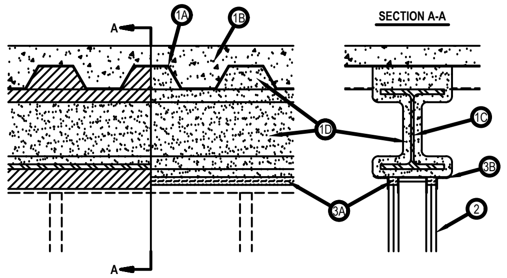
SHEET NUMBER:

A.4.7

CLASSIFIED C US
Classified by Underwriters Laboratories, Inc. to UL 2079 and CAN/ULC-S115

System No. HW-D-0259

ANSI/UL2079	CAN/ULC S115
Assembly Ratings — 1 and 2 Hr (See Items 1 and 2)	F Ratings — 1 and 2 Hr (See Items 1 and 2)
Nominal Joint Width - 1-1/2 In.	FT Ratings — 1 and 2 Hr (See Items 1 and 2)
Class II Movement Capabilities — 50% Compression or Extension	FH Ratings — 1 and 2 Hr (See Items 1 and 2)
L Rating At Ambient — Less Than 1 CFM/sq ft	FTH Ratings — 1 and 2 Hr (See Items 1 and 2)
L Rating At 400 F — Less Than 1 CFM/sq ft	Nominal Joint Width - 1-1/2 In.
	Class II Movement Capabilities — 50% Compression or Extension
	L Rating At Ambient — Less Than 1 CFM/sq ft
	L Rating At 400 F — Less Than 1 CFM/sq ft



1. Floor Assembly — The fire-rated fluted steel floor unit/concrete floor assembly shall be constructed of the materials and in the manner described in the individual Floor-Ceiling Design in the 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. Structural steel support centered over and parallel with wall assembly.
   D. Spray-Applied Fire Resistive Material* — Steel floor units and structural steel beam to be sprayed with the thickness of material specified in the individual D700 Series Design or the structural steel supports to be sprayed in accordance with the specifications in the individual D900 Series 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. For a 1 hr Assembly Rating, the total thickness of material applied to each side of the steel beam web shall be min 13/16 in. (21 mm). For a 2 hr Assembly Rating, the total thickness of material applied to each side of the steel beam web shall be min 1-3/8 in. (35 mm).
   W R GRACE & CO CONSTRUCTION PRODUCTS DIV — Type MK-6-HY.
   D1. Spray-Applied Fire Resistive Material* — Steel floor units and structural steel support to be sprayed with the min thickness of material specified in the individual D700 or D900 Series 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. For a 1 hr Assembly Rating, the total thickness of material applied to each side of the steel beam web shall be min 11/16 in. (18 mm). For a 2 hr Assembly Rating, the total thickness of material applied to each side of the steel beam web shall be min 1-1/2 in. (38 mm).
   ISOLATEK INTERNATIONAL — Type 300
2. Wall Assembly* — The 1 or 2 h fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U400, V400 or W400 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 gauge galv steel channels sized to accommodate steel studs (Item 2B). Flange height of ceiling runner shall be min 1/4 in. (6 mm) greater than max extended joint width. Ceiling runner centered beneath and parallel with steel beam (Item 1C). Ceiling runner secured to steel beam through spray-applied fire resistive material with steel fasteners spaced max 24 in. (610 mm) OC.
   A1. Light Gauge Framing* — Slotted Ceiling Runner As an alternate to the ceiling runner in Item 2A, slotted ceiling runner to consist of galv steel channel with slotted flanges sized to accommodate steel studs (Item 2B). Slotted ceiling runner centered beneath and parallel with steel beam (Item 1C). Slotted ceiling runner secured to steel beam with steel fasteners, 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
   CLARKDIETRICH BUILDING SYSTEMS — Type SLT, SLT-H
   MARINO/WARE, DIV OF WARE INDUSTRIES INC — Type SLT
   SCAFCO STEEL STUD MANUFACTURING CO
   TELLING INDUSTRIES L L C — True-Action Deflection Track
   THE STEEL NETWORK INC — VertiTrack VT, series,250VT, 362VT, 400VT, 600VT and 800VT
   A2. Light Gauge Framing* — Vertical Deflection Ceiling Runner As an alternate to the ceiling runners in Item 2A and 2A1, vertical deflection ceiling runner to consist of galv steel channel with slotted vertical deflection clips mechanically fastened within runner. Slotted clips, provided with step bushings, for permanent fastening of steel studs. Flanges sized to accommodate steel studs (Item 2B). Vertical deflection ceiling runner centered beneath and parallel with steel beam (Item 1C). Vertical Deflection ceiling runner secured to steel beam with steel fasteners, steel fasteners or welds spaced max 24 in. (610 mm) OC.
   THE STEEL NETWORK INC — VertiTrack VTD362, VTD400, VTD600 and VTD800.
   A3. Light Gauge Framing*- Notched Ceiling Runner — As an alternate to the ceiling runners in Items 2A through 2A2, notched ceiling runners to consist of C-shaped galv steel channel with notched return flanges sized to accommodate steel studs (Item 2B). Notched ceiling runner installed perpendicular to direction of fluted steel deck and secured to valleys with steel masonry anchors, steel fasteners or welds spaced max 24 in. (610 mm) OC.
   OLMAR SUPPLY INC — Type SCR
   A4. Light Gauge Framing* — Slotted Ceiling Runner — As an alternate to the ceiling runner in Item 2A through 2A3, ceiling runner to consist of galv steel channel with slotted flanges sized to accommodate steel studs (Item 2B). Flange height of slotted ceiling runner shall be 3-1/4 in. (83 mm) with 2 in. (51 mm) deep slots. Slotted ceiling runner centered beneath and parallel with steel beam (Item 1C). Slotted ceiling runner secured to steel beam with steel fasteners or welds spaced max 24 in. (610 mm) OC.
   SCAFCO STEEL STUD MANUFACTURING CO — Slotted Track-Type SDLT
   B. Studs — Steel studs to be min 3-1/2 in. (89 mm) wide. Studs cut 3/4 in. to 1-1/4 in. (19 to 32 mm) less in length than assembly height with bottom nesting in, resting on and fastened to the floor runner and with top nesting in ceiling runner without attachment. When slotted ceiling runner (Item 2A1) is used, steel studs secured to slotted ceiling runner with No. 8 by 1/2 in. (13 mm) long wafer head steel screws at midheight of slot on each side of wall. When vertical deflection runner (Item 2A2) is used, studs secured to vertical clip through slip bushing, supplied, with No.8 by 1/2 in. (13 mm) steel screws at mid-height of slot of each slot. Stud spacing not to exceed 24 in. (610 mm) OC. When slotted ceiling runner (Item 2A4) is used, steel studs cut in lengths 3/4 to 1-3/4 in. (19 to 44 mm) less than floor to ceiling height and secured to slotted ceiling runner with No. 8 by 1/2 (13 mm) long wafer head steel screws at +/- 3/16 in. (5 mm) of the mid-height of slot on each side of wall.
   C. Gypsum Board* — 5/8 in. (16 mm) thick, 4 ft (1.22 m) wide with square or tapered edges. The gypsum board type, number of layers an sheet orientation shall be as specified in the individual U400 or V400 Series Design in the Fire Resistance Directory, except that a max 1-1/2 in. (38 mm) gap shall be maintained between top edge of the gypsum board and the spray applied fire resistive material on the structural steel support. The top row of screws shall be installed into the studs 1-1/2 in. (38 mm) below the bottom of the ceiling runner.
   D. Steel Attachment Clips — (Optional - Not Shown) - As an alternate to steel fasteners, ceiling runner secured to steel beam with Z-shaped clips formed from min 1 in. (25 mm) long strips of min 20 ga galv steel. Length of clips should not exceed the width (thickness) of the wall. 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 or 2 in. (38 or 51 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.
   The hourly ratings of the joint system are dependent on the hourly rating of the wall.
3. Joint System — Max separation between bottom of spray-applied fire resistive material on beam and top of gypsum board at time of installation is 1-1/2 in. (38 mm). The joint system is designed to accommodate a max 50 percent compression or extension from its installed width. The joint system consists of a forming material and a fill material between the top of the gypsum board and the bottom of the spray-applied fire resistive material on the beam, as follows:
   A. Forming Material* — Nominal 4 pcf (64 kg/m3) mineral wool forming material cut into strips to fill the gap between top of the gypsum board and bottom of beam. Width of the strips shall be equal to the total thickness of the gypsum board. The strips of mineral wool shall be compressed 50 percent in thickness and firmly packed into the gap between the top of gypsum board and bottom of beam.
   ROCK WOOL MANUFACTURING CO — Delta Board
   ROXUL INC — SAFE
   THERMAFIBER INC — Type SAF
   A1. Forming Material* - Strips — (Optional) - Nom 5/8 in. (16 mm) and 1-1/4 in. (32 mm) wide by 2 in. (51 mm) high precut mineral wool strips for 1 and 2 hr rated assemblies respectively. The strips are compressed 50 percent and firmly packed, cut edge first, into the gap between the top of the gypsum board and bottom of the steel floor units on both sides of the wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 767 Speed Strips
   B. Fill, Void or Cavity Material* — Min 1/16 in. (1.6 mm) dry thickness (min 1/8 in. or 3.2 mm wet thickness) of fill material sprayed or troweled on each side of wall to completely cover mineral wool forming material and to overlap 1/2 in. (13 mm) onto gypsum board and 2 in. (51 mm) onto spray-applied fire resistive material on the structural steel support.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP672 Firestop Spray or CFS-SP WB Firestop Joint Spray

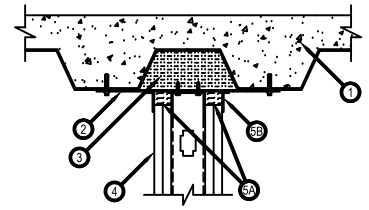
*Bearing the UL Classification Mark

HILTI
Hilti Firestop Systems

CLASSIFIED C US
Classified by Underwriters Laboratories, Inc. to UL 2079 and CAN/ULC-S115

System No. HW-D-0264

ANSI/UL2079	CAN/ULC S115
Assembly Ratings — 1 and 2 Hr (See Item 4)	F Ratings — 1 and 2 Hr (See Item 4)
Nominal Joint Width - 1 In.	FT Ratings — 1 and 2 Hr (See Item 4)
Class II Movement Capabilities — 19% Compression or Extension	FH Ratings — 1 and 2 Hr (See Item 4)
L Rating At Ambient — Less Than 1 CFM/sq ft	FTH Ratings — 1 and 2 Hr (See Item 4)
L Rating At 400 F — Less Than 1 CFM/sq ft	Nominal Joint Width - 1 In.
	Class II Movement Capabilities — 19% Compression or Extension
	L Rating At Ambient — Less Than 1 CFM/sq ft
	L Rating At 400 F — Less Than 1 CFM/sq ft



1. Floor Assembly — The fire-rated fluted steel floor unit/concrete floor assembly shall be constructed of the materials and in the manner described in the individual Floor-Ceiling Design in the 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.
2. Steel Straps — Min. 2 in. (51 mm) wide 16 MSG galv steel straps cut to a length to span the flute and overlap the adjacent valleys of fluted floor units by 1-1/2 in. (38 mm). Straps spaced max 24 in. (610 mm) OC and fastened to floor assembly with 1/4 in. (6 mm) diam by 1-1/2 in. (38 mm) long steel concrete anchors. As an alternate, min 1 in. (25 mm) long Hilti X-DNI 27 P8 S15 or Hilti X-U 27 P8 S15 powder actuated floor pins with integral min 9/16 in. (14 mm) diam washer may be used to secure steel straps to floor assembly.
3. Forming Material* - Plugs — Preformed mineral wool plugs, formed to the shape of the fluted floor units, friction fit to completely fill the flutes above the steel straps. Adjacent lengths of plugs to be tightly butted with butted seams spaced min 24 in. (610 mm) apart along the length of the plugs.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP777 Speed Plugs
4. Wall Assembly — The 1 hr or 2 h fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U400, V400 or W400 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 gauge galv steel channels sized to accommodate steel studs (Item 2B). Ceiling runner to be provided with 2 in. (51 mm) flanges. Ceiling runner installed parallel to direction of fluted steel floor units, directly beneath steel straps, and secured to straps with two No. 8 self-drilling, self-tapping steel screws per strap.
   A1. Light Gauge Framing* — Slotted Ceiling Runner — As an alternate to the ceiling runner in Item 4A, ceiling runner to consist of galv steel channel with slotted flanges sized to accommodate steel studs (Items 4B). Ceiling runner installed parallel to direction of fluted steel floor deck, directly beneath steel straps, and secured to straps with two No. 8 self-drilling, self-tapping steel screws per strap. When slotted ceiling runner is used, deflection channel (Item 3A) shall not be used.
   BRADY CONSTRUCTION INNOVATIONS INC, DBA SLIPTRACK SYSTEMS — SLP-TRK
   CALIFORNIA EXPANDED METAL PRODUCTS CO — CST
   CLARKDIETRICH BUILDING SYSTEMS — Type SLT, SLT-H
   MARINO/WARE, DIV OF WARE INDUSTRIES INC — Type SLT
   METAL-LITE INC — The System
   THE STEEL NETWORK INC — VertiTrack VT, series,250VT, 362VT, 400VT, 600VT and 800VT
   A2. Light Gauge Framing*- Notched Ceiling Runner — As an alternate to the ceiling runners in Items 2A through 2A1, notched ceiling runners to consist of C-shaped galv steel channel with notched return flanges sized to accommodate steel studs (Item 2B). Notched ceiling runner installed perpendicular to direction of fluted steel deck and secured to valleys with steel masonry anchors spaced max 24 in. (610 mm) OC.
   OLMAR SUPPLY INC — Type SCR
   A3. Light Gauge Framing* — Slotted Ceiling Runner — As an alternate to the ceiling runner in Item 4A through 4A2, ceiling runner to consist of galv steel channel with slotted flanges sized to accommodate steel studs (Item 4B). Flange height of slotted ceiling runner shall be 3-1/4 in. (83 mm) with 2 in. (51 mm) deep slots. Slotted ceiling runner installed parallel to direction of fluted steel floor deck, directly beneath steel straps, and secured to straps with two No. 8 self-drilling, self-tapping steel screws per strap.
   SCAFCO STEEL STUD MANUFACTURING CO — Slotted Track-Type SDLT
   B. Studs — Steel studs to be min 2-1/2 in. (64 mm) wide. Studs cut 1/2 in. (13 mm) to 3/4 in. (19 mm) less in length than assembly height with bottom nesting in and resting on the floor runner and with top nesting in ceiling runner without attachment. When slotted ceiling runner (Item 4A1) is used, steel studs secured to slotted ceiling runner with No. 8 by 1/2 in. (13 mm) long wafer head steel screws at midheight of slot on each side of wall. Stud spacing not to exceed 24 in. (610 mm) OC. When slotted ceiling runner (Item 4A3) is used, steel studs cut in lengths 3/4 to 1-3/4 in. (19 to 44 mm) less than floor to ceiling height and secured to slotted ceiling runner with No. 8 by 1/2 (13 mm) long wafer head steel screws at +/- 3/16 in. (5 mm) of the mid-height of slot on each side of wall.
   C. Gypsum Board* — For 1 hr assembly, one layer of 5/8 in. (16 mm) thick gypsum board as specified in the individual Wall and Partition Design. For 2 hr assembly, two layers of 5/8 in. (16 mm) thick gypsum board are specified in the individual Wall and Partition Design. For both hourly ratings, a nominal 1 in. (25 mm) gap shall be maintained between the top of the gypsum board and the bottom surface of the steel floor units and the top row of screws shall be installed into the studs 3 in. (76 mm) below the valleys of the steel floor units.
   The hourly ratings of the joint system are dependent on the hourly rating of the wall.
5. Joint System — Max separation between bottom of floor and top of wall is 1 in. (25 mm). The joint system is designed to accommodate a max 19 percent compression or extension from its installed width. The joint system consists of a forming material and a fill material between the top of the gypsum board and the bottom of the floor, as follows:
   A. Forming Material* — Min 4 pcf (64 kg/m3) density mineral wool batt insulation cut shall be cut into strips to fill the gap between the top of gypsum board and bottom of the floor units. The width of the strips shall be equal to the total thickness of the gypsum board. The strips of mineral wool are compressed 50 percent in thickness and firmly packed into the gap between the top of the gypsum board and bottom of the mineral wool plug or steel floor units.
   A1. Forming Material* - Strips — (Optional) - Nom 5/8 in. (16 mm) and 1-1/4 in. (32 mm) wide precut mineral wool strips for 1 hr and 2 hr rated assemblies respectively. The strips are compressed 50 percent in thickness and firmly packed into the gap between the top of the gypsum board and bottom of the steel floor units on both sides of the wall. Adjoining lengths of strips to be tightly butted with butted seams spaced min 48 in. (1.2 m) apart along the length of the joint.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 767 Speed Strips
   B. Fill, Void or Cavity Material* - Sealant — Min 1/8 in. (3.2 mm) wet thickness (min 1/16 in. or 1.6 mm dry thickness) of fill material sprayed or troweled on each side of the wall to completely cover the mineral wool forming material and to overlap a min of 1/2 in. (13 mm) onto gypsum board, steel floor units and steel straps on both sides of the wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP672 Firestop Spray or CFS-SP WB Firestop Joint Spray

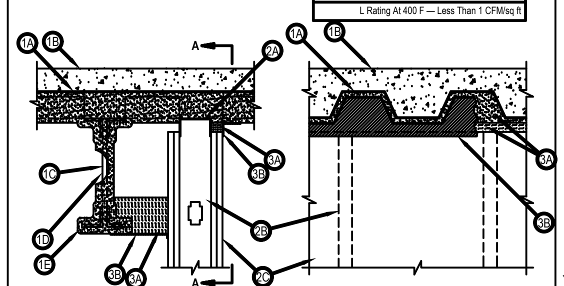
*Bearing the UL Classification Mark

HILTI
Hilti Firestop Systems

CLASSIFIED C US
Classified by Underwriters Laboratories, Inc. to UL 2079 and CAN/ULC-S115

System No. HW-D-0388

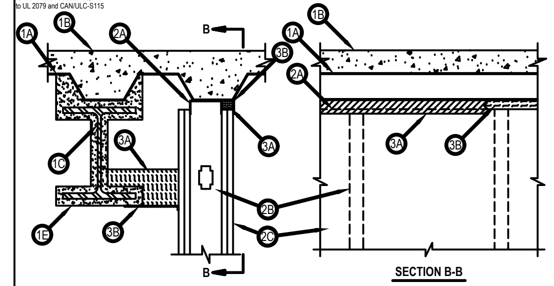
ANSI/UL2079	CAN/ULC S115
Assembly Ratings — 1 and 2 Hr (See Item 2)	F Ratings — 1 and 2 Hr (See Item 2)
Nominal Joint Width - 1 In.	FT Ratings — 1 and 2 Hr (See Item 2)
Class II Movement Capabilities — 12.5% Compression or Extension	FH Ratings — 1 and 2 Hr (See Item 2)
L Rating At Ambient — Less Than 1 CFM/sq ft	FTH Ratings — 1 and 2 Hr (See Item 2)
L Rating At 400 F — Less Than 1 CFM/sq ft	Nominal Joint Width - 1 In.
	Class II Movement Capabilities — 12.5% Compression or Extension
	L Rating At Ambient — Less Than 1 CFM/sq ft
	L Rating At 400 F — Less Than 1 CFM/sq ft



HILTI
Hilti Firestop Systems

CLASSIFIED C US
Classified by Underwriters Laboratories, Inc. to UL 2079 and CAN/ULC-S115

System No. HW-D-0388 (cont.)



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. The hourly fire rating of the floor assembly shall be equal to or greater than the hourly fire rating of the wall assembly. The floor assembly 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 or open-web steel joist, 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 1 to 6 in. (25 to 152 mm) from wall assembly.
   D. Steel Lath — When structural steel support (Item 1C) consists of open-web steel joists, 3/8 in. (10 mm) diamond mesh expanded steel lath having a nom weight of 1.7 to 3.4 lb per sq yd (0.9 to 1.8 kg/m2) shall be installed to completely cover one side of each joist which is located within 6 in. (152 mm) of wall assembly. The lath shall be secured with steel tie wire and shall be fully covered with spray applied fire resistive material.
   E. Spray-Applied Fire Resistive Material* — After installation of the ceiling runner (Item 2A), steel floor units and structural steel supports to be sprayed with the thickness of material specified in the individual D700 Series Design or the structural steel supports to be sprayed in accordance with the specifications in the individual D900 Series Design. The flutes of the steel floor units above the structural steel supports and above the ceiling runner (Item 2A) shall be filled with spray-applied fire resistive material. As an alternate, the spray-applied fire resistive material in the flutes above the ceiling runner may be applied to follow the contour of the steel floor units. Excess material shall be removed from the flanges of the ceiling runner beyond the required thickness of spray-applied fire resistive material on the steel floor units.
   W R GRACE & CO - CONN — Type MK-6/HY, MK-6/HY ES, MK-6s, RG
   ISOLATEK INTERNATIONAL — Type 300
1A. Roof Assembly — (Not Shown) — As an alternate to the floor assembly (Item 1), 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 hourly fire rating of the roof assembly shall be equal to or greater than the hourly fire 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 — Mineral and Fiber Board* — Min 3/4 in. (19 mm) thick boards applied in one or more layers directly over steel roof deck or over gypsum board sheathing laid atop steel roof deck.
   C. Roof Covering* — Hot-mopped or cold-application materials compatible with mineral and fiber board insulation.
   D. Structural Steel Support — Steel beam or open-web steel joist, as specified in the individual P700 or P800 Series Roof-Ceiling Design, used to support steel floor units. Structural steel support oriented parallel to and 1 in. to 6 in. (25 to 152 mm) from wall assembly.
   E. Steel Lath — When structural steel support (Item 1D) consists of open-web steel joists, 3/8 in. (10 mm) diamond mesh expanded steel lath having a nom weight of 1.7 to 3.4 lb per sq yd (0.9 to 1.8 kg/m2) shall be installed to completely cover one side of each joist which is located within 6 in. (152 mm) of wall assembly. The lath shall be secured with steel tie wire and shall be fully covered with spray applied fire resistive material.
   F. Spray-Applied Fire Resistive Material* — After installation of the ceiling runner (Item 2A), steel roof deck and structural steel supports to be sprayed with a thickness of spray applied fire resistive material as specified in the individual P700 Series Roof-Ceiling design. The flutes of the steel deck above the structural steel supports and above the ceiling runner (Item 2A) shall be filled with spray-applied fire resistive material. As an alternate, the spray-applied fire resistive material in the flutes above the ceiling runner may be applied to follow the contour of the steel roof deck. Excess material shall be removed from the flanges of the ceiling runner beyond the required thickness of spray-applied fire resistive material on the steel roof deck.
   W R GRACE & CO - CONN — Type MK-6/HY, MK-6/HY ES, MK-6s, RG
   ISOLATEK INTERNATIONAL — Type 300
2. Wall Assembly — The 1 or 2 hr fire-rated gypsum board/steel stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 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 galv steel channels sized to accommodate steel studs (Item 2B). Ceiling runner to be provided with min 2 in. (51 mm) to max 3 in. (76 mm) flanges. Ceiling runner is secured to steel floor units (Item 1A) with steel fasteners or welds spaced max 24 in. (610 mm) OC. Ceiling runner to be installed parallel with structural steel support and located such that a max clearance of 4 in. (102 mm) is present between the finished wall and the spray-applied fire resistive material at the lowest elevation of the structural steel support.
   A1. Light Gauge Framing* — Slotted Ceiling Runner — As an alternate to the ceiling runner in Item 2A, ceiling runner to consist of galv steel channel with slotted flanges sized to accommodate steel studs (Item 2B). Ceiling runner secured to valleys with steel fasteners spaced max 24 in. (610 mm) OC.
   CALIFORNIA EXPANDED METAL PRODUCTS CO — CST
   BRADY CONSTRUCTION INNOVATIONS INC, DBA SLIPTRACK SYSTEMS — SLP-TRK
   MARINO/WARE, DIV OF WARE INDUSTRIES INC — Type SLT
   THE STEEL NETWORK INC — VertiTrack VT, series,250VT, 362VT, 400VT, 600VT and 800VT
   A2. Light Gauge Framing* — Clipped Ceiling Runner — As an alternate to the ceiling runner in Items 2A and 2A1, clipped runner to consist of galv steel channel with clips preformed in track flanges which positively engage the inside flange of the steel studs (Item 2B). Track sized to accommodate steel studs (Item 2B). Track flanges to be min 2-1/2 in. (64 mm). Clipped ceiling runner secured with steel fasteners spaced max 24 in. (610 mm) OC.
   TOTAL STEEL SOLUTIONS L L C — Snap Trak
   A3. Light Gauge Framing*- Notched Ceiling Runner — As an alternate to the ceiling runners in Items 2A through 2A2, notched ceiling runners to consist of C-shaped galv steel channel with notched return flanges sized to accommodate steel studs (Item 2B). Notched ceiling runner secured to valleys with steel masonry anchors spaced max 24 in. (610 mm) OC.
   OLMAR SUPPLY INC — Type SCR
   A4. Light Gauge Framing* — Slotted Ceiling Runner — As an alternate to the ceiling runner in Item 2A, ceiling runner to consist of galv steel channel with slotted flanges sized to accommodate steel studs (Item 2B). Flange height of slotted ceiling runner shall be 3-1/4 in. (83 mm) with 2 in. (51 mm) deep slots. Ceiling runner secured to valleys with steel fasteners or welds spaced max 24 in. (610 mm) OC.
   SCAFCO STEEL STUD MANUFACTURING CO — Slotted Track-Type SDLT
   B. Studs — Steel studs to be min 3-1/2 in. (89 mm) wide. Studs cut 1/2 in. to 3/4 in. (13 to 19 mm) less in length than assembly height with bottom nesting in and secured to floor runner. When slotted ceiling runner (Item 2A1) is used, steel studs secured to slotted ceiling runner with No. 8 by 1/2 (13 mm) long wafer head steel screws at mid-height of slot on each side of wall. When slotted ceiling runner (Item 2A4) is used, steel studs cut in lengths 3/4 to 1-3/4 in. (19 to 44 mm) less than floor to ceiling height and secured to slotted ceiling runner with No. 8 by 1/2 (13 mm) long wafer head steel screws at +/- 3/16 in. (5 mm) of the mid-height of slot on each side of wall.
   C. 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, V400 or W400 Series Design in the UL Fire Resistance Directory except that a max 1 in. (25 mm) gap shall be maintained between the top of the gypsum board and the bottom plane of the spray applied fire resistive material on the steel deck when D700 series assembly is used or between the top of gypsum board and the steel floor units when D900 series assembly is used, on both sides of the wall assembly. The screws attaching the gypsum board to the studs along the top of the wall shall be located 1 in. (25 mm) below the bottom of the ceiling runner. 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 omitted.
   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 the spray applied fire resistive material on the steel floor units and top of gypsum board (at time of installation of joint system) is 1 in. (25 mm) when D700 series assembly is used. Max separation between bottom of the steel floor units and top of gypsum board (at time of installation of joint system) is 1 in. (25 mm) when D900 series assembly is used. Max separation between spray applied fire resistive material on structural support member and surface of wall is 4 in. (102 mm). The joint system is designed to accommodate a max 12.5 percent compression or extension from its installed width as measured between the bottom plane of the steel floor units or spray-applied fire resistive material on the steel floor units and the top of the gypsum board. The joint system shall consist of forming and fill materials, as follows:
   A. Forming Material* — Nom 4 pcf (64 kg/m3) density mineral wool batt insulation. Sections of mineral wool batt cut to a width of 4 in. (102 mm) and stacked to attain a thickness which is 50 percent greater than the width of the linear gap between the spray applied fire resistive material on the structural steel member and the surface of the wall assembly. Stacked sections of mineral wool compressed 33 percent in thickness and installed cut edge first into linear gap until the bottom edge is flush with the bottom surface of the spray applied fire resistive material on the structural steel member. When the spray-applied fire resistive material in the flutes above the wall follows the contour of the steel deck, sections of mineral wool batt cut to the shape of the fluted deck and stacked to a min 6 in. (152 mm) thickness shall be installed in the flutes of the steel floor or roof deck between the top of the ceiling runner and the spray-applied fire resistive material. The mineral wool batt insulation is to be installed flush with the gypsum board surface on the side of the wall opposite the structural steel support. Additional sections of mineral wool batt insulation are compressed 50 percent in thickness and are installed cut edge first to completely fill the gap above the top of the gypsum board.
   IIG MINWOOL L L C — MinWool-1200 Safing
   ROCK WOOL MANUFACTURING CO — Delta Board
   ROCKWOOL MALAYSIA SDN BHD — SAFE
   ROXUL INC — SAFE
   THERMAFIBER INC — Type SAF
   A1. Forming Material* — Plugs — (Optional, Not Shown) - Preformed mineral wool plugs, formed to the shape of the fluted deck, friction fit to completely fill the flutes. The plugs shall be flush with both wall surfaces. Additional forming material, described in Item 3A, to be used in conjunction with the plugs to fill the gap between the top of the wall and bottom of steel deck.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP777 Speed Plugs
   B. Fill, Void or Cavity Material* — Sealant — Min 1/8 in. (3.2 mm) wet thickness or 1/16 in. (1.6 mm) dry thickness of fill material spray or brush applied over the forming material on each side of the wall. Fill material to overlap a min of 1/2 in. (13 mm) onto the gypsum board and a min 2 in. (51 mm) onto the steel floor units or spray-applied fire resistive material on the steel floor units and on the structural steel support member.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP672 Firestop Spray or CFS-SP WB Firestop Joint Spray

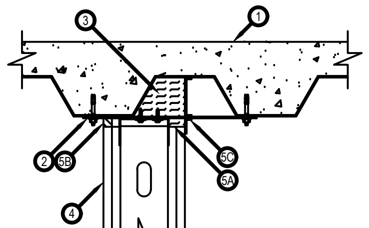
*Bearing the UL Classification Mark

HILTI
Hilti Firestop Systems

CLASSIFIED C US
Classified by Underwriters Laboratories, Inc. to UL 2079 and CAN/ULC-S115

System No. HW-D-0396

ANSI/UL2079	CAN/ULC S115
Assembly Ratings - 1 and 2 Hr (See Item 4)	F Ratings - 1 and 2 Hr (See Item 4)
Nominal Joint Width - 3/4 In.	FT Ratings - 1 and 2 Hr (See Item 4)
Class II Movement Capabilities — 17% Compression or Extension	FH Ratings - 1 and 2 Hr (See Item 4)
L Rating At Ambient — Less Than 1 CFM/sq ft	FTH Ratings - 1 and 2 Hr (See Item 4)
L Rating At 400 F — Less Than 1 CFM/sq ft	Nominal Joint Width - 3/4 In.
	Class II Movement Capabilities — 17% Compression or Extension
	L Rating At Ambient — Less Than 1 CFM/sq ft
	L Rating At 400 F — Less Than 1 CFM/sq ft



1. Floor Assembly — The fire-rated fluted steel floor unit/concrete floor assembly shall be constructed of the materials and in the manner described in the individual D900 Series Floor-Ceiling Design in the 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.
2. Steel Straps — Min 2 in. (51 mm) wide min No. 16 gauge galv steel straps cut to a length to span the flute and overlap the adjacent valleys of fluted floor units by min 1-1/2 in. (38 mm). Straps spaced max 24 in. (610 mm) OC and fastened to floor assembly with masonry anchors or steel fastener.
3. Forming Material* - Plugs — Preformed mineral wool plugs, formed to the shape of the fluted floor area directly above the wall, friction fit to fill the fluted area directly above the steel straps and wall. Adjacent lengths of plugs to be tightly butted with butted seams spaced min 24 in. (610 mm) apart along the length of the plugs.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP777 Speed Plugs
4. Wall Assembly — The 1 or 2 h fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U400, V400 or W400 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 gauge galv steel channels sized to accommodate steel studs (Item 2B). Flange height of ceiling runner shall be min 1/4 in. (6 mm) greater than max extended joint width. Ceiling runner installed parallel to direction of fluted steel floor units, directly beneath steel straps, and secured to straps with two No. 8 self-drilling, self-tapping steel screws per strap.
   A1. Light Gauge Framing* - Slotted Ceiling Runner — As an alternate to the ceiling runner in Item 4A, ceiling runner to consist of galv steel channel with slotted flanges sized to accommodate steel studs (Items 4B). Ceiling runner installed parallel to direction of fluted steel floor deck, directly beneath steel straps, and secured to straps with two No. 8 self-drilling, self-tapping steel screws per strap. When slotted ceiling runner is used, deflection channel (Item 3A) shall not be used.
   CALIFORNIA EXPANDED METAL PRODUCTS CO — CST
   BRADY CONSTRUCTION INNOVATIONS INC, DBA SLIPTRACK SYSTEMS — SLP-TRK
   MARINO/WARE, DIV OF WARE INDUSTRIES INC — Type SLT
   B. Studs — Steel studs to be min 3-1/2 in. (89 mm) wide. 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 the floor runner and with top nesting in ceiling runner without attachment. When slotted ceiling runner (Item 4A1) is used, steel studs secured to slotted ceiling runner with No. 8 by 1/2 in. (13 mm) long wafer head steel screws at midheight of slot on each side of wall. Stud spacing not to exceed 24 in. (610 mm) OC.
   C. Gypsum Board* — For 1 hr assembly, one layer of 5/8 in. (16 mm) thick gypsum board as specified in the individual Wall and Partition Design. For 2 hr assembly, two layers of 5/8 in. (16 mm) thick gypsum board as specified in the individual Wall and Partition Design. For both hourly ratings, a nominal 3/4 in. (19 mm) gap shall be maintained between the top of the gypsum board and the bottom surface of the steel floor units and the bottom surface of the steel straps and forming material (Item 3). The top row of screws shall be installed into the studs 3 in. (76 mm) below the valleys of the steel floor units.
   The hourly fire rating of the joint system is equal to the hourly rating of the wall.
5. Joint System — Max separation between bottom of floor and top of wall is 3/4 in. (19 mm). The joint system is designed to accommodate a max 17 percent compression or extension from its installed width. The joint system consists of a forming material and two fill materials between the top of the gypsum board and the bottom of the floor, as follows:
   A. Forming Material* — Min 4 pcf (64 kg/m3) density mineral wool batt insulation shall be cut into strips to fill the gap between the top of the gypsum board and the underside of the forming material plugs (Item 3) and straps (Item 2) on the side of the wall located beneath the crest of the floor units. The width of the strips shall be equal to the total thickness of the gypsum board. The strips of mineral wool are compressed 50 percent in thickness and inserted cut-edge first into the gap between the top of the gypsum board and bottom of the mineral wool plug or steel straps.
   ROCK WOOL MANUFACTURING CO — Delta Board
   ROXUL INC — SAFE
   THERMAFIBER INC — Type SAF
   A1. Forming Material* - Strips — As an alternate to Item 5A, nom 5/8 in. (16 mm) and 1-1/4 in. (32 mm) wide precut mineral wool strips for 1 and 2 hr rated assemblies respectively. The strips are compressed 50 percent in thickness and inserted cut-edge first into the gap between the top of the gypsum board and the underside of the forming material plugs (Item 3) and straps (Item 2) on the side of the wall located beneath the crest of the floor units. Adjoining lengths of strips to be tightly butted with butted seams spaced min 48 in. (1219 mm) apart along the length of the joint.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 767 Speed Strips
   A2. Forming Material — (Optional, Not Shown) - Mineral wool insulation, fiberglass batt insulation or polyurethane/polyethylene foam backer rod. Forming material to be installed on the side of the 2 hr fire rated wall located beneath valley of steel floor units, between the top of the gypsum board and the valley of the steel floor unit, and recessed from surface of the wall to accommodate the required thickness of sealant (Item 5B).
   B. Fill, Void or Cavity Material* - Sealant — Min 5/8 in. (16 mm) thickness of fill material installed on the side of the wall located beneath valley of steel floor unit, between the top of the gypsum board and the bottom of the valleys of the steel floor units, flush with the surface of the wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP606 Sealant
   C. Fill, Void or Cavity Material* - Sealant — Min 1/8 in. (3.2 mm) wet thickness (min 1/16 in. or 1.6 mm dry thickness) of fill material sprayed or troweled to completely cover the mineral wool plugs (Item 3) and mineral wool forming material (Items 5A and 5A1) on the side of the wall located beneath the crest of the steel floor unit. Fill material to overlap a min of 1/2 in. (13 mm) onto the gypsum board, steel floor units and steel straps.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP672 Firestop Spray or CFS-SP WB Firestop Joint Spray

*Bearing the UL Classification Mark

HILTI
Hilti Firestop Systems

Notes:

1. *Refer to section 07840 of the specifications. For Quality Control requirements, refer to the Quality Control portion of the specification.*
2. *Details shown are typical details. If field conditions do not match requirements of typical details, approved alternate details shall be utilized. Field conditions and dimensions need to be verified for compliance with the details, including but not limited to the following:*
   * *Minimum and maximum Width of Joints*
   * *Type and thickness of fire-rated construction. The minimum assembly rating of the firestop assembly shall meet or exceed the highest rating of the adjacent construction.*
3. *If alternate details matching the field conditions are not available, Manufacturer's engineering judgment drawings are acceptable. Drawings shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.*
4. *References:*
   * *Underwriter's Laboratories Fire Resistance Directory*
   * *Intertek Directory of Listed Products*
   * *NFPA 101 Life Safety Code*
   * *All governing local and regional building codes*
5. *Firestop System installation must meet requirements of UL 2079 tested assemblies that provide the required assembly rating.*
6. *All rated assemblies shall be prominently labeled with the following information:*
   * *ATTENTION: Fire Rated Assembly*
   * *UL System #*
   * *Product(s) used*
   * *Hourly Rating (Assembly Rating)*
   * *Installation Date*

<Notes to designer (delete this note after reading and replace with title block information)>
1. Any modification to these details could result in an application/system not meeting the UL or Intertek Classification or the intended temperature or fire ratings.
2. Details shown are up to date as of February 2015.
3. For additional information on the details, refer to the most current "Underwriter's Laboratories Fire Resistance Directory (volume 2.)"

JOB NUMBER:

DRAWN:

CHECKED:

ISSUE DATE:

REVISIONS:

TYPICAL FIRESTOP JOINT DETAILS

SHEET NAME:

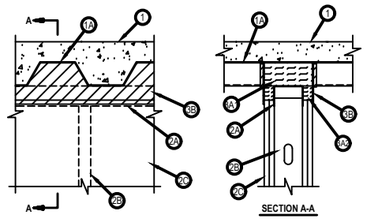
SHEET NUMBER:

A.5.7

System No. HW-D-0538

Assembly Ratings — 1 And 2 Hr (See Item 2)
Nominal Joint Width — 1-3/4 In.
Class II Movement Capabilities — 43% Compression Or Extension

Classified by Underwriters Laboratories, Inc. to UL 2079 and CAN/ULC-S115



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 assembly shall be constructed of the materials and in the manner described in the individual P900 Series Roof-Ceiling Design 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 — Min 2-1/4 in. (57 mm) thick poured insulating concrete, as measured from the top plane of the steel roof deck.

2. Wall Assembly — The 1 hr or 2 hr fire rated gypsum board/steel 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 galv steel channels sized to accommodate steel studs (Item 2B). Flange height of ceiling runner shall be min 1/4 in. (6 mm) greater than max extended joint width. Ceiling runner centered beneath and parallel with the valley of the deck and secured to valleys with steel fasteners, steel masonry anchors or welds spaced max 24 in. (610 mm) OC.
   A1. Light Gauge Framing*-Slotted Ceiling Runner — As an alternate to the ceiling runner in Item 2A, slotted ceiling runner to consist of galv steel channel with slotted flanges sized to accommodate steel studs (Item 2B). Slotted ceiling runner installed perpendicular to direction of fluted steel deck and secured to valleys with steel masonry anchors, steel fasteners or welds spaced max 24 in. (610 mm) OC.
   SCAFCO STEEL STUD MANUFACTURING CO
   BRADY CONSTRUCTION INNOVATIONS INC, DBA SLIPTRACK SYSTEMS — SLP-TRK
   THE STEEL NETWORK INC — VertiTrack VT, series,250VT, 362VT, 400VT, 600VT and 800VT
   A2. Light Gauge Framing* — Slotted Ceiling Runner — As an alternate to the ceiling runner in Item 2A through 2A1, ceiling runner to consist of galv steel channel with slotted flanges sized to accommodate steel studs (Item 2B). Flange height of slotted ceiling runner shall be 3-1/4 in. (83 mm) with 2 in. (51 mm) deep slots. Slotted ceiling runner installed perpendicular to direction of fluted steel deck and secured to valleys with steel masonry anchors, steel fasteners or welds spaced max 24 in. (610 mm) OC.
   SCAFCO STEEL STUD MANUFACTURING CO — Slotted Track-Type SDLT
   B. Studs — Steel studs to be min 3-1/2 in. (89 mm) wide. Studs cut 1-1/4 in. to 1-1/2 in. (32 to 38 mm) less in length than assembly height with bottom resting in and resting on floor runner and with top nesting in ceiling runner without attachment.. Stud spacing not to exceed 24 in. (610 mm) OC. When slotted ceiling runner (Item 2A2) is used, steel studs cut in lengths 3/4 to 1-3/4 in. (19 to 44 mm) less than floor to ceiling height and secured to slotted ceiling runner with No. 8 by 1/2 (13 mm) long wafer head steel screws at +/- 3/16 in. (5 mm) of the mid-height of slot on each side of wall.
   C. Gypsum Board* — Gypsum board installed to a min total thickness of 5/8 in. (16 mm) or 1-1/4 in. (32 mm) on each side of wall for 1 hr and 2 hr rated assemblies, respectively. Wall to be constructed as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory, except that a nom 1-3/4 in. (44 mm) gap shall be maintained between the top of the gypsum board and the bottom of the steel deck and the top row of screws shall be installed into the studs 4 in. (102 mm) below the bottom plane of the floor or roof.
   The hourly rating of the joint system is dependent on the hourly rating of the wall.
3. Joint System — Max separation between bottom plane of floor or roof and top of gypsum board at time of installation of joint system is 1-3/4 in. (44 mm). The joint system is designed to accommodate a max 43 compression or extension from its installed width. The joint system consists of forming material and a fill material as follows:
   A. Forming Material* — Nom 5 in. (127 mm) thick pieces of nom 4 pcf (64 kg/m3) forming material sized to attain a min compression rate of 50 percent in the thickness direction firmly packed to completely fill the flutes. Additional pieces of batt insulation, 5/8 or 1-1/4 in. (16 or 32 mm) wide by 5 in. (127 mm) thick, shall be compressed 50 percent in thickness and installed cut edge first into gap between bottom of fluted floor or roof units and top of gypsum board.
   ROCK WOOL MANUFACTURING CO — Delta Board
   ROXUL INC — SAFE
   THERMAFIBER INC — Type SAF
   A1. Forming Material*—Plugs — As an alternate to Item 3A, preformed mineral wool plugs, formed to the shape of the fluted floor units, friction fit to completely fill the flutes above the ceiling runner. The plugs shall project beyond each side of the ceiling runner, flush with wall surfaces. Additional forming material, described in Item 3A2, to be used in conjunction with the plugs to fill the gap between the top of gypsum board and the bottom of plug.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP777 Speed Plugs
   A2. Forming Material* - Strips — Nom 5/8 in. (16 mm) and 1-1/4 in. (32 mm) wide precut mineral wool strips for 1 and 2 hr rated assemblies, respectively. The strips are compressed 50 percent in thickness and firmly packed into the gap between the top of the gypsum board and bottom of the steel floor or roof deck on both sides of the wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 767 Speed Strips
   B. Fill, Void or Cavity Material* — Min 1/16 in. (1.6 mm) dry thickness (min 1/8 in. or 3.2 mm wet thickness) of fill material sprayed on each side of the wall to completely cover mineral wool forming material and to overlap a min of 1/2 in. (13 mm) onto gypsum board and steel deck on both sides of wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP672 Firestop Spray or CFS-SP WB Firestop Joint Spray

*Bearing the UL Classification Mark

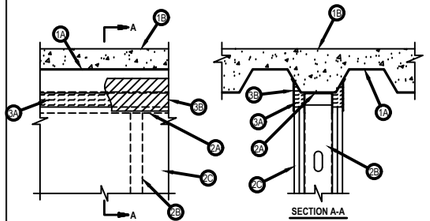
HILTI Hilti Firestop Systems

Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. January 11, 2013

System No. HW-D-0539

Assembly Ratings — 1 and 2 Hr (See Item 2)
Nominal Joint Width — 1-3/4 In.
Class II Movement Capabilities — 43% Compression Or Extension

Classified by Underwriters Laboratories, Inc. to UL 2079 and CAN/ULC-S115



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 assembly shall be constructed of the materials and in the manner described in the individual P900 Series Roof-Ceiling Design 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 — Min 2-1/4 in. (57 mm) thick poured insulating concrete, as measured from the top plane of the steel roof deck.

2. Wall Assembly — The 1 hr or 2 hr fire rated gypsum board /steel 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 galv steel channels sized to accommodate steel studs (Item 2B). Flange height of ceiling runner shall be min 1/4 in. (6 mm) greater than max extended joint width.. Ceiling runner centered beneath and parallel with the valley of the deck and secured to valleys with steel fasteners, steel masonry anchors or welds spaced max 24 in. (610 mm) OC.
   A1. Light Gauge Framing*-Slotted Ceiling Runner — As an alternate to the ceiling runner in Item 2A, slotted ceiling runner to consist of galv steel channel with slotted flanges sized to accommodate steel studs (Item 2B). Slotted ceiling runner installed perpendicular to direction of fluted steel deck and secured to valleys with steel masonry anchors, steel fasteners or welds spaced max 24 in. (610 mm) OC.
   SCAFCO STEEL STUD MANUFACTURING CO
   BRADY CONSTRUCTION INNOVATIONS INC, DBA SLIPTRACK SYSTEMS — SLP-TRK
   THE STEEL NETWORK INC — VertiTrack VT, series,250VT, 362VT, 400VT, 600VT and 800VT
   A2. Light Gauge Framing* — Slotted Ceiling Runner — As an alternate to the ceiling runner in Item 2A through 2A1, ceiling runner to consist of galv steel channel with slotted flanges sized to accommodate steel studs (Item 2B). Flange height of slotted ceiling runner shall be 3-1/4 in. (83 mm) with 2 in. (51 mm) deep slots. Slotted ceiling runner centered beneath and parallel with the valley of the deck and secured to valleys with steel fasteners, steel masonry anchors.
   SCAFCO STEEL STUD MANUFACTURING CO — Slotted Track-Type SDLT
   B. Studs — Steel studs to be min 3-1/2 in. (89 mm) wide. Studs cut 1-1/4 in. to 1-1/2 in. (32 to 38 mm) less in length than assembly height with bottom resting in and resting on floor runner and with top nesting in ceiling runner without attachment. Stud spacing not to exceed 24 in. (610 mm) OC. When slotted ceiling runner (Item 2A2) is used, steel studs cut in lengths 3/4 to 1-3/4 in. (19 to 44 mm) less than floor to ceiling height and secured to slotted ceiling runner with No. 8 by 1/2 (13 mm) long wafer head steel screws at +/- 3/16 in. (5 mm) of the mid-height of slot on each side of wall.
   C. Gypsum Board* — Gypsum board installed to a min total thickness of 5/8 in. (16 mm) or 1-1/4 in. (32 mm) on each side of wall for 1 hr and 2 hr rated assemblies, respectively. Wall to be constructed as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory, except that a max 1-3/4 (44 mm) gap shall be maintained between the top of the gypsum board and the bottom of the steel deck and the top row of screws shall be installed into the studs 4 in. (102 mm) below the lower surface of the floor or roof.
   The hourly rating of the joint system is dependent on the hourly rating of the wall.
3. Joint System — Max separation between bottom of floor or roof and top of gypsum board at time of installation of joint system is 1-3/4 in. (44 mm). The joint system is designed to accommodate a max 43 percent compression or extension from its installed width. The joint system consists of forming material and a fill material, as follows:
   A. Forming Material* — Nom 5/8 in. or 1-1/4 in. (16 or 32 mm) wide strips of min 4 pcf (64 kg/m3) mineral wool batt insulation, for 1 and 2 Hr rated assemblies, respectively. Strips compressed 50 percent in thickness and inserted cut-edge first into gap between top of gypsum board and bottom of the floor or roof deck, flush with both surfaces of the wall. Adjoining lengths of batt to be tightly butted with butted seams spaced min 36 in. (91 cm) apart along the length of the joint.
   ROCK WOOL MANUFACTURING CO — Delta Board
   ROXUL INC — SAFE
   THERMAFIBER INC — Type SAF
   A1. Forming Material*—Strips — As an alternate to Item 3A, nom 5/8 in.(16 mm) and 1-1/4 in. (32 mm) wide precut mineral wool strips for 1 and 2 hr rated assemblies, respectively. The strips are compressed 50 percent in thickness and inserted cut-edge first into the gap between the top of the gypsum board and the bottom of the floor or roof deck, flush with both surfaces of the wall. Adjoining lengths of strips to be tightly butted with butted seams spaced min 36 in. (91 cm) apart along the length of the joint.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 767 Speed Strips
   B. Fill, Void or Cavity Material* — Min 1/16 in. (1.6 mm) dry thickness (min 1/8 in. or 3.2 mm wet thickness) of fill material sprayed on each side of the wall to completely cover mineral wool forming material and to overlap a min of 1/2 in. (13 mm) onto gypsum board and steel deck on both sides of wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP672 Firestop Spray or CFS-SP WB Firestop Joint Spray

*Bearing the UL Classification Mark

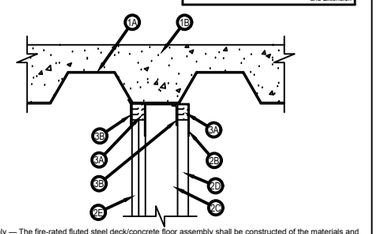
HILTI Hilti Firestop Systems

Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. January 11, 2013

System No. HW-D-0570

Classified by Underwriters Laboratories, Inc. to UL 2079 and CAN/ULC-S115

ANSI/UL2079	CAN/ULC S115
Assembly Ratings — 1 and 2 Hr (See Item 2)	F Ratings — 1 and 2 Hr (See Item 2)
Nominal Joint Width - 1-1/2 In.	FT Ratings — 1 and 2 Hr (See Item 2)
Class II Movement Capabilities — 50% Compression and Extension	FH Ratings — 1 and 2 Hr (See Item 2)
	FTH Ratings — 1 and 2 Hr (See Item 2)
	Nominal Joint Width - 1-1/2 In.
	Class II Movement Capabilities — 50% Compression and 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 Floor-Ceiling Design in the UL Fire Resistance Directory. The floor assembly shall include the following construction features:
   A. Steel Floor and Form Units* — Max 3 in. (76 mm) deep galv fluted floor units.
   B. Concrete — Min 2-1/2 in. (64 mm) thick lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete, as measured from the top plane of the floor units.
   C. Spray-Applied Fire Resistive Materials* — (Optional, Not Shown) — After installation of the steel ceiling runners (Item 2B) the steel floor units may be sprayed with a min 5/16 in. (8 mm) to max 1 3/4 in. (45 mm) thickness of fire resistive material.
   ISOLATEK INTERNATIONAL — Type 300
   W R GRACE & CO - CONN — Type MK-6 HY
2. Shaft 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, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
   A. Floor and Wall Runners — (Not Shown) - J-shaped runner, equal in width to steel studs (Item 2C), with unequal legs of 1 in. (25 mm) and 2 in. (51 mm), fabricated from 24 MSG galv steel. Runners positioned with short leg toward finished side of wall. Runners 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. Ceiling Runner — Ceiling runner of wall assembly shall consist of galv steel channel sized to accommodate steel studs (Item 2C). Flange height of ceiling runner shall be min 1/4 in. (6 mm) greater than max extended joint width. Ceiling runner installed parallel with direction of fluted steel deck and secured to steel deck valley with steel fasteners or welds spaced max 24 in. (610 mm) OC.
   B1. Light Gauge Framing* - Slotted Ceiling Runner — As an alternate to the ceiling runner in Item 2B, slotted ceiling runner to consist of galv steel channel with slotted flanges sized to accommodate steel studs (Item 2C). Flange height of slotted ceiling runner shall be min 1/4 in. (6 mm) greater than max extended joint width. Slotted ceiling runner installed parallel with direction of fluted steel deck and secured to steel deck valley 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
   CLARKDIETRICH BUILDING SYSTEMS — Type SLT, SLT-H
   MARINO/WARE, DIV OF WARE INDUSTRIES INC — Type SLT
   METAL-LITE INC — The System
   SCAFCO STEEL STUD MANUFACTURING CO — Slotted Track
   TELLING INDUSTRIES L L C — True-Action Deflection Track
   B2. Light Gauge Framing* — Slotted Ceiling Runner — As an alternate to the ceiling runner in Item 2B through 2B1, slotted ceiling runner to consist of galv steel channel, sized to accommodate steel studs (Item 2C). Flange height of slotted ceiling runner shall be 3-1/4 in. (83 mm) with 2 in. (51 mm) deep slots. Slotted ceiling runner installed parallel with direction of fluted steel deck and secured to steel deck valley with steel masonry anchors, steel fasteners or welds spaced max 24 in. (610 mm) OC.
   SCAFCO STEEL STUD MANUFACTURING CO — Slotted Track-Type SDLT
   C. Steel Studs — C-H shaped studs, min 4 in. (102 mm) wide by 1-1/2 in. (38 mm) deep, fabricated from 25 MSG galv steel, cut to lengths 3/4 to 1 in. (19 to 25 mm) less than floor to ceiling height and spaced 24 in. (610 mm) OC. When slotted ceiling runner specified in Item 2B2 is used the C-H-shaped studs cut in lengths 3/4 to 1-3/4 in. (19 to 44 mm) less than floor to ceiling height and spaced 24 in. (610 mm) OC.
   D. Gypsum Board* — Nom 1 in. (25 mm) thick gypsum board liner panels. Panels cut 1-1/2 in. (38 mm) less in length than floor to ceiling height. Vertical edges inserted in H-shaped section of C-H studs. At the ends of the assembly, the free edge of the end panels are attached to the long leg of vertical J-runners (Item 2A) with 1-5/8 in. (41 mm) long Type S steel screws spaced max 12 in. (305 mm) OC.
   E. Gypsum Board* — Nom 5/8 in. (16 mm) thick gypsum board applied vertically in one or two layers for 1 hr and 2 hr fire rated assemblies, respectively. Panels cut 1-1/2 in. (38 mm) less in length than floor to ceiling height. The screws attaching the gypsum board layers to the C-H studs shall be located 1 to 1-1/2 in. (25 to 38 mm) below the bottom of the ceiling runner or slotted ceiling track. No gypsum board attachment screws are to penetrate the ceiling runner or slotted ceiling track.
   The hourly ratings of the joint system are equal to the hourly fire rating of the wall.
3. Joint System — Max separation between bottom of fluted deck surface and top of gypsum board (at the time of installation of the joint system) is 1 1/2 in. (38 mm). The joint system is designed to accommodate a max 50 percent compression or extension from its installed width. The joint system consists of the following:
   A. Forming Material* — Min 4 pcf (64 kg/m3) density mineral wool batt insulation cut to a thickness twice larger than the distance between the top of the gypsum board and the bottom of the steel floor unit. Material compressed 50 percent and installed within ceiling runner above top of liner panel flush with the inside surface of the panel. Material compressed and installed on finished side of the wall between the top of the gypsum board and the bottom of the steel floor units, flush with the surface of the wall.
   ROCK WOOL MANUFACTURING CO — Delta Board
   ROXUL INC — SAFE
   THERMAFIBER INC — Type SAF
   A1. Forming Material* - Strips — As an alternate to Item 3A, the strips are stacked to a height twice larger than the distance between the top of the gypsum board and the bottom of the steel floor unit. Strips compressed 50 percent and installed within ceiling runner above top of liner panel flush with the inside surface of the panel. Strips compressed and installed on finished side of the wall between the top of the gypsum board and the bottom of the steel floor units, flush with the surface of the wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 767 Speed Strips
   B. Fill, Void or Cavity Material* — Min 1/16 in. (1.6 mm) dry thickness (1/8 in. or 3.2 mm wet thickness) of fill material sprayed or troweled within stud cavity and on finished side of the shaft wall to completely cover mineral wool forming material. Fill material to overlap a min of 1/2 in. (13 mm) onto gypsum board and ceiling runner within stud cavity. Fill material to overlap a min of 1/2 in. (13 mm) onto gypsum board and steel deck on finished side of wall.
   When spray-applied fire resistive material (Item 1C) is applied to the steel deck, the fill material is to overlap the spray-applied fire resistive material a min of 2 in. (51 mm) on the finished side of the wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 672 Firestop Spray or CFS-SP WB Firestop Joint Spray

*Bearing the UL Classification Mark

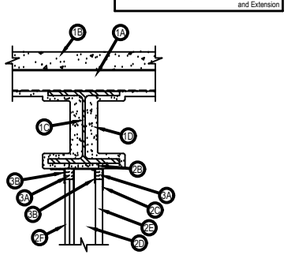
HILTI Hilti Firestop Systems

Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. January 11, 2013

System No. HW-D-0571

Classified by Underwriters Laboratories, Inc. to UL 2079 and CAN/ULC-S115

ANSI/UL2079	CAN/ULC S115
Assembly Ratings — 1 and 2 Hr (See Item 2)	F Ratings — 1 and 2 Hr (See Item 2)
Nominal Joint Width - 1-1/2 In.	FT Ratings — 1 and 2 Hr (See Item 2)
Class II Movement Capabilities — 50% Compression and Extension	FH Ratings — 1 and 2 Hr (See Item 2)
	FTH Ratings — 1 and 2 Hr (See Item 2)
	Nominal Joint Width - 1-1/2 In.
	Class II Movement Capabilities — 50% Compression and 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, D800 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 lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete, as measured from the top plane of the floor units.
   C. Structural Steel Support — Steel beam, as specified in the individual D700, D800, 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 structural steel support to be sprayed with the min thickness of material specified in the individual D700, D800, or D900 Series 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. For a 1 hr Assembly Rating, the total thickness of material applied to each side of the steel beam web shall be 13/16 in. (21 mm). For a 2 hr Assembly Rating, the total thickness of material applied to each side of the steel beam web shall be 1-3/8 in. (35 mm).
   W R GRACE & CO - CONN — Type MK-6/HY
   D1. Spray-Applied Fire Resistive Material* — After installation of the steel attachment clips (Item 2B), steel floor units and structural steel support to be sprayed with the min thickness of material specified in the individual D700, D800, or D900 Series 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. For a 1 hr Assembly Rating, the total thickness of material applied to each side of the steel beam web shall be 11/16 in. (18 mm). For a 2 hr Assembly Rating, the total thickness of material applied to each side of the steel beam web shall be 1-1/2 in. (38 mm).
   ISOLATEK INTERNATIONAL — Type 300 or Type II
2. Shaft 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. Floor and Wall Runners — (Not Shown) - J-shaped runner, sized equal in width to steel studs (Item 2C), with unequal legs of 1 in. (25 mm) and 2 in. (51 mm), fabricated from 24 MSG galv steel. Runners positioned with short leg toward finished side of wall. Runners 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 min 1 in. (25 mm) wide strips of min 20 ga galv steel. Length of clips should not exceed the width (thickness) of the wall. 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 2 in. (51 mm) long upper and lower legs. Height of clips to be equal to the required thickness of spray-applied fireproofing material (Item 1D or 1D1) on the bottom flange of the steel beam. 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 24 in. (610 mm) OC.
   C. Ceiling Runner — Ceiling runner of wall assembly shall consist of galv steel channel sized to accommodate steel studs (Item 2D). Flange height of ceiling runner shall be min 1/4 in. (6 mm) greater than max extended joint width. Ceiling runner to be positioned beneath and parallel with bottom flange of steel beam. Ceiling runner secured to steel attachment clips (Item 2B) with steel fasteners or welds spaced max 24 in. (610 mm) OC.
   C1. Light Gauge Framing* - Slotted Ceiling Runner — As an alternate to the ceiling runner in Item 2B, slotted ceiling runner to consist of galv steel channel with slotted flanges sized to accommodate steel studs (Item 2C). Flange height of slotted ceiling runner shall be min 1/4 in. (6 mm) greater than max extended joint width. Slotted ceiling runner to be positioned beneath and parallel with bottom flange of steel beam. Slotted ceiling runner secured to steel attachment clips (Item 2B) 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
   CLARKDIETRICH BUILDING SYSTEMS — Type SLT, SLT-H
   MARINO/WARE, DIV OF WARE INDUSTRIES INC — Type SLT
   METAL-LITE INC — The System
   SCAFCO STEEL STUD MANUFACTURING CO — Slotted Track
   TELLING INDUSTRIES L L C — True-Action Deflection Track
   C2. Light Gauge Framing* — Slotted Ceiling Runner — As an alternate to the ceiling runner in Item 2C through 2C1, slotted ceiling runner to consist of galv steel channel, sized to accommodate steel studs (Item 2D). Flange height of slotted ceiling runner shall be 3-1/4 in. (83 mm) with 2 in. (51 mm) deep slots. Slotted ceiling runner to be positioned beneath and parallel with bottom flange of steel beam. Slotted ceiling runner secured to steel attachment clips (Item 2B) with steel fasteners or welds spaced max 24 in. (610 mm) OC.
   SCAFCO STEEL STUD MANUFACTURING CO — Slotted Track-Type SDLT
   D. Steel Studs — C-H shaped studs, min 4 in. (102 mm) wide by 1-1/2 in. (38 mm) deep, fabricated from 25 MSG galv steel, cut to lengths 3/4 to 1 in. (19 to 25 mm) less than floor to ceiling height beneath coating on steel beam bottom flange and spaced 24 in. (610 mm) OC. When slotted ceiling runner specified in Item 2C2 is used the C-H-shaped studs cut in lengths 3/4 to 1-3/4 in. (19 to 44 mm) less than floor to ceiling height beneath coating on steel beam bottom flange and spaced 24 in. (610 mm) OC.
   E. Gypsum Board* — Nom 1 in. (25 mm) thick gypsum board liner panels. Panels cut 1-1/2 in. (38 mm) less in length than floor to ceiling height beneath coating on steel beam bottom flange. Vertical edges inserted in H-shaped section of C-H studs. At the ends of the assembly, the free edge of the end panels are attached to the long leg of vertical J-runners (Item 2A) with 1-5/8 in. (41 mm) long Type S steel screws spaced max 12 in. (305 mm) OC.
   F. Gypsum Board* — Nom 5/8 in. (16 mm) thick gypsum board applied vertically in one or two layers for 1 hr and 2 hr fire rated assemblies, respectively. Panels cut 1-1/2 in. (38 mm) less in length than floor to ceiling height beneath coating on steel beam bottom flange. The screws attaching the gypsum board layers to the C-H studs shall be located 1 to 1-1/2 in. (25 to 38 mm) below the bottom of the ceiling runner or slotted ceiling track. No gypsum board attachment screws are to penetrate the ceiling runner or slotted ceiling track.
   The hourly ratings of the joint system are equal to the hourly fire rating of the wall.
3. Joint System — Max separation between coating on steel beam bottom flange and top of gypsum board (at the time of installation of the joint system) is 1 1/2 in. (38 mm). The joint system is designed to accommodate a max 50 percent compression or extension from its installed width. The joint system consists of the following:
   A. Forming Material* — Min 4 pcf (64 kg/m3) density mineral wool batt insulation cut to a thickness twice larger than the distance between the top of the gypsum board and the bottom of the coating on the steel beam bottom flange. Material compressed 50 percent and installed within ceiling runner above top of liner panel flush with the inside surface of the panel. Material compressed and installed on finished side of the wall between the top of the gypsum board and the bottom of the coating on the steel beam bottom flange, flush with the surface of the wall.
   ROCK WOOL MANUFACTURING CO — Delta Board
   ROXUL INC — SAFE
   THERMAFIBER INC — Type SAF
   A1. Forming Material* - Strips — As an alternate to Item 2A, the strips are stacked to a height twice larger than the distance between the top of the gypsum board and the bottom of the coating on the steel beam bottom flange. Strips compressed 50 percent and installed within ceiling runner above top of liner panel flush with the inside surface of the panel. Strips compressed and installed on finished side of the wall between the top of the gypsum board and the bottom of the coating on the steel beam bottom flange, flush with the surface of the wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 767 Speed Strips
   B. Fill, Void or Cavity Material* — Min 1/16 in. (1.6 mm) dry thickness (1/8 in. or 3.2 mm wet thickness) of fill material sprayed or troweled within stud cavity and on finished side of the shaft wall to completely cover mineral wool forming material. Fill material to overlap a min of 1/2 in. (13 mm) onto gypsum board and ceiling runner within stud cavity. Fill material to overlap a min of 1/2 in. (13 mm) onto gypsum board and min 2 in. (51 mm) onto spray-applied fire resistive material (Item 1C) on the finished side of the wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 672 Firestop Spray or CFS-SP WB Firestop Joint Spray

*Bearing the UL Classification Mark

HILTI Hilti Firestop Systems

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Notes:

1. *Refer to section 07840 of the specifications. For Quality Control requirements, refer to the Quality Control portion of the specification.*
2. *Details shown are typical details. If field conditions do not match requirements of typical details, approved alternate details shall be utilized. Field conditions and dimensions need to be verified for compliance with the details, including but not limited to the following:*
   * *Minimum and maximum Width of Joints*
   * *Type and thickness of fire-rated construction. The minimum assembly rating of the firestop assembly shall meet or exceed the highest rating of the adjacent construction.*
3. *If alternate details matching the field conditions are not available, Manufacturer's engineering judgment drawings are acceptable. Drawings shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.*
4. *References:*
   * *Underwriter's Laboratories Fire Resistance Directory*
   * *Intertek Directory of Listed Products*
   * *NFPA 101 Life Safety Code*
   * *All governing local and regional building codes*
5. *Firestop System installation must meet requirements of UL 2079 tested assemblies that provide the required assembly rating.*
6. *All rated assemblies shall be prominently labeled with the following information:*
   * *ATTENTION: Fire Rated Assembly*
   * *UL System #*
   * *Product(s) used*
   * *Hourly Rating (Assembly Rating)*
   * *Installation Date*

<Notes to designer (delete this note after reading and replace with title block information)>
1. Any modification to these details could result in an application/system not meeting the UL or Intertek Classification or the intended temperature or fire ratings.
2. Details shown are up to date as of February 2015.
3. For additional information on the details, refer to the most current "Underwriter's Laboratories Fire Resistance Directory (volume 2.)"

JOB NUMBER:

DRAWN:

CHECKED:

ISSUE DATE:

REVISIONS:

TYPICAL FIRESTOP JOINT DETAILS

SHEET NAME:

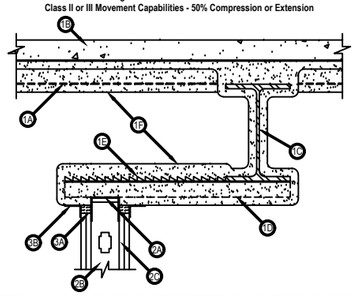
SHEET NUMBER:

A.6.7

System No. HW-D-0634

Assembly Ratings — 1 and 2 Hr (See Items 1 and 2)
Maximum Joint Width - 1-1/2 In.
L Rating At Ambient — Less Than 1 CFM/Lin Ft
L Rating At 400°F — Less Than 1 CFM/Lin Ft
Class II or III Movement Capabilities - 50% Compression or Extension

Classified by Underwriters Laboratories, Inc. to UL 2079 and CAN/ULC-S115



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 as noted below. The hourly fire rating of the floor assembly shall be equal to or greater than the hourly fire rating of the wall assembly. The floor assembly 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 max 12 in. (305 mm) from wall assembly.
   D. Steel Furring — Z-shaped bars or channels, located to span from steel beam to min 1 in. (25 mm) beyond face of wall and spaced max 24 in. (610 mm) on center. Z-shaped bars are nom 1-1/2 to 2 in. (38 to 51 mm) deep and formed from min 16 gauge painted or galvanized steel. Channels are nom 1-1/2 in. (38 mm) or 2 in. (51 mm) deep and formed from min 16 gauge painted or galvanized steel. Each bar or channel welded or fastened with steel fasteners to steel beam and welded, bolted or screwed to ceiling runner of wall. Each bar or channel shall be fully covered with spray applied fire resistive material to the minimum thickness of material required on the flanges of the steel beam.
   E. Steel Lath — Nom 3/8 in. (10 mm) diamond mesh expanded steel rib lath having a nom weight of 3.4 lb/yd2 (1.8 kg/m2) shall be installed over and attached to the steel furring bars or channels (Item 1D) to completely cover the exposed area from the flange tip of the steel beam to the end of the bar/channel framing extending beyond the wall surface. The lath shall be secured with steel fasteners or tie wire and shall be fully covered with spray applied fire resistive material (see Item 1F).
   F. Spray-Applied Fire Resistive Material* — After installation of ceiling runner, steel floor units and structural steel beam to be sprayed with the thickness of material specified in the individual D700 Series Design. The flutes of the steel floor units above the structural steel beam shall be filled with spray-applied fire resistive material across the entire top flange of the steel beam. Each bar or channel furring member (Item 1D) shall be fully covered with spray applied fire resistive material to the minimum thickness of material required on the flanges of the steel beam. The thickness of material applied to the expanded steel lath shall be sufficient to completely fill the spaces between the bar/channel furring above the wall. Additional spray-applied fire resistive material shall be applied to the web of the steel beam on each side of the wall. For a 1 hr Assembly Rating, the thickness of material applied to each side of the steel beam web shall be 13/16 in. (21 mm). For a 2 hr Assembly Rating, the thickness of material applied to each side of the steel beam web shall be 1-3/8 in. (35 mm). In addition, the thickness of material applied to the expanded steel lath shall cover the top surface of the lath with a minimum 1-5/8 in. (41 mm) of material for the 1 hr Assembly Rating and 2-5/8 in. (67 mm) of material for the 2 hr Assembly Rating.
   W R GRACE & CO - CONN — Type MK-6/HY, MK-6/HY ES, MK-6s, RG
   F1. Spray-Applied Fire Resistive Material* — After installation of ceiling runner, steel floor units and structural steel support to be sprayed with the min thickness of material specified in the individual D700 Series Design. The flutes of the steel floor units above the structural steel beam shall be filled with spray-applied fire resistive material across the entire top flange of the steel beam. Each bar or channel furring member (Item 1D) shall be fully covered with spray applied fire resistive material to the minimum thickness of material required on the flanges of the steel beam. The thickness of material applied to the expanded steel lath shall be sufficient to completely fill the spaces between the bar/channel furring above the wall. Additional material shall be applied to the web of the steel beam on each side of the wall. For a 1 hr Assembly Rating, the thickness of material applied to each side of the steel beam web shall be 11/16 in. (18 mm). For a 2 hr Assembly Rating, the thickness of material applied to each side of the steel beam web shall be 1-1/2 in. (38 mm). In addition, the thickness of material applied to the expanded steel lath shall cover the top surface of the lath with a minimum 1-5/8 in. (41 mm) of material for the 1 hr Assembly Rating and 2-5/8 in. (67 mm) of material for the 2 hr Assembly Rating.
   ISOLATEK INTERNATIONAL — Type 300
2. Wall Assembly — The 1 or 2 hr fire rated gypsum board/steel stud wall assembly shall be constructed of the materials and in the manner described in the individual 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 galv steel channels sized to accommodate steel studs (Item 2B). Flange height of ceiling runner shall be min 1/4 in. greater than max extended joint width. Ceiling runner is secured to steel furring (Item 1D) with steel fasteners or welds spaced max 24 in. (610 mm) OC. Ceiling runner to be installed parallel with structural steel support and located such that a max clearance of 12 in. (305 mm) is present between the finished wall and the flange of the steel beam (Item 1C).
   A1. Light Gauge Framing* — Slotted Ceiling Runner — As an alternate to the ceiling runner in Item 2A, ceiling runner to consist of galv steel channel with slotted flanges sized to accommodate steel studs (Item 2B). Flange height of slotted ceiling runner shall be 3-1/4 in. (83 mm) with 2 in. (51 mm) deep slots. Slotted ceiling runner is secured to steel furring (Item 1D) with steel fasteners or welds spaced max 24 in. (610 mm) OC. Slotted ceiling runner to be installed parallel with structural steel support and located such that a max clearance of 12 in. (305 mm) is present between the finished wall and the flange of the steel beam (Item 1C).
   SCAFCO STEEL STUD MANUFACTURING CO — Slotted Track-Type SDLT
   B. Studs — Steel studs to be min 3-1/2 in. (89 mm) wide. Studs cut 1/2 in. 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 slotted ceiling runner (Item 2A1) is used, steel studs cut in lengths 3/4 to 1-3/4 in. (19 to 44 mm) less than floor to ceiling height and secured to slotted ceiling runner with No. 8 by 1/2 (13 mm) long wafer head steel screws at +/- 3/16 in. (5 mm) of the mid-height of slot on each side of wall
   C. 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 that a max 1-1/2 in. (38 mm) gap shall be maintained between the top of the gypsum board and the bottom plane of the spray applied fire resistive material on the steel furring (Item 1D) on both sides of the wall assembly.
   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 plane of spray-applied fire resistive material on the steel attachment clip (Item 1D) and the top of the gypsum board is 1-1/2 in. (38 mm). The joint system is designed to accommodate a max 50 percent compression or extension from its installed width. The joint system shall consist of forming and fill materials, as follows:
   A. Forming Material* — Nom 4 pcf (64 kg/m3) density mineral wool batt insulation. Sections of mineral wool batt cut to a thickness equal to the overall thickness of gypsum board and compressed a min of 50 percent into the gap between the top of the gypsum board and the bottom plane of the spray applied fire resistive material on the steel furring (Item 1D) on both sides of the wall assembly.
   ROCK WOOL MANUFACTURING CO — Delta Board
   ROXUL INC — SAF Mineral Wool
   THERMAFIBER INC — Type SAF
   A1. Forming Material* - Strips — As an alternate to Item 3A, the strips are stacked to a height twice larger than the distance between the top of the gypsum board and the bottom of the steel floor unit. Strips compressed 50 percent and installed within ceiling runner above top of liner panel flush with the inside surface of the panel. Strips compressed and installed on finished side of the wall between the top of the gypsum board and the bottom of the steel floor units, flush with the surface of the wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 767 Speed Strips
   B. Fill, Void or Cavity Material* - Sealant — Min 1/16 in. (1.6 mm) dry thickness (1/8 in. or 3.2 mm wet thickness) fill material sprayed or troweled on each side of wall to completely cover mineral wool forming material and to overlap min 1/2 in. (13 mm) onto wall and min 2 in. (51 mm) onto spray-applied fire resistive material.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP672 Firestop Spray or CFS-SP WB Firestop Joint Spray

*Bearing the UL Classification Mark

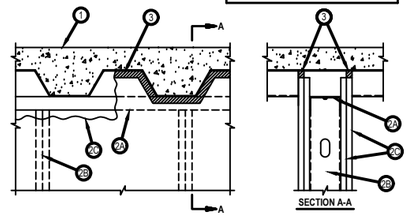
Hilti Firestop Systems

Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc.
January 11, 2013

System No. HW-D-0324

ANSI/UL2079	CAN/ULC S115
Assembly Ratings — 1 and 2 Hr (See Item 2)	F Ratings — 1 and 2 Hr (See Item 2)
Nominal Joint Width - 3/4 In.	FT Ratings — 1 and 2 Hr (See Item 2)
Class II Movement Capabilities — 17% Compression or Extension	FH Ratings — 1 and 2 Hr (See Item 2)
L Rating At Ambient — Less Than 1 CFM/sq ft	FTH Ratings — 1 and 2 Hr (See Item 2)
L Rating At 400 F — Less Than 1 CFM/sq ft	Nominal Joint Width - 3/4 In.
	Class II Movement Capabilities — 17% Compression or Extension
	L Rating At Ambient — Less Than 1 CFM/sq ft
	L Rating At 400 F — Less Than 1 CFM/sq ft

Classified by Underwriters Laboratories, Inc. to UL 2079 and CAN/ULC-S115



1. Floor Assembly — The fire-rated fluted steel floor unit/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 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 Materials* — (Optional)—(Not Shown)—Prior to the installation of the steel ceiling runners and fill material (Items 2A and, 3, respectively) the steel floor units may be sprayed with type and thickness of fire resistive material indicated in the individual D700 Series design.
   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 specified in the individual U400, V400 or W400 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 gauge galv steel channels sized to accommodate steel studs (Item 2B). Flange height of ceiling runner shall be min 1/4 in. (6 mm) greater than max extended joint width. Ceiling runner secured to valleys of steel floor units with steel fasteners or by welds spaced max 24 in. (610 mm) OC. The use of welds to secure the ceiling runner may only be used prior to the installation of the optional spray-applied material.
   A1. Light Gauge Framing*-Slotted Ceiling Runner — As an alternate to the ceiling runner in Item 2A, slotted ceiling runner to consist of galv steel channel with slotted flanges sized to accommodate steel studs (Item 2B). Slotted ceiling runner installed perpendicular to direction of fluted steel floor units and secured to valleys with steel fasteners spaced max 24 in. (610 mm) OC.
   CALIFORNIA EXPANDED METAL PRODUCTS CO — CST
   BRADY CONSTRUCTION INNOVATIONS INC, DBA SLIPTRACK SYSTEMS — SLP-TRK
   MARINO/WARE, DIV OF WARE INDUSTRIES INC — Type SLT
   THE STEEL NETWORK INC — VertiTrack VT, series,2500VT, 362VT, 400VT, 600VT and 800VT
   A2. Light Gauge Framing*-Vertical Deflection Ceiling Runner — As an alternate to the ceiling runners in Item 2A and 2A1, vertical deflection ceiling runner to consist of galv steel channel with slotted vertical deflection clips mechanically fastened within runner. Slotted clips, provided with step bushings, for permanent fastening of steel studs. Flanges sized to accommodate steel studs (Item 2B). Vertical deflection ceiling runner installed perpendicular to direction of fluted steel floor units and secured to valleys with steel fasteners spaced max 24 in. (610 mm) OC.
   THE STEEL NETWORK INC — VertiTrack VTD362, VTD400, VTD600 and VTD800
   B. Studs — Steel studs to be min 3-1/2 in. (89 mm) wide. Studs cut 1/2 in. (13 mm) to 3/4 in. (19 mm) less in length than assembly height with bottom nesting in and resting on the floor runner and with top nesting in ceiling runner without attachment. When slotted ceiling runner is used, steel studs secured to slotted ceiling runner with No. 8 by 1/2 in. (13 mm) long wafer head steel screws at midheight of slot on each side of wall. When vertical deflection ceiling runner is used, steel studs secured to slotted vertical deflection clips, through bushings, with steel screws at midheight of each slot. Stud spacing not to exceed 24 in. (610 mm) OC.
   C. Gypsum Board* — One or two layers of 5/8 in. (16 mm) thick gypsum board on each side of wall. Wall to be constructed as specified in the individual Wall and Partition Design, except that the gypsum board is cut to fit the contour of the steel floor units or spray-applied fire resistive material with a max 3/4 (19 mm) in. gap. The screws attaching the gypsum board to the studs at the top of the first layer shall be located 4 in. (102 mm) from the steel floor unit valleys. The screws attaching the second layer to the steel studs shall be located 3-1/2 in. (89 mm) from the valleys of the steel floor units.
   The hourly fire rating of the joint system is equal to the hourly rating of the wall.
3. Fill, Void or Cavity Material* - Sealant — Max separation between bottom of floor or roof units and top of gypsum board at time of installation is 3/4 in. (19 mm). The joint system is designed to accommodate a max 17 percent compression or extension from its installed width. A 5/8 in. (16 mm) thickness of fill material installed within the annulus between top of gypsum board and bottom of floor units or spray-applied fire resistive material flush with surface of board on both sides of the wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP606 Flexible Firestop Sealant
4. Forming Material — (Optional, Not Shown) - Mineral wool insulation, fiberglass batt insulation or polyurethane/polyethylene foam backer rod. Forming material to be recessed from both surfaces of the 2 hr fire rated wall to accommodate the required thickness of fill material.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP606 Flexible Firestop Sealant

*Bearing the UL Classification Mark

Hilti Firestop Systems

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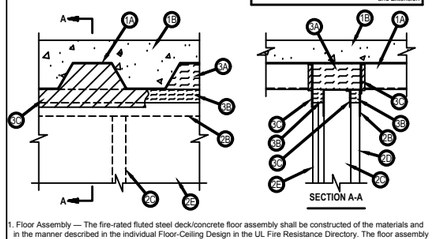
December 14, 2012

System No. HW-D-0569

ANSI/UL2079	CAN/ULC S115
Assembly Ratings — 1 and 2 Hr (See Item 2)	F Ratings — 1 and 2 Hr (See Item 2)
Nominal Joint Width - 1-1/2 In.	FT Ratings — 1 and 2 Hr (See Item 2)
Class II Movement Capabilities — 50% Compression and Extension	FH Ratings — 1 and 2 Hr (See Item 2)
	FTH Ratings — 1 and 2 Hr (See Item 2)
	Nominal Joint Width - 1-1/2 In.
	Class II Movement Capabilities — 50% Compression and Extension

Classified by Underwriters Laboratories, Inc. to UL 2079 and CAN/ULC-S115



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 Floor-Ceiling Design in the UL Fire Resistance Directory. The floor assembly shall include the following construction features:
   A. Steel Floor and Form Units* — Max 3 in. (76 mm) deep galv fluted floor units.
   B. Concrete — Min 2-1/2 in. (64 mm) thick lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete, as measured from the top plane of the floor units.
   C. Spray-Applied Fire Resistive Materials* — (Optional, Not Shown) — After installation of the steel ceiling runners (Item 2B) the steel floor units may be sprayed with a min 5/16 in. (8 mm) to max 1 3/4 in. (45 mm) thickness of fire resistive material.
   ISOLATEK INTERNATIONAL — Type 300
   W R GRACE & CO - CONN — Type MK-6-HY
2. Shaft 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, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
   A. Floor and Wall Runners — (Not Shown) - J-shaped runner, equal in width to steel studs (Item 2C), with unequal legs of 1 in. (25 mm) and 2 in. (51 mm), fabricated from 24 MSG galv steel. Runners positioned with short leg toward finished side of wall. Runners 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. Ceiling Runner — Ceiling runner of wall assembly shall consist of galv steel channel sized to accommodate steel studs (Item 2C). Flange height of ceiling runner shall be min 1/4 in. (6 mm) greater than max extended joint width. Ceiling runner installed perpendicular to direction of fluted steel deck and secured to steel deck valleys with steel fasteners or welds spaced max 24 in. (610 mm) OC.
   B1. Light Gauge Framing* - Slotted Ceiling Runner — As an alternate to the ceiling runner in Item 2B, slotted ceiling runner to consist of galv steel channel with slotted flanges sized to accommodate steel studs (Item 2C). Flange height of slotted ceiling runner shall be min 1/4 in. (6 mm) greater than max extended joint width. Slotted ceiling runner installed perpendicular to direction of fluted steel deck and secured to steel deck valleys with steel masonry anchors spaced max 24 in. (610 mm) OC.
   BRADY CONSTRUCTION INNOVATIONS INC, DBA SLIPTRACK SYSTEMS — SLP-TRK
   CALIFORNIA EXPANDED METAL PRODUCTS CO — CST
   CLARKDIETRICH BUILDING SYSTEMS — Type SLT, SLT-H
   MARINO/WARE, DIV OF WARE INDUSTRIES INC — Type SLT
   METAL-LITE INC — The System
   SCAFCO STEEL STUD MANUFACTURING CO — Slotted Track
   TELLING INDUSTRIES L L C — True-Action Deflection Track
   B2. Light Gauge Framing* — Slotted Ceiling Runner — As an alternate to the ceiling runner in Item 2B, slotted ceiling runner to consist of galv steel channel, sized to accommodate steel studs (Item 2C). Flange height of slotted ceiling runner shall be 3-1/4 in. (83 mm) with 2 in. (51 mm) deep slots. Slotted ceiling runner installed perpendicular to direction of fluted steel deck and secured to steel deck valleys with steel fasteners or welds spaced max 24 in. (610 mm) OC.
   SCAFCO STEEL STUD MANUFACTURING CO — Slotted Track-Type SDLT
   C. Steel Studs — C-H-shaped studs, min 4 in. (102 mm) wide by 1-1/2 in. (38 mm) deep, fabricated from 25 MSG galv steel, cut to lengths 3/4 to 1 in. (19 to 25 mm) less than floor to ceiling height and spaced 24 in. (610 mm) OC. When slotted ceiling runner specified in Item 2B2 is used the C-H-shaped studs cut in lengths 3/4 to 1-3/4 in. (19 to 44 mm) less than floor to ceiling height.
   D. Gypsum Board* — Nom 1 in. (25 mm) thick gypsum board liner panels. Panels cut 1-1/2 in. (38 mm) less in length than floor to ceiling height. Vertical edges inserted in H-shaped section of C-H studs. At the ends of the assembly, the free edge of the end panels are attached to the long leg of vertical J-runners (Item 2A) with 1-5/8 in. (41 mm) long Type S steel screws spaced max 12 in. (305 mm) OC.
   E. Gypsum Board* — Nom 5/8 in. (16 mm) thick gypsum board applied vertically in one or two layers for 1 hr and 2 hr fire rated assemblies, respectively. Panels cut 1-1/2 in. (38 mm) less in length than floor to ceiling height. The screws attaching the gypsum board layers to the C-H studs shall be located 1 to 1-1/2 in. (25 to 38 mm) below the bottom of the ceiling runner or slotted ceiling track. No gypsum board attachment screws are to penetrate the ceiling runner or slotted ceiling track.
   The hourly ratings of the joint system are equal to the hourly fire rating of the wall.
3. Joint System — Max separation between bottom of fluted deck surface and top of gypsum board (at the time of installation of the joint system) is 1 1/2 in. (38 mm). The joint system is designed to accommodate a max 50 percent compression or extension from its installed width. The joint system consists of the following:
   A. Forming Material* — Min 4 pcf (64 kg/m3) density mineral wool batt insulation cut to the shape of the fluted deck, 50 percent larger than the height of the flutes, and compressed into the flutes of the steel floor units above the ceiling runner as a permanent form. The mineral wool batt insulation is to project beyond the ceiling runner to be flush with the finished wall surfaces.
   ROCK WOOL MANUFACTURING CO — Delta Board
   ROXUL INC — SAFE
   THERMAFIBER INC — Type SAF
   A1. Forming Material* — Plugs — As an alternate to Item 3A, preformed mineral wool plugs, formed to the shape of the fluted floor units, friction fit to completely fill the flutes above the ceiling runner. The plugs shall project beyond the finished side of the ceiling runner, flush with wall surface.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP777 Speed Plugs
   B. Forming Material* — Min 4 pcf (64 kg/m3) density mineral wool batt insulation cut to a thickness twice larger than the distance between the top of the gypsum board and the bottom of the steel floor unit. Material compressed 50 percent and installed within ceiling runner above top of liner panel flush with the inside surface of the panel. Material compressed and installed on finished side of the wall between the top of the gypsum board and the bottom of the steel floor units, flush with the surface of the wall.
   ROCK WOOL MANUFACTURING CO — Delta Board
   ROXUL INC — SAFE
   THERMAFIBER INC — Type SAF
   B1. Forming Material* - Strips — As an alternate to Item 2B, the strips are stacked to a height twice larger than the distance between the top of the gypsum board and the bottom of the steel floor unit. Strips compressed 50 percent and installed within ceiling runner above top of liner panel flush with the inside surface of the panel. Strips compressed and installed on finished side of the wall between the top of the gypsum board and the bottom of the steel floor units, flush with the surface of the wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 767 Speed Strips
   C. Fill, Void or Cavity Material* — Min 1/16 in. (1.6 mm) dry thickness (1/8 in. or 3.2 mm wet thickness) of fill material sprayed or troweled within stud cavity and on both sides of the shaft wall to completely cover mineral wool forming material. Fill material to overlap a min of 1/2 in. (13 mm) onto gypsum board and ceiling runner within stud cavity. Fill material to overlap a min of 1/2 in. (13 mm) onto gypsum board and steel deck on finished side of wall. Fill material to overlap a min of 1/2 in. onto steel deck and ceiling runner on unfinished side of wall with no overlap onto gypsum liner panel. When spray-applied fire resistive material (Item 1C) is applied to the steel deck, the fill material is to overlap the spray-applied fire resistive material a min of 2 in. (51 mm) on both sides of wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 672 Firestop Spray or CFS-SP WB Firestop Joint Spray

*Bearing the UL Classification Mark

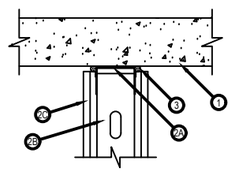
Hilti Firestop Systems

Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc.
January 11, 2013

System No. HW-D-0757

ANSI/UL2079	CAN/ULC S115
Assembly Ratings — 1 and 2 Hr (See Item 2)	F Rating — 1 and 2 Hr (See Item 2)
Nominal Joint Width — 1/2 or 3/4 In. (See Item 3)	FT Rating — 1 and 2 Hr (See Item 2)
Class II or III Movement Capabilities — 50% Compression or Extension or 66% Compression Only	FH Rating — 1 and 2 Hr (See Item 2)
L Rating at Ambient — Less than 1 CFM/Lin Ft	FTH Rating — 1 and 2 Hr (See Item 2)
L Rating at 400° F — Less than 1 CFM/Lin Ft	Nominal Joint Width - 13 or 19 mm (See Item 3)
	Class II or III Movement Capabilities — 50% Compression or Extension or 66% Compression Only
	L Rating at Ambient — Less than 1.55 L/s/lin.m
	L Rating at 400° F — Less than 1.55 L/s/lin.m

Classified by Underwriters Laboratories, Inc. to UL 2079 and CAN/ULC-S115



1. Floor Assembly — Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. Floor may also be constructed of any 6 in. (152 mm) thick UL Classified hollow-core Precast Concrete Units*.
   See Precast Concrete Units category in the Fire Resistance Directory for names of manufactures.
2. Wall Assembly — The 1 or 2 hr fire-rated gypsum board /steel stud wall assembly shall be constructed of the materials and in the manner specified 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 gauge galv steel channels sized to accommodate steel studs (Item 2B). Flange height of ceiling runner shall be min 1/4 in. (6 mm) greater than max extended joint width. Ceiling runner secured to concrete floor slab with steel masonry anchors, steel fasteners spaced 24 in. (610 mm) OC.
   A1. Light Gauge Framing* — Slotted Ceiling Runner — As an alternate to the ceiling runner in Item 2A, slotted ceiling runner to consist of galv steel channel with slotted flanges sized to accommodate steel studs (Item 2B). Slotted ceiling runner secured to concrete floor slab with steel masonry anchors or steel fasteners spaced 24 in. (610 mm) OC.
   BRADY CONSTRUCTION INNOVATIONS INC, DBA SLIPTRACK SYSTEMS — SLP-TRK
   CALIFORNIA EXPANDED METAL PRODUCTS CO — CST
   CLARKDIETRICH BUILDING SYSTEMS — Types SLT, SLT-H
   MARINO/WARE, DIV OF WARE INDUSTRIES INC — Type SLT
   METAL-LITE INC — The System
   SCAFCO STEEL STUD MANUFACTURING CO — Slotted Track
   TELLING INDUSTRIES L L C — True-Action Deflection Track
   A2. Light Gauge Framing* — Vertical deflection Ceiling Runner — As an alternate to the ceiling runners in Items 2A and 2A1, vertical deflection ceiling runner to consist of galv steel channel with slotted vertical deflection clips mechanically fastened within runner. Slotted clips, provided with step bushings, for permanent fastening of steel studs. Flanges sized to accommodate steel studs (Item 2B). Vertical deflection ceiling runner secured to concrete floor slab with steel fasteners or steel masonry anchors spaced max 24 in. (610 mm) OC.
   THE STEEL NETWORK INC — VertiTrack VTD250, VTD362, VTD400, VTD600 and VTD800
   A3. Light Gauge Framing* — Notched Ceiling Runner — As an alternate to the ceiling runners in Items 2A through 2A3, notched ceiling runners to consist of C-shaped galv steel channel with notched return flanges sized to accommodate steel studs (Item 2B). Notched ceiling runner secured to concrete floor slab with steel masonry anchors or steel fasteners spaced max 24 in. (610 mm) OC.
   OLMAR SUPPLY INC — Type SCR
   B. Studs — Steel studs to be min 3-1/2 in. (64 mm) wide. Studs cut 3/4 to 1 in. (19 to 25 mm) less in length than assembly height with bottom nesting in and resting on floor runner and with top nesting in ceiling runner without attachment. When slotted ceiling runner (Item 2A1) is used, steel studs secured to slotted ceiling runner with No. 8 by 1/2 in. (13 mm) long wafer head steel screws at mid-height of slot on each side of wall. Stud spacing not to exceed 24 in. (610 mm) OC. When vertical deflection ceiling runner (Item 2A2) is used, steel studs secured to slotted vertical deflection clips, through the bushings, with steel screws at mid-height of each slot. Stud spacing not to exceed 24 in. (610 mm) OC.
   C. Gypsum Board* — For 1 hr assembly, one layer of 5/8 in. (16 mm) thick gypsum board is required in the individual Wall and Partition Design. For 2 hr assembly, two layers of 5/8 in. (16 mm) thick gypsum board is required in the individual Wall and Partition Design. For both hourly ratings, a max 3/4 in. (19 mm) gap shall be maintained between the top of gypsum board and the bottom of surface of the concrete floor. The screws attaching the gypsum board to studs at the top of the wall shall be located 1 in. (25 mm) to 1-1/2 in. (38 mm) below the bottom edge of the ceiling runner.
   The hourly ratings of the joint system are dependent on the hourly rating of the wall.
3. Fill, Void or Cavity Material* — Top Track Seal — When max separation between the bottom of floor and top of wall is 1/2 in. (13 mm), the joint system is designed to accommodate a max 50 percent compression or extension from its installed width. When max separation between the bottom of floor and top of wall is 3/4 in. (19 mm), the joint system is designed to accommodate a max 66% compression only from its installed width. Factory supplied foam seal installed over the ceiling runner (Item 2A) prior to attachment to underside of concrete floor in accordance with the installation instructions.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CFS-TTS 358, CFS-TTS 600 or CFS-TTS-OS
   * Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

Hilti Firestop Systems

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December 22, 2015

Notes:

1. *Refer to section 07840 of the specifications. For Quality Control requirements, refer to the Quality Control portion of the specification.*
2. *Details shown are typical details. If field conditions do not match requirements of typical details, approved alternate details shall be utilized. Field conditions and dimensions need to be verified for compliance with the details, including but not limited to the following:*
   - ** Minimum and maximum Width of Joints*
   - ** Type and thickness of fire-rated construction. The minimum assembly rating of the firestop assembly shall meet or exceed the highest rating of the adjacent construction.*
3. *If alternate details matching the field conditions are not available, Manufacturer's engineering judgment drawings are acceptable. Drawings shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.*
4. *References:*
   - ** Underwriter's Laboratories Fire Resistance Directory*
   - ** Intertek Directory of Listed Products*
   - ** NFPA 101 Life Safety Code*
   - ** All governing local and regional building codes*
5. *Firestop System installation must meet requirements of UL 2079 tested assemblies that provide the required assembly rating.*
6. *All rated assemblies shall be prominently labeled with the following information:*
   - ** ATTENTION: Fire Rated Assembly*
   - ** UL System #*
   - ** Product(s) used*
   - ** Hourly Rating (Assembly Rating)*
   - ** Installation Date*

<Notes to designer (delete this note after reading and replace with title block information)>
1. Any modification to these details could result in an application/system not meeting the UL or Intertek Classification or the intended temperature or fire ratings.
2. Details shown are up to date as of February 2015.
3. For additional information on the details, refer to the most current "Underwriter's Laboratories Fire Resistance Directory (volume 2.)"

JOB NUMBER:

DRAWN:

CHECKED:

ISSUE DATE:

REVISIONS:

TYPICAL FIRESTOP JOINT DETAILS

SHEET NAME:

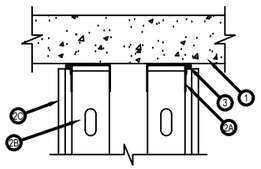
SHEET NUMBER:

A.7.7

System No. HW-D-0758

Classified by Underwriters Laboratories, Inc. to UL 2079 and CAN/ULC-S115

ANSI/UL2079	CAN/ULC S115
Assembly Ratings — 1 and 2 Hr (See Item 2)	F Rating — 1 and 2 Hr (See Item 2)
Nominal Joint Width — 1/2 or 3/4 In. (See Item 3)	FT Rating — 1 and 2 Hr (See Item 2)
Class II or III Movement Capabilities — 50% Compression or Extension or 66% Compression Only	FH Rating — 1 and 2 Hr (See Item 2)
L Rating at Ambient — Less than 1 CFM/Lin Ft	FTH Rating — 1 and 2 Hr (See Item 2)
L Rating at 400° F — Less than 1 CFM/Lin Ft	Nominal Joint Width - 13 or 19 mm (See Item 3)
	Class II or III Movement Capabilities — 50% Compression or Extension or 66% Compression Only
	L Rating at Ambient — Less than 1.55 L/s/lin m
	L Rating at 400° F — Less than 1.55 L/s/lin m



1. Floor Assembly — Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. Floor may also be constructed of any 6 in. (152 mm) thick UL Classified hollow-core Precast Concrete Units*. See Precast Concrete Units category in the Fire Resistance Directory for names of manufactures.
2. Wall Assembly — The 1 or 2 hr fire rated gypsum board/stud chase (double stud) wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 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 gauge galv steel channels sized to accommodate steel studs (Item 2B). Flange height of ceiling runner shall be min 1/4 in. (6 mm) greater than max extended joint width. Ceiling runner secured to concrete floor slab with steel masonry anchors, steel fasteners spaced 24 in. (610 mm) OC.
   A1. Light Gauge Framing* — Slotted Ceiling Runner — As an alternate to the ceiling runner in Item 2A, slotted ceiling runner to consist of galv steel channel with slotted flanges sized to accommodate steel studs (Item 2B). Slotted ceiling runner secured to concrete floor slab with steel masonry anchors or steel fasteners spaced max 24 in. (610 mm) OC.
   BRADY CONSTRUCTION INNOVATIONS INC, DBA SLIPTRACK SYSTEMS — SLP-TRK
   CALIFORNIA EXPANDED METAL PRODUCTS CO — CST
   CLARKDIETRICH BUILDING SYSTEMS — Types SLT, SLT-H
   MARINO/WARE, DIV OF WARE INDUSTRIES INC — Type SLT
   METAL-LITE INC — The System
   SCAFCO STEEL STUD MANUFACTURING CO — Slotted Track
   TELLING INDUSTRIES L L C — True-Action Deflection Track
   A2. Light Gauge Framing* — Vertical deflection Ceiling Runner — As an alternate to the ceiling runners in Items 2A and 2A1, vertical deflection ceiling runner to consist of galv steel channel with slotted vertical deflection clips mechanically fastened within runner. Slotted clips, provided with step bushings, for permanent fastening of steel studs. Flanges sized to accommodate steel studs (Item 2B). Vertical deflection ceiling runner secured to concrete floor slab with steel fasteners or steel masonry anchors spaced max 24 in. (610 mm) OC.
   THE STEEL NETWORK INC — VertiTrack VTD250, VTD362, VTD400, VTD600 and VTD800
   A3. Light Gauge Framing* — Notched Ceiling Runner — As an alternate to the ceiling runners in Items 2A through 2A3, notched ceiling runners to consist of C-shaped galv steel channel with notched return flanges sized to accommodate steel studs (Item 2B). Notched ceiling runner secured to concrete floor slab with steel masonry anchors or steel fasteners spaced max 24 in. (610 mm) OC.
   OLMAR SUPPLY INC — Type SCR
   B. Studs — Steel studs to be min 3-1/2 in. (89 mm) wide and formed of min 25 ga galv steel. Studs cut 3/4 to 1 in. (19 to 25 mm) less in length than assembly height with bottom nesting in and secured to floor runner. Steel studs nested in ceiling runner without attachment. Studs spaced max 24 in. (610 mm) OC.
   C. Gypsum Board* — Gypsum board 1/2 or 5/8 in. (13 or 16 mm) thick, applied on both sides of wall as specified in the individual Wall and Partition Design except that a max 3/4 in. (19 mm) gap shall be maintained between the top of the gypsum board and the bottom of the floor assembly. The screws attaching the gypsum board to studs at the top of the wall shall be located 1 in. (25 mm) to 1-1/2 in. (38 mm) below the bottom edge of the ceiling runner. No gypsum board attachment screws shall be driven into the ceiling runner.
   The hourly ratings of the joint system are equal to the hourly fire rating of the wall.
3. Fill, Void or Cavity Material* — Top Track Seal — When max separation between the bottom of floor and top of wall is 1/2 in. (13 mm), the joint system is designed to accommodate a max 50 percent compression or extension from its installed width. When max separation between the bottom of floor and top of wall is 3/4 in. (19 mm), the joint system is designed to accommodate a max 66% compression only from its installed width. Factory supplied foam seal installed over the ceiling runners (Item 2A) prior to attachment to underside of concrete floor in accordance with the installation instructions.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CFS-TTS 358, CFS-TTS 600 or CFS-TTS-OS

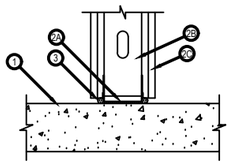
* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

Hilti Firestop Systems

System No. BW-S-0039

Classified by Underwriters Laboratories, Inc. to UL 2079 and CAN/ULC-S115

ANSI/UL2079	CAN/ULC S115
Assembly Ratings — 1 and 2 Hr (See Item 1)	F Ratings — 1 and 2 Hr (See Item 1)
Nominal Joint Width - 3/4 In.	FT Ratings — 1 and 2 Hr (See Item 1)
L Rating at Ambient — Less than 1 CFM/Lin Ft	FH Ratings — 1 and 2 Hr (See Item 1)
L Rating at 400° F — Less than 1 CFM/Lin Ft	FTH Ratings — 1 and 2 Hr (See Item 1)
	Nominal Joint Width - 3/4 In.
	L Rating at Ambient — Less than 1.55 L/s/lin m
	L Rating at 400° F — Less than 1.55 L/s/lin m



1. Floor Assembly — Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. Floor may also be constructed of any 6 in. (152 mm) thick UL Classified hollow-core Precast Concrete Units*. See Precast Concrete Units category in the Fire Resistance Directory for names of manufactures.
2. Wall Assembly — The 1 or 2 hr fire-rated gypsum board/steel stud wall assembly shall be constructed of the materials and in the manner specified in the individual U400, V400 or W400 Series Wall or Partition Design in the UL Fire Resistance Directory. In addition, the wall may incorporate a head-of-wall joint system as specified in the HW Series Joint Systems in the UL Fire Resistance Directory. The wall shall include the following construction features:
   A. Steel Floor Runners — Floor runners of wall assembly shall consist of min No. 25 gauge galv steel channels sized to accommodate steel studs (Item 2B). Floor runners to be provided with 1-1/4 in. (32 mm) flanges. Runners secured with steel fasteners spaced 12 in. (305 mm) OC.
   B. Studs — Steel studs to be min 3-1/2 in. (89 mm) wide. Studs cut 1/2 to 3/4 in. (13 to 19 mm) less in length than assembly height with bottom nesting in, resting on and fastened to floor runner with sheet metal screws. Stud spacing not to exceed 24 in. (610 mm) OC.
   C. Gypsum Board* — Gypsum board installed to a min total thickness of 5/8 or 1-1/4 in. (16 or 32 mm) on each side of wall for a 1 or 2 hr rated wall, respectively. Wall to be constructed as specified in the individual U400, V400 or W400 Series Design in the UL Fire Resistance Directory, except that a max 3/4 in. (19 mm) gap shall be maintained between the bottom of gypsum board and top of concrete floor.
   The hourly fire rating of the joint system is equal to the hourly fire rating of the wall.
3. Fill, Void or Cavity Material* — Bottom Track Seal — Max separation between the bottom of floor and bottom of wall is 3/4 in. (19 mm). Factory supplied foam seal installed under the floor runners (Item 2A) prior to attachment to top side of concrete floor in accordance with the installation instructions.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CFS-TTS 358, CFS-TTS 600 or CFS-TTS-OS

* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

Hilti Firestop Systems

JOINT TYPE	F-RATING (HR)	BASIS OF DESIGN UL SYSTEM	
		JOINT WIDTH LESS THAN OR EQUAL TO 2"	JOINT WIDTH GREATER THAN 2", LESS THAN OR EQUAL TO 6" 4
CONCRETE (FLOOR-TO-FLOOR)	1	FF-D-1012, FF-D-1013*	FF-D-1012, FF-D-1013
	2	FF-D-1012, FF-D-1013*	FF-D-1012, FF-D-1013
	3	FF-D-1011, FF-D-1026*	FF-D-1011, FF-D-1026
	4	FF-D-1047	FF-D-1125
CONCRETE (EDGE OF FLOOR SLAB-TO-WALL)	1	FW-D-1011, FW-D-1012, FW-D-1013	FW-D-1011, FW-D-1012, FW-D-1013, FW-D-1021
	2	FW-D-1011, FW-D-1012, FW-D-1013	FW-D-1011, FW-D-1012, FW-D-1013, FW-D-1021
	3	FW-D-1011	FW-D-1011, FW-D-1021
	4	FW-D-1047	FW-D-1092
CONCRETE OR BLOCK WALL TO FLAT CONCRETE FLOOR (TOP-OF-WALL)	1	N/A**	N/A**
	2	HW-D-0097*	HW-D-1009
	3	HW-D-1008*, HW-D 0268	HW-D-1008
	4	HW-D-1042	HW-D-1103
CONCRETE OR BLOCK WALL TO CONCRETE OVER FLUTED METAL DECK (TOP-OF-WALL)	1	HW-D-0098	N/A**
	2	HW-D-0080, HW-D-0081, HW-D-0098	HW-D-1037
	3	N/A**	N/A**
	4	HW-D-0294	N/A**
GYPSUM WALL TO FLAT CONCRETE FLOOR (TOP-OF-WALL)	1	HW-D-0757, HW-D-0082, HW-D-0083, HW-D-0106, HW-D-0119	HW-D-1011, HW-D-1012, HW-1020
	2	HW-D-0757, HW-D-0082, HW-D-0083, HW-D-0106, HW-D-0119	HW-D-1011, HW-D-1012, HW-1020
	3	HW-D-0119	HW-D-1011, HW-D-1012, HW-1020
GYPSUM SHAFT WALL TO TOP-OF-WALL	2	HW-D-0342 (FLAT CONCRETE), HW-D-0541, HW-D-0542 (CONCRETE OVER METAL DECK)	N/A**
GYPSUM SHAFT WALL TO CONCRETE FLOOR (BOTTOM-OF-WALL)	1	BW-S-0023	N/A**
	2	BW-S-0023	N/A**
GYPSUM WALL TO CONCRETE FLOOR (BOTTOM-OF-WALL)	1	BW-S-0001, BW-S-0002, BW-S-0039	N/A**
	2	BW-S-0001, BW-S-0002, BW-S-0039	N/A**
GYPSUM WALL TO CONCRETE OVER FLUTED METAL DECK (TOP-OF-WALL)	1	HW-D-0042*, HW-D-0049*, HW-D-0087*, HW-D-0089*, HW-D-0046*, HW-D-0076*, HW-D-0077*, HW-D-0154, HW-D-0184*, HW-D-0292, HW-D-0295, HW-D-038*	HWD-1011, HWD-1012, HW-1020
	2	HW-D-0042*, HW-D-0049*, HW-D-0087*, HW-D-0089*, HW-D-0045, HW-D-0046*, HW-D-0076*, HW-D-0077*, HW-D-0154, HW-D-0184*, HW-D-292, HW-D-0295, HW-D0038*	HW-D-1011, HW-D-1012, HW-D-1020
	3	HW-D-0292, HW-D-0295	HWD-1011, HWD-1012, HW-1020
	4	HW-D-0292, HW-D-0295	N/A**
CONCRETE (WALL TO WALL)	2	WW-D-0017, WW-D-0082	WW-D-1080, WW-D-1084
	3	WW-D-1011*, WW-D-0032	WW-D-1011
	4	WW-D-1047	WW-D-1128
GYPSUM TO CONCRETE (WALL TO WALL)	1	WW-D-0040	N/A**
	2	WW-D-0040	N/A**

* SEE NOTE 3

** CONTACT HILTI FOR CURRENT UL-CLASSIFIED SYSTEM OR ENGINEER JUDGMENT DRAWING: 800-879-8000

NOTES : 1. CLASSIFIED SYSTEMS FOR 2" - 6" WIDE JOINTS MAY BE USED FOR JOINTS 2" WIDE AND LESS.
2. CONFIRM THAT MOVEMENT CAPABILITIES OF THE SELECTED UL SYSTEM MEETS OR EXCEEDS THE SPECIFIED MOVEMENT RANGE OF THE PARTICULAR JOINT.
3. SYSTEMS MARKED WITH ASTERIK (*) ARE SUITABLE FOR TOP-OF-WALL JOINTS WHERE THE FLUTED METAL DECK HAS SPRAY-ON MONOKOTE MK-6/HY FIREPROOFING.
4. VERIFY ALLOWABLE JOINT WIDTH ON SPECIFIC UL SYSTEM DRAWING.

Notes:

1. *Refer to section 07840 of the specifications. For Quality Control requirements, refer to the Quality Control portion of the specification.*
2. *Details shown are typical details. If field conditions do not match requirements of typical details, approved alternate details shall be utilized. Field conditions and dimensions need to be verified for compliance with the details, including but not limited to the following:*
   * *Minimum and maximum Width of Joints*
   * *Type and thickness of fire-rated construction. The minimum assembly rating of the firestop assembly shall meet or exceed the highest rating of the adjacent construction.*
3. *If alternate details matching the field conditions are not available, Manufacturer's engineering judgment drawings are acceptable. Drawings shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.*
4. *References:*
   * *Underwriter's Laboratories Fire Resistance Directory*
   * *Intertek Directory of Listed Products*
   * *NFPA 101 Life Safety Code*
   * *All governing local and regional building codes*
5. *Firestop System installation must meet requirements of UL 2079 tested assemblies that provide the required assembly rating.*
6. *All rated assemblies shall be prominently labeled with the following information:*
   * *ATTENTION: Fire Rated Assembly*
   * *UL System #*
   * *Product(s) used*
   * *Hourly Rating (Assembly Rating)*
   * *Installation Date*

<Notes to designer (delete this note after reading and replace with title block information)>
1. *Any modification to these details could result in an application/system not meeting the UL or Intertek Classification or the intended temperature or fire ratings.*
2. *Details shown are up to date as of February 2015.*
3. *For additional information on the details, refer to the most current "Underwriter's Laboratories Fire Resistance Directory (volume 2.)"*

JOB NUMBER:

DRAWN:

CHECKED:

ISSUE DATE:

REVISIONS:

TYPICAL FIRESTOP JOINT DETAILS

SHEET NAME:

SHEET NUMBER:

A.8.7