

**System No. W-L-7155**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings — 1 and 2 Hr (See Item 1)	F Ratings — 1 and 2 Hr (See Item 1)
T Ratings — 0 Hr	FT Ratings — 0 Hr
L Rating at Ambient — Less Than 1 CFM/sq ft	FH Ratings — 1 and 2 Hr (See Item 1)
L Rating at 400 F — Less Than 1 CFM/sq ft	FTH Ratings — 0 Hr
	L Rating at Ambient — Less Than 1 CFM/sq ft
	L Rating at 400 F — Less Than 1 CFM/sq ft

1. Wall Assembly — The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400, U400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

A. Studs — Wall framing shall consist of min 3-1/2 in. (89 mm) wide steel channel studs spaced max 24 in. (610 mm) OC. Additional steel studs shall be used to completely frame the opening.

B. Gypsum Board — 5/8 in. (16 mm) thick 4 ft (122 mm) wide with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory. Max area of opening is 73.7 sq ft (6.85 m<sup>2</sup>) with a max dimension of 104 in. (2,64 m).

The hourly F and FH Ratings of the freestop system are equal to the hourly fire rating of the wall assembly in which it is installed.

2. Steel Duct — Max 100 in. by 100 in. (2.5 by 2.5 m) galv steel duct to be installed either concentrically or eccentrically within the freestop system. The duct shall be constructed and reinforced in accordance with SMACNA construction standards. The space between the steel duct and periphery of opening shall be min 0 in. (point contact) to max 2 in. (51 mm). Steel duct to be rigidly supported on both sides of the wall assembly.

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2A1. Through-Penetrating Product\* — As an alternate to Item 2. Fiber cement with galvanized steel facing, 3/8 in. (10 mm) thick composite metallic duct, with a max cross-sectional area of 43.0 sq ft. (4 m<sup>2</sup>) and a max individual dimension of 78 3/4 in. (2 m). Duct to be installed either concentrically or eccentrically within the freestop system such that the annular space is min 0 in. (point contact) to max 2 in. (51 mm). Duct to be rigidly supported on both sides of wall assembly. Refer to Ventilation Duct Assemblies in Vol. 2 of the Fire Resistance Directory.

DURASYSTEMS BARRIERS INC — Type DuraDuct HP.

2A2. Through-Penetrating Product\* — As an alternate to Item 2. Fiber cement with galvanized steel facing, 1/4 in. (6 mm) thick, with a max cross-sectional area of 175.4 sq ft. (1,14 m<sup>2</sup>), and a max individual dimension of 42 in. (1067 mm). Duct to be installed either concentrically or eccentrically within the freestop system such that the annular space is min 0 in. (point contact) to max 2 in. (51 mm). Duct to be rigidly supported on both sides of wall assembly and installed in accordance. Refer to Ventilation Duct Assemblies in Vol. 2 of the Fire Resistance Directory.

DURASYSTEMS BARRIERS INC — Type DuraDuct SD.

2A3. Through-Penetrating Product\* — As an alternate to Item 2. Galvanized steel faced duct panel, with a max cross-sectional area of 2450 sq ft. (226 m<sup>2</sup>) and a max individual dimension of 48-1/2 in. (1238 mm). Duct to be installed either concentrically or eccentrically within the freestop system such that the annular space is min 0 in. (point contact) to max 2 in. (51 mm). Duct to be rigidly supported on both sides wall assembly. Refer to Ventilation Duct Assemblies in Vol. 2 of the Fire Resistance Directory.

DURASYSTEMS BARRIERS INC — Type DuraDuct GNX.

3. Freestop System — The freestop system shall consist of the following:

A. Packing Material — (Optional, Not Shown) — Polyethylene backer rod, mineral wool batt insulation or fiberglass batt insulation friction fitted into annular space. Packing material to be recessed from both surfaces of wall to accommodate the required thickness of fill material.

A1. Packing Material — Required as specified in Table below. Min 3-3/4 in. (95 mm) or 5 in. (127 mm) thickness of min 4 pcf (64 kg/m<sup>3</sup>) mineral wool batt insulation firmly packed into opening as a permanent form for 1 and 2 hr rated assemblies, respectively. Packing material to be recessed from both surfaces of wall to accommodate the required thickness of fill material.

B. Fill, Void or Cavity Material\* — Sealant — Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with both surfaces of wall. Min 1/4 in. (6 mm) diam bead of fill material shall be applied at the point contact location between the steel duct and the gypsum board.

HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CFS-S SIL GG Sealant, FS-ONE Sealant, FS-ONE MAX Intumescent Sealant or CP606 Flexible Firestop Sealant

C. Steel Retaining Angles — Min No. 16 gauge galv steel angles sized to lap steel duct a min of 2 in. (51 mm) and to lap wall surfaces a min of 1 in. (25 mm). When max duct dimension does not exceed 48 in. (122 cm) and duct area does not exceed 1300 in<sup>2</sup> (8387 cm<sup>2</sup>), angles may be min No. 18 gauge galv steel. Angles attached to steel duct on both sides of wall with min No. 10 by 1/2 in. (13 mm) long steel sheet metal screws located a max of 1 in. (25 mm) from each end of steel duct and spaced a max of 6 in. (152 mm) OC. Steel angles are optional for those sides of duct that do not exceed the dimension specified in Table below, dependent on packing material, sealant and annular space as specified.

Max Duct Dimension	Duct Thickness	Annular Space	Packing Material	Angle (Item 3C) Required
24 in. (610 mm)	24 ga or heavier	1/2 in. min to 1 in. max (13 to 25 mm)	Item 3A1	No

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

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F Ratings — 1 and 2 Hr (See Item 1)	F Ratings — 1 and 2 Hr (See Item 1)
T Rating — 0 Hr	FT Rating — 0 Hr
	FH Ratings — 1 and 2 Hr (See Item 1)
	FTH Rating — 0 Hr

1. 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 U300, U400, V400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

A. Studs — Wall framing shall consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced max 16 in. (406 mm) OC. Steel studs to be min 3-1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) OC. Additional framing members shall be used to completely frame around opening.

B. Gypsum Board\* — 5/8 in. (16 mm) thick 4 ft (122 mm) wide with square or tapered edges. The gypsum board type, thickness, number of layers and orientation shall be as specified in the individual Wall and Partition Design. Max size of opening is 117.1 sq ft (10.8 m<sup>2</sup>) with a max width of 14-1/2 in. (368 mm) for wood studs. Max size of opening is 76.2 sq ft (7 m<sup>2</sup>) with a max width of 105-1/2 in. (2680 mm) for steel studs.

The hourly F and FH Ratings of the freestop system are equal to the hourly fire rating of the wall in which it is installed.

2. Steel Duct — Max 100 by 100 in. (2.5 by 2.5 m) steel duct to be installed within the framed opening. The duct shall be constructed and reinforced in accordance with SMACNA construction standards. Steel duct to be rigidly supported on both sides of wall assembly.

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3. Batts and Blankets\* — Nom 1-1/2 or 2 in. (38 or 51 mm) thick glass fiber batt or blanket (min 3/4 pcf or 12 kg/m<sup>3</sup>) jacketed on the outside with a foil-scrim-kraft facing. Longitudinal and transverse joints sealed with aluminum foil tape. During the installation of the fill material, the batt or blanket shall be compressed minimum 50% such that the annular space within the freestop system shall be min 1/2 in. (13 mm) to max 2 in. (51 mm) to be used.

See Batts and Blankets (BKNV) category in the Building Materials Directory for names of manufacturers. Any batt or blanket meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index 50 or less may be used.

4. Freestop System — The freestop system shall consist of the following:

A. Packing Material — Min 3-5/8 (92 mm) or 4-7/8 in. (124 mm) thickness of min 4 pcf (64 kg/m<sup>3</sup>) mineral wool batt insulation firmly packed into opening as a permanent form for 1 or 2 hr fire-rated walls, respectively. Packing material to be recessed from both surfaces of wall to accommodate the required thickness of fill material.

B. Fill, Void or Cavity Material\* — Sealant — Min 5/8 in. (16 mm) thickness of fill material applied within annulus, flush with both surfaces of wall.

HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-ONE Sealant or FS-ONE MAX Intumescent Sealant

C. Steel Retaining Angles — Min No. 16 gauge (0.059 in. or 1.5 mm) galv steel angles sized to lap steel duct a min of 2 in. (51 mm) and lap wall surfaces a min of 1 in. (25 mm). Angles attached to steel duct on both sides of wall with min No. 10 steel sheet metal screws spaced a max of 1 in. (25 mm) from each end of steel duct and spaced a max of 6 in. (152 mm) OC. When max duct dimension does not exceed 48 in. (122 cm) and duct area does not exceed 1300 in<sup>2</sup> (8387 cm<sup>2</sup>), angles may be min No. 18 gauge galv steel. Angles attached to steel duct on both sides of wall with min No. 10 by 1/2 in. (13 mm) long steel sheet metal screws located a max of 1 in. (25 mm) from each end of steel duct and spaced a max of 6 in. (152 mm) OC. Steel angles are optional for those sides of duct that do not exceed the dimension specified in Table below, dependent on packing material, sealant and annular space as specified.

Max Duct Dimension	Duct Thickness	Annular Space	Packing Material	Angle (Item 3C) Required
24 in. (610 mm)	24 ga or heavier	1/2 in. min to 1 in. max (13 to 25 mm)	Item 3A1	No

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

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**System No. W-L-8079**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings — 1 and 2 Hr (See Item 1)	F Ratings — 1 and 2 Hr (See Item 1)
T Ratings — 0, 1/2, 3/4, 1-1/2 and 2 Hr (See Items 1, 2, 3 and 4)	FT Ratings — 0, 1/2, 3/4, 1-1/2 and 2 Hr (See Items 1, 2, 3 and 4)
	FH Ratings — 1 and 2 Hr (See Item 1)
	FTH Ratings — 0, 1/2, 3/4, 1-1/2 and 2 Hr (See Items 1, 2, 3 and 4)

1. 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 U300, U400, V400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

A. Studs — Wall framing may consist of either wood studs or channel shaped steel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced max 16 in. (406 mm) OC. Steel studs to be min 3-1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) OC. When item 5A1 is not used, additional framing members (not shown) shall be installed to frame the periphery of the wall opening. When additional framing members are used to frame the opening, the hourly T, FT and FTH Ratings of the freestop system are 0 hr.

B. Gypsum Board\* — 5/8 in. (16 mm) thick with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300, U400 or V400 Wall and Partition Design. If the through penetrants are installed in a wood stud/gypsum board assembly, the max area of square, rectangular, or circular opening is 240 sq ft (22.2 m<sup>2</sup>) with a max dimension of 14-1/2 in. (368 mm). If the through penetrants are installed in a steel channel stud/gypsum board assembly, the max area of square, rectangular, or circular opening is 240 sq ft. (22.2 m<sup>2</sup>) with a max dimension of 14-1/2 in. (368 mm).

The hourly F and FH Ratings of the freestop system are equal to the hourly fire rating of the wall assembly in which it is installed.

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2. Through-Penetrant — One or more pipes, conduit or tubes to be installed within the opening. The total number of through-penetrants is dependent on the size of the opening and the types and sizes of the penetrants. Any combination of the penetrants described below may be used provided that the following parameters relative to the annular spaces and the spacing between the through penetrants are maintained. The separation between the penetrants shall be min 1 in. (25 mm) to max 20 in. (508mm). The annular space between penetrants and the periphery of opening shall be min 0 in. (point contact) to max 20 in. (508 mm). Pipes, conduit or tubes to be rigidly supported on both sides of wall assembly. The following types and sizes of pipes, conduit or tubes may be used:

A. Copper Tubing — Nom 3 in. (76 mm) diam (or smaller) Type L (or heavier) copper tube.

B. Copper Pipe — Nom 3 in. (76 mm) diam (or smaller) Regular (or heavier) copper pipe.

C. Steel Pipe — Nom 4 in. (102 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.

D. Iron Pipe — Nom 4 in. (102 mm) diam (or smaller) cast or ductile iron pipe.

E. Conduit — Nom 3 in. (76 mm) diam (or smaller) electric metallic tubing (EMT) or rigid steel conduit.

F. Polyvinyl Chloride (PVC) Pipe — Nom 2 in. (51 mm) diam (or smaller) Schedule 40 cellular or solid core PVC pipe for use in closed (process or supply) or vented (drain, waste, or vent) piping systems.

G. Chlorinated Polyvinyl Chloride (CPVC) Pipe — Nom 2 in. (51 mm) diam (or smaller) SDR 13.5 CPVC pipe for use in closed (process or supply) piping systems.

The T, FT and FTH Ratings are 0 Hr if bare pipe and tubing is used.

3. Pipe Insulation — One or more metallic penetrants (pipe or tubing) may be insulated with the following types of pipe covering:

A. Pipe Covering\* — Min 1 in. (25 mm) to max 2 in. (51 mm) thick hollow cylindrical heavy density min 3.2 pcf (50 kg/m<sup>3</sup>) glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints shall be secured with metal fasteners or factory-applied self-sealing lap tape. Transverse joints secured with metal fasteners or with tape applied with the product.

See Pipe and Equipment Covering - Materials (BREQ) category in the Building Materials Directory for names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.

B. Tubing — Glass fiber — Min 1/2 in. (13 mm) thick max 4 in. (102 mm) diam (19 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible furnished as a permanent form.

See Plastics (CPZZ) category in the Plastics Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation material meeting the above specifications and having a UL 94 Flammability Classification of 94-5VA may be used.

The annular space between the insulated penetrants and the periphery of the opening shall be min 0 in. (0 mm, point contact) The separation between the insulated penetrants and the other penetrants shall be a min 1 in. (25 mm).

The T, FT and FTH Ratings are 1-1/2 hour if item 3B is used. The T, FT and FTH Ratings are 2 hr if item 3A is used.

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4. Cables — Cables — Min 1/2 in. (13 mm) diam bundle of cables installed within the opening and rigidly supported on both surfaces of wall. The annular space between the tightly-bundled cables and the periphery of the opening shall be min 0 in. (point contact) to max 20 in. (508 mm). The separation between the cable bundle and the other penetrants shall be min 1 in. (25 mm) to max 20 in. (508 mm). Any combination of the following types and sizes of cables may be used:

A. Max 25 pair No. 24 AWG telephone cable with polyvinyl chloride (PVC) insulation and jacket.

B. Max 7/0 No. 12 AWG copper conductor power and control cable with PVC or cross-linked polyethylene (XLPE) insulation and PVC jacket.

C. Multiple fiber optical communication cable jacketed with PVC and having a max outside diam of 1/2 in. (13 mm).

D. Max 3/0 No. 8 AWG with bare aluminum ground, PVC insulated steel Metal-Clad+ Cable currently Classified under the Through Penetrating Product (XHL1) category.

E. Max 3/0 (with ground) No. 8 AWG (or smaller) nonmetallic sheathed (Romex) cable with PVC insulation and jacket materials.

F. RGU coaxial cable with polyethylene (PE) insulation and polyvinyl chloride (PVC) jacket having a max outside diam of 1/2 in. (13 mm).

G. Max 3/4 in. (19 mm) diam copper ground cable with or without PVC jacket.

H. Max 1-1/4 in. (32 mm) diam single or multi conductor mineral-insulated copper-clad cable.

The T, FT and FTH Ratings are 1/4 hr if cables D, G and H are used. The T, FT and FTH Ratings are 3/4 hr for any other combination.

4A. Through Penetrants — (Not shown) - Max six nom 1 in. (25 mm) diam (or smaller) flexible steel conduits to be installed either concentrically or eccentrically within the freestop system. The annular space between the conduits and the periphery of the opening shall be min 0 in. (point contact) to a max 3 in. (76 mm). Conduits to be rigidly supported on both sides of wall. The T, FT and FTH Ratings are 0 Hr if this penetrant is used.

4B. Through Penetrants — (Not shown) - Max twelve nom 3/8 in. (10 mm) diam (or smaller) polyvinyl chloride (PVC) pneumatic tubing for use in closed (process or supply) piping systems. Tubing to be installed either concentrically or eccentrically within the freestop system. The annular space between the tubing and the periphery of the opening shall be min 0 in. (point contact) to a max 1 in. (25 mm). Tubing to be rigidly supported on both sides of wall.

5. Freestop System — The freestop system shall consist of the following:

A. Packing Material — In 2 hr fire rated wall assemblies, min 4-3/4 in. (121 mm) thickness of min 4 pcf (64 kg/m<sup>3</sup>) mineral wool batt insulation firmly packed into opening as a permanent form. In 1 hr fire rated wall assemblies, min 3-1/2 in. (89 mm) thickness of min 4 pcf (64 kg/m<sup>3</sup>) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material recessed from both surfaces of the wall to accommodate the required thickness of fill material.

A1. Packing Material — Min 1-1/4 in. (32 mm) thickness of min 4 pcf (64 kg/m<sup>3</sup>) mineral wool batt insulation firmly packed as a backer around the perimeter of opening as a permanent form. When additional framing members are used to frame the opening (see item 1A), this packing material is optional. Packing material can be used in combination with the additional framing members.

B. Fill, Void or Cavity Material\* — Sealant — Min 5/8 in. (16 mm) thickness of fill material applied within annulus, flush with both surfaces of wall. At the point contact location between through penetrants and gypsum board, a min 1/2 in. (13 mm) diam bead of fill material shall be applied at the gypsum board/through penetrant interface on both surfaces of wall.

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# Bearing the UL Listing Mark

# Bearing the UL Recognized Component Mark

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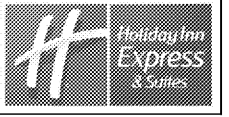
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HILTI FIRESTOP DETAILS  
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