

System No. C-AJ-3298 (Cont.)

Classified by Underwriters Laboratories, Inc. to UL 1479 and CANULC S115

3. Firestop Device* — Firestop device consists of a corrugated steel tube with an inner plastic housing, intumescent material rings, tightly twisted inner fabric smoke seal, flanges and gasketing material (not shown). Firestop device to be installed in accordance with the accompanying installation instructions. Device slid into wall such that ends project an equal distance from the approximate centerline of the wall assembly. As an option, in floors, steel sleeves of device may be installed flush with bottom of floor. The annular space between the device and the periphery of the opening shall be min 0 in. (point contact) to max 1/2 in. (13 mm). Device provided with flange(s) that are spun clockwise onto device threads, over gasket material butting tightly to top side of floor or both sides of floor or wall. In floors, when one device flange is used, device flange to be secured to floor with min 1/4 in. (3 mm) diameter screws or anchors. As an alternate to gasketing material, sealant (Item 4) may be used.

HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC. — CP 653 2" Speed Sleeve and CP 653 4" Speed Sleeve

4. Firestop System — The firestop system shall consist of the following:

A. Packing Material* — Min 4 in. (102 mm) thickness and 4 pcf (64 kg/m³) mineral wool batt insulation firmly packed into annular space between firestop device and opening as a permanent form. Packing material to be installed flush with bottom of floor and recessed from top surface of floor or from both surfaces of wall to accommodate the required thickness of fill material.

B. Fill Void or Cavity Material* — Sealant — As an alternate to gasketing material (see Item 3), min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall. For L Ratings when sealant is used, an additional 1/4 in. (6 mm) bead of fill material shall be applied at the devicelloor or devicewall interface on top side of floor or both sides of wall assembly prior to installing flanges.

HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC. — CP 606 Sealant, FS-ONE Sealant or FS-ONE MAX Intumescent Sealant.

C. Cable Wrap Materials* — Nom 1-1/2 in. or 2 in. (38 or 51 mm) thick blanket, faced on one side or two with a foil facing. The cables shall be wrapped with one layer of cable wrap. Cable wrap to be extended a minimum of 1/2 in. (13 mm) from top surface of floor or both sides of wall assembly. The ends are to be tightly butted together and taped. The exposed edges of the faced blankets are taped with 4 in. (102 mm) wide pressure-sensitive aluminum foil tape.

Thermal Ceramics Inc. — FireMaster FastWrap XL
 UBRFAX I L L C — FireWrap Duct Insulation or FireWrap 1.5 Duct Insulation

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

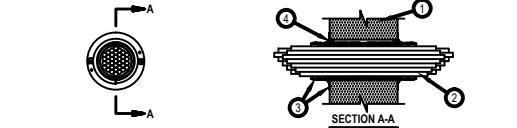
Hilti Firestop Systems

Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. January 14, 2015

System No. W-J-3167

Classified by Underwriters Laboratories, Inc. to UL 1479 and CANULC S115

| | | | |
|---|---|------------------------------------|--|
| ANSI/UL1479 (ASTM E814) | | CANULC S115 | |
| F Ratings — 2, 3 and 4 Hr (See Item 1) | F Ratings — 2, 3 and 4 Hr (See Item 1) | | |
| T Ratings — 0, 1/2, 1-1/2, and 2 Hr (See Items 2 and 3) | FT Ratings — 0, 1/2, 1-1/2, and 2 Hr (See Items 2 and 3) | | |
| L Rating At Ambient — See Item 2 | FH Ratings — 2, 3, or 4 Hr (See Item 1) | | |
| L Ratings At 400 F — See Item 2 | FTH Ratings — 1/2, 1, 1-1/2, and 2 Hr (See Items 2 and 3) | | |
| | | L Rating At Ambient — (See Item 2) | |
| | | L Ratings At 400 F — (See Item 2) | |



1. Wall Assembly — Min 5 in. (127 mm) thick for 2 hr wall assembly, min 5-5/8 in. (142 mm) thick for 3 hr wall assembly, min 6-1/2 in. (167 mm) thick for 4 hr wall assembly, reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) concrete. Wall may also be constructed of any UL Classified Concrete Block*. Opening in wall to be 2-1/2 in. (64 mm) diam for nominal 2 in. (51 mm) firestop device and 4 1/2 in. (114 mm) diam for nominal 4 in. (102 mm) firestop device.
2. Cables — Within the loading area for each firestop device, the cables may represent a 0 to 100 percent visual fill. Cables to be tightly bundled within the device and rigidly supported on both sides of wall assembly. Any combination of the following types of cables may be used:
- A. Max 100 pair No. 24 AWG (or smaller) copper conductor telecommunication cable with polyvinyl chloride (PVC) jacketing and insulation.
 - B. Max 7/8 No. 12 AWG copper conductor control cable with PVC or XLPE jacket and insulation.
 - C. Max 40 AWG Type RH ground cable.
 - D. Max 4 pr No. 22 AWG Cat 5 or Cat 6 control cables.
 - E. Max RG 6U coaxial cable with fluorinated ethylene insulation and jacketing.
 - F. Five optic cable with polyethylene (PE) jacket and insulation having a max diam of 1/2 in. (13 mm).
 - G. Max 20C No. 22 AWG shielded printer cable with PVC jacket.
 - H. Through-Penetrating Product* — Two copper conductors No. 18 AWG (or smaller) Power or Non Power Limited Fire Alarm Cable with or without a jacket under a metal armor.
- AFC CABLE SYSTEMS INC.
- I. Max 1/4 in. (6 mm) diameter S-Video Cable consisting of 2 max 24 AWG 75 ohm coax or twisted pair cable with PE insulation and PVC jacket.
- When the hourly rating of the wall assembly is 2 hr, the T, FT and FTH Ratings are 1 hr except that, when Item 2B or 2C is used, the T, FT and FTH Ratings are 1/2 hr. When the hourly rating of the wall assembly is 3 or 4 hr, the T, FT and FTH Ratings are 1-1/2 and 2 hr, respectively.
- L Ratings apply only when device flanges are used. L Ratings vary depending on whether the gasketing material (see Item 3) or the sealant (Item 4) is used. See Table below for L Ratings.

| Max Cable Fill | Cable Type | L Rating, CFMSq Ft | | | | L Rating, CFM | | | |
|----------------|--|--------------------|--------|-------------|--------|---------------|-------------|-------------|-------------|
| | | Sealant | Gasket | 400°F | Gasket | Sealant | Gasket | Sealant | Gasket |
| 0% | — | Less than 1 | 1.0 | Less than 1 | 2.7 | Less than 1 | Less than 1 | Less than 1 | Less than 1 |
| 100% | Item 2D only | 4.9 | 4.9 | 1.3 | 3.5 | Less than 1 | Less than 1 | Less than 1 | Less than 1 |
| 100% | Any cables (Item 2) in any combination | 9.2 | 9.2 | 9.6 | 11.8 | 1.2 | 1.2 | 1.3 | 1.6 |

3. Firestop Device* — Firestop device consists of a corrugated steel tube with an inner plastic housing, intumescent material rings, twisted inner fabric smoke seal, flanges and gasketing material (not shown). Firestop device to be installed in accordance with the accompanying installation instructions. As an option, the inner fabric seal may remain open except that, to attain the L Rating, the inner fabric seal shall be twisted to completely close off the opening within device. Device slid into wall such that ends project an equal distance from the approximate centerline of the wall assembly. The annular space between the device and the periphery of the opening shall be min 0 in. (point contact). Device provided with flanges that are spun clockwise onto device threads, over gasketing material, butting tightly to both sides of wall. Device flanges are optional except for 3 and 4 hr fire rating, flanges are required. When the device flanges are not used, the T, FT and FTH Ratings for the firestop system are 0 hr. For blank opening (no cables), the T, FT and FTH Ratings for the firestop system are 2, 3 or 4 hr only when the device flanges are used.
- HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC. — CP 653 2" Speed Sleeve and CP 653 4" Speed Sleeve
4. Fill Void or Cavity Material* — Sealant — As an alternate to gasketing material (see Item 3), min 1/2 in. (13 mm) thickness of fill material applied within the annulus between firestop device and wall, flush with both surfaces of wall, and an additional 1/4 in. (6 mm) bead applied around periphery of device. Sealant is required when device flanges are not used (see Item 3).
- HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC. — FS-ONE or FS-ONE MAX Intumescent Sealant, or CP 606 Sealant
- *Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

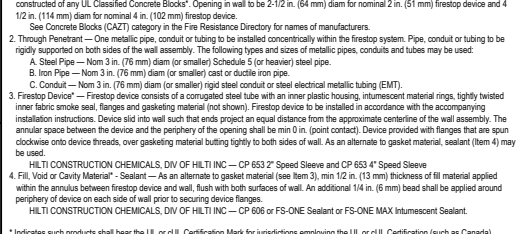
Hilti Firestop Systems

Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. January 22, 2015

System No. W-J-1215

Classified by Underwriters Laboratories, Inc. to UL 1479 and CANULC S115

| | | | |
|-------------------------|--------------------|---------------------|--|
| ANSI/UL1479 (ASTM E814) | | CANULC S115 | |
| F Ratings — 2 Hr | F Ratings — 2 Hr | | |
| T Ratings — 3/4 Hr | FT Rating — 3/4 Hr | | |
| | | FH Rating — 2 Hr | |
| | | FTH Rating — 3/4 Hr | |



1. Wall Assembly — Min 5-5/8 in. (143 mm) reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) concrete. Wall may also be constructed of any UL Classified Concrete Block*. Opening in wall to be 2-1/2 in. (64 mm) diam for nominal 2 in. (51 mm) firestop device and 4 1/2 in. (114 mm) diam for nominal 4 in. (102 mm) firestop device.
2. Through Penetrant* — One metallic pipe, conduit or tubing to be installed concentrically within the firestop system. Pipe, conduit or tubing to be rigidly supported on both sides of the wall assembly. The following types and sizes of metallic pipes, conduits and tubes may be used:
- A. Steel Pipe — Nom 3 in. (76 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.
 - B. Iron Pipe — Nom 3 in. (76 mm) diam (or smaller) cast or ductile iron pipe.
 - C. Conduit — Nom 3 in. (76 mm) diam (or smaller) rigid steel conduit or steel electrical metallic tubing (EMT).
3. Firestop Device* — Firestop device consists of a corrugated steel tube with an inner plastic housing, intumescent material rings, tightly twisted inner fabric smoke seal, flanges and gasketing material (not shown). Firestop device to be installed in accordance with the accompanying installation instructions. Device slid into wall such that ends project an equal distance from the approximate centerline of the wall assembly. The annular space between the device and the periphery of the opening shall be min 0 in. (point contact). Device provided with flanges that are spun clockwise onto device threads, over gasketing material butting tightly to both sides of wall. As an alternate to gasketing material, sealant (Item 4) may be used.
- HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC. — CP 653 2" Speed Sleeve and CP 653 4" Speed Sleeve
4. Fill Void or Cavity Material* — Sealant — As an alternate to gasketing material (see Item 3), min 1/2 in. (13 mm) thickness of fill material applied within the annulus between firestop device and wall, flush with both surfaces of wall. An additional 1/4 in. (6 mm) bead shall be applied around periphery of device on each side of wall prior to securing device flanges.
- HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC. — CP 606 or 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.

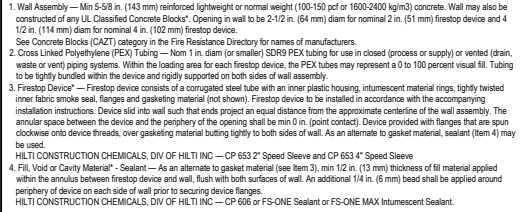
Hilti Firestop Systems

Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. January 21, 2015

System No. W-J-2229

Classified by Underwriters Laboratories, Inc. to UL 1479

F Rating — 2 Hr
 T Rating — 1/4 Hr



1. Wall Assembly — Min 5-5/8 in. (143 mm) reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) concrete. Wall may also be constructed of any UL Classified Concrete Block*. Opening in wall to be 2-1/2 in. (64 mm) diam for nominal 2 in. (51 mm) firestop device and 4 1/2 in. (114 mm) diam for nominal 4 in. (102 mm) firestop device.
2. Cross Linked Polyethylene (PEX) Tubing — Nom 1 in. diam (or smaller) SDR9 PEX tubing for use in closed (process or supply) or vented (drain, waste or vent) piping systems. Within the loading area for each firestop device, the PEX tubes may represent a 0 to 100 percent visual fill. Tubing to be tightly bundled within the device and rigidly supported on both sides of wall assembly.
3. Firestop Device* — Firestop device consists of a corrugated steel tube with an inner plastic housing, intumescent material rings, tightly twisted inner fabric smoke seal, flanges and gasketing material (not shown). Firestop device to be installed in accordance with the accompanying installation instructions. Device slid into wall such that ends project an equal distance from the approximate centerline of the wall assembly. The annular space between the device and the periphery of the opening shall be min 0 in. (point contact). Device provided with flanges that are spun clockwise onto device threads, over gasketing material butting tightly to both sides of wall. As an alternate to gasketing material, sealant (Item 4) may be used.
- HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC. — CP 653 2" Speed Sleeve and CP 653 4" Speed Sleeve
4. Fill Void or Cavity Material* — Sealant — As an alternate to gasketing material (see Item 3), min 1/2 in. (13 mm) thickness of fill material applied within the annulus between firestop device and wall, flush with both surfaces of wall. An additional 1/4 in. (6 mm) bead shall be applied around periphery of device on each side of wall prior to securing device flanges.
- HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC. — CP 606 or 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.

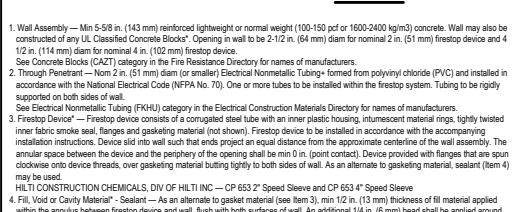
Hilti Firestop Systems

Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. January 22, 2015

System No. W-J-2230

Classified by Underwriters Laboratories, Inc. to UL 1479

F Rating — 2 Hr
 T Rating — 0 Hr



1. Wall Assembly — Min 5-5/8 in. (143 mm) reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) concrete. Wall may also be constructed of any UL Classified Concrete Block*. Opening in wall to be 2-1/2 in. (64 mm) diam for nominal 2 in. (51 mm) firestop device and 4 1/2 in. (114 mm) diam for nominal 4 in. (102 mm) firestop device.
2. Through Penetrant* — Nom 2 in. (51 mm) diam (or smaller) Electrical Nonmetallic Tubing* formed from polyvinyl chloride (PVC) and installed in accordance with the National Electrical Code (NFPA No. 70). One or more tubes to be installed within the firestop system. Tubing to be rigidly supported on both sides of wall.
- See Electrical Nonmetallic Tubing (FNUH) category in the Electrical Construction Materials Directory for names of manufacturers.
3. Firestop Device* — Firestop device consists of a corrugated steel tube with an inner plastic housing, intumescent material rings, tightly twisted inner fabric smoke seal, flanges and gasketing material (not shown). Firestop device to be installed in accordance with the accompanying installation instructions. Device slid into wall such that ends project an equal distance from the approximate centerline of the wall assembly. The annular space between the device and the periphery of the opening shall be min 0 in. (point contact). Device provided with flanges that are spun clockwise onto device threads, over gasketing material butting tightly to both sides of wall. As an alternate to gasketing material, sealant (Item 4) may be used.
- HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC. — CP 653 2" Speed Sleeve and CP 653 4" Speed Sleeve
4. Fill Void or Cavity Material* — Sealant — As an alternate to gasketing material (see Item 3), min 1/2 in. (13 mm) thickness of fill material applied within the annulus between firestop device and wall, flush with both surfaces of wall. An additional 1/4 in. (6 mm) bead shall be applied around periphery of device on each side of wall prior to securing device flanges.
- HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC. — CP 606 or 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.

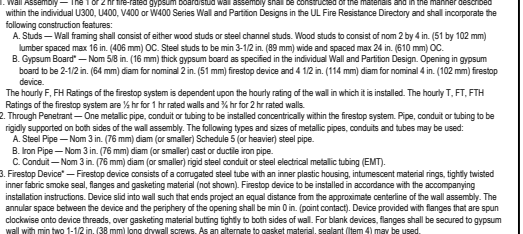
Hilti Firestop Systems

Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. January 22, 2015

System No. W-L-1441

Classified by Underwriters Laboratories, Inc. to UL 1479 and CANULC S115

| | | | |
|---|--|--|--|
| ANSI/UL1479 (ASTM E814) | | CANULC S115 | |
| F Ratings — 1 and 2 Hr (See Item 1) | F Ratings — 1 and 2 Hr (See Item 1) | | |
| T Ratings — 1/2 and 3/4 Hr (See Item 1) | FT Ratings — 1/2 and 3/4 Hr (See Item 1) | | |
| | | FH Ratings — 1 and 2 Hr (See Item 1) | |
| | | FTH Rating — 1/2 and 3/4 Hr (See Item 1) | |



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 within the individual U300, U400, W400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall incorporate 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.
 - B. Gypsum Board* — Nom 5/8 in. (16 mm) thick gypsum board as specified in the individual Wall and Partition Design. Opening in gypsum board to be 2-1/2 in. (64 mm) diam for nominal 2 in. (51 mm) firestop device and 4 1/2 in. (114 mm) diam for nominal 4 in. (102 mm) firestop device.
- The hourly F Rating of the firestop system is dependent upon the hourly rating of the wall in which it is installed. The hourly T, FT, FTH Rating of the firestop system are 1/2 hr for 1 hr rated walls and 3/4 hr for 2 hr rated walls.
2. Through Penetrant* — One metallic pipe, conduit or tubing to be installed concentrically within the firestop system. Pipe, conduit or tubing to be rigidly supported on both sides of the wall assembly. The following types and sizes of metallic pipes, conduits and tubes may be used:
- A. Steel Pipe — Nom 3 in. (76 mm) diam (or smaller) cast or ductile iron pipe.
 - B. Iron Pipe — Nom 3 in. (76 mm) diam (or smaller) rigid steel conduit or steel electrical metallic tubing (EMT).
3. Firestop Device* — Firestop device consists of a corrugated steel tube with an inner plastic housing, intumescent material rings, tightly twisted inner fabric smoke seal, flanges and gasketing material (not shown). Firestop device to be installed in accordance with the accompanying installation instructions. Device slid into wall such that ends project an equal distance from the approximate centerline of the wall assembly. The annular space between the device and the periphery of the opening shall be min 0 in. (point contact). Device provided with flanges that are spun clockwise onto device threads, over gasketing material butting tightly to both sides of wall. As an alternate to gasketing material, sealant (Item 4) may be used.
- HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC. — CP 653 2" Speed Sleeve and CP 653 4" Speed Sleeve
4. Fill Void or Cavity Material* — Sealant — As an alternate to gasketing material (see Item 3), min 1/2 in. (13 mm) thickness of fill material applied within the annulus between firestop device and wall, flush with both surfaces of wall. An additional 1/4 in. (6 mm) bead shall be applied around periphery of device on each side of wall prior to securing device flanges.
- HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC. — CP 606, 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.

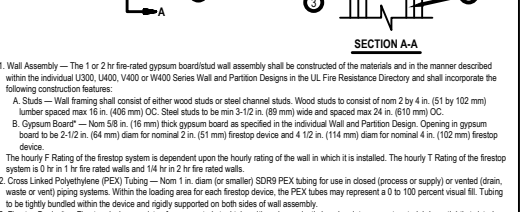
Hilti Firestop Systems

Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. January 23, 2015

System No. W-L-2537

Classified by Underwriters Laboratories, Inc. to UL 1479

F Ratings — 1 and 2 Hr (See Item 1)
 T Ratings — 0 and 1/4 Hr (See Item 1)



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 within the individual U300, U400, W400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall incorporate 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.
 - B. Gypsum Board* — Nom 5/8 in. (16 mm) thick gypsum board as specified in the individual Wall and Partition Design. Opening in gypsum board to be 2-1/2 in. (64 mm) diam for nominal 2 in. (51 mm) firestop device and 4 1/2 in. (114 mm) diam for nominal 4 in. (102 mm) firestop device.
- The hourly F Rating of the firestop system is dependent upon the hourly rating of the wall in which it is installed. The hourly T Rating of the firestop system is 0 hr in 1 hr fire rated walls and 1/4 hr in 2 hr rated walls.
2. Cross Linked Polyethylene (PEX) Tubing — Nom 1 in. diam (or smaller) SDR9 PEX tubing for use in closed (process or supply) or vented (drain, waste or vent) piping systems. Within the loading area for each firestop device, the PEX tubes may represent a 0 to 100 percent visual fill. Tubing to be tightly bundled within the device and rigidly supported on both sides of wall assembly.
3. Firestop Device* — Firestop device consists of a corrugated steel tube with an inner plastic housing, intumescent material rings, tightly twisted inner fabric smoke seal, flanges and gasketing material (not shown). Firestop device to be installed in accordance with the accompanying installation instructions. Device slid into wall such that ends project an equal distance from the approximate centerline of the wall assembly. The annular space between the device and the periphery of the opening shall be min 0 in. (point contact). Device provided with flanges that are spun clockwise onto device threads, over gasketing material butting tightly to both sides of wall. As an alternate to gasketing material, sealant (Item 4) may be used.
- HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC. — CP 653 2" Speed Sleeve and CP 653 4" Speed Sleeve
4. Fill Void or Cavity Material* — Sealant — As an alternate to gasketing material (see Item 3), min 1/2 in. (13 mm) thickness of fill material applied within the annulus between firestop device and wall, flush with both surfaces of wall. An additional 1/4 in. (6 mm) bead shall be applied around periphery of device on each side of wall prior to securing device flanges.
- HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC. — CP 606 or 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.

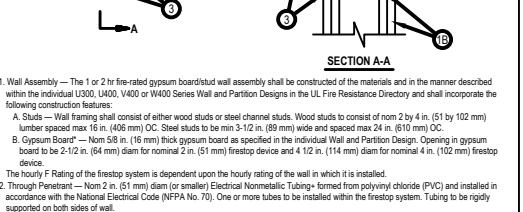
Hilti Firestop Systems

Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. January 23, 2015

System No. W-L-2538

Classified by Underwriters Laboratories, Inc. to UL 1479

F Ratings — 1 and 2 Hr (See Item 1)
 T 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 described within the individual U300, U400, W400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall incorporate 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.
 - B. Gypsum Board* — Nom 5/8 in. (16 mm) thick gypsum board as specified in the individual Wall and Partition Design. Opening in gypsum board to be 2-1/2 in. (64 mm) diam for nominal 2 in. (51 mm) firestop device and 4 1/2 in. (114 mm) diam for nominal 4 in. (102 mm) firestop device.
- The hourly F Rating of the firestop system is dependent upon the hourly rating of the wall in which it is installed.
2. Through Penetrant* — Nom 2 in. (51 mm) diam (or smaller) Electrical Nonmetallic Tubing* formed from polyvinyl chloride (PVC) and installed in accordance with the National Electrical Code (NFPA No. 70). One or more tubes to be installed within the firestop system. Tubing to be rigidly supported on both sides of wall.
- See Electrical Nonmetallic Tubing (FNUH) category in the Electrical Construction Materials Directory for names of manufacturers.
3. Firestop Device* — Firestop device consists of a corrugated steel tube with an inner plastic housing, intumescent material rings, tightly twisted inner fabric smoke seal, flanges and gasketing material (not shown). Firestop device to be installed in accordance with the accompanying installation instructions. Device slid into wall such that ends project an equal distance from the approximate centerline of the wall assembly. The annular space between the device and the periphery of the opening shall be min 0 in. (point contact). Device provided with flanges that are spun clockwise onto device threads, over gasketing material butting tightly to both sides of wall. As an alternate to gasketing material, sealant (Item 4) may be used.
- HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC. — CP 653 2" Speed Sleeve and CP 653 4" Speed Sleeve
4. Fill Void or Cavity Material* — Sealant — As an alternate to gasketing material (see Item 3), min 1/2 in. (13 mm) thickness of fill material applied within the annulus between firestop device and wall, flush with both surfaces of wall. An additional 1/4 in. (6 mm) bead shall be applied around periphery of device on each side of wall prior to securing device flanges.
- HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC. — CP 606, 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

Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. January 23, 2015

System No. W-L-2538 (Cont.)

Classified by Underwriters Laboratories, Inc. to UL 1479

3. Firestop Device* — Firestop device consists of a corrugated steel tube with an inner plastic housing, intumescent material rings, tightly twisted inner fabric smoke seal, flanges and gasketing material (not shown). Firestop device to be installed in accordance with the accompanying installation instructions. Device slid into wall such that ends project an equal distance from the approximate centerline of the wall assembly. The annular space between the device and the periphery of the opening shall be min 0 in. (point contact). Device provided with flanges that are spun clockwise onto device threads, over gasketing material butting tightly to both sides of wall. As an alternate to gasketing material, sealant (Item 4) may be used.

HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC. — CP 653 2" Speed Sleeve and CP 653 4" Speed Sleeve

4. Fill Void or Cavity Material* — Sealant — As an alternate to gasketing material (see Item 3), min 1/2 in. (13 mm) thickness of fill material applied within the annulus between firestop device and wall, flush with both surfaces of wall. An additional 1/4 in. (6 mm) bead shall be applied around periphery of device on each side of wall prior to securing device flanges.

HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC. — CP 606 or 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.

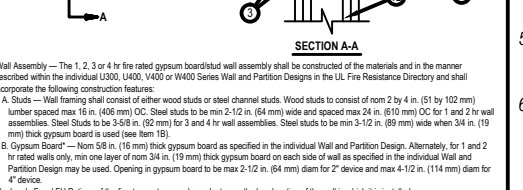
Hilti Firestop Systems

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System No. W-L-3334

Classified by Underwriters Laboratories, Inc. to UL 1479 and CANULC S115

| | | | |
|---|---|----------------------------------|--|
| ANSI/UL1479 (ASTM E814) | | CANULC S115 | |
| F Ratings — 1, 2, 3 and 4 Hr (See Item 1) | F Ratings — 1, 2, 3 and 4 Hr (See Item 1) | | |
| T Ratings — 0, 1/2, 1-1/2, 2 Hr (See Items 2 and 3) | FT Ratings — 0, 1/2, 1-1/2, and 2 Hr (See Items 2 and 3) | | |
| L Rating At Ambient — See Item 2 | FH Ratings — 1, 2, 3 and 4 Hr (See Item 1) | | |
| L Ratings At 400 F — See Item 2 | FTH Ratings — 0, 1/2, 1, 1-1/2, and 2Hr (See Items 2 and 3) | | |
| | | L Rating At Ambient — See Item 2 | |
| | | L Ratings At 400 F — See Item 2 | |



1. Wall Assembly — The 1, 2, 3 or 4 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described within the individual U300, U400, W400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall incorporate 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 for 1 and 2 hr wall assemblies. Steel studs to be 5/8 in. (16 mm) for 3 and 4 hr wall assemblies. Steel studs to be min 3-1/2 in. (89 mm) thick gypsum board is used (see Item 1B).
 - B. Gypsum Board* — Nom 5/8 in. (16 mm) thick gypsum board as specified in the individual Wall and Partition Design. Alternately, for 1 and 2 hr rated walls only, min one layer of nom 3/4 in. (19 mm) thick gypsum board on each side of wall as specified in the individual Wall and Partition Design may be used. Opening in gypsum board to be max 2-1/2 in. (64 mm) diam for 2" device and max 4-1/2 in. (114 mm) diam for 4" device.
- The hourly F and FH Ratings of the firestop system are dependent upon the hourly rating of the wall in which it is installed.
2. Cables — Within the loading area for each firestop device, the cables may represent a 0 to 100 percent visual fill. Cables to be tightly bundled within the device and rigidly supported on both sides of wall assembly. Any combination of the following types of cables may be used:
- A. Max 100 pair No. 24 AWG (or smaller) copper conductor telecommunication cable with polyvinyl chloride (PVC) jacketing and insulation.
 - B. Max 7/8 No. 12 AWG copper conductor control cable with PVC or XLPE jacket and insulation.
 - C. Max 40 AWG Type RH ground cable.
 - D. Max 4 pr No. 22 AWG Cat 5 or Cat 6 control cables.
 - E. Max RG 6U coaxial cable with fluorinated ethylene insulation and jacketing.
 - F. Five optic cable with polyvinyl chloride (PVC) or polyethylene (PE) jacket and insulation having a max diam of 1/2 in. (13 mm).
 - G. Max 20C No. 22 AWG shielded printer cable with PVC jacket.
 - H. Through-Penetrating Product* — Two copper conductors No. 18 AWG (or smaller) Power or Non Power Limited Fire Alarm Cable with or without a jacket under a metal armor.
- AFC CABLE SYSTEMS INC.
- I. Max. 1/4 in. (6 mm) diameter S-Video Cable consisting of 2 max 24 AWG 75 ohm coax or twisted pair cable with PE insulation and PVC jacket.
 - J. Max 3/8 No. 12 AWG MC Cable.
 - K. Through Penetrating Product* — Any cables, Armored Cable or Metal Clad Cables currently Classified under the Through Penetrating Product category. See Through Penetrating Product (DOLY) category in the Fire Resistance Directory for names of manufacturers.
- When the hourly rating of the wall assembly is 1 hr, the T, FT and FTH Ratings are 0 hr. When the hourly rating of the wall assembly is 2 hr, the T, FT and FTH Ratings are 1 hr except that, when Item 2B or 2C is used, the T, FT and FTH Ratings are 1/2 hr. When the hourly rating of the wall assembly is 3 or 4 hr, the T, FT and FTH Ratings are 1-1/2 and 2 hr, respectively.
- L Ratings apply only when device flanges are used. L Ratings vary depending on whether the gasketing material (see Item 3) or the sealant (Item 4) is used. See Table below for L Ratings.

| Max Cable Fill | Cable Type | L Rating, CFMSq Ft | | | | L Rating, CFM | | | |
|----------------|------------|--------------------|--------|-------|--------|---------------|--------|---------|--|
| | | Sealant | Gasket | 400°F | Gasket | Sealant | Gasket | Sealant | |

System No. W-L-2541 (Cont.)

Classified by Underwriters Laboratories, Inc. to UL 1479 and CANULC S115

- Through Penetrants — One nonmetallic pipe or conduit to be centered within the freestop system. Pipe to be rigidly supported on both sides of wall. The following types and sizes of pipe may be used:
 - Polystyrene (PVC) Pipe — Nom 3 in. (76 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.
 - Chlorinated Polyvinyl Chloride (CPVC) Pipe — Nom 3 in. (76 mm) diam (or smaller) SDR 13.5 CPVC pipe for use in closed (process or supply) piping systems.
- Firestop Device — Firestop device consists of a corrugated steel tube with an inner plastic housing, intumescent material rings and tightly twisted inner fabric smoke seal. Firestop device to be installed in accordance with the accompanying installation instructions. Device slid into wall such that ends project an equal distance from the approximate centerline of the wall assembly. The annular space between the device and the periphery of the opening shall be min 0 in. (point contact). Device provided with flanges that are spun clockwise onto device threads, butting tightly to both sides of wall.
- HLTI CONSTRUCTION CHEMICALS, DIV OF HLTI INC. — CP 653 2" Speed Sleeve and CP 653 4" Speed Sleeve
- Fill, Void or Cavity Material* — Sealant — Min 1/2 in. (13 mm) thickness of fill material applied within the annulus between firestop device and wall, flush with both surfaces of wall. An additional 1/4 in. (6 mm) bead shall be applied around periphery of device on each side of wall prior to securing device flanges.
- HLTI CONSTRUCTION CHEMICALS, DIV OF HLTI INC. — CP 606, 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.



Reproduced by HLTI, Inc. Courtesy of Underwriters Laboratories, Inc. January 28, 2015

System No. W-L-8086

Classified by Underwriters Laboratories, Inc. to UL 1479 and CANULC S115

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| ANSI/UL1479 (ASTM E814) | CANULC S115 |
| F Rating — 1 and 2 Hr (See Item 1) | F Rating — 1 and 2 Hr (See Item 1) |
| T Rating — 0, 1/2 and 1 Hr (See Items 2 and 3) | FT Rating — 0, 1/2 and 1 Hr (See Item 2 and 3) |
| | FH Rating — 1 and 2 Hr (See Item 1) |
| | FTH Rating — 0, 1/2 and 1 Hr (See Items 2 and 3) |

SECTION A-A

- 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 within the individual U500, U400, U400 or V400 Series Wall or Partition Designs in the UL Fire Resistance Directory and shall incorporate the following construction features:
 - 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.
 - Gypsum Board* — Nom 5/8 in. (16 mm) thick gypsum board as specified in the individual Wall and Partition Design. Opening in gypsum board to be max 2-1/2 in. (64 mm) diam for 2" device and max 4-1/2 in. (114 mm) diam for 4" device.
 - The F, FH, FTH Rating of the freestop system is dependent upon the hourly rating of the wall in which it is installed.
- Cables — Within the loading area for each freestop device, the cables may represent a 0 to 100 percent visual fill. Cables to be tightly bundled within the device and rigidly supported on both sides of wall assembly. Any combination of the following types of cables may be used:
 - Max 100 pair No. 24 AWG (or smaller) copper conductor telecommunication cable with polyvinyl chloride (PVC) jacketing and insulation.
 - Max 7/8 No. 12 AWG copper conductor control cable with PVC or XLPE jacket and insulation.
 - Max 40 AWG Type RH ground cable.
 - Max 4 pr No. 22 AWG Cat 6 computer cables.
 - Max RG 6U coaxial cable with fluorinated ethylene insulation and jacketing.
 - Fiber optic cable with polyvinyl chloride (PVC) or polyethylene (PE) jacket and insulation having a max diam of 1/2 in. (13 mm).
 - Max 200 No. 22 AWG shielded printer cable with PVC jacket.
 - Through-Penetrating Product* — Two copper conductors No. 18 AWG (or smaller) Power or Non Power Limited Fire Alarm Cable with or without a jacket under a metal armor.
 - AFPC CABLE SYSTEMS INC.
 - Max 1/4 in. (6 mm) diameter S-Video Cable consisting of 2 max 24 AWG 75 ohm coax or twisted pair cable with PE insulation and PVC jacket.
 - Max 3/8 No. 12 AWG MC Cable.
 - Through Penetrating Product* — Any cables, Armored Cable or Metal Clad Cable* currently Classified under the Through Penetrating Product category. See Through Penetrating Product (XHLV) category in the Fire Resistance Directory for names of manufacturers. For openings with cables, the T, FT, FTH Ratings are 0 hr for 1 hr rated wall assemblies, 1 hr for 2 hr rated wall assemblies, 1 hr, FT, FTH Ratings are 1 hr (see Item 3 and 4 also).
- Metallic Penetrants — One pipe or tube to be installed in opening. The following types and sizes of through penetrants may be used:
 - Steel Pipe — Nom 2 in. (51 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.
 - Iron Pipe — Nom 2 in. (51 mm) diam (or smaller) cast or ductile iron pipe.
 - Copper Pipe — Nom 2 in. (51 mm) diam (or smaller) Regular (or heavier) copper pipe.
 - Copper Tube — Nom 2 in. (51 mm) diam (or smaller) Type L (or heavier) copper tube.
 - Conduit — Nom 2 in. (51 mm) diam (or smaller) steel conduit, nom 2 in. (51 mm) diam (or smaller) steel electrical metallic tubing (EMT), or nom 1 in. (25 mm) diam (or smaller) flexible steel conduit.

- For openings with metallic penetrants the hourly T, FT, FTH Ratings are 1/2 hr.
 - Firestop Device* — Firestop device consists of a corrugated steel tube with an inner plastic housing, intumescent material rings, tightly twisted inner fabric smoke seal, flanges and gasketing material (not shown). Firestop device to be installed in accordance with the accompanying installation instructions. Device slid into wall such that ends project an equal distance from the approximate centerline of the wall assembly. The annular space between the device and the periphery of the opening shall be min 0 in. (point contact). Device provided with flanges that are spun clockwise onto device threads, over gasketing material butting tightly to both sides of wall. As an alternate to gasket material, sealant (Item 4) may be used.
 - HLTI CONSTRUCTION CHEMICALS, DIV OF HLTI INC. — CP 653 2" Speed Sleeve and CP 653 4" Speed Sleeve
 - Fill, Void or Cavity Material* — Sealant — As an alternate to gasket material (see Item 3), min 1/2 in. (13 mm) thickness of fill material applied within the annulus between firestop device and wall, flush with both surfaces of wall, and an additional 1/4 in. (6 mm) bead applied around periphery of device.
 - HLTI CONSTRUCTION CHEMICALS, DIV OF HLTI INC. — FS-ONE Sealant, FS-ONE MAX Intumescent Sealant or CP 606 Sealant
- *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-8085

Classified by Underwriters Laboratories, Inc. to UL 1479 and CANULC S115

| | |
|--------------------------------------|--|
| ANSI/UL1479 (ASTM E814) | CANULC S115 |
| F Rating — 1 and 2 Hr (See Item 1) | F Rating — 1 and 2 Hr (See Item 1) |
| T Rating — 0 and 3/4 Hr (See Item 1) | FT Rating — 0 and 3/4 Hr (See Item 1) |
| | FH Rating — 1 and 2 Hr (See Item 1) |
| | FTH Rating — 0 and 3/4 Hr (See Item 1) |

SECTION A-A

- 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 within the individual U500, U400 or V400 Series Wall or Partition Designs in the UL Fire Resistance Directory and shall incorporate the following construction features:
 - 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.
 - Gypsum Board* — Nom 5/8 in. (16 mm) thick gypsum board as specified in the individual Wall and Partition Design. Opening in gypsum board to be max 2-1/2 in. (64 mm) diam for 2 in. (51 mm) device and max 4-1/2 in. (114 mm) diam for 4 in. (102 mm) device.
 - The hourly F, FH Rating of the freestop system is dependent upon the hourly rating of the wall in which it is installed. The T, FT and FTH Rating is 0 and 3/4 hr for 1 and 2 hr rated wall assemblies, respectively.
- Air Conditioners (AC) Line Sets — AC line set consists of two pipes or tubes (Item 3A), tubing insulation (Item 2B) and a thermostat cable (Item 2C). The AC line sets shall be rigidly supported on both sides of the floor or wall assembly.
- Metallic Penetrants — A max of two pipes or tubes to be installed in each AC line set. Of the two pipes or tubes, only one may have a nom diam greater than 3/4 in. (19 mm). The following types and sizes of through penetrants may be used:
 - Steel Pipe — Nom 1 in. (25 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.
 - Iron Pipe — Nom 1 in. (25 mm) diam (or smaller) cast or ductile iron pipe.
 - Copper Pipe — Nom 1 in. (25 mm) diam (or smaller) Regular (or heavier) copper pipe.
 - Copper Tube — Nom 1 in. (25 mm) diam (or smaller) Type L (or heavier) copper tube.



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System No. W-L-8085 (Cont.)

Classified by Underwriters Laboratories, Inc. to UL 1479 and CANULC S115

- Tube Insulation - Plastic — Nom 3/4 in. (19 mm) thick acrylonitrile butadiene/styrene (ABS) flexible foam furnished in the form of tubing. The tube insulation may be installed on one max 1 in. (25 mm) diam pipe or tube in each AC line set. The space between the insulated and un-insulated pipes or tubes within each AC line set shall be 0 in. (point contact).
- Plastic (DMEFZ) category in the Plastic Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation meeting the above specifications and having a UL 94 Flammability Classification of 94VA may be used.
- Cable — One 4 pr No. 18 AWG (or smaller) twisted cable with polyvinyl chloride (PVC) insulation and gasket material may be installed with each AC line set.
- Firestop Device* — Firestop device consists of a corrugated steel tube with an inner plastic housing, intumescent material rings, tightly twisted inner fabric smoke seal, flanges and gasketing material (not shown). Firestop device to be installed in accordance with the accompanying installation instructions. Device slid into wall such that ends project an equal distance from the approximate centerline of the wall assembly. The annular space between the device and the periphery of the opening shall be min 0 in. (point contact). Device provided with flanges that are spun clockwise onto device threads, over gasketing material butting tightly to both sides of wall. As an alternate to gasket material, sealant (Item 4) may be used.
- HLTI CONSTRUCTION CHEMICALS, DIV OF HLTI INC. — CP 653 2" Speed Sleeve and CP 653 4" Speed Sleeve
- Fill, Void or Cavity Material* — Sealant — As an alternate to gasket material (see Item 3), min 1/2 in. (13 mm) thickness of fill material applied within the annulus between firestop device and wall, flush with both surfaces of wall, and an additional 1/4 in. (6 mm) bead applied around periphery of device.
- HLTI CONSTRUCTION CHEMICALS, DIV OF HLTI INC. — FS-ONE Sealant, FS-ONE MAX Intumescent Sealant or CP 606 Sealant

*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-3335

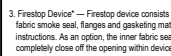
Classified by Underwriters Laboratories, Inc. to UL 1479 and CANULC S115

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| ANSI/UL1479 (ASTM E814) | CANULC S115 |
| F Ratings - 1 and 2 Hr (See Item 1) | F Ratings - 1 and 2 Hr (See Item 1) |
| T Ratings - 0, 1/2 and 1 Hr (See Item 2) | FT Ratings - 0, 1/2 and 1 Hr (See Item 2) |
| L Rating At Ambient - See Items 2 and 4 | FH Ratings - 1 and 2 Hr (See Item 1) |
| L Ratings At 400 F - See Items 2 and 4 | FTH Ratings - 0, 1/2 and 1 Hr (See Item 2) |
| | L Rating At Ambient - See Items 2 and 4 |
| | L Ratings At 400 F - See Items 2 and 4 |

SECTION A-A

- 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 within the individual U500, U400, V400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall incorporate the following construction features:
 - 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. Steel studs to be min 3-1/2 in. (89 mm) wide when 3/4 in. (19 mm) thick gypsum board is used (see Item 1B).
 - Gypsum Board* — Nom 5/8 in. (16 mm) thick gypsum board as specified in the individual Wall and Partition Design. Alternately, min one layer of nom 3/4 in. (19 mm) thick gypsum board on each side of wall as specified in the individual Wall and Partition Design may be used. Opening in gypsum board to be max 3 in. (76 mm) diam for 2" device and max 5 in. (127 mm) diam for 4" device.
 - The hourly F and FH Ratings of the freestop system are dependent upon the hourly rating of the wall in which it is installed.
- Cables — Within the loading area for each freestop device, the cables may represent a 0 to 100 percent visual fill. Cables to be tightly bundled within the device and rigidly supported on both sides of wall assembly. Any combination of the following types of cables may be used:
 - Max 100 pair No. 24 AWG (or smaller) copper conductor telecommunication cable with polyvinyl chloride (PVC) jacketing and insulation.
 - Max 7/8 No. 12 AWG copper conductor control cable with PVC or XLPE jacket and insulation.
 - Max 40 AWG Type RH ground cable.
 - Max 4 pr No. 22 AWG Cat 5 or Cat 6 computer cables.
 - Max RG 6U coaxial cable with fluorinated ethylene insulation and jacketing.
 - Fiber optic cable with polyvinyl chloride (PVC) or polyethylene (PE) jacket and insulation having a max diam of 1/2 in. (13 mm).
 - Max 200 No. 22 AWG shielded printer cable with PVC jacket.
 - Through-Penetrating Product* — Two copper conductors No. 18 AWG (or smaller) Power or Non Power Limited Fire Alarm Cable with or without a jacket under a metal armor.
 - AFPC CABLE SYSTEMS INC.
 - Max 1/4 in. (6 mm) diameter S-Video Cable consisting of 2 max 24 AWG 75 ohm coax or twisted pair cable with PE insulation and PVC jacket.
 - Max 3/8 No. 12 AWG MC Cable.
 - Through Penetrating Product* — Any cables, Armored Cable or Metal Clad Cable* currently Classified under the Through Penetrating Product category. See Through Penetrating Product (XHLV) category in the Fire Resistance Directory for names of manufacturers. For openings with cables, the T, FT, FTH Ratings are 0 hr for 1 hr rated wall assemblies, 1 hr for 2 hr rated wall assemblies, 1 hr, FT and FTH Ratings are 1/2 hr (see Item 3 and 4 also).
- Metallic Penetrants — One pipe or tube to be installed in opening. The following types and sizes of through penetrants may be used:
 - Steel Pipe — Nom 2 in. (51 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.
 - Iron Pipe — Nom 2 in. (51 mm) diam (or smaller) cast or ductile iron pipe.
 - Copper Pipe — Nom 2 in. (51 mm) diam (or smaller) Regular (or heavier) copper pipe.
 - Copper Tube — Nom 2 in. (51 mm) diam (or smaller) Type L (or heavier) copper tube.
 - Conduit — Nom 2 in. (51 mm) diam (or smaller) steel conduit, nom 2 in. (51 mm) diam (or smaller) steel electrical metallic tubing (EMT), or nom 1 in. (25 mm) diam (or smaller) flexible steel conduit.

- For openings with metallic penetrants the hourly T, FT, FTH Ratings are 1/2 hr.
 - Firestop Device* — Firestop device consists of a corrugated steel tube with an inner plastic housing, intumescent material rings, tightly twisted inner fabric smoke seal, flanges and gasketing material (not shown). Firestop device to be installed in accordance with the accompanying installation instructions. As an option, the inner fabric seal may remain open except that, to attain the L Rating, the inner fabric seal shall be twisted to completely close off the opening within each device. Device slid into wall such that ends project an equal distance from the approximate centerline of the wall assembly. The annular space between the device and the periphery of the opening shall be min 0 in. (point contact). Device flanges may overlap one another. As an alternate to gasket material, sealant (Item 3B) may be used.
 - HLTI CONSTRUCTION CHEMICALS, DIV OF HLTI INC. — CP 653 2" Speed Sleeve and CP 653 4" Speed Sleeve
 - Fill, Void or Cavity Material* — Sealant — As an alternate to gasket material (see Item 3A), min 1/2 in. (13 mm) thickness of fill material applied within the annulus between firestop device and wall, flush with both surfaces of wall, and an additional 1/4 in. (6 mm) bead of FS-ONE or CP 606 at the device/wall interface on both sides of wall prior to installing flanges.
 - HLTI CONSTRUCTION CHEMICALS, DIV OF HLTI INC. — FS-ONE Sealant, FS-ONE MAX Intumescent Sealant, CP 606 Sealant or CP 618 Putty
- *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-8085

Classified by Underwriters Laboratories, Inc. to UL 1479 and CANULC S115

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| ANSI/UL1479 (ASTM E814) | CANULC S115 |
| F Rating — 1 and 2 Hr (See Item 1) | F Rating — 1 and 2 Hr (See Item 1) |
| T Rating — 0 and 3/4 Hr (See Item 1) | FT Rating — 0 and 3/4 Hr (See Item 1) |
| | FH Rating — 1 and 2 Hr (See Item 1) |
| | FTH Rating — 0 and 3/4 Hr (See Item 1) |

SECTION A-A

- 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 within the individual U500, U400 or V400 Series Wall or Partition Designs in the UL Fire Resistance Directory and shall incorporate the following construction features:
 - 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.
 - Gypsum Board* — Nom 5/8 in. (16 mm) thick gypsum board as specified in the individual Wall and Partition Design. Opening in gypsum board to be max 2-1/2 in. (64 mm) diam for 2 in. (51 mm) device and max 4-1/2 in. (114 mm) diam for 4 in. (102 mm) device.
 - The hourly F, FH Rating of the freestop system is dependent upon the hourly rating of the wall in which it is installed. The T, FT and FTH Rating is 0 and 3/4 hr for 1 and 2 hr rated wall assemblies, respectively.
- Air Conditioners (AC) Line Sets — AC line set consists of two pipes or tubes (Item 3A), tubing insulation (Item 2B) and a thermostat cable (Item 2C). The AC line sets shall be rigidly supported on both sides of the floor or wall assembly.
- Metallic Penetrants — A max of two pipes or tubes to be installed in each AC line set. Of the two pipes or tubes, only one may have a nom diam greater than 3/4 in. (19 mm). The following types and sizes of through penetrants may be used:
 - Steel Pipe — Nom 1 in. (25 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.
 - Iron Pipe — Nom 1 in. (25 mm) diam (or smaller) cast or ductile iron pipe.
 - Copper Pipe — Nom 1 in. (25 mm) diam (or smaller) Regular (or heavier) copper pipe.
 - Copper Tube — Nom 1 in. (25 mm) diam (or smaller) Type L (or heavier) copper tube.



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System No. W-J-3189

Classified by Underwriters Laboratories, Inc. to UL 1479 and CANULC S115

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| ANSI/UL1479 (ASTM E814) | CANULC S115 |
| F Rating - 2 Hr | F Rating - 2 Hr |
| T Ratings - 1/2 and 1-1/2 Hr (See Item 2) | FT Ratings - 1/2 and 1-1/2 Hr (See Item 2) |
| L Rating At Ambient - 1.2 and Less Than 1 CFM per Device (See Items 2, 3A and 3A1) | FH Rating - 2 Hr |
| L Ratings At 400 F - 1.3, 1.6 and Less Than 1 CFM per Device (See Items 2, 3A and 3A1) | FTH Ratings - 1/2 and 1-1/2 Hr (See Item 2) |
| | L Rating At Ambient - Less Than 1.2 and Less Than 1 CFM per Device (See Items 2, 3A and 3A1) |
| | L Ratings At 400 F - 1.3, 1.6 and Less Than 1 CFM per Device (See Items 2, 3A and 3A1) |

CONFIGURATION A

SECTION A-A

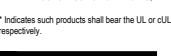
CONFIGURATION B

- Wall Assembly — Minimum 5 in. (127 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) concrete wall. Wall may also be constructed of any UL Classified Concrete Blocks* Maximum five individual openings may be provided (see Item 3A). Diam of opening for each freestop device shall not exceed 4-1/2 in. (114 mm) and shall be sized to the OD of the freestop device. See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.
- Cables — The aggregate cross-sectional area of cables in freestop devices to be min 0 percent (blank) to max 100 percent visual fill. Cables to be tightly bundled within the device and rigidly supported on both sides of wall assembly. Any combination of the following types and sizes of cables may be used:
 - Max 100 pair No. 24 AWG (or smaller) copper conductor telecommunication cable with polyvinyl chloride (PVC) jacketing and insulation.
 - Max 7/8 No. 12 AWG copper conductor control cable with PVC or XLPE jacket and insulation.
 - Max 40 AWG Type RH ground cable.
 - Max 4 pr No. 22 AWG Cat 5 or Cat 6 computer cables.
 - Max RG 6U coaxial cable with fluorinated ethylene insulation and jacketing.
 - Fiber optic cable with polyvinyl chloride (PVC) or polyethylene (PE) jacket and insulation having a max diam of 1/2 in. (13 mm).
 - Max 200 No. 22 AWG shielded printer cable with PVC jacket.
 - Through-Penetrating Product* — Two copper conductors No. 18 AWG (or smaller) Power or Non Power Limited Fire Alarm Cable with or without a jacket under a metal armor.
 - AFPC CABLE SYSTEMS INC.
 - Max 1/4 in. (6 mm) diameter S-Video Cable consisting of 2 max 24 AWG 75 ohm coax or twisted pair cable with PE insulation and PVC jacket.
 - Max 3/8 No. 12 AWG MC Cable.
 - Through Penetrating Product* — Any cables, Armored Cable or Metal Clad Cable* currently Classified under the Through Penetrating Product category. See Through Penetrating Product (XHLV) category in the Fire Resistance Directory for names of manufacturers. For openings with cables, the T, FT and FTH Ratings are 1/2 hr. For blank opening (no cables), the T, FT and FTH Ratings are 1-1/2 hr. L Ratings vary depending on whether the gasketing material (see Item 3) or the sealant (Item 4) is used. See Table below for L Ratings.

| Max Cable Fill | Cable Type | L Rating, CFM Per Device | | | |
|----------------|--|--------------------------|-------------|-------------|-------------|
| | | Ambient | | 400°F | |
| | | Sealant | Gasket | Sealant | Gasket |
| 0% | — | Less than 1 | Less than 1 | Less than 1 | Less than 1 |
| 100% | Item 2D only | Less than 1 | Less than 1 | Less than 1 | Less than 1 |
| 100% | Any cables (Item 2) in any combination | 1.2 | 1.2 | 1.3 | 1.6 |

- Firestop System* — The freestop system shall consist of the following:
 - Firestop Device* — Maximum five freestop devices grouped in two row configuration as depicted. The individual opening in the wall for each device are spaced min 2-7/16 in. (62 mm) apart such that the device flanges of adjacent devices are no closer than point contact. Firestop device consists of a corrugated steel tube with an inner plastic housing, intumescent material rings, twisted inner fabric smoke seal, flanges and gasketing material (not shown). Firestop device to be installed in accordance with the accompanying installation instructions. As an option, the inner fabric seal within each device may remain open except that, for all blank devices (no cables), the inner fabric seal shall be twisted to completely close the device. In addition, to attain the L Rating, the inner fabric seal must also be twisted to completely close the opening within each device. Device slid into wall such that ends project an equal distance from the approximate centerline of the wall assembly. The annular space between each device and the periphery of the opening shall be min 0 in. (point contact). Device flanges are to be secured to wall with two 1-1/4 in. (32 mm) long masonry screws or anchors. As an alternate to gasket material, sealant (Item 3B) may be used.
 - HLTI CONSTRUCTION CHEMICALS, DIV OF HLTI INC. — CP 653 2" Speed Sleeve and CP 653 4" Speed Sleeve
 - Fill, Void or Cavity Material* — Same as Item A above except maximum four freestop devices grouped in one row as depicted. The individual openings in the wall for each device are spaced min 1-7/16 in. (36.5 mm) apart. Device flanges may overlap one another. As an option, the inner fabric seal may remain open except that, to attain the L Rating, the inner fabric seal shall be twisted to completely close off the opening within each device.
 - HLTI CONSTRUCTION CHEMICALS, DIV OF HLTI INC. — CP 653 2" Speed Sleeve and CP 653 4" Speed Sleeve
 - Fill, Void or Cavity Material* — As an alternate to gasket material (see Item 3A), min 1/4 in. (6 mm) bead of fill material applied around periphery of each device to wall interface on both sides of wall prior to installing device flanges.
 - HLTI CONSTRUCTION CHEMICALS, DIV OF HLTI INC. — FS-ONE Sealant, FS-ONE MAX Intumescent Sealant, CP 606 Sealant or CP 618 Putty

- *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-3384

Classified by Underwriters Laboratories, Inc. to UL 1479 and CANULC S115

| | |
|--|--|
| ANSI/UL1479 (ASTM E814) | CANULC S115 |
| F Ratings - 1 and 2 Hr (See Item 1) | F Ratings - 1 and 2 Hr (See Item 1) |
| T Ratings - 1/2 and 1 Hr (See Item 2) | FT Ratings - 1/2 and 1 Hr (See Item 2) |
| L Rating At Ambient - 1.2 and Less Than 1 CFM per Device (See Items 2, 3A and 3A1) | FH Ratings - 1 and 2 Hr (See Item 1) |
| L Ratings At 400 F - 1.3, 1.6 and Less Than 1 CFM per Device (See Items 2, 3A and 3A1) | FTH Ratings - 1/2 and 1 Hr (See Item 2) |
| | L Rating At Ambient - Less Than 1.2 and Less Than 1 CFM per Device (See Items 2, 3A and 3A1) |
| | L Ratings At 400 F - 1.3, 1.6 and Less Than 1 CFM per Device (See Items 2, 3A and 3A1) |

CONFIGURATION A

SECTION A-A

CONFIGURATION B

- 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 within the individual U500, U400 or V400 Series Wall or Partition Designs in the UL Fire Resistance Directory and shall incorporate the following construction features:
 - 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.
 - Gypsum Board* — The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U500, U400 or V400 Series Designs in the UL Fire Resistance Directory. Maximum five individual openings may be provided (see Item 3A). Diam of opening for each freestop device shall not exceed 4-1/2 in. (114 mm) and shall be sized to the OD of the freestop device.
 - 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.
- Cables — The aggregate cross-sectional area of cables in freestop device to be min 0 percent (blank) to max 100 percent visual fill. Cables to be tightly bundled within the device and rigidly supported on both sides of wall assembly. Any combination of the following types and sizes of cables may be used:
 - Max 100 pair No. 24 AWG (or smaller) copper conductor telecommunication cable with polyvinyl chloride (PVC) jacketing and insulation.
 - Max 7/8 No. 12 AWG copper conductor control cable with PVC or XLPE jacket and insulation.
 - Max 40 AWG Type RH ground cable.
 - Max 4 pr No. 22 AWG Cat 5 or Cat 6 computer cables.
 - Max RG 6U coaxial cable with fluorinated ethylene insulation and jacketing.
 - Fiber optic cable with polyvinyl chloride (PVC) or polyethylene (PE) jacket and insulation having a max diam of 1/2 in. (13 mm).
 - Max 200 No. 22 AWG shielded printer cable with PVC jacket.
 - Through-Penetrating Product* — Two copper conductors No. 18 AWG (or smaller) Power or Non Power Limited Fire Alarm Cable with or without a jacket under a metal armor.
 - AFPC CABLE SYSTEMS INC.
 - Max 1/4 in. (6 mm) diameter S-Video Cable consisting of 2 max 24 AWG 75 ohm coax or twisted pair cable with PE insulation and PVC jacket.
 - Max 3/8 No. 12 AWG MC Cable.
 - Through Penetrating Product* — Any cables, Armored Cable or Metal Clad Cable* currently Classified under the Through Penetrating Product category. See Through Penetrating Product (XHLV) category in the Fire Resistance Directory for names of manufacturers. For openings with cables, the T, FT and FTH Ratings are 1/2 hr. For blank opening (no cables), when the hourly rating of the wall assembly is 1 hr, the T, FT and FTH Ratings are 1/2 hr.
 - L Ratings vary depending on whether the gasketing material (see Item 3) or the sealant (Item 4) is used. See Table below for L Ratings.



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System No. W-L-3384

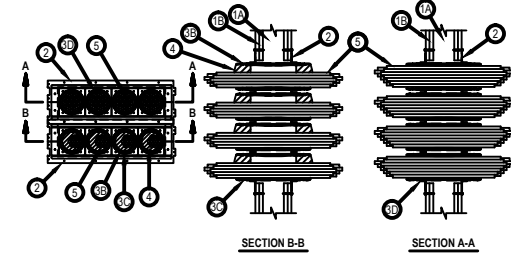
Classified by Underwriters Laboratories, Inc. to UL 1479 and CANULC S115

| | |
|--|--|
| ANSI/UL1479 (ASTM E814) | CANULC S115 |
| F Ratings - 1 and 2 Hr (See Item 1) | F Ratings - 1 and 2 Hr (See Item 1) |
| T Ratings - 1/2 and 1 Hr (See Item 2) | FT Ratings - 1/2 and 1 Hr (See Item 2) |
| L Rating At Ambient - 1.2 and Less Than 1 CFM per Device (See Items 2, 3A and 3A1) | FH Ratings - 1 |



System No. W-L-3395

Table with 2 columns: ANSUL1479 (ASTM E814) and CANULC S115. Rows include F Ratings, T Ratings, L Rating At Ambient, and L Rating At 400F.



- 1. Wall Assembly - The 1 or 2 hr fire rated gypsum board/wall assembly shall be constructed of the materials and in the manner described within the individual U400, V400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall incorporate the following construction features.

Table with 3 columns: FIRESTOP DEVICE (Item 2), SURFACE MOUNTED, and STUD MOUNTED. Rows include 24" PLATE (SINGLE, DOUBLE), 16" PLATE (SINGLE, DOUBLE).

The hourly F and FH Ratings of the firestop system are dependent upon the hourly rating of the wall in which it is installed.

- 2. Firestop Device - The firestop device consists of a steel plate sandwich construction with three (16" device size) or four (24" device size) circular opening ports which are each 4 in. (102 mm) diam. The firestop device is intended to be oriented vertically or horizontally and mounted to the face of the opening on both sides of wall.

- 3. Firestop Device - Within each circular opening port of the CFS-SL GP firestop gang plate (Item 2), one of the following firestop devices shall be installed. Any combination of these firestop devices may be used within each gang plate.

The L Ratings are dependent on the type and number of devices within the gang plate and the cable type and fill. For devices with cable bundle, the cable bundle shall be normally centered within the device to attain the L Ratings. The L Ratings in CFM per GP Device (Table 1) and in CFM per ft2 of opening (Table 2) are specified below:

Table 1 - CFM per CFS-SL GP Gangplate Device at Ambient and 400F. Table with 5 columns: TYPE AND NUMBER OF DEVICES IN CFS-SL GP, CAP(S) ONLY, CAP(S) AND ONE DEVICE, CAP(S) AND TWO DEVICES, CAP (OPT) AND THREE DEVICES, FOUR DEVICES.



System No. W-L-3395 (Cont.)

Table 2 - CFM per FT2 of Opening at Ambient and 400F

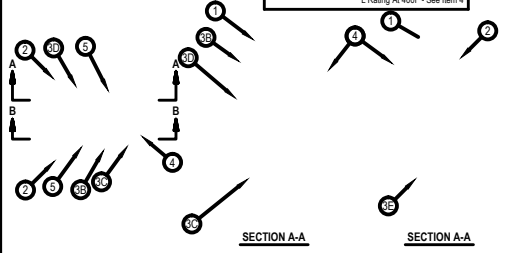
Table with 5 columns: TYPE AND NUMBER OF DEVICES IN CFS-SL GP, CAP(S) ONLY, CAP(S) AND ONE DEVICE, CAP(S) AND TWO DEVICES, CAP (OPT) AND THREE DEVICES, FOUR DEVICES.

*Bearing the UL Classification Mark



System No. W-J-3200

Table with 2 columns: ANSUL1479 (ASTM E814) and CANULC S115. Rows include F Ratings, T Rating, L Rating At Ambient, and L Rating At 400F.



- 1. Wall Assembly - Min 6 in. (152 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete. Wall may also be constructed of any UL Classified Concrete Blocks. Maximum opening sizes are specified in Table below.

Table with 2 columns: FIRESTOP DEVICE and MAXIMUM OPENING SIZE. Rows include 24" PLATE (SINGLE, DOUBLE), 16" PLATE (SINGLE, DOUBLE).

- 2. Firestop Device - The firestop device consists of a steel plate sandwich construction with three (16" device size) or four (24" device size) circular opening ports which are each 4 in. (102 mm) diam. The firestop device is intended to be oriented vertically or horizontally and mounted to the face of the opening on both sides of wall.

The L Ratings are dependent on the type and number of devices within the gang plate and the cable type and fill. For devices with cable bundle, the cable bundle shall be normally centered within the device to attain the L Ratings. The L Ratings in CFM per GP Device (Table 1) and in CFM per ft2 of opening (Table 2) are specified below:

Table 1 - CFM per CFS-SL GP Gangplate Device at Ambient and 400F. Table with 5 columns: TYPE AND NUMBER OF DEVICES IN CFS-SL GP, CAP(S) ONLY, CAP(S) AND ONE DEVICE, CAP(S) AND TWO DEVICES, CAP (OPT) AND THREE DEVICES, FOUR DEVICES.



System No. W-J-3200 (Cont.)

Table 1 - CFM per CFS-SL GP Gangplate Device at Ambient and 400F

Table with 5 columns: TYPE AND NUMBER OF DEVICES IN CFS-SL GP, CAP(S) ONLY, CAP(S) AND ONE DEVICE, CAP(S) AND TWO DEVICES, CAP (OPT) AND THREE DEVICES, FOUR DEVICES.

*Bearing the UL Classification Mark



Notes:

- 1. Refer to section 16055 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.

<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 CP 653 SPEED SLEEVE DETAILS
SHEET NUMBER: