

System No. F-C-3012

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

1. Floor-Ceiling Assembly — The 1 or 2 hr fire-rated solid or trussed lumber joist floor-ceiling assembly shall be constructed of the materials and in the manner specified in the individual L500 Series Floor-Ceiling Designs in the UL Fire Resistance Directory. The general construction features of the floor-ceiling assembly are summarized below:

- Flooring System — Lumber or plywood subfloor with finish floor of lumber, plywood or Floor Topping Mixture* as specified in the individual Floor-Ceiling Design. Max diam of opening for 1 or 2 hr assembly is 2-1/2 in. (64 mm) or 2 in. (51 mm), respectively.
- Wood Joists* — Nom 10 in. (254 mm) deep (or deeper) lumber, steel or combination lumber and steel joists, trusses or Structural Wood Members* with bridging as required and with ends firestopped.
- Furring Channels — (Not Shown) — (As required) — Resilient galvanized steel furring installed in accordance with the manner specified in the individual L500 Series Designs in the Fire Resistance Directory.
- Gypsum Board* — Thickness, type, number of layers and fasteners shall be as specified in the individual Floor-Ceiling Design. Max diam of opening for 1 or 2 hr assembly is 2-1/2 in. (64 mm) or 2 in. (51 mm), respectively.

The F Rating of the firestop system is equal to the rating of the floor-ceiling assembly.

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System No. F-C-3012

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

2. Chase Wall — (Optional) — The through penetrant (Item 3) shall be routed through a fire-rated single, double or staggered wood stud/gypsum wallboard chase wall having a fire rating consistent with that of the floor-ceiling assembly. The chase wall shall be constructed of the materials and in the manner specified in the individual U300 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

- Studs — Nom 2 by 6 in. (51 by 152 mm) or double nom 2 by 4 in. (51 by 102 mm) lumber studs.
- Sole Plate — Nom 2 by 6 in. (51 by 152 mm) or parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Max diam of opening for 1 or 2 hr rated assembly is 2-1/2 in. (64 mm) or 2 in. (51 mm), respectively.
- Top Plate — The double top plate shall consist of two nom 2 by 6 in. (51 by 152 mm) or two sets of parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Max diam of opening for 1 or 2 hr rated assembly is 2-1/2 in. (64 mm) or 2 in. (51 mm), respectively.
- Gypsum Board* — Thickness, type, number of layers and fasteners shall be as specified in individual Wall and Partition Design.

3. Cables — In 1 hr fire-rated assemblies, aggregate cross-sectional area of cables in opening to be max 45 percent of the cross-sectional area of the opening (max 2 in. (51 mm) diam bundle). Cables to be rigidly supported on both sides of floor assembly. Any combination of the following types and sizes of copper conductors may be used:

- RS 59 coaxial cable with single copper conductor, cellular polyethylene cellular foam insulation and polyvinyl chloride (PVC) jacket.
- Max 8/C No. 22 AWG telephone cable with polyvinyl chloride (PVC) jacketing.
- Max 2/C No. 12 AWG cable with polyvinyl chloride (PVC) insulation and jacketing.
- Max 3/C with ground No. 20 AWG aluminum or copper Type SER cable with polyvinyl chloride (PVC) insulation.
- Max 3/C No. 12 AWG MC (BX) cable with polyvinyl chloride (PVC) insulation.
- Max 1 in. diam metal clad TEK cable with PVC jacket.
- Max 4/C with ground No. 300 kcmil (or smaller) aluminum SER cable with PVC insulation and jacket.

1. Through Penetrating Product* — Any cables, Metal-Clad Cable* or Armored Cable* currently Classified under the Through Penetrating Products category.

See Through Penetrating Product (XPLY) category in the Fire Resistance Directory for names of manufacturers.

The T Rating is 1 and 1-3/4 hr for 1 and 2 hr rated assemblies, respectively, for cables 3A through 3G. The T Rating is 0 hr for cables 3H and 3I.

4. Fill, Void or Cavity Material* — Sealant — Min 3/4 in. (19 mm) thickness of fill material applied within the annulus, flush with top surface of floor or sole plate. Min 5/8 in. (16 mm) thickness of fill material also applied within the annulus, flush with bottom surface of ceiling or lower top plate.

HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-611A Sealant 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.

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System No. F-C-5004

| ANSI/UL1479 (ASTM E814) | CAN/ULC S115 |
|---|---|
| F Rating — 1 and 2 Hr (See Item 1) | F Rating — 1 and 2 Hr (See Item 1) |
| T Rating — 1 and 1-3/4 Hr (See Item 1) | FT Rating — 1 and 1-3/4 Hr (See Item 1) |
| L Rating At Ambient — 4 CFMSq Ft (See Item 4) | FH Rating — 1 and 2 Hr (See Item 1) |
| L Rating At 400 F — Less Than 1 CFMSq Ft (See Item 4) | FTH Rating — 1 and 1-3/4 Hr (See Item 1) |
| | L Rating At Ambient — 4 CFMSq Ft (See Item 4) |
| | L Rating At 400 F — Less Than 1 CFMSq Ft (See Item 4) |

1. Floor-Ceiling Assembly — The 1 or 2 hr fire-rated solid or trussed lumber joist floor-ceiling assembly shall be constructed of the materials and in the manner specified in the individual L500 Series Floor-Ceiling Designs in the UL Fire Resistance Directory. The F Rating of the firestop system is equal to the rating of the floor-ceiling assembly. The T Rating is 1 and 1-3/4 hr for 1 and 2 hr rated assemblies, respectively. The general construction features of the floor-ceiling assembly are summarized below:

- Flooring System — Lumber or plywood subfloor with finish floor of lumber, plywood or Floor Topping Mixture* as specified in the individual Floor-Ceiling Design. Max diam of floor opening is 3-1/2 in. (89 mm).
- Wood Joists* — Nom 10 in. (254 mm) deep (or deeper) lumber, steel or combination lumber and steel joists, trusses or Structural Wood Members* with bridging as required and with ends firestopped.
- Furring Channels — (Not Shown) — (As required) — Resilient galvanized steel furring installed in accordance with the manner specified in the individual L500 Series Designs in the Fire Resistance Directory.
- Gypsum Board* — Thickness, type, number of layers and fasteners shall be as specified in the individual Floor-Ceiling Design. Max diam of floor opening is 3-1/2 in. (89 mm).

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System No. F-C-5004

| ANSI/UL1479 (ASTM E814) | CAN/ULC S115 |
|---|---|
| F Rating — 1 and 2 Hr (See Item 1) | F Rating — 1 and 2 Hr (See Item 1) |
| T Rating — 1 and 1-3/4 Hr (See Item 1) | FT Rating — 1 and 1-3/4 Hr (See Item 1) |
| L Rating At Ambient — 4 CFMSq Ft (See Item 4) | FH Rating — 1 and 2 Hr (See Item 1) |
| L Rating At 400 F — Less Than 1 CFMSq Ft (See Item 4) | FTH Rating — 1 and 1-3/4 Hr (See Item 1) |
| | L Rating At Ambient — 4 CFMSq Ft (See Item 4) |
| | L Rating At 400 F — Less Than 1 CFMSq Ft (See Item 4) |

2. Chase Wall — (Optional) — The through penetrant (Item 3) may be routed through a fire-rated single, double or staggered wood stud/gypsum wallboard chase wall having a fire rating consistent with that of the floor-ceiling assembly. The chase wall shall be constructed of the materials and in the manner specified in the individual U300 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

- Studs — Nom 2 by 6 in. (51 by 152 mm) or double nom 2 by 4 in. (51 by 102 mm) lumber studs.
- Sole Plate — Nom 2 by 6 in. (51 by 152 mm) or parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Max diam of opening shall be 3-1/2 in. (89 mm).
- Top Plate — The double top plate shall consist of two nom 2 by 6 in. (51 by 152 mm) or two sets of parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Max diam of opening is 3-1/2 in. (89 mm).
- Gypsum Board* — Thickness, type, number of layers and fasteners shall be as specified in the individual Wall and Partition Design.

3. Through Penetrants — One metallic pipe or tubing to be installed within the firestop system. Pipe or tubing to be rigidly supported on both sides of floor assembly. The following types and sizes of metallic pipes or tubing may be used:

- Steel Pipe — Nom 2 in. (51 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
- Copper Tubing — Nom 2 in. (51 mm) diam (or smaller) Type L (or heavier) copper tubing.
- Copper Pipe — Nom 2 in. (51 mm) diam (or smaller) Regular (or heavier) copper pipe.

4. Pipe Covering* — Nom 1/2 in. (13 mm) thick hollow cylindrical heavy density (min 3.5 pcf (56 kg/m³)) glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory-applied self-sealing tape. Traverse joints secured with metal fasteners or with butt tape supplied with the product. A nom annular space of 1/8 in. (3 mm) is required within the firestop system.

See Pipe and Equipment Covering* — Materials (BRGU) 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.

4A. Tube Insulation — Plastics* — Nom 3/4 in. (19 mm) thick acrylonitrile butadiene (AB/PVC) flexible foam furnished in the form of tubing. An annular space of min 1/8 in. (3 mm) to max 3/8 in. (10 mm) is required within the firestop system.

See Plastics* (CMFZZ) category in the Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation material meeting the above specifications and having a UL94 Flammability Classification of 94-5VA may be used.

(Note: L Ratings apply only when glass fiber insulation is used.)

5. Fill, Void or Cavity Material* — Sealant — Min 3/4 in. (19 mm) thickness of sealant applied within the annulus, flush with top surface of floor or sole plate. Min 5/8 in. (16 mm) thickness of fill material also applied within the annulus, flush with bottom surface of ceiling or lower top plate.

HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — 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.

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System No. F-C-5036

| ANSI/UL1479 (ASTM E814) | CAN/ULC S115 |
|-------------------------|-------------------|
| F Rating — 1 Hr | F Rating — 1 Hr |
| T Rating — 1 Hr | FT Rating — 1 Hr |
| | FH Rating — 1 Hr |
| | FTH Rating — 1 Hr |

1. Floor-Ceiling Assembly — The 1 hr fire-rated solid or trussed lumber joist floor-ceiling assembly shall be constructed of the materials and in the manner specified in the individual L500 Series Floor-Ceiling Designs in the UL Fire Resistance Directory. The general construction features of the floor-ceiling assembly are summarized below:

- Flooring System — Lumber or plywood subfloor with finish floor of lumber, plywood or Floor Topping Mixture* as specified in the individual Floor-Ceiling Design. Max diam of opening shall be 6-7/8 in. (175 mm).
- Wood Joists* — Nom 10 in. (254 mm) deep (or deeper) lumber, steel or combination lumber and steel joists, trusses or Structural Wood Members* with bridging as required and with ends firestopped.
- Gypsum Board* — Nom 4 ft (1.2 m) wide by 5/8 in. (16 mm) thick as specified in the individual Floor-Ceiling Design. Max diam of opening shall be 6-7/8 in. (175 mm).

1.1 Chase Wall — (Not Shown, Optional) The through penetrants (Item 2) may be routed through a 1 hr fire-rated single, double or staggered wood stud/gypsum wallboard chase wall having a fire rating consistent with that of the floor-ceiling assembly. The chase wall shall be constructed of the materials and in the manner specified in the individual U300 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

- Studs — Nom 2 by 6 in. (51 by 152 mm) or double nom 2 by 4 in. (51 by 102 mm) lumber studs.
- Sole Plate — Nom 2 by 6 in. (51 by 152 mm) or parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Max diam of opening shall be 6-7/8 in. (175 mm).
- Top Plate — The double top plate shall consist of two nom 2 by 8 in. (51 by 203 mm) lumber plates or two sets of nom 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Max diam of opening is 6-7/8 in. (175 mm).
- Gypsum Board* — Thickness, type, number of layers and fasteners shall be as specified in individual Wall and Partition Design.

2. Through Penetrants — One metallic tube or pipe to be installed within the firestop system. Tube or pipe to be rigidly supported on both sides of floor-ceiling assembly. The following types and sizes of metallic tubes or pipes may be used:

- Copper Tubing — Nom 2 in. (51 mm) diam (or smaller) Type L (or heavier) copper tubing.
- Copper Pipe — Nom 2 in. (51 mm) diam (or smaller) Regular (or heavier) copper pipe.
- Steel Pipe — Nom 2 in. (51 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
- Steel Pipe — Nom 2 in. (51 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.

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System No. F-C-5036

| ANSI/UL1479 (ASTM E814) | CAN/ULC S115 |
|-------------------------|-------------------|
| F Rating — 1 Hr | F Rating — 1 Hr |
| T Rating — 1 Hr | FT Rating — 1 Hr |
| | FH Rating — 1 Hr |
| | FTH Rating — 1 Hr |

3. Pipe Covering* — Nom 1-1/2 in. (38 mm) thick hollow cylindrical heavy density (min 3.5 pcf (56 kg/m³)) glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory-applied self-sealing tape. Traverse joints secured with metal fasteners or with butt tape supplied with the product. The annular space shall be min 1/2 in. (13 mm) and max 1 in. (25 mm).

See Pipe and Equipment Covering* — Materials (BRGU) 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.

4. Fill, Void or Cavity Material* — Sealant — Min 3/4 in. (19 mm) thickness of sealant applied within annular space, flush with top surface of subfloor or sole plate. Min 5/8 in. (16 mm) thickness of sealant applied within the annular space, flush with bottom surface of gypsum wallboard or lower top plate.

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

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System No. F-C-5037

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

1. Floor-Ceiling Assembly — The 1 and 2 hr fire-rated solid or trussed lumber joist floor-ceiling assembly shall be constructed of the materials and in the manner specified in the individual L500 Series Floor-Ceiling Designs in the UL Fire Resistance Directory. The F and FH Rating are dependent on the hourly rating of the floor ceiling assembly. The T, FT and FTH Rating are 1/4 hr for 1 hr rated floor ceiling assemblies and 1-3/4 hr for 2 hr rated floor ceiling assemblies. The general construction features of the floor-ceiling assembly are summarized below:

- Flooring System — Lumber or plywood subfloor with finish floor of lumber, plywood or Floor Topping Mixture* as specified in the individual Floor-Ceiling Design. Max diam of opening shall be 5-1/8 in. (130 mm).
- Wood Joists* — Nom 10 in. (254 mm) deep (or deeper) lumber, steel or combination lumber and steel joists, trusses or Structural Wood Members* with bridging as required and with ends firestopped.
- Furring Channels (Not Shown) — Resilient galv steel furring installed perpendicular to wood joists between first and second layers of wallboard (Item 1D). Furring channels spaced max 24 in. (610 mm).
- Gypsum Board* — Nom 4 ft (1.2 m) wide by 5/8 in. (16 mm) thick as specified in the individual Floor-Ceiling Design. First layer of wallboard nailed to wood joists. Second layer of wallboard screw-attached to furring channels. Max diam of ceiling opening is 5-1/8 in. (130 mm).

1.1 Chase Wall — (Not Shown, Optional) The through penetrants (Item 2) may be routed through fire-rated single, double or staggered wood stud/gypsum wallboard chase wall having a fire rating consistent with that of the floor-ceiling assembly. The chase wall shall be constructed of the materials and in the manner specified in the individual U300 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

- Studs — Nom 2 by 6 in. (51 by 152 mm) lumber or double nom 2 by 4 in. (51 by 102 mm) lumber studs.
- Sole Plate — Nom 2 by 6 in. (51 by 152 mm) lumber or parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Max diam of opening shall be 5-1/8 in. (130 mm).
- Top Plate — The double top plate shall consist of two nom 2 by 6 in. (51 by 152 mm) lumber plates or two sets of nom 2 by 4 in. (51 by 102 mm) lumber plates tightly butted. Max diam of opening is 5-1/8 in. (130 mm).
- Gypsum Board* — Thickness, type, number of layers and fasteners shall be as specified in individual Wall and Partition Design.

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System No. F-C-5037

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

2. Through Penetrants — One metallic tube or pipe to be installed within the firestop system. Tube or pipe to be rigidly supported on both sides of floor-ceiling assembly. The following types and sizes of metallic tubes or pipes may be used:

- Copper Tubing — Nom 2 in. (51 mm) diam (or smaller) Type L (or heavier) copper tubing.
- Copper Pipe — Nom 2 in. (51 mm) diam (or smaller) Regular (or heavier) copper pipe.
- Steel Pipe — Nom 2 in. (51 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.

3. Tube Insulation-Plastics* — Nom 3/4 in. (19 mm) thick acrylonitrile butadiene (AB/PVC) flexible foam furnished in the form of tubing. The annular space shall be min 3/8 in. (10 mm) to max 1 in. (25 mm).

See Plastics* (CMFZZ) category in the Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation material meeting the above specifications and having a UL94 Flammability Classification of 94-5VA may be used.

4. Fill, Void or Cavity Material* — Sealant — Fill material forced into annular space to fill space to max extent possible. Sealant shall be installed flush with top surface of floor or sole plate and bottom surface of ceiling or lower top plate.

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

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PROJ. DATE: 06-07-19

PROJ. NO: 18-176

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DRAWN BY: RFF

CHECKED BY: TGC

SHEET NO. A907

SCALE: 1/2" = 1'-0"

