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HILTI

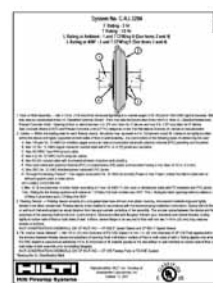
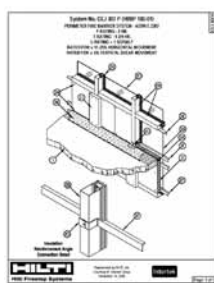
Firestop Submittal Builder

www.HiltiFirestopSubmittals.com

Submittal Builder Support: 1-800-363-4458

1

Search and select UL- and Intertek-listed firestop systems



2

Select product data / MSDS / Certificate of Compliance



3

Generate single-file, comprehensive firestop submittals

You can then ...

- Email
- Download
- Print
- Share (via a link)

any of your submittals!



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With you every step of the way.

At Hilti, our people and products are with you every step of the way. From design to construction, we help make your team more productive every day with expert technical advice, reliable products, prompt delivery, ongoing research and development, and outstanding service.

Fire Protection Specialists offer firestop consultation and training

Fire Protection Engineers provide Engineering Judgments and Firestop Custom Details for unique and complex applications

Hilti Accredited Firestop Specialty Contractors (HAFSC) are independent, professional firestop installers who have received specialized training from Hilti. To learn more, see page 452.

Benefits of using a HAFSC:

- Allows tradespeople to focus on their area of expertise, leaving firestopping to passive fire protection specialists
- Provide single contractor accountability for all firestop applications
- Promote hassle-free inspection by officials who know and trust professional firestop installers
- Increase your confidence that all firestopping is completed correctly the first time

Available online.

www.hilti.ca/firestop

Firestop Design Center

Anytime access for online ordering, up-to-date product and application information

Firestop Design Center Support 1-800-363-4458

Firestop Submittal Builder

Search and select UL- and Intertek-listed firestop systems, generate firestop submittals

Firestop Submittal Builder Support 1-800-363-4458

Hilti Accredited Firestop Specialty Contractors

Find a firestop contractor and learn more about the HAFSC program



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Firestop system selection and specification made easy!

The **Hilti Firestop Design Center** makes finding suitable firestop systems, solving application problems and downloading CAD-ready drawings easy.

Access our complete library of detailed drawings and specifications including:

- Sample specifications
- UL Firestop System drawings
- Product information
- Firestop terms and definitions
- Building regulations and codes
- Search by application: Joints or Through-Penetrations
- Design and specification resources
- Featured new products
- Online Engineering Judgment request forms
- Submittal packages / Submittal builder
- MSDS/LEED documentation
- Approvals and listings
- Common system detail sheets
- BIM/CAD objects*

**Visit the Hilti Firestop Design Center
at www.hilti.ca/firestop**

*Coming Summer 2013

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Hilti is dedicated to saving lives through innovation and education

The quality and excellence of Hilti Firestop products help ensure that fire, smoke and toxic gases are contained to reduce the tragic loss of human life and property. Through a combination of superior products, advanced knowledge and unparalleled customer service we are able to provide the highest quality firestop systems.

Hilti offers a comprehensive support package

Throughout the entire firestopping process, whether it is specification, installation or inspection, Hilti will be there to offer jobsite support and expertise. Highly-trained Hilti account managers, Fire Protection Specialists, and in-house Fire Protection engineering team can help you select the correct products and systems to match your specific project needs. Hilti has a support package that is unmatched in the passive firestop industry.

Fire safety

Fire safety is a major concern for all who are responsible for the design and specification of new buildings.

The causes of fire are varied and unpredictable, and often outside the control of the designer. What can be controlled, however, is the effect of fire once it has started.

The control of fire within a building is normally affected by a combination of active and passive fire protection systems.

Active fire protection systems

Active fire protection systems are designed to detect fire, and either to extinguish it by means of water sprinklers, halogen installations or fire extinguishers, or to minimize its effects by smoke ventilation. Active systems are also used to assist the escape of occupants by the provision of alarms and emergency lighting.

Passive fire protection systems

Passive fire protection is designed into the structure of the building, so that if fire breaks out, it is contained within a fire compartment, surrounded by fire-resistant walls and floors. For the walls and floors to maintain their fire-resistance, however, every opening, penetration and joint must be sealed against the escape of fire and smoke.

Intumescent fire seals

The materials used to form the seals must not only fill all gaps at the time of construction, but also, in the event of fire, expand to close any further gaps formed by melted components. These intumescent fire seals, if properly installed, can help prevent fire escaping from a compartment for a rating period of up to four hours. This time period can prove vital in allowing occupants to escape and firefighters to control the fire.

Hilti

Around the world Hilti red is a familiar sight on building sites, and the Hilti name is known and respected.

To most people, Hilti means precision tools and secure fastenings. For many years

however, Hilti has applied their skills to a critical area of construction where precision and security are vital: firestopping.

Hilti Firestop Systems

The aim of Hilti Firestop Systems is to provide designers and specifiers with the following:

- Excellence — finished solutions that match the well known, high quality standards associated with the Hilti product
- Easy installation — all firestop components are readily available and simple and fast to install
- Tested and used worldwide — Hilti offers 'one-stop' firestopping systems tested in accordance with most relevant regulations
- Wide ranging solutions — for virtually any opening or penetration through which heat or smoke might pass, Hilti offers a firestop solution that will help minimize damage in the event of a fire

Hilti and the designer/specifier

To assist the designer or specifier in selecting and specifying the appropriate firestop system, Hilti has developed two online tools: the Firestop Submittal Builder and the Firestop Design Center.

The Firestop Submittal Builder is an online application that provides assistance with system selection. Once the appropriate systems are selected, the application generates a professional looking submittal package with all the necessary documents.

To visit the Firestop Submittal Builder, go to www.HiltiFirestopSubmittals.com. The support team for the submittal builder can be reached at 1-800-363-4458.

The online Firestop Design Center allows you to access specification tools and resources by application or by product names. To visit, go to www.hilti.ca/firestop.

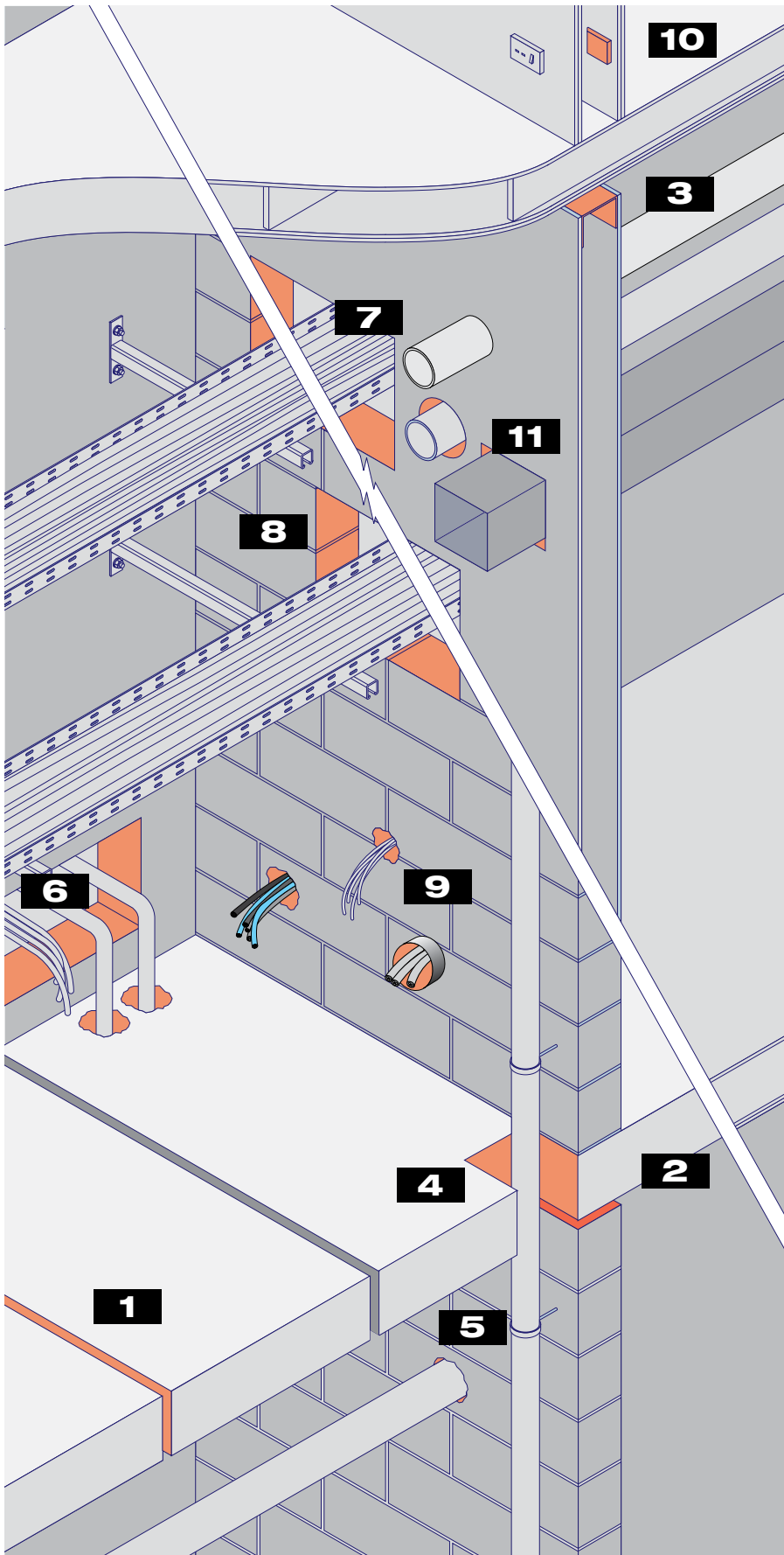
Hilti customized solutions

If standard firestop systems do not meet the requirements of your design, Hilti is ready to offer expertise and customized solutions. To learn more, see page 450.



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Problem

The illustration on the left indicates a range of typical problems facing the designer.

Construction may consist of:

- concrete
- wood
- gypsum

The problem areas are:

- 1** Movement joints
- 2** Rigid or low movement joints
- 3** Head of wall and perimeter joints
- 4** Metal and plastic pipes
- 5** Plastic pipes
- 6** Multiple penetrations, pipes and/or cables
- 7** Cable trays (with permanent sealing of opening during construction, or temporary sealing allowing additional cables to be installed subsequently)
- 8** Cable trays (with permanent sealing of opening during construction)
- 9** Cables (single or bundled)
- 10** Electrical boxes
- 11** Heating/ventilation/air conditioning

Fire resistance rating

To help prevent the rapid spread of fire within a building, certain walls, floors and joints are required to meet a specific fire resistance rating — the period of time during which a building component has been tested to confine a fire or continue to perform a structural function or both. Through-penetrations and joints created during the construction process require the installation of firestop systems in order to bring the wall or floor back up to its original fire-rating.

Firestopping

It is essential that every penetration or joint in a fire-rated wall or floor is adequately protected by sealing — or “firestopping” — such that the building component is restored to its original fire-rated condition in order to maintain compartmentalization. The quality and excellence of Hilti Firestop Products help ensure that fire, smoke and toxic gases are contained to reduce the tragic loss of human life and damage to property.

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Hilti Firestop Solutions

For each of the firestopping situations illustrated on the facing page, Hilti has designed and tested a specific solution. Not only is there a solution for each type of opening, but Hilti also offers a choice of firestop systems for several applications, according to the size of the opening and whether the installation is permanent or temporary.

Hilti firestop systems are suitable for use with constructions of:

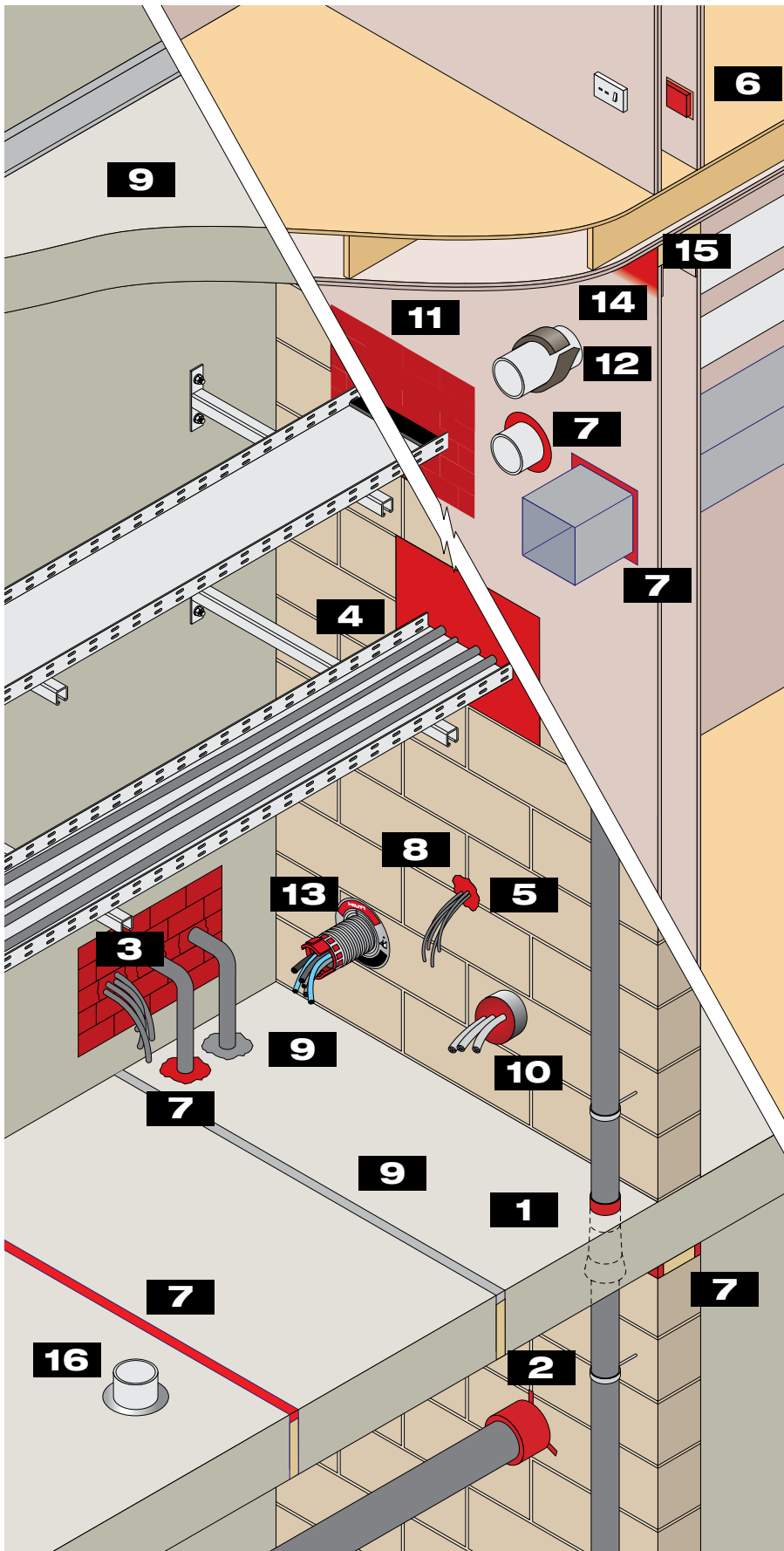
- C** Concrete or concrete block
- G** Gypsum
- W** Wood

Hilti Product	Description	Application	F rating	Page
Metallic and Non-metallic Pipes				
1 CP 680-P/M	Cast-in Firestop Device	Metal and plastic pipes with diameters up to 6"	up to 4 hours	17
8 CP 620	Fire Foam	Metal and plastic pipes (in conjunction with CP 648-E)	up to 3 hours	28
2 CP 643N	Firestop Collar	Plastic pipes with diameters 6" or less	up to 4 hours	35
7 FS-ONE	Intumescent Firestop	Metal and plastic pipes	up to 4 hours	22
9 CP 604	Self-Leveling Firestop Sealant	Metal pipes	up to 3 hours	25
12 CP 648S	Firestop Wrap Strip	Single wrap for plastic pipes	up to 3 hours	36
12 CP 648E	Firestop Wrap Strip	Continuous wrap for plastic pipes	up to 4 hours	37
16 CFS-DID	Firestop Drop-in Device	Metal and plastic pipes with diameters up to 6"	up to 3 hours	16
Cables and Cable Trays				
13 CP 653	Speed Sleeve	Cable bundles	up to 3 hours	15
1 CP 680-P/M	Cast-in Firestop Device	Cable bundles	up to 3 hours	17
10 CFS-PL	Firestop Plug	Single or bundled cables	up to 4 hours	34
11 CP 675T	Firestop Board	Temporary and permanent sealing of cables and cable trays	up to 2 hours	31
8 CP 620	Fire Foam	Permanent sealing of cables and cable trays	up to 2 hours	28
7 FS-ONE	Intumescent Firestop	Jacketed cables and cable bundles	up to 4 hours	22
3 CFS-BL	Firestop Block	Temporary and permanent sealing of cables and cable trays	up to 4 hours	30
4 CP 637	Firestop Mortar	Permanent sealing of cables and cable trays	up to 4 hours	29
5 CP 618	Firestop Putty Stick	Single or bundled cables	up to 4 hours	33
6 CP 617-L/XL	Firestop Putty Pad	Electrical boxes	up to 2 hours	32
9 CP 604	Self-Leveling Firestop Sealant	Cable bundles	up to 3 hours	25
Multiple Penetrations				
7 FS-ONE	Intumescent Firestop	Metal and plastic pipes, jacketed cables and cable bundles	up to 3 hours	22
3 CFS-BL	Firestop Block	Temporary and permanent sealing of metal and plastic pipes, cables and cable trays	up to 4 hours	30
4 CP 637	Firestop Mortar	Permanent sealing of metal and plastic pipes cables and cable trays	up to 4 hours	29
1 CP 680-P/M	Cast-in Firestop Device	Multiple metallic and non-metallic pipes	up to 3 hours	17
11 CP 675T	Firestop Board	Temporary and permanent sealing of cables, cable trays and metal pipes	up to 2 hours	31
Heating / Ventilation / Air-conditioning				
7 FS-ONE	Intumescent Firestop	Sealing around metal ducts	up to 3 hours	22
7 CP 601S	Elastomeric Firestop Sealant	Sealing around metal ducts	up to 3 hours	23
7 CP 606	Flexible Firestop Sealant	Sealing around metal ducts	up to 3 hours	24
11 CP 604	Self-Leveling Firestop Sealant	Sealing around metal ducts	up to 3 hours	25
Joints/Curtain Walls				
7 CP 606	Flexible Firestop Sealant	Sealing floor joints, head of wall and wall to wall joints	up to 3 hours	24
7 CP 601S	Elastomeric Firestop Sealant	Sealing floor, head of wall and wall to wall joints	up to 4 hours	23
9 CP 604	Self-Leveling Firestop Sealant	Sealing floor to wall joints (Perimeter/Curtain Walls)	up to 2 hours	25
14 CFS-SP WB	Firestop Joint Spray	Sealing head of wall, wall to wall and floor to walls (Perimeter/Curtain Walls)	up to 4 hours	26
15 CP 767/777	Speed Plugs/Speed Strips	Provides non-combustible backing for FS sealants	-	27



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Hilti Firestop Solutions

The illustration on the left provides a basic guide to the range of Hilti Firestop products available for the applications shown.

- 1** Firestop Cast-In Device (CP 680-P/M)
- 2** Firestop Collar (CP 643N)
- 3** Firestop Block (CFS-BL)
- 4** Firestop Mortar (CP 637)
- 5** Firestop Putty Stick (CP 618)
- 6** Firestop Putty Pad (CP 617 / CP 617L / CP 617XL)
- 7** FS-ONE High Performance Intumescent Sealant
Elastomeric Firestop Sealant (CP 601S)
Flexible Firestop Sealant (CP 606)
- 8** Fire Foam (CP 620)
- 9** Self-Leveling Firestop Sealant (CP 604)
- 10** Firestop Plug (CFS-PL)
- 11** Firestop Board (CP 675T)
- 12** Firestop Wrap Strip (CP 648-E/S)
- 13** Speed Sleeve (CP 653)
- 14** Firestop Joint Spray (CFS-SP WB)
- 15** Speed Strips (CP 767)
Speed Plugs (CP 777)
- 16** Drop-in Device (CFS-DID)



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Applications and Products

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CP 680-P Cast-In Firestop Device	17
CP 680-M Cast-In Firestop Device	17
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Water Barrier Module	19
Top Seal Plug	19
CP 681 Tub Box Kit	20
Shower and Floor Drain	21
Aerator Adapter	21
FS-ONE High Performance Intumescent Firestop Sealant	22
CP 601S Elastomeric Firestop Sealant	23
CP 606 Flexible Firestop Sealant	24
CP 604 Self-Leveling Firestop Sealant	25
CFS-SP WB Firestop Joint Spray	26
CP 777 Speed Plugs	27
CP 767 Speed Strips	27
CP 620 Fire Foam	28
CP 637 Firestop Mortar	29
CFS-BL Firestop Block	30
CP 675T Firestop Board	31
CP 617, CP 617 L and CP 617 XL Firestop Putty Pad	32
CP 618 Firestop Putty Stick	33
CFS-PL Firestop Plug	34
CP 643N Firestop Collar	35
CP 648S Firestop Wrap Strip	36
CP 648E Firestop Wrap Strip	37
CP 506 Smoke and Acoustic Sealant	38
CP 572 Smoke and Acoustic Spray	39

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Firestop Systems Application Review

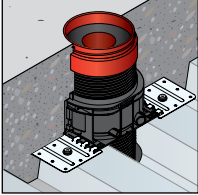
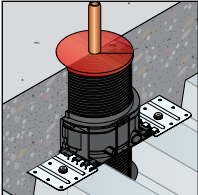
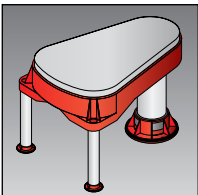
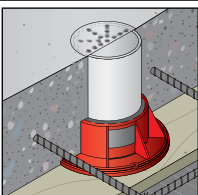
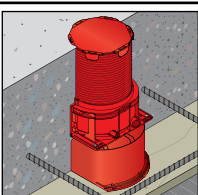
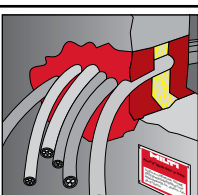
Page	Description	Features	Benefits	Application						
				Metal pipes	Plastic/glass pipes	Cables/cable trays	Insulated metal pipes	Metal ducts	Multiple penetrations	Joints
15	<p>Speed Sleeve (CP 653) Re-penetrable cable management device for electrical and telecom professionals</p>	<ul style="list-style-type: none"> Fast installation Low L-ratings Can be installed in wall and floor applications 	<ul style="list-style-type: none"> Easy penetration and re-penetration Withstands the rigors of usage and time 	■	■	■			■	
16	<p>Firestop Drop-In Device (CFS-DID) One-step firestop solution for a variety of pipe materials and diameters</p>	<ul style="list-style-type: none"> Integrated moisture and smoke seal Quick and simple installation 	<ul style="list-style-type: none"> Easily identifiable to building inspectors Solution for renovation/retrofit as well as new construction Buy American compliant 	■	■		■		■	
17	<p>Cast-In Firestop Device (CP 680-P) A one-step cast-in firestop device for a wide variety of pipe materials and diameters</p>	<ul style="list-style-type: none"> Quick and simple installation Integrated moisture and smoke seal Tested in concrete floor thicknesses from 2-1/2" (63 mm) Innovative adapter for metal deck applications 	<ul style="list-style-type: none"> Ready to use — no additional caulk required Easy to specify, install and inspect Cost effective solution 	■	■	■	■	■	■	
17	<p>Cast-In Firestop Device (CP 680-M) A one-step cast-in firestop device for a wide variety of non-combustible pipe materials and diameters</p>	<ul style="list-style-type: none"> Quick and simple installation Integrated moisture and smoke seal Tested in concrete floor thicknesses from 2-1/2" (63 mm) Innovative adapter for metal deck applications 	<ul style="list-style-type: none"> Ready to use — no additional caulk required Easy to specify, install and inspect Cost effective solution 	■		■	■		■	
18	<p>Height Extension For use with CP 680-P/M</p>	<ul style="list-style-type: none"> One extension adds up to 6" For concrete floors over 8" Positive connection system promotes a secure fit 	<ul style="list-style-type: none"> Fast, modular installation Color coded for easier topside layout 	■	■	■	■	■	■	
18	<p>Metal Deck Adapters For use with CP 680-P/M</p>	<ul style="list-style-type: none"> Positive connection system promotes a secure fit to the base 	<ul style="list-style-type: none"> Fast, modular installation Color coded for easier identification below deck 	■	■	■	■	■	■	



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Firestop Systems Application Review

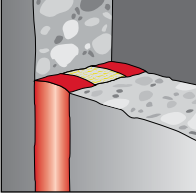
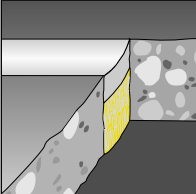
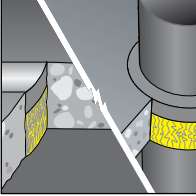
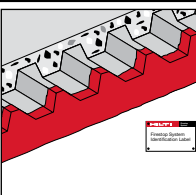
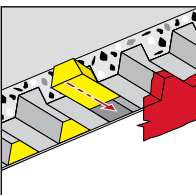
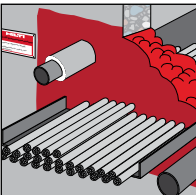
Page	Description	Features	Benefits	Application						
				Metal pipes	Plastic/glass pipes	Cables/cable trays	Insulated metal pipes	Metal ducts	Multiple penetrations	Joints
19	 Water Barrier Module For use with CP 680-P/M	<ul style="list-style-type: none"> Available in 2", 3", 4" and 6" sizes Adds 1" to the overall height Secures to top of device 	<ul style="list-style-type: none"> A pre-concrete casting water barrier solution Many tested details meeting UL's Class I W-Rating 	■	■					
19	 Top Seal Plug For use with 2 inch CP 680-P/M 1/2" to 2" diameter pipes	<ul style="list-style-type: none"> Restricts water from flowing through pipe penetrations Easy friction fit around pipes to create a water resistant seal Forces pipe to be centered in the opening 	<ul style="list-style-type: none"> A post-concrete casting water barrier solution Many tested details meeting UL's Class I W-Rating 	■	■					
20	 Tub Box Kit (CP 681) A unique firestop cast-in device for recessed tub drain applications	<ul style="list-style-type: none"> Assembles easily with solvent cement Triangular shape makes working around rebar easy 3 fastening points instead of 4 	<ul style="list-style-type: none"> Saves time and labor costs Structurally stable during concrete pouring No special tools required for installation 	■	■					
21	 Shower and Floor Drain	<ul style="list-style-type: none"> Cast-In device for shower/floor drains Material can be attached to pipes via solvent welding or glue 	<ul style="list-style-type: none"> Economical, dependable solution for drains 		■					
21	 Aerator Adapter Used in Combination with CP 680-P/M for firestopping aerator applications	<ul style="list-style-type: none"> Allows for vertical/horizontal and angle movement 	<ul style="list-style-type: none"> Creates a void in concrete that allows for simple and flexible installation Available for 3" and 4" cast-in place devices 	■	■					
22	 FS-ONE High Performance Intumescent Firestop Sealant A water-based intumescent firestop sealant, designed to expand when exposed to heat	<ul style="list-style-type: none"> UL Listings for various penetrating items Several 1/4" depth systems Available in foil pack (600 ml) 	<ul style="list-style-type: none"> One product to specify, purchase or inspect for most applications Low cost per penetration Quick and simple installation procedure 	■	■	■	■	■	■	■



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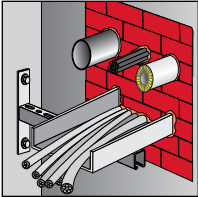
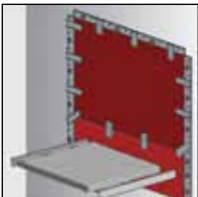
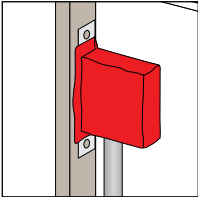
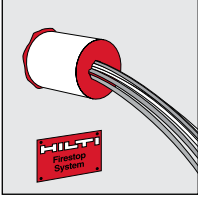
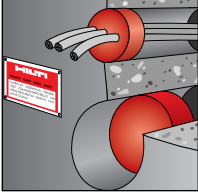
Page	Description	Features	Benefits	Application						
				Metal pipes	Plastic/glass pipes	Cables/cable trays	Insulated metal pipes	Metal ducts	Multiple penetrations	Joints
23	 Elastomeric Firestop Sealant (CP 601S) A single component silicone firestop sealant for joint and through penetration applications	<ul style="list-style-type: none"> ■ Silicone based formula ■ 1/4" depth systems ■ Available in foil pack (600 ml) ■ Meets 500 cycle requirements in joint applications (ASTM E 1966 and UL 2079) 	<ul style="list-style-type: none"> ■ Allows for movement and vibration ■ Cost effective solutions ■ Fast and easy dispensing ■ Smoke, fume and water resistant ■ Meets Class I W Rating requirements 	■		■	■	■		■
24	 Flexible Firestop Sealant (CP 606) An acrylic based firestop sealant for joint and through penetration applications	<ul style="list-style-type: none"> ■ Acrylic based formula ■ Can be painted ■ Available in foil pack (580 ml) ■ Tested up to 33% movement with 500 cycles in accordance to UL 2079 and ASTM 1966 	<ul style="list-style-type: none"> ■ Fast and easy clean-up with water ■ Allows for excellent finished appearance ■ Fast and easy dispensing 	■		■	■	■		■
25	 Self-Leveling Firestop Sealant (CP 604) A self-leveling, single-component, silicone-based firestop sealant for use with through-penetrations as well as construction joints in floors	<ul style="list-style-type: none"> ■ 1/4" depth systems ■ Excellent elongation/compression properties ■ Resistant to smoke, fumes and water ■ Meets 500 cycle requirements (ASTM E 1966 and UL 2079) 	<ul style="list-style-type: none"> ■ Smoke, fume and water resistant ■ No tooling required ■ Meets Class 1 W Rating requirements 	■		■	■	■	■	■
26	 Firestop Joint Spray (CFS-SP WB) A sprayable fire-rated mastic for construction joints where higher movement is expected	<ul style="list-style-type: none"> ■ Sprayable or apply by brush ■ Paintable ■ Quick and easy installation with the Titan 600 or 1100 Sprayers ■ Meets 500 cycle requirements 	<ul style="list-style-type: none"> ■ Contains no halogens, solvents or asbestos so it is safe to use and won't harm the environment ■ Water based formulation so spills and over-spray clean up quickly and easily 							■
27	 Speed Plugs (CP 777) Pre-cut flute configuration for top of wall firestopping Speed Strips (CP 767) Pre-cut mineral wool strips suitable for joint applications	<ul style="list-style-type: none"> ■ Pre-cut ■ Superior finish ■ Safe to use ■ User friendly 	<ul style="list-style-type: none"> ■ Leaves no gaps or voids ■ Smooth surface provides cost effective spray coverage ■ No asbestos ■ Inorganic — will not mildew 							■
28	 Fire Foam (CP 620) Universal firestopping solution for common construction materials. Can also be used in conjunction with CP 648E Wrap Strip	<ul style="list-style-type: none"> ■ One stop application ■ Virtually impervious to smoke ■ Fully cures in approximately 1 minute ■ No additional materials required ■ High yield 	<ul style="list-style-type: none"> ■ One solution for various applications ■ Easy handling for difficult to reach applications ■ Excellent mold resistance ■ Meets Class I W Rating requirements 	■	■	■	■		■	



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Firestop Systems Application Review

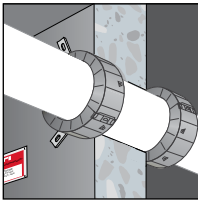
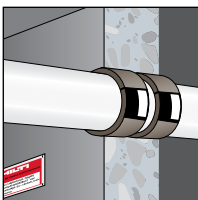
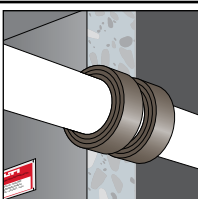
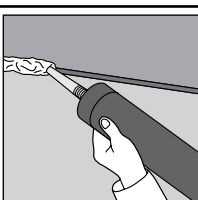
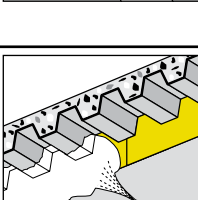
Page	Description	Features	Benefits	Application						
				Metal pipes	Plastic/glass pipes	Cables/cable trays	Insulated metal pipes	Metal ducts	Multiple penetrations	Joints
29	 Firestop Mortar (CP 637) A dry powder, when mixed with water forms a pourable, trowelable firestop mortar. Can also be used in conjunction with CP 648E Wrap Strip	<ul style="list-style-type: none"> Some applications require minimum 2-1/2" depth Cleans up with water 	<ul style="list-style-type: none"> Economical and simple to use Fast and easy clean-up 							
30	 Firestop Block (CFS-BL) An innovative and simple to install firestop block designed to expand when exposed to heat	<ul style="list-style-type: none"> Soft flexible design Easy to cut and shape User friendly UL systems One-sided wall systems available Non-curing 	<ul style="list-style-type: none"> Easy to install, reuse and repenetrated Simply trim block to fit around penetrating items Reduces need for extra labor, tools and parts Easiest solution for large openings with multiple penetrations 							
31	 Firestop Board with Accessories (CP 675T) Ready to use Firestop Board designed for large openings with cable trays and multiple penetrations	<ul style="list-style-type: none"> Lightweight design Variety of tested systems Systems for one-sided installation 	<ul style="list-style-type: none"> Easy to install; can be cut without power tools Solutions for low and high penetrated openings Solutions for access impeded areas 							
32	 Firestop Putty Pad (CP 617, CP 617 L and CP 617 XL) A moldable putty sheet designed to help protect electrical outlet boxes	<ul style="list-style-type: none"> Pad sizes 6" x 7", 7" x 7" or 9" x 9" 1 and 2 hour systems Tested for wood and steel studs 	<ul style="list-style-type: none"> Fits most common electrical boxes (refer to UL listings) Only one pad to stock and install Can be used for commercial and residential applications 							
33	 Firestop Putty Stick (CP 618) A moldable putty which remains pliable over time	<ul style="list-style-type: none"> Non-curing No volatile solvents Flexible, moldable product 	<ul style="list-style-type: none"> Reusable and easily repenetrated Approved for combustible penetrations (cables) along with conduit, EMT and steel pipe 							
34	 Firestop Plug (CFS-PL) A pre-sized, intumescent firestop plug for blank openings and cable penetrations	<ul style="list-style-type: none"> Soft Flexible Design Versatile in use Non-curing 	<ul style="list-style-type: none"> Fast and cost effective installation Provides temporary or permanent fire protection Reusable 							



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Firestop Systems Application Review

					Application						
Page	Description	Features	Benefits		Metal pipes	Plastic/glass pipes	Cables/cable trays	Insulated metal pipes	Metal ducts	Multiple penetrations	Joints
35	 Firestop Collar (CP 643N) A ready-to-use firestop device designed to collapse plastic pipe penetrations when exposed to fire conditions	<ul style="list-style-type: none"> Ready-to-use out of package Adjustable mounting tabs Low profile design 	<ul style="list-style-type: none"> Simple and quick installation Flexibility in positioning of collar Allows for correct installation in tight areas 			■	■				
36	 Firestop Wrap Strip (CP 648S) An intumescent, flexible firestop wrap for plastic pipe penetrations	<ul style="list-style-type: none"> Pre-measured — no cutting required Integrated fastening tape No special tools required 	<ul style="list-style-type: none"> Easy installation User friendly Saves time and labor costs 			■					
37	 Firestop Wrap Strip (CP 648E) An intumescent, flexible firestop wrap for plastic and insulated pipe penetrations	<ul style="list-style-type: none"> May be continuously wrapped Flexible Versatile 	<ul style="list-style-type: none"> No need to measure each layer for multi-wrap applications Easy to use May be used inside the annular space or outside of the substrate 			■		■			
38	 Smoke and Acoustic Sealant (CP 506) Flexible sealant for joints and through-penetration openings in non fire-rated acoustical assemblies and smoke partitions (Not for use in fire-rated applications)	<ul style="list-style-type: none"> Fast and easy dispensing Low shrinkage after curing Excellent sound and air barrier characteristics Paintable 	<ul style="list-style-type: none"> Reduced labor and less operator fatigue Quality finished product appearance limits re-work Limits sound transmission and restricts smoke migration 								
39	 Smoke and Acoustic Spray (CP 572) Flexible spray for construction joint openings in non fire-rated acoustical assemblies and smoke partitions (Not for use in fire-rated applications)	<ul style="list-style-type: none"> Quick and easy spray application Can be applied at low temperatures High elasticity product Excellent sprayability and low slump characteristics Paintable 	<ul style="list-style-type: none"> Saves time and reduces re-work Reduces down-time due to cold weather Good movement capabilities Cleaner, faster installation versus most competitive sprays 								



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Speed Sleeve (CP 653)

Product description

- Re-penetrable cable management device for electrical and telecom professionals

Product features

- Fast installation
- Easy penetration and re-penetration
- Low L-ratings
- Withstands the rigors of usage and time
- Can be installed in wall and floor applications

Areas of application

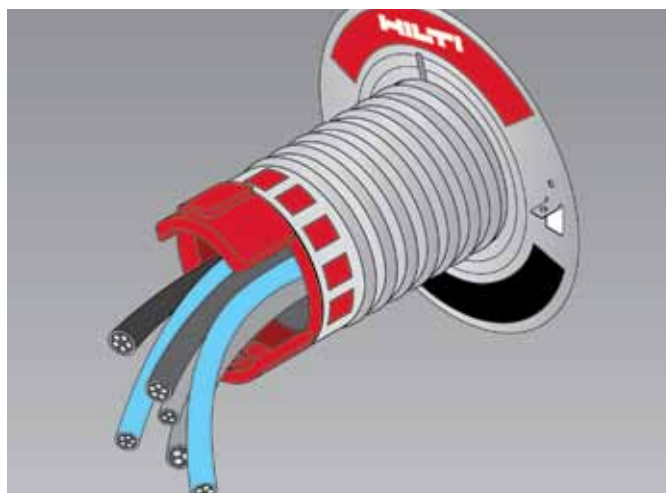
- Cable and cable bundles

For use with

- Concrete floor rated up to 3 hours
- Gypsum walls rated up to 4 hours

Examples

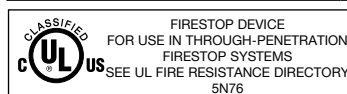
- Electrical wiring
- Premise wiring
- Low voltage and datacom



Technical Data	CP 653	
	2" (50 mm)	4" (102 mm)
OD (device only)	2.3" (60 mm)	4.3" (110 mm)
OD (flange)	4.7" (120 mm)	6.7" (170 mm)
ID	1.7" (48 mm)	3.6" (92 mm)
Total length	12.4" (315 mm)	12.4" (315 mm)
Weight (device and flanges)	1.5 lbs	2.6 lbs
Temperature resistance	22° F to 212° F (-6° C to 100° C)	
Intumescent activation	Approx. 320° F (160° C)	
Expansion ratio (unrestricted)	1:40	
Metal	Steel with zinc coating	
Plastic	ABS	
Fabric	Glass-fiber	

Tested in accordance with

- UL 1479 • ASTM E 814 • CAN/ULC-S115



Installation instructions for CP 653

Notice

Always refer to the MSDS before use and the UL Fire Resistance Directory or Hilti Firestop Systems Guide for complete installation information.

Instructions for use

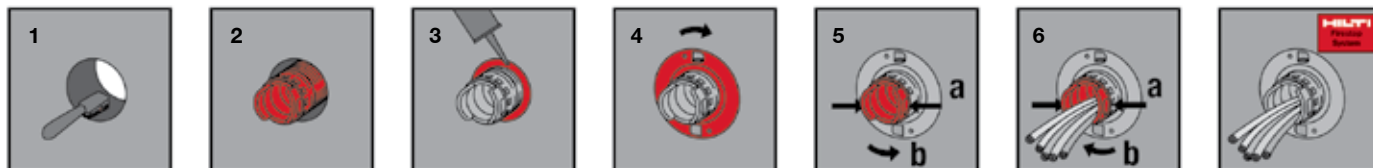
1. Use hole saw to create the appropriate hole.
2. Insert the sleeve.
3. Seal the gap with firestop sealant to impede smoke and gas migration. Repeat on other side of the wall

4. Spin the flange clockwise onto the device. Repeat on other side of the wall.
5. To open the device:
 - (a) On one side of the wall, press the clip closures inward.
 - (b) Twist the device counterclockwise and pull the red housing outwards to eliminate the bunching of the smoke seal fabric. A yellow label will be visible to indicate that the device is open.

6. To close the device:
 - (a) On the same side of the wall, press the clip closures inward.
 - (b) Twist the device clockwise until finger-tight, allowing it to engage with a click.

For re-penetration of cables, repeat steps 5 and 6.

For installation options not presented here, consult your local Hilti representative for other rated firestop systems.



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Firestop Drop-In Device (CFS-DID)

Product description

- One step firestop solution for a variety of pipe materials and diameters
- Helps reduce labor costs and increase productivity
- Ready-to-use out of box
- Internationally tested and approved by UL

Product features

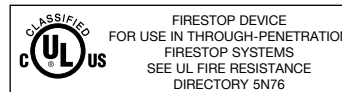
- Integrated moisture and smoke seal
- Simple, quick error free installation
- Easily identifiable to building inspectors
- All-in-one solution for renovation, retrofit, and new construction
- Buy American Compliant

Areas of application

- For use in concrete, hollow core, and metal deck slab thicknesses ranging from 2-1/2" to 12-1/2"
- For use in firestopping plastic, metal, and insulated pipes through cored or sleeved holes
- Installation complete with several fastening options including gas actuated fasteners, metal hit anchors, and kwik con screw anchor systems



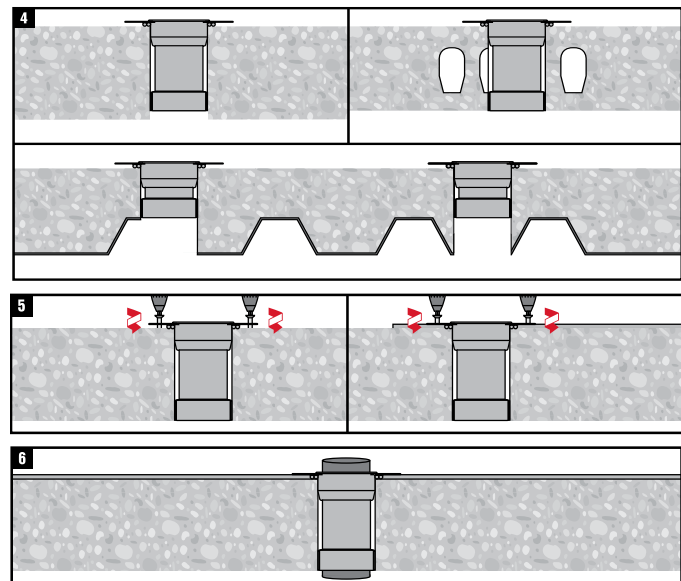
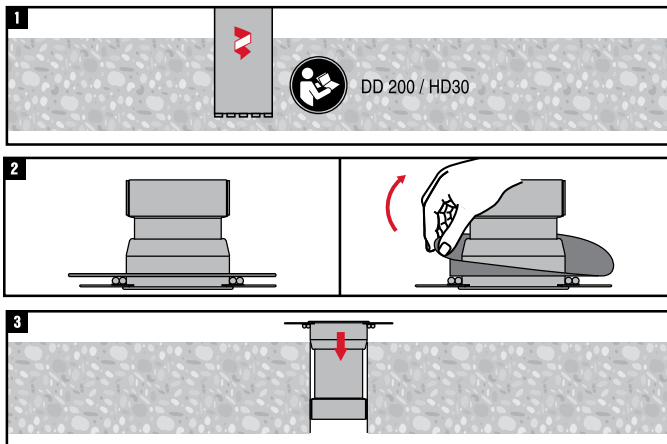
Technical Data	CFS-DID
Expansion temperature	~ 356° F (~ 180° C)
Expansion rate	1:15 load expansion, load = 5g/cm³ 1:40 free expansion
Temperature resistance	-4 up to 190° F (20 up to 88° C)
Storage temperature	23 up to 122° F (-5 up to 50° C)
Tested in accordance with • ASTM E814 • UL 1479 • CAN/ULC-S115	



Installation instructions for CFS-DID

Notice

Always refer to the MSDS before use and the UL Fire Resistance Directory or Hilti Firestop Systems Guide for complete installation information.



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Hilti (Canada) Corp. 1-800-363-4458 • www.hilti.ca • Hilti Firestop Systems Guide — Canada

Cast-In Firestop Devices (CP 680-P and CP 680-M)

For use in

- Dust and fiber free environments such as hospitals, computer centers and laboratories
- Concrete floor assemblies rated up to 4 hours

Product description

- A one-step cast-in firestop device for a variety of pipe materials and diameters
- Helps reduce labor costs and increase productivity
- Ready-to-use out of the package
- Internationally tested and approved by UL and FM
- Reduces the chance of project delays due to failed inspections

Product features

- Quick and simple installation
- SpeedLine Alignment system promotes faster layout
- QuickTurn System creates fast, simple vertical connections
- Integrated moisture and smoke seal
- Innovative adapter for metal deck applications

Installation and applications

- Concrete floors from 2.5" (63 mm) thickness for either flat concrete or concrete over metal deck

CP 680-M:

- Insulated and non-insulated metal pipes
- EMT and electrical conduits
- Cable bundles
- Multiple pipes

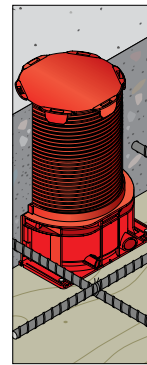
CP 680-P:

Addresses all applications for CP 680-M as well as the following:

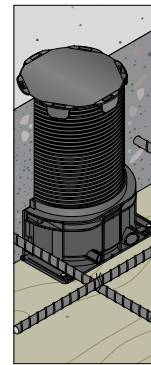
- Plastic pipes such as PVC, CPVC, ABS, ENT and FRPP
- Fresh and waste water pipes

Not suited for

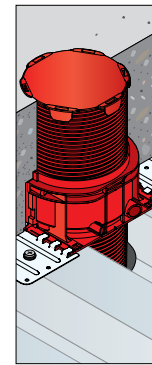
- Areas with high condensation
- Outdoor areas
- Wall applications



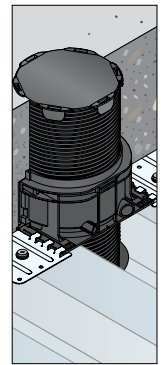
CP 680-P in concrete over wood forms



CP 680-M in concrete over wood forms



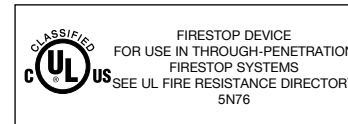
CP 680-P over metal deck



CP 680-M over metal deck

Technical Data		CP 680-P and CP 680-M
ID	Footprint	Opening required thru metal deck
2"	3-3/4" x 4-1/2"	3-1/2" diameter
3"	4-3/4" x 5-5/8"	4-1/2" diameter
4"	6-3/8" x 6-3/4"	5-1/2" diameter
6"	9" x 9-1/2"	7-1/4" diameter
Expansion temperature		392°F (200°C)
Expansion rate		1:50 (unrestrained) 1:30 (Load expansion, Load = 20g/cm³)
Standard height		8"
Temperature resistance		Maximum 212°F (100°C)
Color		CP 680-P: red CP 680-M: black
Tested in accordance with		
• UL 1479 • ASTM E 814 • ASTM G21 • CAN/ULC-S115		

Internationally tested and approved



Installation instructions

Notice

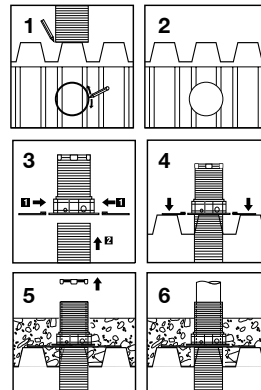
- Before handling, read Material Safety Data Sheet and product label for safe usage and health information.
- Instructions below are general guidelines — always refer to the applicable drawing in the UL Fire Resistance Directory or Hilti Firestop Systems Guide for complete installation information

Instructions for use

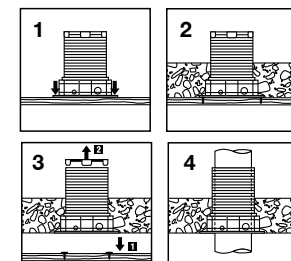
- Before pouring concrete, secure the cover cap in place, thereby preventing the flow of concrete into the cast-in device
- Do not use for wall applications

Concrete floor with metal decking

For concrete floor with metal decking applications use the correct size CP 680 Metal Deck Adapter for installed cast-in device and follow the illustrations.

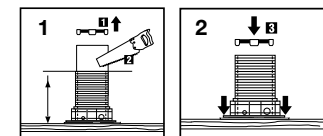


Concrete floor



Installation option

Follow the illustrations if CP 680 has to be cut to slab thickness before installation, or when riser clamps are used.



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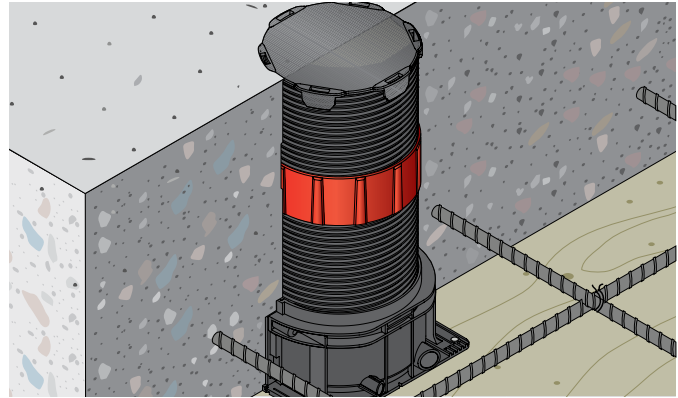
Height Extension

Product description

- For use when concrete slabs are greater than 8" thick
- Device may add up to 6" with each extension kit
- QuickTurn Connection system promotes a fast, positive connection to the top of the appropriate cast-in device
- Red (CP 680-P) and Black (CP 680-M) versions for easier identification when both combustible and non-combustible penetrants are employed on the same project

Color

- CP 680-P Kit — Red cylinder with Red coupling band
- CP 680-M Kit — Black cylinder with Red coupling band



Installation Instructions

Notice

- Before handling, read Material Safety Data Sheet and product label for safe usage and health information.
- Always refer to the applicable drawing in the UL Fire Resistance Directory or Hilti Firestop Systems Guide for complete installation information

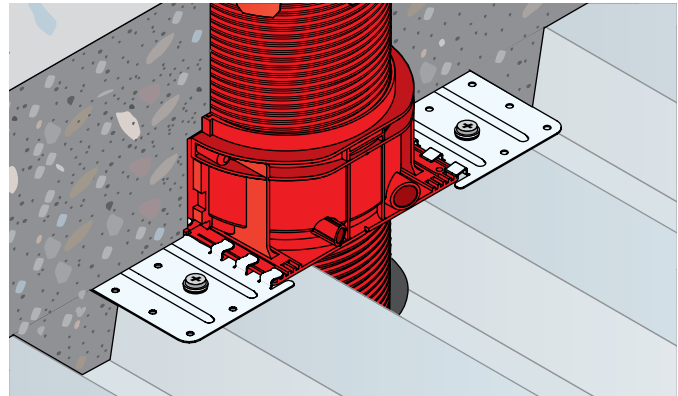
Metal Deck Adapters

Product description

- For use with concrete over metal deck applications
- 6" cylinder extension protrudes through even the thickest spray fireproofing
- QuickTurn Connection system promotes a fast, positive connection to the underside of the appropriate cast-in device
- Red (CP 680-P) and Black (CP 680-M) versions for easier identification when both combustible and non-combustible penetrants are employed on the same project
- Opening required to place the cylinder through a metal deck
 - For 2" Devices — 3-1/2" diameter
 - For 3" Devices — 4-1/2" diameter
 - For 4" Devices — 5-1/2" diameter
 - For 6" Devices — 7-1/4" diameter

Color

- CP 680-P Kit — Red cylinder with two (2) metal plates
- CP 680-M Kit — Black cylinder with two (2) metal plates



Installation instructions

Notice

- Before handling, read Material Safety Data Sheet and product label for safe usage and health information.
- Always refer to the applicable drawing in the UL Fire Resistance Directory or Hilti Firestop Systems Guide for complete installation information



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Water Barrier Module

Product description

- A pre-installed water barrier solution that impedes water
- Meets W-Rating requirements for select penetrants
- For use where a single penetrant is employed per cast-in device
- QuickTurn Connection system promotes a fast, positive connection to the top of the appropriate cast-in device

Dimension

- Adds 1" to all cast-in devices
- Pipe sizes addressed (See UL Systems)
 - 2" water module for 2" pipe; 3" water module for 2.5" and 3" pipe;
 - 4" water module for 4" pipe; 6" water module for 6" pipe

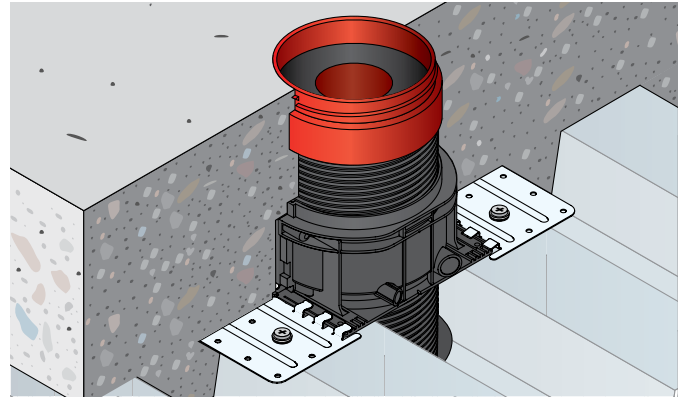
Color

- Red housing with black gasket

Installation instructions

Notice

- Before handling, read Material Safety Data Sheet and product label for safe usage and health information.
- Always refer to the applicable drawing in the UL Fire Resistance Directory or Hilti Firestop Systems Guide for complete installation information



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Top Seal Plug

Product description

- A post-installed water barrier solution that impedes water
- Meets W-Rating requirements for select penetrants
- For use where a single penetrant is employed per cast-in device
- Chemically stable elastomeric material will not react with combustible pipes

Applications

- For single penetrants placed through a 2" cast-in place device
- Iron Pipe Sizing (IPS) and Copper Pipe Sizing (CPS) offerings available
- For pipes ranging from nominal 0.5" to 2.0" in diameter

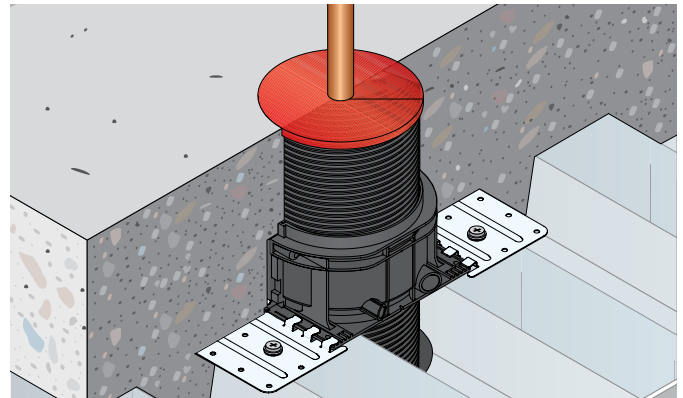
Color

- Red

Installation instructions

Notice

- Before handling, read Material Safety Data Sheet and product label for safe usage and health information.
- Always refer to the applicable drawing in the UL Fire Resistance Directory or Hilti Firestop Systems Guide for complete installation information



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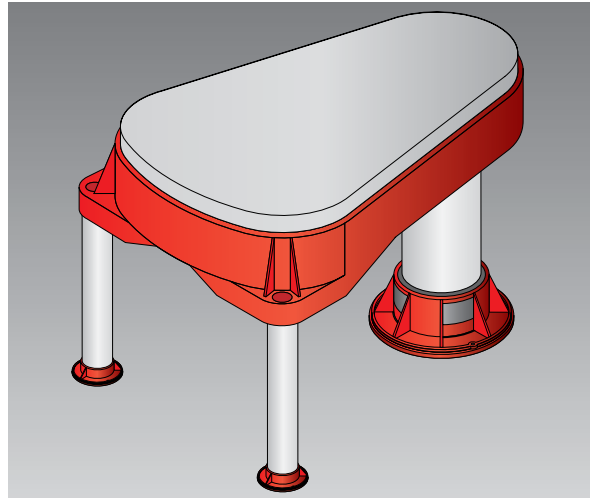
Tub Box Kit (CP 681)

Product description

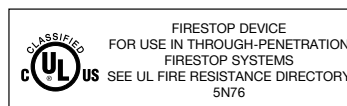
- Structurally stable during concrete pouring
- Assembles easily with solvent cement — no additional tools required
- Triangular shape makes working around rebar easy
- 3 fastening points instead of 4 reduces installation time
- Pre-cut to customer's height requirement upon request — helps reduce labor costs
- One system for all pipe materials, easy to choose and inspect
- Accepts a pass through 1-1/2" pipe (with a sealing bushing) or a standard 2" P-trap (direct connection to the coupling)

Product features

- Sealing bushings available for standard schedule 40 pipe or thin wall piping
- Versatile CP 681 tub box kit allows sealing bushing to be installed from top or bottom



Technical Data	CP 681
Dimensions (LxWxH)	10-3/4" x 13" x slab thickness
Application dimension	Creates a 2-1/2" deep recess in the slab
Minimum slab thickness	4-1/2"
Intumescent activation	Approx. 375°F (190°C)
Expansion ratio (unrestricted)	1:10
Temperature resistance	Maximum 212°F (100°C)
Color	Red with white PVC legs and coupling
Storage	Store in dry location
Tested in accordance with • UL 1479 • ASTM E 814 • ASTM G21 • CAN/ULC-S115	



Assembly and installation instructions for CP 681

Notice

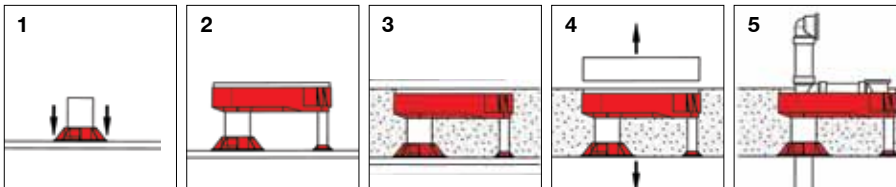
- Before handling, read Material Safety Data Sheet and product label for safe usage and health information.
- Instructions below are general guidelines — always refer to the applicable drawing in the UL Fire Resistance Directory or Hilti Firestop Systems Guide for complete installation information

Instructions for use

1. Concrete on wood form — secure the coupling sleeve flange (the larger of the three flanges) to the floor deck using nails or screws.
2. Using standard solvent cement on both plastic surfaces, assemble the CP 681 Tub Box legs and sleeve to bottom of the Tub Box as follows:
 - Cement the two 3/4" PVC stabilizing legs to the matching connecting area on the bottom side of the CP 681 Tub Box
 - Cement the CP 681 Tub Box and larger PVC plastic sleeve to the connecting area on the bottom side of the CP 681 Tub Box
 - Secure the smaller leg flanges to the deck using nails or screws
3. Pour concrete to the proper height. CP 681 Tub Box assembly is pre-cut to the slab thickness.

4. After concrete is cured, remove the floor deck and foam insert. Remove pressure test cap before installing drain piping.
5. Install the tub drain/overflow assembly piping (plastic or brass) through the CP 681 Tub Box and plastic coupling. Insert proper elastomeric bushing into the bottom or top of the CP 681 Tub Box assembly around the drain pipe.

Note: Install bushing before final drain/overflow assembly if installing from the top side. Complete the installation by installing branch and trap piping.



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Shower and Floor Drain

Product description

- An economical solution to address shower and floor drain applications
- The same trusted firestop material as the tub box
- Two variations: (1) extended sleeve and (2) hub coupling
- Designed to accommodate solvent welding to 2" PVC pipes

Product dimensions

- Extended Sleeve: 5 -3/4" base diameter 8" height
- Hub Coupling: 5-3/4" base diameter; 2-13/16" height

Application dimensions

- Extended Sleeve: 2-3/8" inner diameter (for use with 2" PVC pipe)
- Hub Coupling: 2-3/8" inner diameter (for use with 2" PVC pipe)

Minimum slab thickness

- 4-1/2"

Color

- Extended Sleeve: red flange with white extended sleeve
- Hub Coupling: red flange with white hub coupling

Aerator Adapters

Product description

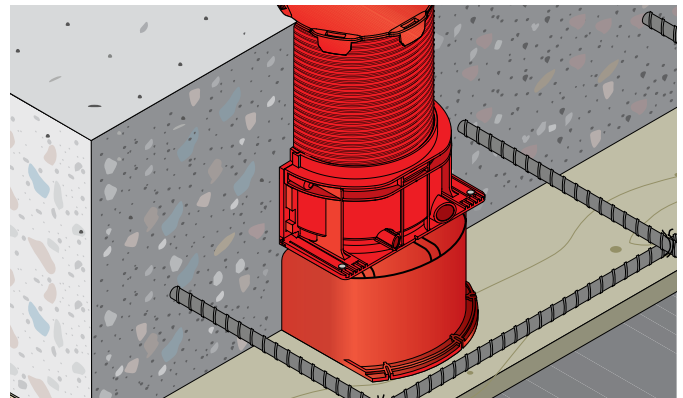
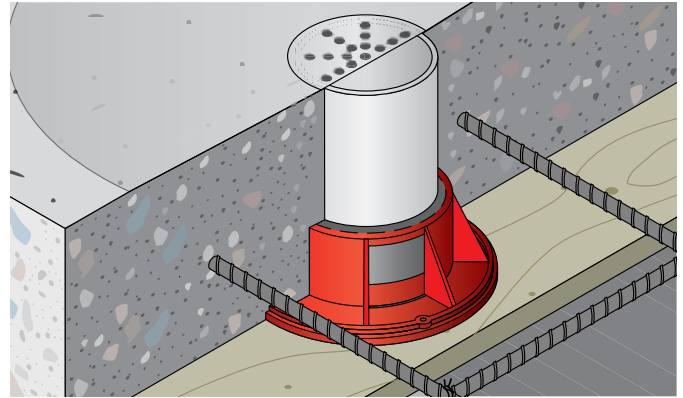
- When used in conjunction with the appropriate cast-in place device, creates an underside void for the installation of a single stack waste pipe aerator system

Product features

- Up to a 4-1/2" recess created in the slab to reduce final ceiling height
- Allows for vertical, horizontal and angle movement to simplify plumbing installations
- Excellent sound insulation

For use with

- Soil and Aerator assemblies



Technical Data	Aerator-Adapter
Product dimensions (LxWxH)	3": 6" x 6-7/8" x 3" 4": 6" x 8-3/4" x 4-1/2"
Void created	3": 5-3/4" x 2-3/8" (DxH) 4": 5-7/8" x 7.5" x 4-1/2" (LxWxH)
Minimum slab thickness	4-1/2"
Color	Red
Storage	Store in dry location
Tested in accordance with	
• UL 1479 • ASTM E 814 • ASTM G21 • CAN/ULC-S115	

Installation instructions for Aerator Adapter

Notice

- Before handling, read Material Safety Data Sheet and product label for safe usage and health information.
- Instructions below are general guidelines — always refer to the applicable drawing in the UL Fire Resistance Directory or Hilti Firestop Systems Guide for complete installation information

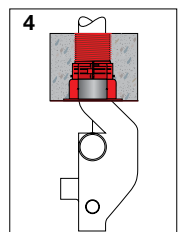
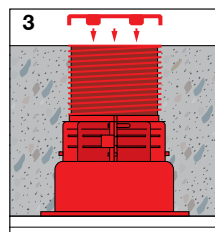
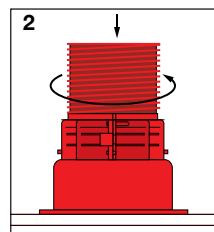
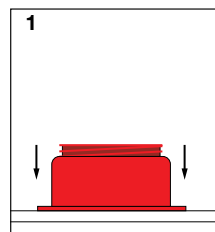
Note: Before purchasing aerator adapters for your project, please confirm the following:

- aerators may be employed on the project as per local codes and construction allowances
- minimum concrete floor slab thickness

Instructions for use

1. Secure the assembly to the floor deck using nails or screws.
2. Attach the Aerator Adapter to the appropriate cast-in place device.

3. Before pouring concrete, confirm that the cover cap of the assembly is properly secured. This will help prevent flowing concrete into the CP 680-P/M during the concrete pour.
4. Complete installation by installing cast iron aerator and pipe.



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FS-ONE High Performance Intumescent Firestop Sealant

Product description

- Intumescent (expands when exposed to fire) firestop sealant that helps protect combustible and non-combustible penetrations for up to 4 hours fire rating

Product features

- Smoke, gas and water resistant after material has cured
- Contains no halogen, solvents or asbestos
- High fire rating properties
- Water based, easy to clean
- Protects most typical firestop penetration applications
- Paintable
- Single component systems available
- Meets LEED™ requirements for indoor environmental quality credit 4.1 Low Emitting Materials, Sealants and Adhesives and 4.2 Paints and Coatings

Areas of application

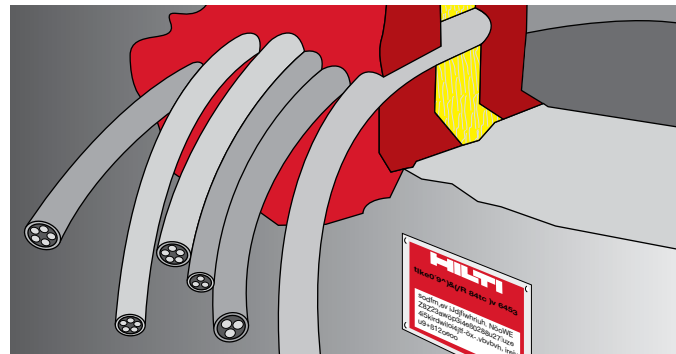
- Steel, copper and EMT pipes
- Insulated steel and copper pipes
- Cable bundles
- Closed or vented plastic pipes
- HVAC penetrations

For use with

- Concrete, masonry, drywall and wood floor assemblies
- Wall and floor assemblies rated up to 4 hours

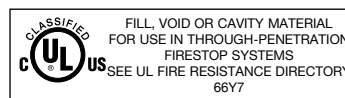
Examples

- Sealing around combustible pipe penetrations in fire rated construction
- Sealing around non-combustible penetrations in fire rated construction



Technical Data*	FS-ONE
Chemical basis	Water-based intumescent acrylic dispersion
Color	Red
Application temperature	40°F to 104°F (5°C to 40°C)
Skin forming time	Approx. 20-30 min.
Curing time	Approx. 2 mm / 3 days
Average volume shrinkage (ASTM C1241)	24.1%
Movement capability	Approx. 5%
Expansion rate (unrestricted)	Up to 3-5 times original volume
Temperature resistance (cured)	-40°F to 212°F (-40°C to 100°C)
Surface burning characteristics (ASTM E 84-96)	Flame Spread: 0 Smoke Development: 5
Sound transmission classification (ASTM E 90-99)	56 (Relates to specific construction)
Tested in accordance with	<ul style="list-style-type: none"> UL 1479 ASTM E 814 ASTM E 84 ASTM G21 CAN/ULC-S115

*At 73°F (23°C) and 50% relative humidity



Installation instructions for FS-ONE

Notice

- Before handling, read Material Safety Data Sheet and product label for safe usage and health information.
- Instructions below are general guidelines — always refer to the applicable drawing in the UL Fire Resistance Directory or Hilti Firestop Systems Guide for complete installation information

Opening

- Clean the opening. Surfaces to which FS-ONE will be applied should be cleaned of loose debris, dirt, oil, moisture, frost and wax. Structures supporting penetrating items must be installed in compliance with local building and electrical standards.

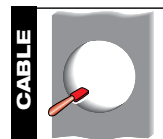
Application of firestop sealant

- Install the prescribed backfilling material type and depth to obtain the desired rating (if required). Leave sufficient depth for applying FS-ONE.
- Application of firestop sealant: Apply FS-ONE to the required depth in order to obtain the desired fire rating. Make sure FS-ONE contacts all surfaces to provide maximum adhesion. For application of FS-ONE use a standard caulking gun, foil pack gun, bulk loader and bulk gun. With FS-ONE buckets, Graco type sealant pumps may be used. (Contact pump manufacturer for proper selection).

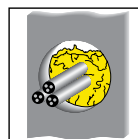
- Smoothing of firestop sealant: To complete the seal, tool immediately to give a smooth appearance. Excess sealant, prior to curing, can be cleaned away from adjacent surfaces and tools with water.
- Leave completed seal undisturbed for 48 hours.
- For maintenance reasons, a penetration seal could be permanently marked with an identification plate. In such a case, mark the identification plate and fasten it in a visible position next to the seal.

Not for use

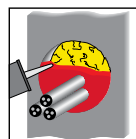
- High movement expansion joints
- Underwater



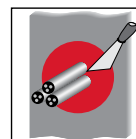
1. Clean opening.



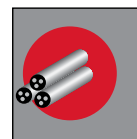
2. Pack mineral wool. (If required)



3. Apply FS-ONE.



4. Smooth FS-ONE.



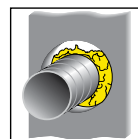
5. Leave completed seal undisturbed for 48 hours.



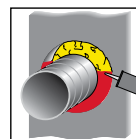
6. Fasten identification plate (if required).



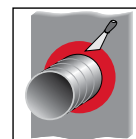
1. Clean opening.



2. Pack mineral wool. (If required)



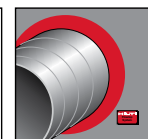
3. Apply FS-ONE.



4. Smooth FS-ONE.



5. Leave completed seal undisturbed for 48 hours.



6. Fasten identification plate (if required).

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Elastomeric Firestop Sealant (CP 601S)

Product description

- A silicone based firestop sealant that provides maximum movement in fire-rated joints and seals through-penetration applications

Product features

- Halogen and solvent free
- Asbestos free
- Simple to use and apply
- Good adhesion without use of a primer
- Smoke, fume, water and UV resistant
- Excellent movement capability, meets 500 cycle requirements (ASTM E 1966 and UL 2079)
- Meets Class I W-rating requirements
- Meets LEED™ requirements for indoor environmental quality credit 4.1 Low Emitting Materials, Sealants and Adhesives and 4.2 Paints and Coatings

Areas of application

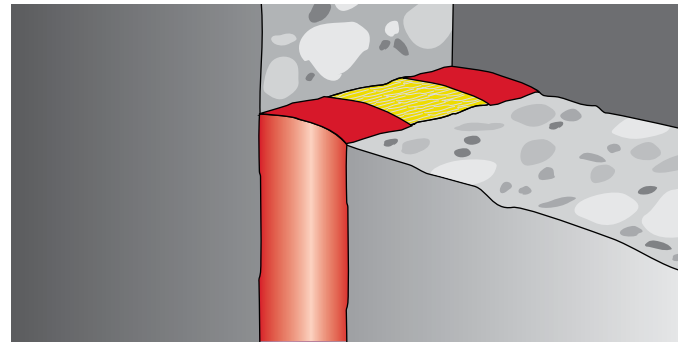
- Sealing construction/expansion joints
- Top-of-wall joints
- Metal pipes
- Cable bundles
- HVAC penetrations

For use with

- Various base materials such as masonry, concrete, metal, glass, etc.
- Wall and floor assemblies rated up to 4 hours

Examples

- Where a gypsum wall assembly meets the underside of a metal or concrete deck
- Sealing expansion joints to impede the passage of fire, smoke and toxic fumes
- Sealing around HVAC penetrations through fire-rated assemblies

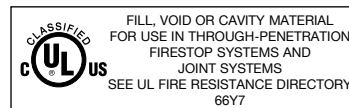


Technical Data*	CP 601S
Chemical basis	Neutral elastic silicone
Density	Approx. 1.25 g/cm³
Color	Red
Application temperature	40°F to 104°F (5°C to 40°C)
Skin-forming time	Approx. 15 min.
Curing time	Approx. 2 mm / 3 days
Volume shrinkage	Approx. 0 – 5%
Movement capability	Approx. 25%
Temperature resistance	–40°F to 320°F (–40°C to 160°C)
Surface burning characteristics (ASTM E84-96)	Flame spread: 0 Smoke development: 30
Sound transmission classification (ASTM E 90-97)	50 (Relates to specific construction)

Tested in accordance with

- UL 2079
- ASTM E 814
- ASTM E 1966
- CAN/ULC-S115
- ASTM C 920
- UL 1479
- ASTM E 84
- ASTM G21

*At 73°F (23°C) and 50% relative humidity



Installation instructions for CP 601S

Notice

- Before handling, read Material Safety Data Sheet and product label for safe usage and health information.
- Instructions below are general guidelines — always refer to the applicable drawing in the UL Fire Resistance Directory or Hilti Firestop Systems Guide for complete installation information

Opening

1. Clean the opening. Surfaces to which CP 601S will be applied should be cleaned of loose debris, dirt, oil, wax and grease. The surface should be moisture and frost free.

Application of firestop

2. Insert fill of mineral wool (or backer as required).
3. Apply firestop over backer.
4. Smooth firestop sealant with a trowel before the skin forms. Once cured, CP 601S can only be removed mechanically.
5. For maintenance reasons, a penetration seal can be permanently marked with an identification plate and fastened in a visible position next to the seal.

Chemical resistance

- At room temperature the cured silicone sealant is resistant for a short time to diluted (15%) acids and lyes/alkalis as well as most commercially available

cleaning agents and disinfectants (except those containing iodine)

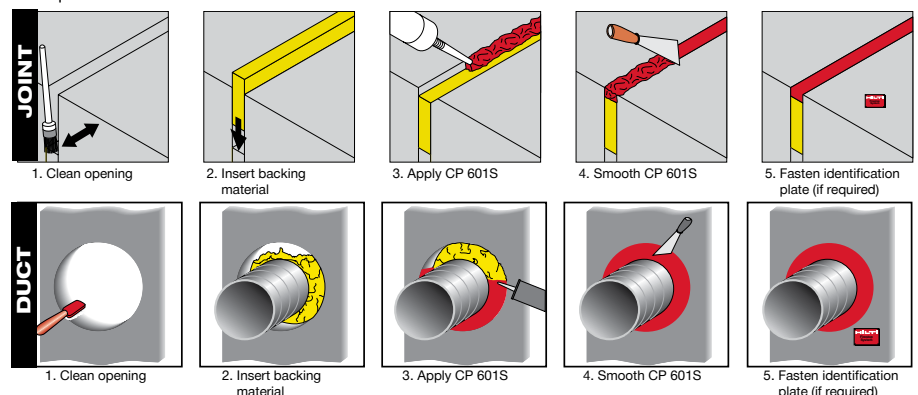
- Concentrated acids and lyes/alkalis destroy silicone rubber over time.
- Solvents and mineral oils cause cured silicone to swell. Consequently, proper functioning of the sealant should be checked after exposure to a solvent or mineral oil. Please contact your local sales representative or the nearest Hilti center if special requirements for chemical resistance have to be met.

Not for use

- In areas immersed in water
- Not to be painted

Storage

- Store only in the original packaging in a location protected from moisture at a temperature of 40°F to 77°F (5°C to 25°C)
- Observe expiration date on package



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Flexible Firestop Sealant (CP 606)

Product description

- An acrylic based firestop sealant that provides movement capability in fire rated joints and seals through-penetrations applications

Product features

- Silicone free
- Halogen, asbestos and solvent free
- Paintable
- Tested up to 33% movement with 500 cycles in accordance to UL 2079 and ASTM 1966
- Smoke and fume resistant
- Easy clean up with water
- Single component systems available
- Meets LEED™ requirements for indoor environmental quality credit 4.1 Low Emitting Materials, Sealants and Adhesives and 4.2 Paints and Coatings

Areas of application

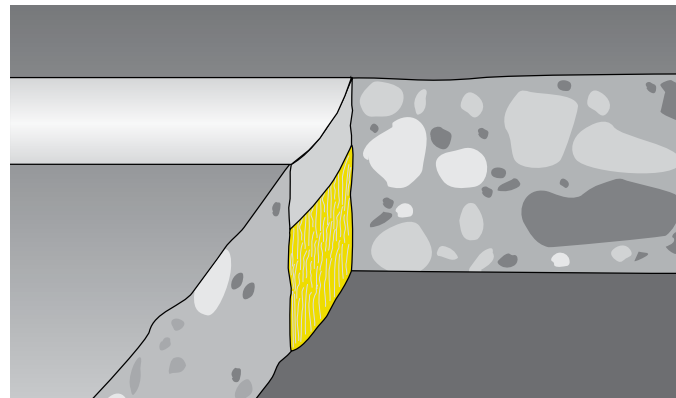
- Sealing construction/expansion joints
- Top-of-wall joints
- Metal pipes
- Cable bundles
- HVAC penetrations

For use with

- Various base materials such as masonry, concrete, gypsum, etc.
- Wall and floor assemblies rated up to 3 hours

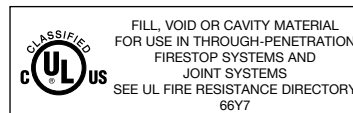
Examples

- Where a gypsum wall assembly meets the underside of a metal or concrete deck
- Sealing expansion joints to impede the passage of fire, smoke and toxic fumes
- Sealing around HVAC penetrations through fire-rated assemblies



Technical Data*	CP 606
Chemical basis	Acrylic based firestop sealant
Color	Available in red, white and gray
Application temperature	40°F to 104°F (5°C to 40°C)
Skin-forming time	Approx. 15 min
Curing time	Approx. 3 mm / 3 days
Average volume shrinkage (ASTM C1241)	22.2%
Movement capability	Approx. 10%
Temperature resistance	-22°F to 176°F (-30°C to 80°C)
Surface burning characteristics (ASTM E 84-96)	Flame Spread: 10 Smoke Development: 0
Sound transmission classification (ASTM E 90-99)	56 (Relates to specific construction)
Tested in accordance with	
• UL 2079	• ASTM E 814
• ASTM E 84	• UL 1479
	• ASTM E 1966
	• ASTM G21
	• CAN/ULC-S115
	• CAN/ULC-S102

*At 73°F (23°C) and 50% relative humidity



Installation instructions for CP 606

Notice

- Before handling, read Material Safety Data Sheet and product label for safe usage and health information.
- Instructions below are general guidelines — always refer to the applicable drawing in the UL Fire Resistance Directory or Hilti Firestop Systems Guide for complete installation information
- The use of backing material is recommended to control the sealant depth and help ensure assembly seal is complete

Opening

1. Clean the opening. Surfaces to which CP 606 will be applied should be cleaned of loose debris, dirt, oil, wax and grease. The surface should be moisture and frost free.

Application of firestop

2. Insert fill of mineral wool or backer (as required).
3. Apply firestop over backer.
4. Smooth firestop sealant with a trowel before the skin forms. Once cured, CP 606 can only be removed mechanically.
5. For maintenance reasons, a penetration seal can be

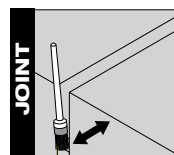
permanently marked with an identification plate and fastened in a visible position next to the seal.

Not for use

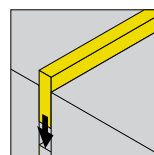
- On areas immersed in water

Storage

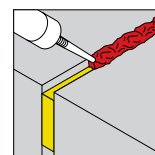
- Store only in the original packaging in a location protected from moisture at a temperature of 40°F to 77°F (5°C to 25°C)
- Observe expiration date on package



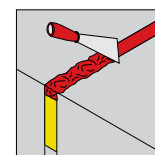
1. Clean opening



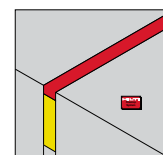
2. Insert backing material compressed per UL System



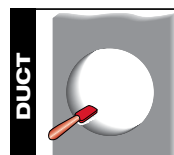
3. Apply CP 606



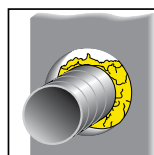
4. Smooth CP 606



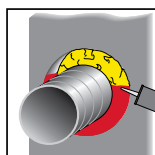
5. Fasten identification plate (if required)



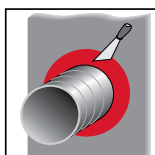
1. Clean opening



2. Insert backing material



3. Apply CP 606



4. Smooth CP 606



5. Fasten identification plate (if required)



Hilti Firestop
Saving lives
through innovation
and education

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Self-Leveling Firestop Sealant (CP 604)

Product description

- Self-leveling, single-component, silicone-based firestop sealant for use with through-penetrations as well as construction joints in floors.

Product features

- Self-leveling—requires no tooling
- Excellent elongation/compression properties
- Meets 500 cycle requirements (ASTM E 1966 and UL 2079)
- Smoke, fume, water and UV resistant
- Meets Class I W-rating requirements
- Meets LEED™ requirements for indoor environmental quality credit 4.1 Low Emitting Materials, Sealants and Adhesives and 4.2 Paints and Coatings

Areas of application

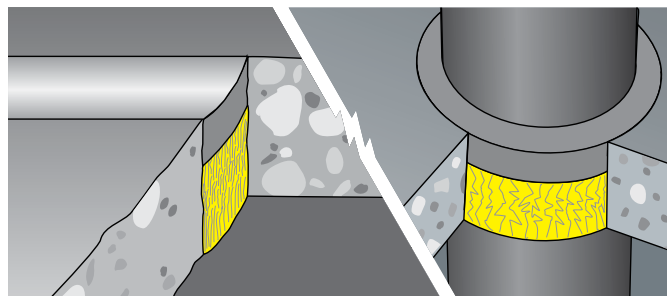
- Sealing construction/expansion joints
- Metal pipes
- Cable bundles
- Sealing multiple penetrations in small or large openings

For use with

- Concrete floors rated up to 3 hours

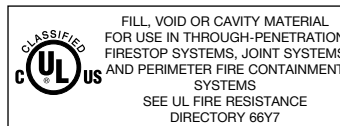
Examples

- Penetrations for metal pipes between floor levels
- Construction joints and expansion joints in floors



Technical Data*	CP 604
Chemical basis	Neutral elastic silicone
Color	Gray
Application temperature	40°F to 104°F (5°C to 40°C)
Skin forming time	Approx. 15 min
Curing time	Approx. 2 mm/3 days
Joint movement capability	Approx. 20%
Temperature resistance	-40°F to 248°F (-40°C to 120°C)
Surface burning characteristics (ASTM E 84-00)	Flame Spread: 5 Smoke Development: 60
Sound transmission classification (ASTM E 90-02)	56 (Relates to specific construction)
Tested in accordance with	
• UL 1479	• ASTM E 1966
• ASTM E 814	• ASTM E 2307
• ASTM G21	• CAN/ULC-S115
	• UL 2079
	• ASTM E 84
	• CAN/ULC-S102

*At 73°F (23°C) and 50% relative humidity



Installation instructions for CP 604

Notice

- Before handling, read Material Safety Data Sheet and product label for safe usage and health information.
- Instructions below are general guidelines — always refer to the applicable drawing in the UL Fire Resistance Directory or Hilti Firestop Systems Guide for complete installation information

Opening

- Clean the opening. Surfaces to which CP 604 will be applied should be cleaned of loose debris, dirt, oil, wax and grease. The surface should be moisture and frost free.

Application of firestop

- Insert fill of mineral wool (or backer as required).
- Apply firestop over backer.
- Allow firestop sealant to level. Once cured, CP 604 can only be removed mechanically.
- For maintenance reasons, a penetration seal could be permanently marked with an identification plate. In such a case, mark the identification plate and fasten it in a visible position next to the seal.

Chemical resistance

- At room temperature the cured silicone sealant is resistant for a short time to diluted (15%) acids and lyes/alkalis as well as commercially available cleaning agents and disinfectants (except those containing iodine).
- Concentrated acids and lyes/alkalis destroy silicone rubber over time.
- Solvents and mineral oils cause cured silicone to swell. Consequently, proper functioning of the sealant should be checked after exposure to a solvent or mineral oil. Please contact your local sales representative or the nearest Hilti Center if special requirements for chemical resistance have to be met.

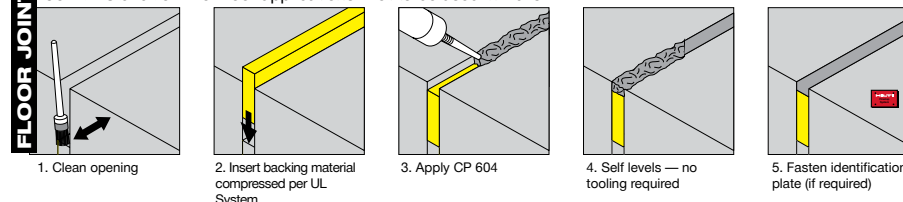
Not for use

- In areas immersed in water
- Not to be painted

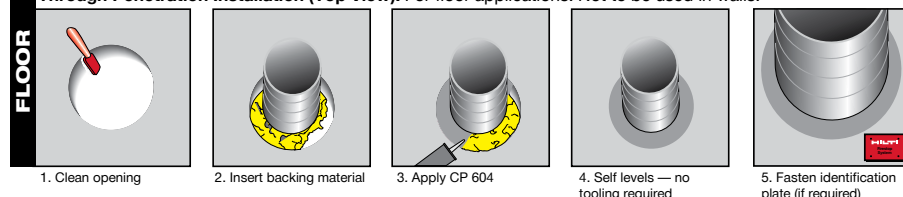
Storage

- Store only in the original packaging in a location protected from moisture at a temperature of 40°F (5°C) to 77°F (25°C)
- Observe expiration date on package

Joint installation: For floor applications. Not to be used in walls.



Through Penetration Installation (Top View): For floor applications. Not to be used in walls.



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Firestop Joint Spray (CFS-SP WB)

Product description

- A sprayable fire-rated mastic for construction joints where maximum movement is required

Product features

- Sprayable or apply by brush
- Maximum flexibility, meets 500 cycle requirements (Class II and III Approval) (ASTM E 1966 and UL 2079)
- Quick and easy installation with the Titan 600 or 1100 Sprayers can help save you time and money
- Contains no halogens, solvents or asbestos
- Water based formulation so spills and over-spray clean up quickly and easily
- Paintable
- Meets LEED™ requirements for indoor environmental quality credit 4.1 Low Emitting Materials, Sealants and Adhesives and 4.2 Paints and Coatings

Areas of application

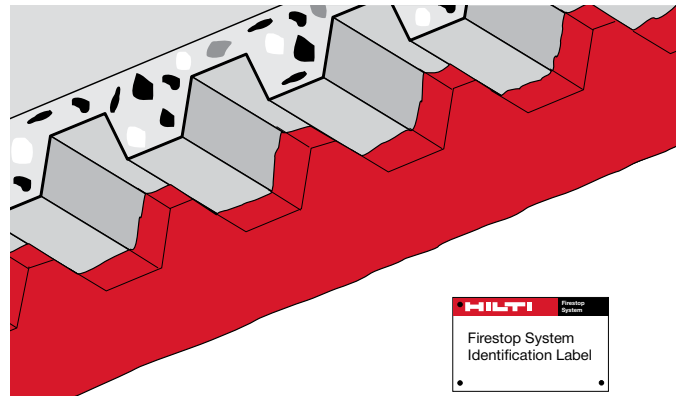
- Top-of-wall joints
- Curtain wall/edge of slab
- Expansion joints

For use with

- Concrete, masonry and gypsum wall assemblies
- Wall and floor/wall assemblies rated up to 4 hours

Examples

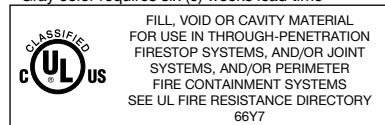
- Where a gypsum wall assembly meets the underside of a metal or concrete deck
- Where a concrete floor assembly meets with non-rated exterior wall (concrete, glass, etc.)
- Where two concrete floor/wall assemblies meet



Technical Data*	CFS-SP WB
Density	Approx. 10.8 lb/gal (1.3 g/cm ³)
Color	Available in red, white and gray**
Application temperature	39°F to 104°F (4°C to 40°C)
Temperature resistance	-40°F to 176°F (-40°C to 80°C)
Consistency	Sprayable liquid
Chemical basis	Acrylic-water-based-dispersion
Curing time	Approx. 24 hours @ 73°F, 50% humidity for 1/8" depth
Average volume shrinkage (ASTM C1241)	51.1%
Ph-value	Approx. 8-9
Movement capability	Up to 50%
Surface burning characteristics (CAN/ULC-S102)	Flame spread: 15 Smoke development: 10
Sound transmission classification (ASTM E 90-99)	59 (per tested construction type)
Tested in accordance with <ul style="list-style-type: none"> • UL 2079 • ASTM E 2837 • ASTM E 2307 • ASTM E 1966 • UL 1479 • CAN/ULC-S115 • ASTM E 84 • ASTM E 814 • CAN/ULC-S102 	

*At 73°F (23°C) and 50% relative humidity

**Gray color requires six (6) weeks lead time



Installation instructions for Firestop Joint Spray CFS-SP WB

Notice

- Before handling, read Material Safety Data Sheet and product label for safe usage and health information.
- Instructions below are general guidelines — always refer to the applicable drawing in the UL Fire Resistance Directory or Hilti Firestop Systems Guide for complete installation information

Opening

1. Clean the opening. Surfaces to which Firestop Joint Spray will be applied should be cleaned of loose debris, dirt, oil, wax and grease. The surface should be moisture and frost free.

Application of Firestop Joint Spray

2. Mineral wool packing: Install the prescribed back filling material type and depth to obtain desired rating.
3. Application of Firestop Joint Spray: Apply Firestop Joint Spray to the required depth in order to obtain the desired rating. Make sure Firestop Joint Spray contacts all surfaces and overlaps beyond all surrounding surfaces (Refer to UL System). Titan Sprayers have been successful in applying Firestop Joint Spray. Hilti recommends the use of the Titan 600 (for application temperatures above 50°F) or

Firestop Joint Spray may also be brushed on with a paint brush. Contact Hilti Technical Support for more information.

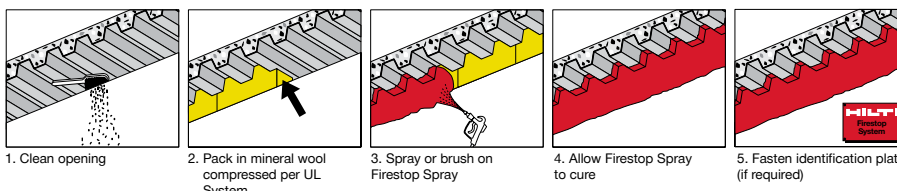
4. Curing time: Allow approx. 24 hours for typical application thickness (@ 73°F / 23°C) 50% humidity for 1/8" depth for the Firestop Joint Spray to fully cure.
5. Identification: For maintenance reasons all Firestop Joint Spray applications can be permanently marked with an identification plate and fastened in a visible position next to the seal.

Not for use

- In areas immersed in water
- On hot surfaces (above 176°F)

Storage

- Store only in the original packaging at temperatures 39°F to 77°F (4°C to 25°C)
- Observe expiration date on package



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Speed Strips (CP 767)

Speed Plugs (CP 777)

Product description

- CP 777: Pre-formed mineral wool plugs for 1.5", 2" and 3" decks
- CP 767: Pre-formed mineral wool strips suitable for joint applications

Product features

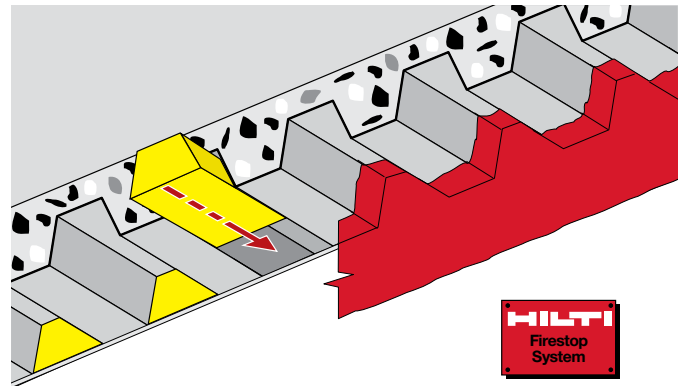
- Pre-cut to industry standard size decking flutes
- Reduces material waste
- 3 sizes available
- Pre-cut — leaves no gaps or voids
- Smooth surface provides cost effective spray coverage
- Safe to use — no asbestos/inorganic, will not mildew
- Up to 60% faster than castle cutting!

Areas of application

- Top-of-wall

Tested and approved

- UL Classified when used in conjunction with CP 606 Flexible Firestop Sealant, CP 601S Elastomeric Firestop Sealant, CP 672 Speed Spray, or CFS-SP WB Firestop Joint Spray

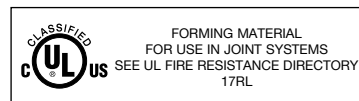


Technical Data

CP 767 and CP 777

Tested in accordance with

- UL 2079
- ASTM E 1966
- ASTM C G12 Type I-IUB
- CAN/ULC-S115



Saves time and money!

Castle cutting	50 MINUTES
Conventional mineral wool	35 MINUTES
Hilti speed plugs	20 MINUTES

60% Faster than castle cutting
43% Faster than conventional mineral wool

*Based upon 40 linear feet of installation. Actual results may vary.

Installation instructions for CP 777

Notice

- Before handling, read Material Safety Data Sheet and product label for safe usage and health information.
- Instructions below are general guidelines — always refer to the applicable drawing in the UL Fire Resistance Directory or Hilti Firestop Systems Guide for complete installation information



Easy one step installation — simply cut to length and install.



Full coverage pre-cut flute configuration leaves no gaps or voids.



Superior finish smooth surface allows quick and cost effective coverage with Hilti CFS-SP WB Firestop Joint Spray.



Easy to utilize — Speed Strips in joints between wall substrate and bottom of deck. Compress per UL System.



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Fire Foam (CP 620)

Product description

- Innovative firestopping solution for complex applications

Product features

- Up to 6 times expansion of can yield
- Repenetrable
- Cures within 60 seconds
- Easy handling for difficult to reach applications
- Paintable
- Virtually impervious to smoke
- Mold resistant
- No additional materials required
- Excellent water vapor resistance
- Meets LEED™ requirements for indoor environmental quality credit 4.1 Low Emitting Materials, Sealants and Adhesives and 4.2 Paints and Coatings

Areas of application

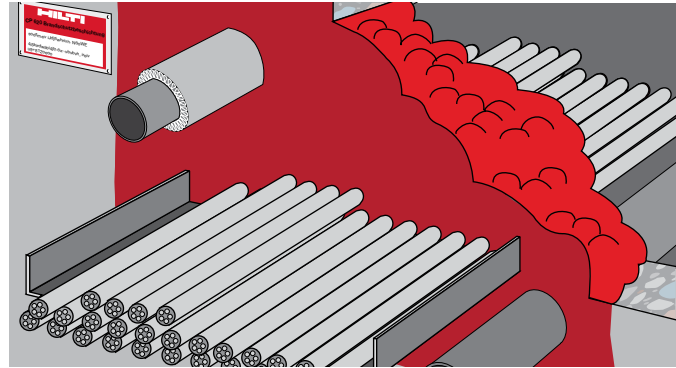
- Sealing small to medium size openings
- Cables and cable trays
- Non-combustible pipes
- Combustible pipes when used in conjunction with Hilti Wrap Strips
- Where cables, steel, copper, cast iron or plastic pipes all pass through the same opening

For use with floor and wall assemblies

- Concrete, drywall and masonry

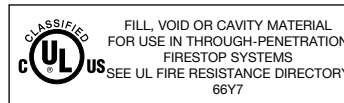
Examples

- Multiple penetrations
- Insulated metal pipes



Technical Data*	CP 620
Chemical basis	Two component polyurethane
Color	Red
Fire foam yield	Up to 110 in³
Application temperature	Substrate: 32°F to 104°F (0°C to 40°C) Product: 50°F to 104°F (10°C to 40°C)
Curing time*	Non-tacky after Approx. 35 seconds Ready to cut after Approx. 1 minute
Thermal insulation (R-value)	2.8–3.0 per inch of thickness
Temperature resistance of cured foam	–22°F to 212°F (–30°C to 100°C)
Sound transmission classification (ASTM E90-97)	50 (Relates to specific construction)
Structure-borne sound insulation	Pipe/wall 30–50%
Surface burning characteristics (ASTM E84-01)	Flame spread: 0 Smoke development: 15
Tested in accordance with	<ul style="list-style-type: none"> • UL 1479 • ASTM E 814 • ASTM E 84 • ASTM G21 • CAN/ULC-S115

*At 73°F (23°C) and 50% relative humidity



Installation instructions for CP 620

Notice

- Before handling, read Material Safety Data Sheet and product label for safe usage and health information.
- Instructions below are general guidelines — always refer to the applicable drawing in the UL Fire Resistance Directory or Hilti Firestop Systems Guide for complete installation information

Application

1-4.

Prepare dispenser and cartridges as shown below. The Fire Foam from the first few strokes of the dispenser should be discarded until the Fire Foam in the mixer has a consistent red color.

- Apply the CP 620 Fire Foam in the opening.
 - Begin applying CP 620 Fire Foam at the back of the opening and work toward the front. Fill the opening completely with CP 620 Fire Foam.
 - When dispensed slowly, the Fire Foam can be easily built up.
 - When dispensed quickly, the consistency of the Fire Foam is more liquid allowing it to flow better between the cables. Note: The CP 620 Fire Foam becomes warm for a short time after application.

- For maintenance reasons, the application can be permanently marked with an installation plate. Mark the installation plate and fasten it in a visible position next to the seal.

Re-installing cables or pipes

- Additional cables or pipes can be installed later without difficulty.
- Use a suitable tool to create an opening. Push the cable or pipe through and then seal the remaining opening carefully with CP 620 Fire Foam.

Notes

- The CP 620 Fire Foam can be cut back to no less than the minimum specified installation depth (see applicable UL systems for depths).

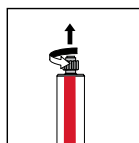
- Pieces of cured excess CP 620 Fire Foam which have been cut off can be laid in the next opening and fresh CP 620 Fire Foam can be applied around these.

Not for use

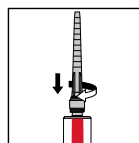
- Exposed to weather
- Exposed to UV

Storage

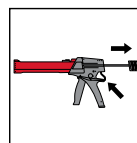
- Store only in the original packaging in a dry place at a temperature of 40°F to 77°F (5°C to 25°C). See technical data for application and substrate temperatures. Partly-used cartridges can be stored with mixer attached until they are required again. When re-using a partially used cartridge, simply attach a new mixer and dispense accordingly.



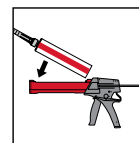
1. Hold the cartridge in the upright position and unscrew the cap.



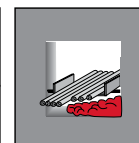
2. Fit the mixer and screw in a clockwise motion until secure.



3. Release the dispenser and pull back the piston rod.



4. Insert the cartridge in the dispenser.



5. Apply CP 620 Fire Foam, building up a seal by working from the back towards the front.



6. Attach the installation plate (if required).



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Firestop Mortar (CP 637)

Product description

- Fire-resistant mortar suitable for firestopping large openings

Product features

- Quick-setting — forms can be removed in as little as 2 hours
- Superior working properties
- Can be used in horizontal or vertical applications
- Saves time
- Versatile
- Simple mixing

Areas of application

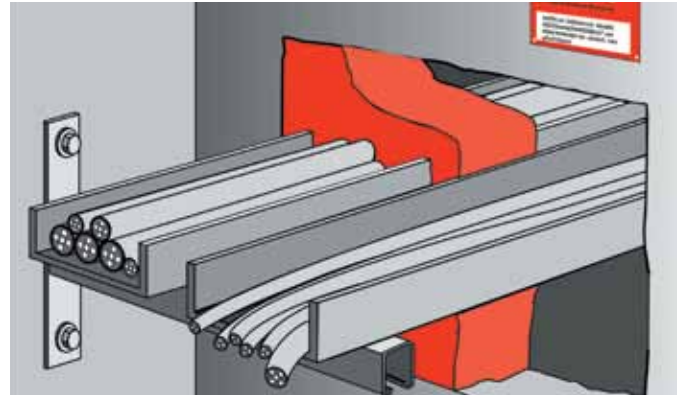
- Sealing medium size to large openings with non-combustible pipes or cable trays
- Permanent fire seal for cables, cable trays and non-combustible pipes

For use with

- Concrete and masonry assemblies
- Walls and floors rated up to 4 hours

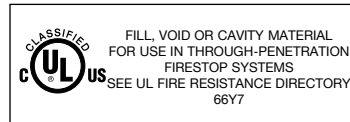
Examples

- Large openings containing multiple steel, conduit and EMT pipes
- Large openings with single or multiple cable tray applications



Technical Data*		CP 637
Color		Light red
Application temperature		40°F to 110°F (5°C to 43°C)
Form removal (depending on consistency)		Approx. 2 hours
Density		Approx. 40.6 pcf (dry)
Expansion on setting (approx.)		0.08%
Compressive strength		
	24 hrs. after casting	After full cure
• Pourable	508 psi (3.5 N/mm ²)	725 psi (5.0 N/mm ²)
• Trowelable	870 psi (6.0 N/mm ²)	1784 psi (12.3 N/mm ²)
Surface burning characteristics (ASTM E84-01)		Flame spread: 5 Smoke development: 0
Yield (30 lb pail)		900–1000 cubic inches depending on mix ratio
Tested in accordance with		
<ul style="list-style-type: none"> • ASTM E 814 • UL 1479 • ASTM E 84 • ASTM G21 • CAN/ULC-S115 		

*At 73°F (23°C) and 50% relative humidity



Installation instructions for CP 637

Notice

- Before handling, read Material Safety Data Sheet and product label for safe usage and health information.
- Instructions below are general guidelines — always refer to the applicable drawing in the UL Fire Resistance Directory or Hilti Firestop Systems Guide for complete installation information

Mix ratio (recommended, mortar to water):

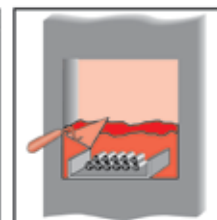
- Trowelable** 30 lb (14.6 kg) : 2 U.S. gal (8 L)
Pourable 30 lb (14.6 kg) : 2.5 U.S. gal (9.5 L)



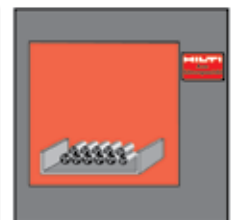
1. Clean penetration. Pre-moisten sides of penetration.



2. Important! First add clean water to separate container. Then slowly add CP 637 to water while stirring by hand or power mixer to ensure smooth, lump-free mix. See table above for mix ratio.



3. Work prepared mortar into opening by troweling, pouring, or pumping with suitable pump. Use forms for large openings. Make sure application has been sealed according to the applicable UL Fire Resistance Directory or Hilti Firestop Manual.



4. Fasten identification plate (if required).



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Firestop Block (CFS-BL)

Product description

- Ready-to-use, intumescent flexible block designed to seal medium to large size openings

Product features

- Integrated "Grid-Tech" increases Annular Space up to 12"
- Suitable for re-penetration or new penetrations
- Economical to use with short installation times
- Easy installation — no special tools required
- Ideal for use in floors — no forming required
- One sided wall systems available
- Halogen, asbestos and solvent free
- Operational immediately after installation
- Smoke resistant

Areas of application

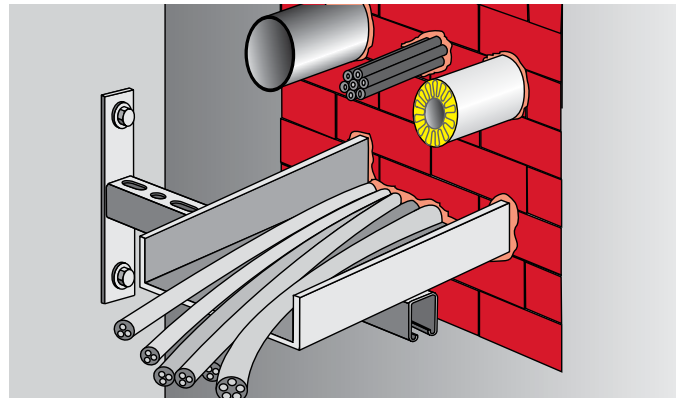
- Sealing single or multiple penetrations in small to large openings
- Temporary or permanent sealing of cables and cable tray penetrations
- Temporary or permanent sealing of insulated and non-insulated metallic pipes and combustible pipe penetrations

For use with

- Walls (UL tested up to max. opening 72" x 36")
- Floors (UL tested up to max. opening 72" x 36")
- Concrete, porous concrete, masonry and gypsum wall assemblies
- Wall assemblies rated up to 4 hours
- Floor assemblies rated up to 3 hours

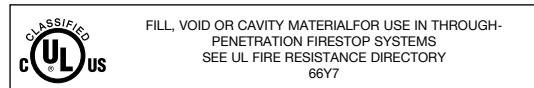
Examples

- Completely dust and fiber free rooms and places where electrical installations are frequently used (ie: computer centers, hospitals, laboratories, etc.)
- New buildings in the construction phase and during renovation
- Large openings containing multiple penetrations as found in production bays, warehouses, hospitals etc.



Technical Data*	CFS-BL
Color	Red
Application temperature	40° F to 104° F (5° C to 40° C)
Temperature resistance	5° F to 140° F (-15° C to 60° C)
Intumescent activation	Approx. 392° F (200° C)
Expansion ratio (unrestricted)	Up to 1:3
Surface burning characteristics (ASTM E 84-10b)	Flame Spread Index: 10 Smoke Development Index: 15
Sound transmission classification (ASTM E 90)	STC Rating: 52
Tested in accordance with • UL 1479 • ASTM E 814 • ASTM E 84 • CAN/ULC-S115	

*At 73°F (23°C) and 50% relative humidity



Installation instructions for Firestop Block CFS-BL

Notice

- Before handling, read Material Safety Data Sheet and product label for safe usage and health information.
- Instructions below are general guidelines — always refer to the applicable drawing in the UL Fire Resistance Directory or Hilti Firestop Systems Guide for complete installation information

Opening

- Clean the opening. Penetration and penetration supporting structures must be installed in compliance with local building and electrical standards.

Application of Firestop Blocks

- If no penetrations are located, build up Firestop Block CFS-BL, firmly seated, within opening.
- If penetrations are located, build up Firestop Block CFS-BL, firmly seated, while cutting blocks with a knife to suit the placed penetrations.
- Finish building up Firestop Blocks until entire opening is filled.
- Completely fill cable spaces, gaps between blocks and pipes, and joints with FS-ONE Firestop Sealant (as required).
- For maintenance reasons, a penetration seal could be permanently marked with an identification plate. In such a case, mark the identification plate and fasten it in a visible position next to the seal.

Re-installing cables or other penetrations

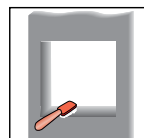
- Remove or cut the block from the seal.
- Install the penetrant and re-lay the block in compliance with the approval. Fill gaps and spaces with FS-ONE Firestop Sealant (as required).
Single cables can be run through joints between blocks or a hole can be drilled through a block using a sharpened piece of metal pipe or tubing.

Not for use

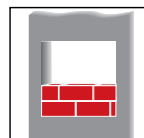
- In wet rooms, outdoors or exposed to the weather or UV radiation (can be done only after applying an additional silicone coating, i.e. CP 601S).

Storage

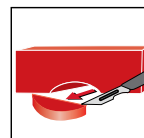
- Store only in the original packaging in a location protected from moisture and direct sunlight



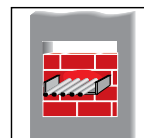
1. Clean opening.



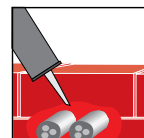
2a. Build up blocks



2b. Cut blocks to size for penetrations in place



3. Build up blocks



4. Fill gaps with FS-ONE, CP 617 or CP 618 putty (as required).



5. Fasten identification plate in place (if required)



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Firestop Board (CP 675T)

Product description

- Ready to use Firestop Board designed for large openings with cable trays and multiple penetrations

Product features

- Lightweight design
- Satisfies a wide range of application scenarios
- Allows for high flexibility and eases re-penetration/cable mining from one side of the wall
- Easy and fast cable re-penetration and cable mining with reduced labor and materials
- Labor saving "one person, one sided installation" method
- Polyurethane foam material, easy to cut without electric tools
- No dust, no fibers, no mess
- Same system for all types of wall materials

Areas of application

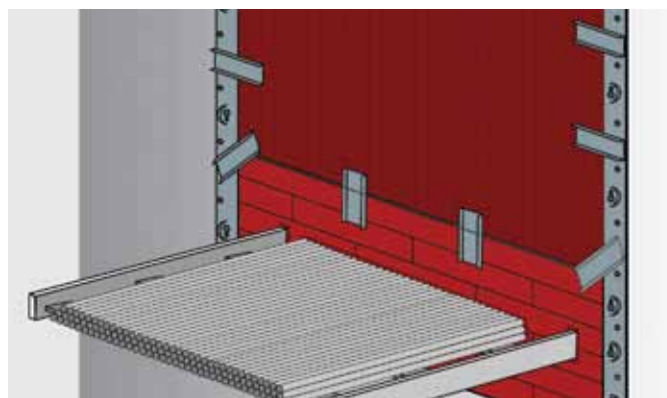
- Temporary or permanent sealing of cables and cable tray penetrations
- Sealing single or multiple penetrations in large openings
- Temporary or permanent sealing of large blank openings

For use with

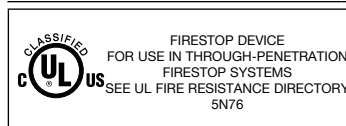
- Concrete, concrete block, and gypsum wall assemblies
- Concrete floor assemblies

Examples

- Locations where telecommunications and electrical applications are modified on a regular basis such as central office facilities, computer data centers, commercial buildings, healthcare facilities, and laboratories
- New buildings under construction and during renovation



Technical Data	CP 675T
Color	Red
Dimensions (LxWxH)	26" x 39" x 1" (Large Board) (660 mm x 990 mm x 25 mm) 26" x 28" x 1" (Small Board) (660 mm x 711 mm x 25 mm)
Density	320 kg/m ³
Application temperature	-22°F to 176°F (-30°C to 80°C)
Temperature resistance	-22°F to 176°F (-30°C to 80°C)
Surface burning characteristics (ASTM E 84-00)	Flame Spread Index: 5 Smoke Development Index: 10
Tested in accordance with	<ul style="list-style-type: none"> UL 1479 ASTM E 814 ASTM G21 CAN/ULC-S115 ASTM E 84



Installation Instructions for CP 675T Firestop Board

Notice

- Before handling, read Material Safety Data Sheet and product label for safe usage and health information.
- Instructions below are general guidelines — always refer to the applicable drawing in the UL Fire Resistance Directory or Hilti Firestop Systems Guide for complete installation information

Surface mounted installation (wall)

- Clean the opening.
- Measure the size of the opening. Cut the Firestop Board to size (check system for overlap requirements) with a utility knife, hand saw, circular saw, jig saw, or table saw.
- If penetrants run through the opening, cut the Firestop Board correspondingly (max. annular space between Board and penetrant: 1/2"). The Board can be cut into two pieces or just cut to allow space for the penetrant(s).
- Apply CP 619T Putty Roll around edges of the Firestop Board next to the wall. In case of penetrants, the cables and cable trays have to be sealed with CP 619T Putty Roll at their interface with the Firestop Board.

- Attach Firestop Board with approved Hilti anchors as specified in accordance with the applicable firestop system. When two Firestop Boards come together, seal intersection with CP 619T Putty Roll or FS-ONE (per firestop system requirements).
- Fasten identification plate (if required).
- Repeat steps on other side of wall.

Frame mounted installation (wall)

- Clean the opening.
- Measure the size of the opening. Cut the CP 675T Z-Frame component to size and attach to top and both sides of opening as specified by firestop system with appropriate Hilti fasteners. Apply CP 619T Putty Roll to back lip of Z-Frame inside opening.
- Apply a maximum of three rows (6") of FS 657 Firestop Blocks in the opening above and below cable tray (lengthwise). Cut the CP 675T T-Separator Bar to the width of the opening and put it on top of the FS 657 Firestop Blocks (T-edge against back of opening). Apply CP 619T Putty Roll to the backward T-Bar edge protruding above the FS 657 Firestop Block section and around back lip of frames.

- Cut Firestop Boards to size +1/2" vertically. Use the extra 1/2" to compress the FS 657 Firestop Block partition and provide a tight fit into the opening. Place CP 675T Distance Holders around Firestop Board at a maximum of every 8". With downward pressure, press top of inside Firestop Board into opening and push flush with back edge of Z-Frame followed by outside Firestop Board inserted flush with wall surface.

- Secure front of Firestop Board with Z-Frame Latches every 8". Apply CP 619T Putty Roll over the intersection between the Board and the Frame. Fill voids around penetrating items within FS 657 Firestop Block partition with Hilti Firestop Putty. Refer to UL systems for complete details.
- Fasten identification plate (if required).

Not for use

- In wet rooms, outdoors or in areas exposed to the weather or UV radiation.

Storage

- Store only in the original packaging in a location protected from moisture and direct sunlight

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Firestop Putty Pad (CP 617, CP 617L and CP 617XL)

Product description

- A moldable firestop putty designed to help protect electrical outlet boxes

Product features

- Applied by hand
- Fast installation

Areas of application

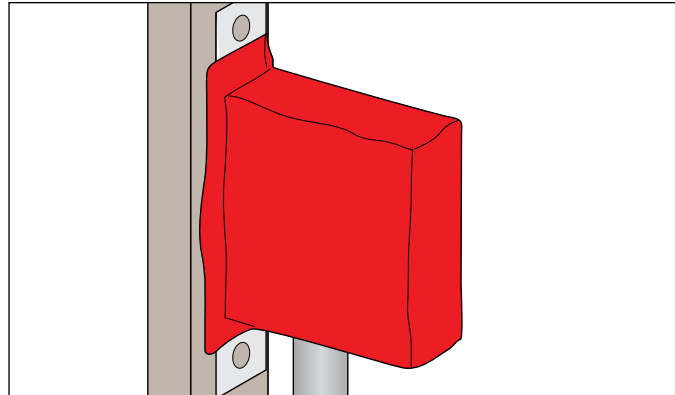
- Protection of electrical outlet boxes

For use with

- Gypsum wall assemblies with wood or metal studs

Examples

- Where two outlets are within a single stud/cavity or within 24" measured horizontally (not back to back unless specified by the specific UL approval)



Technical Data*

Dimensions (LxWxH)

CP 617

CP 617: 6" x 7" x 1/8" (15 x 18 x 0.3 cm)
CP 617L: 7" x 7" x 1/8" (18 x 18 x 0.3 cm)
CP 617XL: 9" x 9" x 1/8" (23 x 23 x 0.3 cm)

Consistency

Moldable putty

Color

Red

Application temperature

40°F (5°C) to 95°F (35°C)

Storage temperature

40°F (5°C) to 104°F (40°C)

Curing time

Non-curing

Density

1.48 g/cm³

Intumescent activation

Approx. 220°F to 250°F
(104°C to 121°C)

Volatile solvents

None

Asbestos fibers

None

Surface burning characteristics (ASTM E 84-96)

Flame Spread: 15
Smoke development: 10

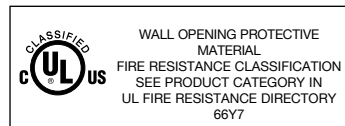
Sound transmission classification (ASTM E 90-97)

59 (Relates to specific construction)

Tested in accordance with

• UL 263 • ASTM E 84 • ASTM G21 • CAN/ULC-S115

*At 73°F (23°C) and 50% relative humidity



Installation instructions for CP 617

Notice

- Before handling, read Material Safety Data Sheet and product label for safe usage and health information.
- Instructions below are general guidelines — always refer to the applicable listing (CLIV) in the UL Fire Resistance Directory or Hilti Firestop Systems Guide for complete installation information

Application of firestop putty

1. After ensuring box is cleaned of loose debris, dirt, oil, moisture, frost and wax, remove label from one side of pad. For a 1 to 2 hour fire rating, one CP 617 pad is required. Exposed side of pad is placed against box.
2. CP 617 Firestop Putty Pads are to be installed to completely cover the exterior surfaces of the outlet box (except for the side of the outlet box against the

stud) and completely seal against the stud within the stud cavity.

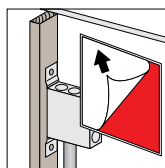
3. Reshape CP 617 to fit around conduit or cables.
4. Press CP 617 to all sides of electrical box.
5. Remove other side of label.

Not for use

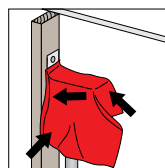
- In areas exposed to water

Storage

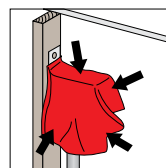
- Store only in the original packaging in a location at temperatures 40°F (5°C) to 104°F (40°C)



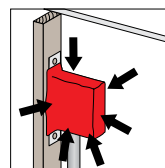
1. Remove label from one side of CP 617



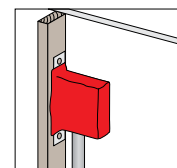
2. Adhere CP 617 to outlet box



3. Reshape CP 617 to fit around box



4. Press CP 617 to all sides of outlet box



5. Remove other side of label



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Firestop Putty Stick (CP 618)

Product description

- An intumescent, non-hardening, firestop putty for cable and pipe penetrations

Product features

- Contains no volatile solvents or asbestos
- Easy to re-penetrate
- Reusable
- Easy to add or remove cables
- Fast installation

Areas of application

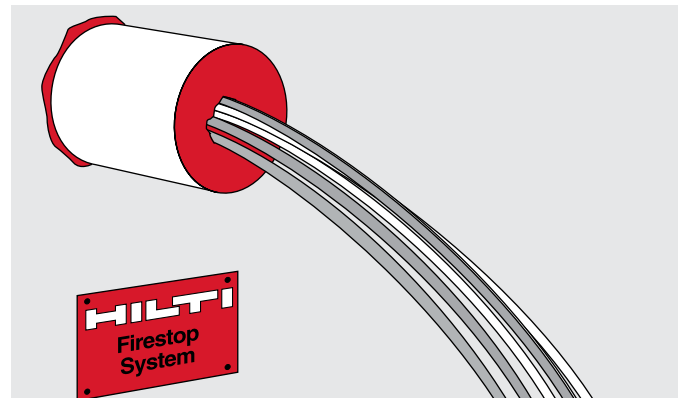
- Single or bundled cables
- Non-combustible pipe
- Blank openings

For use with

- Concrete, masonry and gypsum wall assemblies
- Wall and floor assemblies rated up to 3 hours

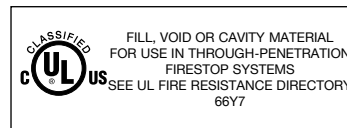
Examples

- Where telecommunication and data lines penetrate gypsum wall assemblies
- Where steel conduit and EMT penetrate concrete and block wall assemblies
- Where blank openings exist in concrete and block wall assemblies



Technical Data*	CP 618
Volume	18 in ³
Consistency	Moldable putty
Color	Red
Application temperature	40°F to 95°F (5°C to 35°C)
Curing time	Non-curing
Density	Approx. 1.48 g/cm ³
Surface burning characteristics (ASTM E84-96)	Flame Spread: 15 Smoke development: 10
Sound transmission classification (ASTM E 90-97)	49 (Relates to specific construction)
Tested in accordance with	
<ul style="list-style-type: none"> • UL 1479 • ASTM E 814 • ASTM G21 • CAN/ULC-S115 • ASTM E 84 	

*At 73°F (23°C) and 50% relative humidity



Installation instructions for CP 618

Notice

- Before handling, read Material Safety Data Sheet and product label for safe usage and health information.
- Instructions below are general guidelines — always refer to the applicable drawing in the UL Fire Resistance Directory or Hilti Firestop Systems Guide for complete installation information

Opening

1. Clean the opening: Surfaces to which CP 618 will be applied should be cleaned of loose debris, dirt, oil, moisture, frost and wax.

Application of firestop putty

2. Install the prescribed backing material, if required.
3. Install CP 618 Firestop Putty to the required depth, making sure that the putty contacts all surfaces to provide the greatest adhesion.

4. Smooth CP 618 putty.

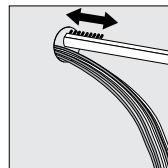
5. For maintenance reasons, a penetration seal can be permanently marked with an identification plate and fastened in a visible position next to the seal.
6. Re-installation (not shown): Remove and re-install CP 618 Firestop Putty as needed.

Not for use

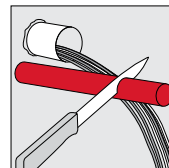
- In areas exposed to water

Storage

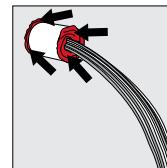
- Store only in the original packaging at temperatures 40°F to 104°F (5°C to 40°C)



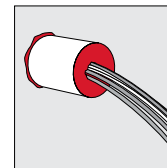
1. Clean opening



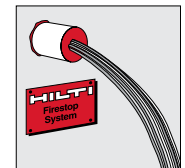
2. Slice CP 618 to be packed into opening from stick (optional sleeve)



3. Pack in CP 618



4. Smooth CP 618



5. Fasten installation plate (if required)



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Firestop Plug (CFS-PL)

Product description

- Ready-to-use intumescent and reusable plug for small openings

Product features

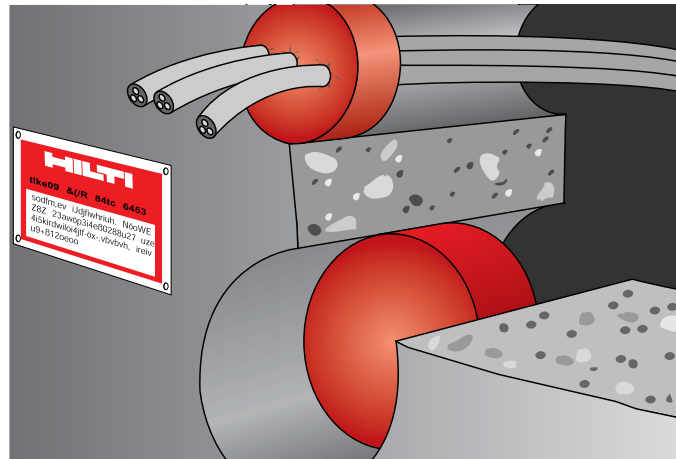
- Fast and easy installation — no special tools required, helps reduce installation time and costs
- Immediately functional after installation
- Suitable for laying new cables later
- Versatile in use (temporary or permanent protection)
- Smoke resistant
- One-sided installation wall systems available
- Halogen and solvent free
- Paintable

Areas of application

- Walls and floors
- Temporary or permanent sealing of cables — single or bundled cables

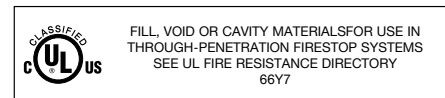
Examples

- Dust and fiber free rooms and places where electrical installations are frequently changed such as computer centers, hospitals and laboratories
- New buildings in the construction phase and during renovation
- Office buildings, production bays, warehouses



Technical Data*	CFS-PL
Density	Approx. 0.27 g/cm³
Color	Red
Application temperature	40°F to 104°F (5°C to 40°C)
Temperature resistance	5°F to 140°F (-15°C to 60°C)
Intumescent activation	Approx. 392°F (200°C)
Expansion ratio (unrestricted)	Approx. 1:3
Surface burning characteristics (ASTM E 84-10b)	Flame Spread Index: 10 Smoke Development Index: 15
Sound Transmission Classification (ASTM E 90)	STC Rating: 55
Tested in accordance with • UL 1479 • ASTM E 814 • ASTM E 84 • ASTM E 90 • CAN/ULC S115	

*At 73°F (23°C) and 50% relative humidity



Installation instructions for Firestop Plug CFS-PL

Notice

- Before handling, read Material Safety Data Sheet and product label for safe usage and health information.
- Instructions below are general guidelines — always refer to the applicable drawing in the UL Fire Resistance Directory or Hilti Firestop Systems Guide for complete installation information

Opening

- Clean the opening. Surfaces Firestop Plug CFS-PL will be in contact with, should be cleaned of loose debris, dirt, oil, moisture, frost and wax.

Application of firestop plug

- If there are no penetrations, install Firestop Plug CFS-PL within opening and bead with Hilti CP 618 Putty Stick where firestop plug interfaces with inside of sleeve (when required).
- If there are penetrations, cut Firestop Plug CFS-PL to fit around cables.

- Insert firestop plug into sleeve. Optional: seal cables by forcing CP 618 into interstices of cables.
- For maintenance reasons, a penetration seal can be permanently marked with an identification plate and fastened in a visible position next to the seal.

Re-installing cables

- Remove firestop plug from opening
- Install the penetrant and re-install the firestop plug in compliance with the appropriate UL system.

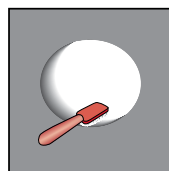
- If single cables are installed, a hole can be drilled through the firestop plug and a cable passed through.

Not for use

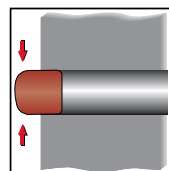
- In wet rooms or outdoors exposed to the weather or UV radiation

Storage

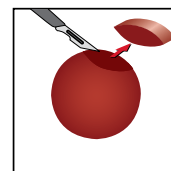
- Store only in the original packaging in a location protected from moisture and direct sunlight



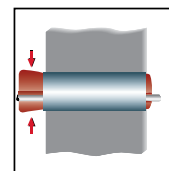
1. Clean opening



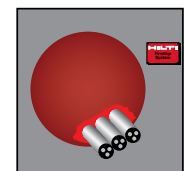
2. Blank opening: Install plug and CP 618 Putty Stick



3a. With cables: Cut plug to fit around cables



3b. Install plug around cables (optional: CP 618 Putty Stick forced into interstices of cables)



4. Fasten installation plate in place (if required)



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Firestop Collar (CP 643N)

Product description

- A ready-to-use firestop collar, made of a galvanized steel housing and intumescent inserts for firestopping combustible pipes

Product features

- Ready-to-use collar
- No construction required
- Fast installation time
- Adjustable mounting tabs
- Low profile for tight installations

Areas of application

- Firestopping combustible pipes up to 6" diameter in penetrations through fire walls and floors
- Suitable for the following pipe materials:
- PVC, CPVC, ABS, PVDF, PP and FRPP

For use with

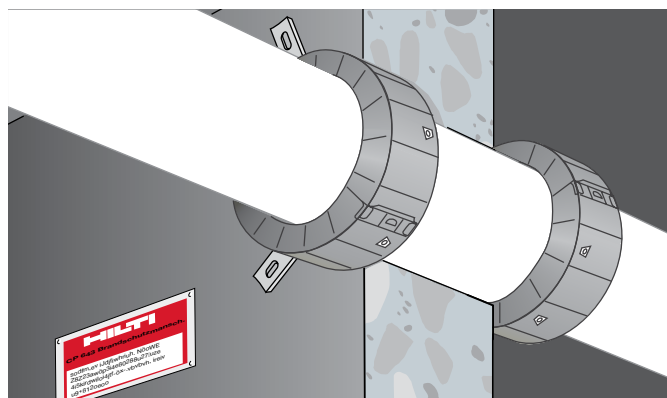
- Concrete, masonry, wood floor and gypsum wall assemblies
- Wall and floor assemblies rated up to 4 hours

Types of installation

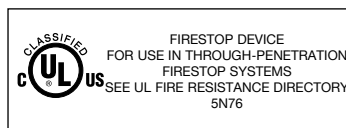
- Wall: two collars, one on each side
- Floor: one collar on underside (bottom)

Example

- Waste water pipes
- Fresh water pipes



Technical Data		CP 643N		
Description	Pipe outside dia (in.)	Collar outside dia. (in.)	Collar Height (in.)	No. of hooks and fasteners
CP 643-50/1.5"N	1.4-2.0	2.8	0.9	2
CP 643-63/2"N	2.0-2.5	3.4	1.3	2
CP 643-90/3"N	2.6-3.6	4.9	1.7	3
CP 643-110/4"N	3.6-4.5	6.0	1.9	3
CP 643-160/6"N	6.6	9.8	1.9	4
Temperature resistance		-40°F to 140°F (-40°C to 60°C)		
Intumescent activation		Approx. 392°F (200°C)		
Expansion ratio (unrestricted)		Up to 1:10		
Tested in accordance with				
• UL 1479 • ASTM E 814 • ASTM G21 • CAN/ULC-S115				



Installation instructions for CP 643N

Notice

- Before handling, read Material Safety Data Sheet and product label for safe usage and health information.
- Instructions below are general guidelines — always refer to the applicable drawing in the UL Fire Resistance Directory or Hilti Firestop Systems Guide for complete installation information

Opening

1. Clean the plastic pipes. Expansion of the intumescent material during a fire acts to close the plastic pipe. Very dirty pipes (ie: with remains of mortar) may lead to a delay in this closing action. Soiled plastic pipes should, therefore, be cleaned in the area where the CP 643N Firestop Collar is to be installed.

Application of firestop system

2. Seal the opening if required. Gaps may be closed with FS-ONE. The approved methods vary and are given in the specific UL system.
3. Close the CP 643N Firestop Collar. Place the CP 643N Firestop Collar around the plastic pipe and lock the closure by applying firm pressure until it latches.
4. Attach fastening hooks. The fastening hooks can be attached to various points on the metal housing. This allows the fastening points to be made to suit the space available in each case. The hooks must be positioned as symmetrically as possible. The required number of fastening hooks is indicated on the packaging.

5. Fastening the CP 643N Firestop Collar. Only when fastened properly can CP 643N offer protection against fire.

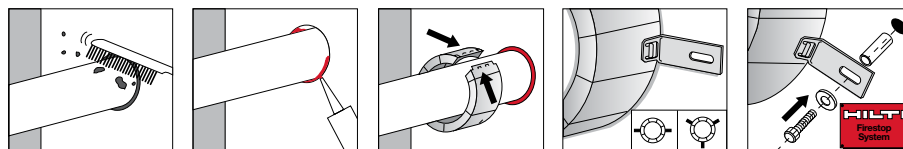
- a. Mark the fastening points.
- b. Drill holes with a Hilti rotary hammer drill (i.e. TE 4-A18) or, depending on base material, fasten using Hilti powder-actuated tool.
- c. To secure the CP 643N Firestop Collar, use Hilti anchors/fasteners.
- d. For maintenance reasons, a penetration can be permanently marked with an identification plate and fastened in a visible position next to the seal.

Not for use

- With metal pipes
- In highly corrosive surroundings
- With unapproved anchors/fasteners

Storage

- Store only in the original packaging in a location protected from moisture



1. Clean plastic pipe.

2. Close remaining gap to provide smoke and gas resistant seal.

3. Close collar.

4. Attach fastening hooks.

5. Fasten collar and identification plate (if required).

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Firestop Wrap Strip (CP 648-S)

Product description

- A single wrap strip of intumescent, flexible firestop for use with plastic and insulated pipe penetrations

Product features

- Highly intumescent
- Pre-measured — no cutting required
- Integrated fastening tape
- Cost effective
- Quick and easy closure without tools
- Ideal for very tight installations

Areas of application

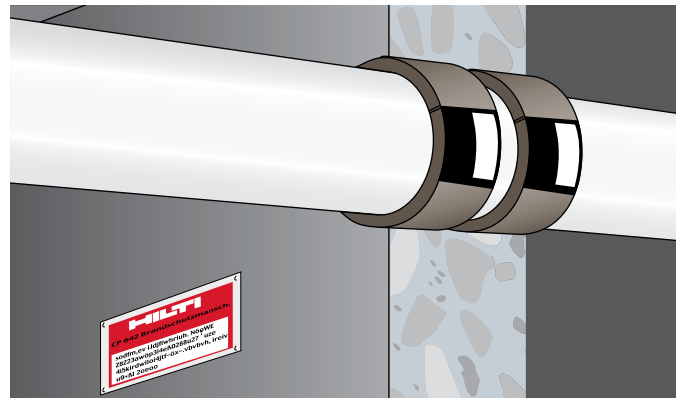
- Firestopping combustible pipe penetrations
- Difficult applications where space is limited
- Penetrations through concrete over metal deck
- Suitable for the following plastic pipe materials: PVC, CPVC, ABS, FRPP

For use with

- Concrete, masonry, wood floor and gypsum wall assemblies
- Wall and floor assemblies rated up to 3 hours

Examples

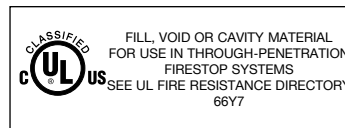
- Waste water pipes
- Fresh water pipes
- Decking penetrations



Technical Data*

Technical Data*	CP 648-S
Density	Approx. 1.35 g/cm³
Dimension (approximate) (thkns" x width" x length")	1.5": 3/16" x 1" x 6-3/4" 2": 3/16" x 1" x 8-1/4" 3": 3/16" x 1-3/4" x 11-1/2" 4": 3/8" x 1-3/4" x 15" 6": 1/2" x 1-3/4" x 22-1/4"
Color	Black with foil backing
Temperature resistance	-40°F to 212°F (-40°C to 100°C)
Intumescent activation	Approx. 320°F (160°C)
Expansion ratio (unrestricted)	1:40
Tested in accordance with	
• UL 1479 • ASTM E 814 • ASTM G21 • CAN/ULC-S115	

*At 73°F (23°C) and 50% relative humidity



Installation instructions for CP 648-S

Notice

- Before handling, read Material Safety Data Sheet and product label for safe usage and health information.
- Instructions below are general guidelines — always refer to the applicable drawing in the UL Fire Resistance Directory or Hilti Firestop Systems Guide for complete installation information

Installation

1. Clean the plastic or insulated pipe penetration. Expansion of the intumescent material during a fire closes the plastic pipe. Very dirty pipes (ie: with remains of mortar) may lead to a delay in the closing action. Soiled plastic or insulated pipes should, therefore, be cleaned in the area where the CP 648-S Firestop Wrap Strip is to be installed.
2. Install Wrap Strip. First check the annular space to ensure compatibility with the appropriate UL System. Use the CP 648-S Firestop Wrap Strip corresponding to the diameter of the pipe to be installed. Wrap the CP 648-S strip around the pipe and fasten it tightly using the integrated adhesive strip.

Push the CP 648-S Firestop Wrap Strip into the annular space in accordance with the UL listing.

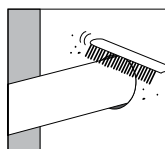
3. Seal against smoke and gas. Seal the remaining gap with Hilti FS-ONE sealant.
4. For maintenance reasons, a penetration seal can be permanently marked with an identification plate and fastened in a visible position next to the seal.

Not for use

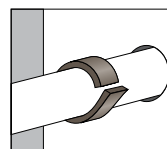
- In highly corrosive surroundings
- Outdoors

Storage

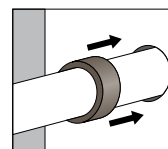
- Store only in the original packaging in a location protected from moisture at temperatures between 23°F and 86°F (-5°C and 30°C).



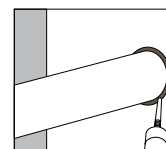
1. Clean penetration



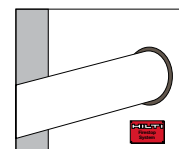
2A. Wrap the CP 648-S Wrap Strip around the pipe and fasten it tightly with the adhesive strip.



2B. Push the CP 648-S Wrap Strip along the pipe and into the annular space as indicated above.



3. Seal penetration against smoke with FS-ONE sealant.



4. Fasten installation plate (if required)



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Firestop Wrap Strip (CP 648-E)

Product description

- An intumescent, flexible firestop wrap strip for plastic and insulated pipe penetrations

Product features

- Highly Intumescent
- Long length avoids waste
- Can be continuously wrapped
- Cost effective
- Quick and easy closure without tools
- Ideal for very tight installations

Areas of application

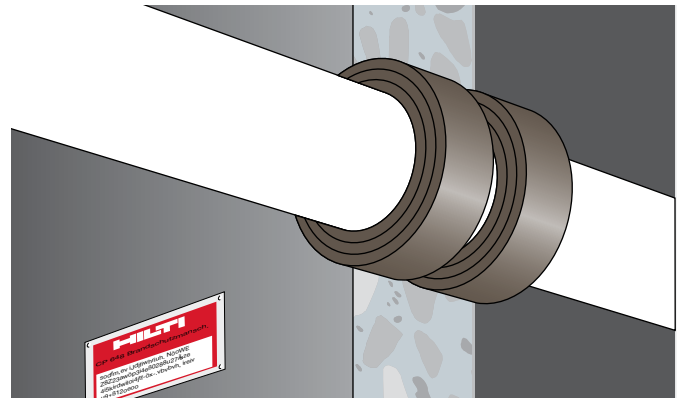
- Firestopping combustible pipe penetrations
- Difficult applications where space is limited
- Penetrations through concrete over metal deck
- Plastic and insulated penetrations using PVC, CPVC, ABS, FRPP and PEX

For use with

- Concrete, masonry, wood floor and gypsum wall assemblies
- Wall and floor assemblies rated up to 4 hours

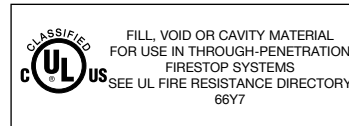
Examples

- Waste water pipes
- Fresh water pipes
- Decking penetrations



Technical Data*	CP 648-E
Density	Approx. 1.35 g/cm ³
Dimensions (approximate)	3/16" x 1" x 33 ft or 3/16" x 1-3/4" x 33 ft
Color	Black with foil backing
Temperature resistance	-40°F to 212°F (-40°C to 100°C)
Intumescent activation	Approx. 320°F (160°C)
Expansion ratio (unrestricted)	1:40
Tested in accordance with	
• UL 1479 • ASTM E 814 • ASTM G21 • CAN/ULC-S115	

*At 73°F (23°C) and 50% relative humidity



Installation instructions for CP 648-E

Notice

- Before handling, read Material Safety Data Sheet and product label for safe usage and health information.
- Instructions below are general guidelines — always refer to the applicable drawing in the UL Fire Resistance Directory or Hilti Firestop Systems Guide for complete installation information

Opening

1. Clean the plastic or insulated pipe penetration.
Expansion of the intumescent material during a fire closes the plastic or insulated pipe penetration. Very dirty pipes (ie: with remains of mortar) may lead to a delay in this closing action. Soiled plastic pipes or insulated pipe penetrations should, therefore, be cleaned in the area where the CP 648-E Firestop Wrap Strip is to be installed.

Application of firestop system

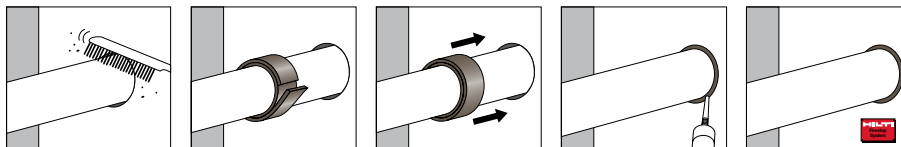
2. Tightly wrap the required number of strips continuously around the penetrant, and hold in place with tape.
3. Push the Hilti Wrap Strip into the opening until it is flush with the substrate surface unless otherwise required by the UL system. It may be required by the UL system to clamp, wire or use a Hilti Retaining Collar to secure the wrap strip in place for some applications.
4. If the UL system requires a cold smoke seal, then apply the proper amount of Hilti FS-ONE sealant in the opening over the wrap strip.
5. For maintenance reasons, a penetration seal can be permanently marked with an identification plate and fastened in a visible position next to the seal.

Not for use

- In highly corrosive surroundings
- With unapproved retaining collars, anchors/fasteners
- Outdoors

Storage

- Store only in the original packaging in a location protected from moisture at temperatures between 23°F and 86°F (-5°C and 30°C).



1. Clean penetration

2. Wrap strips around pipe the specified number of times

3. Push Wrap Strips into hole

4. Seal penetration against smoke with FS-ONE

5. Fasten installation plate (If required)

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Smoke and Acoustic Sealant (CP 506)

Applications

- Sealing construction joints and through-penetration openings in non fire-rated acoustical assemblies and smoke partitions (Not for use in fire-rated applications)

Advantages

- Easy to dispense, apply and tool
- Excellent airborne sound insulation properties
- Low shrinkage after curing
- Easy cleaning with water
- Paintable

Tested/evaluated in accordance with:

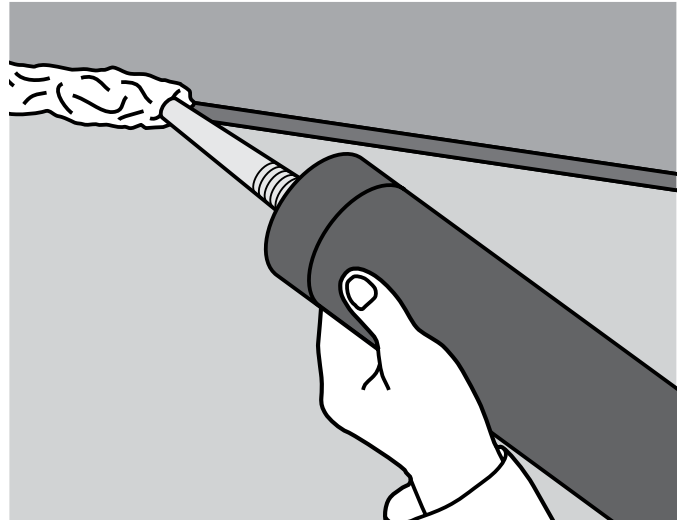
- ASTM E 90
- ASTM C 834
- ASTM E 84
- ASTM C 919



Restricts smoke migration



Excellent sound insulation characteristics with application based testing in accordance with ASTM E 90.



Technical Data	CP 506
Color	white
Chemical basis	acrylic
Storage and transport temperature range	40°F to 77°F (5°C to 25°C)
Curing time (73°F / 50% relative humidity)	approx. 3 mm / 3 days
Skin-forming time (73°F / 50% relative humidity)	approx. 15 min
Application temperature range	40°F to 104°F (5°C to 40°C)
Shelf life	24 months from date of manufacture
Sound transmission classification (ASTM E 90)	STC 63 (per tested construction type)
Movement capability (ISO 11600)	approx. 12.5%
Mold and mildew (ASTM G 21)	mold resistant
Surface burning characteristics (ASTM E 84-08)	Flame spread: 10 Smoke development: 10
Air leakage (Modified UL 2079 L-Rating)	L-Rating at Ambient = Less than 1 CFM / Lin Ft. L-Rating at 400°F = Less than 1 CFM / Lin Ft.

Installation instructions for CP 506

Notice

- Before handling, read Material Safety Data Sheet and product label for safe usage and health information.
- Instructions below are general guidelines — always refer to the product label, applicable product test reports and/or architect requirements

Opening

- Clean the opening. Surfaces to which CP 506 will be applied should be cleaned of loose debris, dirt, oil, wax, grease, and other contaminants. The surface should be moisture and frost free.

Application of sealant

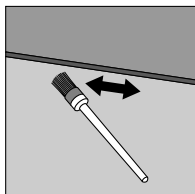
- Apply sealant in opening at required depth
- Smooth sealant with a trowel before the skin forms. Once cured, CP 506 can only be removed mechanically

Not for use

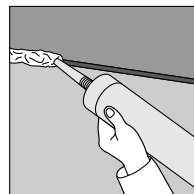
- In areas immersed in water

Storage

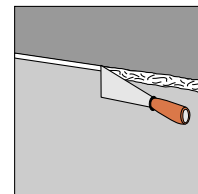
- Store only in the original packaging in a location protected from moisture at a temperature of 40°F to 77°F (5°C to 25°C)
- Observe expiration date on package



1. Clean opening



2. Apply CP 506



3. Tool CP 506



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Smoke and Acoustic Spray (CP 572)

Applications

- Sealing construction joint openings in non fire-rated acoustical assemblies and smoke partitions (Not for use in fire-rated applications)

Advantages

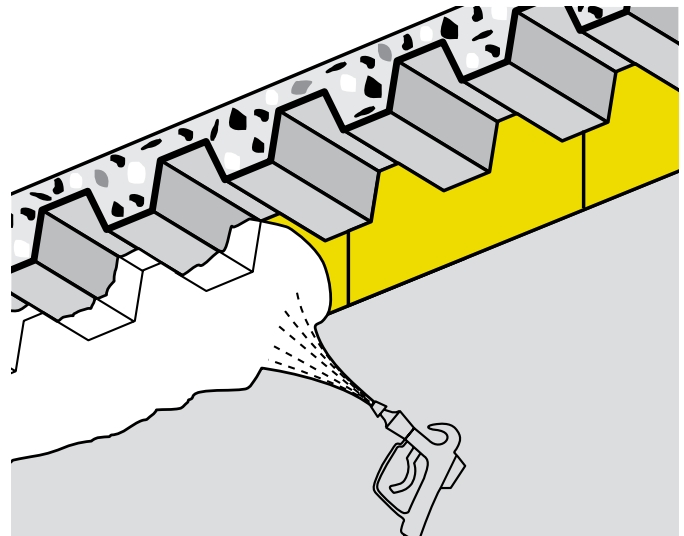
- Quick and easy spray application
- Can be applied at low temperatures
- Excellent airborne sound insulation properties
- High elasticity for good movement absorption
- Excellent sprayability and low slump characteristics
- Paintable



Restricts smoke migration



Excellent sound insulation characteristics with application based testing in accordance with ASTM E 90.



Technical Data	CP 572
Color	white
Chemical basis	acrylic
Storage and transport temperature range	40°F to 77°F (5°C to 25°C)
Curing time approx. (73°F / 50% relative humidity)	approx. 3 mm / 3 days
Skin-forming time (73°F / 50% relative humidity)	approx. 15 min
Application temperature range	40°F to 104°F (5°C to 40°C)
Shelf life	12 months from date of manufacture
Sound transmission classification (ASTM E 90)	STC 56 (per tested construction type)
Surface burning characteristics (ASTM E 84-08)	Flame spread: 10 Smoke development: 5
Movement capability	approx. 12.5%
Mold and mildew (ASTM G 21)	mold resistant
Air leakage (Modified UL 2079 L-Rating)	L-Rating at Ambient = Less than 1 CFM / Lin Ft. L-Rating at 400°F = Less than 1 CFM / Lin Ft.

Installation instructions for CP 572

Notice

- Before handling, read Material Safety Data Sheet and product label for safe usage and health information.
- Instructions below are general guidelines — always refer to the product label, applicable product test reports and/or architect requirements.

Opening

- Clean the opening. Surfaces to which CP 572 will be applied should be cleaned of loose debris, dirt, oil, wax, grease, and contaminants. The surface should be moisture and frost free.

Application of spray

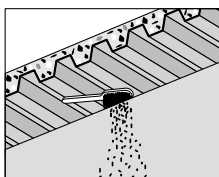
- Install mineral wool backing to required depth
- Application of spray: Apply CP 572 to the required depth in order to obtain desired sound rating. Make sure CP 572 contacts all surfaces and overlaps beyond all surrounding surfaces (Refer to test reports). Titan Sprayers have been successful in applying CP 572 Smoke and Acoustic Spray. Hilti recommends the use of the Titan 600 (for application temperatures above 50°F) or 1100 Sprayers. CP 572 may also be brushed on with a paint brush.

Not for use

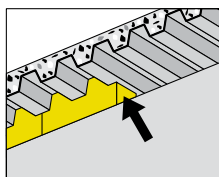
- In areas immersed in water
- On hot surfaces (above 176°F)

Storage

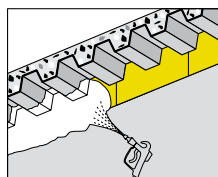
- Store only in the original packaging at temperatures 40°F to 77°F (5°C to 25°C)
- Observe expiration date on package



1. Clean opening



2. Install mineral wool



3. Spray or brush on CP 572



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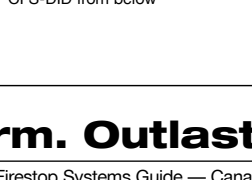

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Ordering Information

Description	Color	Volume	Qty	Item No.	
CP 653 2" Speed Sleeve	-	-	1	00236323	
CP 653 4" Speed Sleeve	-	-	1	00236324	
CP 680-P 2" Cast-In Device for Combustible Penetrations	Red	-	1	00244244	
CP 680-P 3" Cast-In Device for Combustible Penetrations	Red	-	1	00244245	
CP 680-P 4" Cast-In Device for Combustible Penetrations	Red	-	1	00244246	
CP 680-P 6" Cast-In Device for Combustible Penetrations	Red	-	1	00244247	
CP 680-M 2" Cast-In Device for Metallic Penetrations	Black	-	1	00244248	
CP 680-M 3" Cast-In Device for Metallic Penetrations	Black	-	1	00244249	
CP 680-M 4" Cast-In Device for Metallic Penetrations	Black	-	1	00244250	
CP 680-M 6" Cast-In Device for Metallic Penetrations	Black	-	1	00244251	

Description	For use with	Core bit size	Pipe size	Qty	Item No.	
CFS-DID Drop-In Device 2" C	6" to 12" thick concrete / metal deck	4"	up to 2" *	1	02008097	
CFS-DID Drop-In Device 3" C		5"	3"	1	02008098	
CFS-DID Drop-In Device 4" C		6"	4"	1	02008099	
CFS-DID Drop-In Device 6" C		9"	6"	1	02008250	
CFS-DID Drop-In Device 2" MD	2-1/2" to 8" thick concrete / metal deck	4"	up to 2" *	1	02008251	
CFS-DID Drop-In Device 3" MD		5"	3"	1	02008252	
CFS-DID Drop-In Device 4" MD		6"	4"	1	02008253	
CFS-DID Drop-In Device 6" MD		9"	6"	1	02015574	
CFS-DID Drop-In Device 2" HC8	7-1/2" to 8-1/2" thick hollow core	4"	up to 2" *	1	02008254	
CFS-DID Drop-In Device 3" HC8		5"	3"	1	02008255	
CFS-DID Drop-In Device 4" HC8		6"	4"	1	02008256	
CFS-DID Drop-In Device 2" HC10	9-1/2" to 10-1/2" thick hollow core	4"	up to 2" *	1	02008257	
CFS-DID Drop-In Device 3" HC10		5"	3"	1	02008258	
CFS-DID Drop-In Device 4" HC10		6"	4"	1	02008259	
CFS-DID Drop-In Device 2" HC12	11-1/2" to 12-1/2" thick hollow core	4"	up to 2" *		02008260	
CFS-DID Drop-In Device 3" HC12		5"	3"	1	02008261	
CFS-DID Drop-In Device 4" HC12		6"	4"	1	02008262	
CFS-DID Adapter 2" • Adapter to hold top seal plug in place • Adds 1" to the overall height	All Drop-In Device sizes 2"	-	-	6	02008266	CFS-DID from below

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Ordering Information

Description	Color	Volume	Qty	Item No.	
1" Height Extension for 2" CP 680-P/M	Red	-	10	00203893	
1" Height Extension for 3" CP 680-P/M	Red	-	10	00203894	
1" Height Extension for 4" CP 680-P/M	Red	-	5	00203895	
1" Height Extension for 6" CP 680-P/M	Red	-	1	00203896	
6" Height Extension for 2" CP 680-P/M	Red	-	10	03424887	
6" Height Extension for 3" CP 680-P/M	Red	-	10	03424888	
6" Height Extension for 4" CP 680-P/M	Red	-	10	03424889	
6" Height Extension for 6" CP 680-P/M	Red	-	1	03424890	
6" Height Extension for 2" CP 680-P/M	Black	-	10	03424891	
6" Height Extension for 3" CP 680-P/M	Black	-	10	03424892	
6" Height Extension for 4" CP 680-P/M	Black	-	10	03424943	
6" Height Extension for 6" CP 680-P/M	Black	-	1	03424944	
CP 680-P/M 2" MD	Red	-	10	03424945	
CP 680-P/M 3" MD	Red	-	10	03424946	
CP 680-P/M 4" MD	Red	-	10	03424947	
CP 680-P/M 6" MD	Red	-	1	03424948	
CP 680-P/M 2" MD	Black	-	10	03424949	
CP 680-P/M 3" MD	Black	-	10	03424950	
CP 680-P/M 4" MD	Black	-	10	03424951	
CP 680-P/M 6" MD	Black	-	1	03424952	
CP 680-P/M 2" WR	Red	-	10	00244260	
CP 680-P/M 3" WR	Red	-	10	00244261	
CP 680-P/M 4" WR	Red	-	5	00244262	
CP 680-P/M 6" WR	Red	-	1	00244263	
Top Seal, IPS 1/2" Use with CP 680-P/M and 1/2" iron pipe size (Schedule 40)	Red	-	10	03425366	
Top Seal, IPS 3/4" Use with CP 680-P/M and 3/4" iron pipe size (Schedule 40)	Red	-	10	03425367	
Top Seal, IPS 1" Use with CP 680-P/M and 1" iron pipe size (Schedule 40)	Red	-	10	03425368	
Top Seal, IPS 1-1/2" Use with CP 680-P/M and 1-1/2" iron pipe size (Schedule 40)	Red	-	10	03425370	
Top Seal, IPS 2" Use with CP 680-P/M and 2" iron pipe size (Schedule 40)	Red	-	10	03425371	
Top Seal, CPS 1/2" Use with CP 680-P/M and 1/2" copper tubing size	Red	-	10	03425372	
Top Seal, CPS 3/4" Use with CP 680-P/M and 3/4" copper tubing size	Red	-	10	03425403	
Top Seal, CPS 1" Use with CP 680-P/M and 1" copper tubing size	Red	-	10	03425404	
Top Seal, CPS 1-1/4" Use with CP 680-P/M and 1-1/4" copper tubing size	Red	-	10	03425405	
Top Seal, CPS 1-1/2" Use with CP 680-P/M and 1-1/2" copper tubing size	Red	-	10	03425406	
Top Seal, CPS 2" Use with CP 680-P/M and 2" copper tubing size	Red	-	10	03425407	










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Ordering Information

Description	Color	Volume	Qty	Item No.	
Tub Box Kit Standard — Uncut 10-1/2" Height Includes tub box, sealing bushing for schedule 40 pipe, (2) legs, flange and styrofoam inlay. Field cut to desired height	-	-	1	00377920	
Tub Box Kit Custom — Precut to desired slab thickness* Includes tub box, sealing bushing for schedule 40 pipe, (2) legs, flange and styrofoam inlay	-	-	1	03002087	
Bushing, Standard (1-1/2", Schedule 40)	-	-	1	03410182	
Bushing, Thin Wall (1-1/2")	-	-	1	03009526	
Shower Drain Sleeve	-	-	1	03410134	
Floor Drain Sleeve	-	-	10	03425365	
Aerator Adapter, 3"	Red	-	1	00244264	
Aerator Adapter, 4"	Red	-	1	00244265	
FS-ONE, 10.1 oz tube (300 ml)	Red	18.2 in³ ea	12	00259580	
FS-ONE, 20.2 oz foil (600 ml)	Red	36.4 in³ ea	25	00377232	
FS-ONE, 5 gal pail (19 L)	Red	1155 in³	1	00259578	
CP 601S, 10.5 oz tube (310 ml)	Red	18.9 in³ ea	20	00315013	
CP 601S, 20.2 oz foil (600 ml)	Red	36.4 in³ ea	20	00314269	
CP 601S, 5 gal pail (19 L)	Red	1155 in³	1	00314270	
CP 606, 10.5 oz tube (310 ml)	Red	18.9 in³ ea	20	03436798	


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Ordering Information

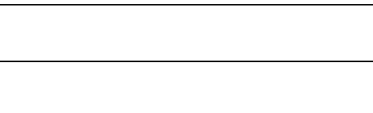
Description	Color	Volume	Qty	Item No.	
CP 606, 19.6 oz foil (580 ml)	White	35.3 in ³ ea	20	03441442	
CP 606, 19.6 oz foil (580 ml)	Red	35.3 in ³ ea	20	00209634	
CP 606, 19.6 oz foil (580 ml)	Gray	35.3 in ³ ea	20	03437907	
CP 606, 5 gal pail (19 L)	White	1155 in ³	1	00209637	
CP 606, 5 gal pail (19 L)	Red	1155 in ³	1	00209636	
CP 604, 20.2 oz foil (600 ml)	Gray	36.4 in ³ ea	12	00369637	
CP 604, 4 gal pail	Gray	924 in ³	1	00369177	
CFS-SP WB Firestop Joint Spray, 5 gal pail	Red	1155 in ³	1	00430792	
CFS-SP WB Firestop Joint Spray, 5 gal pail	White	1155 in ³	1	00430793	
CFS-SP WB Firestop Joint Spray, 5 gal pail (** Gray color requires a 6 week lead time)	Gray**	1155 in ³	1	00430802	
Titan Advantage 1100 Sprayer	-	-	1	00334123	
Titan Advantage 600 Sprayer (Temperature 50°F/10°C or warmer)	-	-	1	03426208	
Titan Sprayer Tip .225	-	-	1	00376841	
Titan Sprayer Tip .331	-	-	1	03425297	

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Ordering Information







Description	Flute Dimensions (L x (Flute) x H)	Qty	Item No.	
CP 777 1.5" Speed Plug	36" x (3.5" x 4.5") x 1.5"	18	00371925	
CP 777 2" Speed Plug	36" x (4.5" x 5.5") x 2"	18	00340998	
CP 777 3" Speed Plug	36" x (5" x 7") x 3"	18	00340999	
CP 767 2" Speed Strips (1 Hour)	36" x 0.625" x 2"	84	00374507	
CP 767 2" Speed Strips (2 Hour)	36" x 1.25" x 2"	42	00374508	
CP 767 4" Speed Strips (1 Hour)	36" x 0.625" x 4"	42	00374505	
CP 767 4" Speed Strips (2 Hour)	36" x 1.25" x 4"	21	00374506	
Mineral Wool (46" L x 24" W x 4" H)	17,664 in ³	4	00236993	

Ordering Information

Description	Color	Volume	Qty	Item No.	
CP 620 Fire Foam 10.2 oz tube (300 ml) Includes 1 cartridges, 2 mixers and 1 extension pipe	Red	-	12	00338725	
CP 620 Deluxe Starter Kit Includes 1 dispenser, 12 cartridges, 24 mixers and 12 extension pipes in Hilti case	Red	-	1	00371883	
CP 620 Mixer	-	-	12	00338718	
CP 620 Dispenser	-	-	1	00338720	
CP 620 Extension Pipe	-	-	12	00338716	
CFS-BL Firestop Block (2" x 5" x 8")	Red	80 in ³	1	02030020	
CFS-BL Firestop Block — Case	Red	2,080 in ³	20	03484119	
CP 675T Firestop Board Small 26" x 28"	Red	-	1	00304434	
CP 675T Firestop Board Large 26" x 39"	Red	-	1	00305688	
CP 675T Z-Frame (36" length) Includes fasteners for drywall, concrete, block and steel	-	-	1	00283855	
CP 675T T-Separator Bar (36" length) Includes fastener	-	-	1	00283854	
CP 675T L-Sleeve, Optional (36" length) Includes fasteners for drywall, concrete, block and steel	-	-	5	00283893	
CP 675T Fastener Kit (Surface-Mounted Boards) Includes fasteners for drywall, concrete, block and steel	-	-		00284094	
CP 619T Putty Roll (1" x 12')	-	-	1	00305072	

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Ordering Information

Description	Color	Volume	Qty	Item No.	
CP 617 Putty Pad 6" x 7"	Red	-	20	00309760	
CP 617L Putty Pad 7" x 7"	Red	-	20	00333583	
CP 617XL Putty Pad 9" x 9"	Red	-	20	00373387	
CP 618 Putty Stick	Red	18 in ³ ea	12	00314721	
CFS-PL Firestop Plug 2"	Red	-	10	02030021	
CFS-PL Firestop Plug 4"	Red	-	10	02030022	
CP 643N 50/1.5" Includes 1 collar and 2 fastening hooks	-	-	1	00304325	
CP 643N 63/2" Includes 1 collar and 2 fastening hooks	-	-	1	00304326	
CP 643N 90/3" Includes 1 collar and 3 fastening hooks	-	-	1	00304328	
CP 643N 110/4" Includes 1 collar and 3 fastening hooks	-	-	1	00304329	
CP 643N 160/6" Includes 1 collar and 4 fastening hooks	-	-	1	00304331	
CP 643N Firestop Collar Fastening Hooks Use CP 643N collars	-	-	30	00304345	
CP 648-S Single Wrap Strip 1-1/2"	Black with foil backing	-	10	00304303	
CP 648-S Single Wrap Strip 2"	Black with foil backing	-	10	00304304	
CP 648-S Single Wrap Strip 3"	Black with foil backing	-	10	00304305	
CP 648-S Single Wrap Strip 4"	Black with foil backing	-	10	00304306	
CP 648-S Single Wrap Strip 6"	Black with foil backing	-	6	00304307	
CP 648-E Wrap Strip 1" x 33' roll	Black with foil backing	-	1	00304308	
CP 648-E Wrap Strip 1-3/4" x 33' roll	Black with foil backing	-	1	00304309	

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Ordering Information







Description	Color	Volume	Qty	Item No.	
CP 648-E Retaining Collar 1" x 25'	-	-	1	00283224	
CP 648-E Retaining Collar 1-3/4" x 25'	-	-	1	00283225	
CP 506 smoke and acoustic sealant (580 ml foil pack)	White	35.3 in ³	20	00412590	
CP 506 smoke and acoustic sealant (5 gallon pail)	White	1155 in ³	1	00412591	
CP 572 smoke and acoustic spray (5 gallon pail)	White	1155 in ³	1	00412592	
Foil Dispenser, Manual (CS 270-P1)	-	-	1	00024669	
Foil Dispenser Replacement Nut	-	-	1	00334548	
Foil Dispenser Nozzles	-	-	10	00220139	
Tube Dispenser (CB 200-P1) Use with standard 10 oz (300ml) tubes	-	-	1	00055205	
CS-CG-2400/2300 Dispenser Use with standard 10 oz (300ml) tubes	-	-	1	00024825	



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Description	Color	Volume	Qty	Item No.	
Foil Dispenser, Pneumatic	-	-	1	00374502	
Bulk Firestop Sealant Dispenser	-	-	1	00423363	
Force Flow Bulk Dispenser Loader	-	-	1	03009304	
Follow Plate Assits in loading Bulk Firestop Sealant Dispenser	-	-	1	03024002	
Hilti Firestop System Identification Plate (Plastic) (5-3/4" W x 4-1/8" H)	-	-	10	03450661	
Hilti Firestop System Identification Labels (100 adhesive labels per roll)	-	-	1	00339611	
Stainless Steel Mixing Paddle Specially designed stainless steel paddle mixer for mortars. Has a smooth shank for use with drills equipped with a Jacob style chuck.	-	-	1	00024155	



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How to use this selection chart

1. Identify the penetrating item (metal pipe, cable trays, insulated metal pipe, etc.)
2. Identify the base material being penetrated (concrete, gypsum or wood)
3. Match the two items within the selection chart to identify the approved Hilti UL/Intertek System

Base Material	Penetrating Item	Fire Rating (F Rating)	Hilti Product Used	System Number	Maximum Annular Space	See Page
> Metal Pipe (continued)						
C	Max. 4" steel, cast iron, copper, steel conduit, or EMT (optional sleeve)	3 hr	FS-ONE Intumescent Firestop Sealant or CP 604 Self-Leveling Firestop Sealant	C-AJ-1421	5-3/8"	
C	Max. 30" steel, cast iron, max. 6" copper, steel conduit, or max. 4" EMT	3 hr	CP 604 Self-Leveling Firestop Sealant	C-AJ-1425	1-7/8"	
C	Max. 30" steel, cast iron, max. 6" copper, steel conduit, or max. 4" EMT (sleeved)	2 hr	CP 606 Flexible Firestop Sealant	C-AJ-1435	1-7/8"	
C	Max. 8" steel or cast iron pipe, max. 4" copper pipe or tubing, max 6" steel conduit or EMT (optional sleeve)	2 hr	CP 601S Elastomeric Firestop Sealant	C-AJ-1498	2"	
	C Concrete or concrete block					
	G Gypsum					
	W Wood					

Through-Penetration

Base material	Penetrating item	Fire rating (F rating)	Hilti product used	System number	Maximum annular space	See page
> Blank Openings						
C	Blank Opening (Max. 6" diameter opening) (optional sleeve)	3 Hr	FS-ONE Intumescent Firestop Sealant	C-AJ-0004	-	64
C	Max. 24" x 12" opening	3 Hr	CP 637 Firestop Mortar	C-AJ-0082	-	65
C	Blank Opening (Max. 6" diameter opening) (optional sleeve)	2 Hr	FS-ONE Intumescent Firestop Sealant	C-AJ-0090	-	66
C	Blank Opening (Max. 4" diameter opening) (optional sleeve)	2 Hr	CP 658T Firestop Plug	C-AJ-0097	-	67
C	Blank Opening (Max. 10" diameter — no sleeve) (optional sleeve)	2 Hr	CP 604 Self-Leveling Firestop Sealant	F-A-0001	-	145
C	2", 3", 4" or 6" cast-in firestop device (concrete over metal deck)	3 Hr	CP 680-P Cast-In Firestop Device with CP 618 Firestop Putty Stick	F-A-0006	-	146
C	Max. 30" x 12" or 12" diameter blank opening	3 Hr	CP 604 Self-Leveling Firestop Sealant	F-A-0012	-	147
C	2", 3" or 4" cast-in firestop device (concrete or concrete over metal deck)	3 Hr	CP 680-M/P Cast-In Firestop Device with Mineral Wool	F-A-0014	-	148
G	Blank Opening (Max. 4" diameter sleeved opening)	1 or 2 Hr	CP 658T Firestop Plug	W-L-0003	-	288
G	Max. 24" x 36" opening	1 or 2 Hr	CP 675T Firestop Board	W-L-0014	-	289
> Metal Pipe						
C	Max. 2" steel, cast iron or copper pipe, steel conduit or EMT	2 Hr	FS-ONE Intumescent Firestop Sealant, CP 606 Flexible Firestop Sealant, or CP 601S Elastomeric Firestop Sealant	C-AJ-1010	3-7/8"	68
C	Max. 4" steel, cast iron or copper pipe, steel conduit or EMT (sleeve optional)	2 or 3 Hr	FS-ONE Intumescent Firestop Sealant (3 Hr) or CP 604 Self-Leveling Firestop Sealant (2 Hr)	C-AJ-1011	5-3/8"	69
C	Max. 30" steel or cast iron pipe, max. 6" copper pipe, steel conduit, or max. 4" EMT (sleeve optional)	3 Hr	CP 604 Self-Leveling Firestop Sealant	C-AJ-1012	2"	70
C	Max. 8" steel pipe or cast iron pipe, max 6" steel conduit, max 4" copper pipe/tubing or EMT (optional sleeve)	2 Hr	FS-ONE Intumescent Firestop Sealant	C-AJ-1016	1-7/8"	71
C	Max. 30" steel or cast iron pipe, max. 6" copper pipe or steel conduit, max. 4" EMT (optional sleeve)	3 Hr	FS-ONE Intumescent Firestop Sealant	C-AJ-1226	1-7/8"	73
C	Max. 1" flexible steel conduit or gas piping	2 Hr	FS-ONE Intumescent Firestop Sealant	C-AJ-1346	1-1/4"	74
C	Max. 8" steel or cast iron pipe, max. 4" copper pipe or steel conduit, or EMT (optional sleeve)	3 Hr	CP 606 Flexible Firestop Sealant	C-AJ-1372	1-7/8"	75
C	Max. 30" steel or cast iron pipe, max. 6" copper pipe or steel conduit, max. 4" EMT (optional sleeve)	2 Hr	FS-ONE Intumescent Firestop Sealant	C-AJ-1380	1-7/8"	76

C Concrete or concrete block **G** Gypsum **W** Wood

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Base material	Penetrating item	Fire rating (F rating)	Hilti product used	System number	Maximum annular space	See page
> Metal Pipe (continued)						
C	Max. 30" steel or cast iron pipe, max. 6" copper pipe or steel conduit, max. 4" EMT	3 Hr	CP 604 Self-Leveling Firestop Sealant	C-AJ-1425	1-7/8"	77
C	Max. 30" steel or cast iron pipe, max. 6" copper pipe or steel conduit, max. 4" EMT (sleeve optional) or steel conduit, max. 4" EMT (sleeve optional)	2 Hr	CP 606 Flexible Firestop Sealant	C-AJ-1453	1-7/8"	78
C	Max. 8" steel pipe or cast iron pipe, max 6" steel conduit, max 4" copper pipe/tubing or EMT (optional sleeve)	2 Hr	CP 601S Elastomeric Firestop Sealant	C-AJ-1498	2"	79
C	Max. 8" steel pipe or cast iron pipe, max 6" steel conduit, max 4" copper pipe/tubing or EMT	2 Hr	FS-ONE Intumescent Firestop Sealant	C-AJ-1534	1-7/8"	80
C	Max. 8" steel or cast iron pipe, max. 6" steel conduit, max. 4" copper or EMT (T-rating = 2-3/4 Hr)	3 Hr	FS-ONE Intumescent Firestop Sealant or CP 604 Self-Leveling Firestop Sealant	C-AJ-1597	2"	81
C	Max. 6" steel or cast iron pipe, max. 6" copper pipe, or steel conduit, max. 4" EMT	2 Hr	CP 604 Self-Leveling Firestop Sealant	F-A-1004	9-3/8"	149
C	Max. 6" steel or cast iron pipe, max. 6" copper pipe, or steel conduit, max. 4" EMT (includes concrete over metal deck)	2 Hr	CP 680-P/M Cast-In Firestop Device	F-A-1016	-	150
C	Max. 1" flexible steel conduit (includes concrete over metal deck)	2 Hr	FS-ONE Intumescent Firestop Sealant	F-A-1018	1-1/4"	152
C	Max. 30" steel or cast iron pipe, max. 6" copper pipe or steel conduit, max. 4" EMT (optional sleeve) (includes concrete over metal deck)	2 Hr	FS-ONE Intumescent Firestop Sealant	F-A-1028	1-7/8"	154
C	Max. 30" steel or cast iron pipe, max. 6" copper pipe or steel conduit, max. 4" EMT (includes concrete over metal deck)	2 Hr	FS-ONE Intumescent Firestop Sealant	F-A-1029	7/8"	155
C	Max. 2" copper, brass or cast iron pipe waste/overflow fittings (includes concrete over metal deck)	2 Hr	CP 637 Firestop Mortar	F-A-1051	1-7/8"	156
C	Maximum 10" steel or cast iron pipe, max. 6" steel conduit, max. 4" EMT	2 Hr	FS-ONE Intumescent Firestop Sealant or CP 604 Self-Leveling Firestop Sealant	F-A-1105	2"	157
C	Maximum 3" steel or cast iron pipe with closet flange	2 Hr	FS-ONE Intumescent Firestop Sealant	F-A-1108	3/8"	158
C	Max 6" steel, cast iron, copper, steel conduit or EMT	2 or 3 Hr	CFS-DID Drop-in Device	F-A-1128	-	159
C	Max. 6" steel or cast iron pipe or steel conduit, max. 4" EMT	2 Hr	CP 680-P/M Cast-In Firestop Device	F-B-1010	-	198
C	Max. 6" steel or cast iron pipe or steel conduit, max. 4" EMT	3 Hr	CFS-DID Drop-in Device	F-B-1026	-	199
C	Max. 4" steel or cast iron pipe, copper pipe, or steel conduit, or EMT	3 Hr	CFS-DID Drop-in Device	F-B-1029	-	202
C	Max. 6" steel or cast iron pipe or steel conduit, max. 4" EMT or copper pipe	1 Hr	FS-ONE Intumescent Firestop Sealant	F-E-1004	3/4"	242
C	Max. 4" steel or cast iron pipe or steel conduit or EMT	2 Hr	FS-ONE Intumescent Firestop Sealant	HI/PHV 120-01	1-1/2"	247
C	Max 4" copper pipe	2 Hr	FS-ONE Intumescent Firestop Sealant	HI/PHV 120-03	1-7/8"	249
C	Max. 30" steel or cast iron pipe, max. 6" copper pipe or steel conduit, max. 4" EMT	1 or 2 Hr	FS-ONE Intumescent Firestop Sealant	W-J-1067	2-1/4"	254
C	Max. 8" steel or cast iron pipe, max. 4" copper pipe, max. 6" steel conduit, max. 4" EMT or max. 2" flexible steel conduit (shaft wall)	1 or 2 Hr	FS-ONE Intumescent Firestop Sealant	W-J-1089	1-7/8"	255

C Concrete or concrete block **G** Gypsum **W** Wood

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Base material	Penetrating item	Fire rating (F rating)	Hilti product used	System number	Maximum annular space	See page
> Metal Pipe (continued)						
C	Max. 30" steel or cast iron pipe, max. 6" copper pipe or steel conduit, max. 4" EMT	2 Hr	CP 606 Flexible Firestop Sealant	W-J-1128	1-7/8"	256
C	Max. 6" cast or ductile iron pipe	2 Hr	FS-ONE Intumescent Firestop Sealant	W-J-1174	1"	257
G	Max. 30" steel or cast iron pipe, max. 6" copper pipe or steel conduit, max. 4" EMT	1 or 2 Hr	FS-ONE Intumescent Firestop Sealant	W-L-1054	2-1/4"	290
G	Max. 8" steel or cast iron pipe, max. 4" copper pipe, max. 6" steel conduit, max 4", max. EMT, max. 2" flexible steel conduit (Shaft Wall)	1 or 2 Hr	FS-ONE Intumescent Firestop Sealant	W-L-1206	1-7/8"	293
G	Max. 4" steel, cast iron, copper pipe, steel conduit or EMT	1 or 2 Hr	CP 606 Flexible Firestop Sealant	W-L-1290	1/2"	294
G	Max. 30" steel or cast iron pipe, max. 6" copper pipe or steel conduit, max. 4" EMT	2 Hr	CP 606 Flexible Firestop Sealant	W-L-1297	2"	295
G	Max. 6" cast iron pipe	1 or 2 Hr	FS-ONE Intumescent Firestop Sealant	W-L-1359	1"	296
W	Max. 4" steel, cast iron, copper pipe, steel conduit or EMT	1 or 2 Hr	FS-ONE Intumescent Firestop Sealant, CP 606 Flexible Firestop Sealant, CP 601S Elastomeric Firestop Sealant	F-C-1009	1"	213
W	Max. 6" steel, cast iron pipe or steel conduit, max. 4" EMT, max. 2" flexible steel conduit (Chase Wall Optional)	1 or 2 Hr	FS-ONE Intumescent Firestop Sealant	F-C-1059	3/4"	214
W	Max. 4" steel, cast iron, copper pipe, steel conduit or EMT	1 Hr	FS-ONE Intumescent Firestop Sealant or CP 606 Flexible Firestop Sealant	F-C-1106	7/8"	215
W	Cast iron closet flange with max. 4" cast iron drain pipe and 90 degree elbow	1 Hr	FS-ONE Intumescent Firestop Sealant or CP 606 Flexible Firestop Sealant	F-C-1134	1/4"	216
W	Max. 1-1/2" cast iron pipe, p-trap, drain and tee connected with stainless steel connectors, max. 1-1/2" ABS, PVC or brass bathtub waste/overflow fittings	1 Hr	FS-ONE Intumescent Firestop Sealant	F-C-1135	1"	217
> Plastic and Glass Pipe						
C	Max. 6" PVC, ABS or FRPP pipe, max 4" FRPP (closed or vented system), max. 6" CPVC or rigid non-metallic conduit (closed system only, max. 3" Aquarise CPVC (SDR11) (closed system only)	3 Hr	CP 648E Wrap Strip with retaining collar	C-AJ-2021 *	3/8"	83
C	Max. 4" PVC, ABS or FRPP pipe (closed or open system), max. 4" CPVC or rigid non-metal conduit (closed system only) max. 3" Aquarise CPVC (SDR 11) (closed system only)	2 Hr	CP 648E Wrap Strip	C-AJ-2022 *	1-1/8"	85
C	Max. 6" PVC, ABS, FRPP or CPVC pipe (closed or vented system, max. 3" Aquarise CPVC (SDR 11) (closed system only)	2 or 3 Hr	CP 643N Firestop Collar	C-AJ-2035 *	1/2"	86
C	Max. 4" PVC or ABS pipe (closed or vented system) Max. 4" CPVC pipe (closed system only, max. 3" Aquarise CPVC (SDR 11) (closed system only)	2 Hr	CP 648S Single Wrap Strip	C-AJ-2036 *	1-1/8"	88
C	Max. 2" Blazemaster® CPVC pipe (SDR 13.5) (closed system only), max. 3" steel pipe sleeve (optional)	1 or 2 Hr	FS-ONE Intumescent Firestop Sealant	C-AJ-2042	5/8"	89
C	Max. 6" PVC, ABS or FRPP pipe (closed or vented system), max. 6" CPVC (closed system only)	3 Hr	CP 643N Firestop Collar	C-AJ-2053 *	1-1/4"	90
C	Max. 2" polypropylene (PP) pipe (closed or vented system)	2 Hr	CP 648S Wrap Strip	C-AJ-2056 *	7/16"	94
C	Max. 2" PVC, CPVC, RNC, PEX or Aquarise CPVC (SDR 11) (closed system only)	2 Hr	FS-ONE Intumescent Firestop Sealant	C-AJ-2061	1-5/8"	97
C	Max. 2" PVC or CPVC (closed or vented system)	2 Hr	FS-ONE Intumescent Firestop Sealant	CA-J 2078 *	13/16"	98
C	Max. 2" PVC (closed or vented system), max. 2" CPVC (closed system)	2 Hr	FS-ONE Intumescent Firestop Sealant	CA-J 2079 *	5/8"	99

* Tested with a 50 Pa pressure differential.

C Concrete or concrete block **G** Gypsum **W** Wood**Hilti. Outperform. Outlast.**Hilti (Canada) Corp. 1-800-363-4458 • www.hilti.ca • Hilti Firestop Systems Guide — Canada

Base material	Penetrating item	Fire rating (F rating)	Hilti product used	System number	Maximum annular space	See page
> Plastic and Glass Pipe (continued)						
C	Max. 6" PVC (closed system), max. 6" CPVC (closed or vented system)	1 Hr	CP 648S Wrap Strip	CA-J 2080 *	7/8"	100
C	Plastic pipe and tub drain fittings with bottom-mounted bushing (see drawing details for specifics)	2 Hr	CP 681 Tub Box Kit	F-A-2006 *	-	161
C	Max. 2" PVC pipe (closed or vented system), max. 2" CPVC or PEX (closed system only)	2 Hr	CP 648E Wrap Strip and FS-ONE Intumescent Firestop Sealant	F-A-2009 *	9/16"	162
C	Max. 6" PVC, CPVC, FRPP or max. 4" ABS (closed or vented system), max. 3" Aquarise (closed system only) (includes concrete over metal deck)	1, 2 or 3 Hr	CP 680-P Cast in Firestop Device	F-A-2012 *	-	163
C	2" Pex tubing (closed system only) (includes concrete over metal deck)	2 or 3 Hr	CP 680-P Cast in Firestop Device	F-A-2013 *	-	165
C	Max. 6" PVC, FRPP or ABS pipe (closed or vented system); max. 6" CPVC pipe (SDR 13.5) (closed system); max. 6" Aquarise CPVC (closed system)	2 Hr	CP 643N Firestop Collar and FS-ONE Intumescent Firestop Sealant	F-A-2025 *	1-1/2"	166
C	Max. 4" PVC, FRPP, ABS or RNC pipe; max. 2" PP pipe (closed or vented system); max. 4" CPVC pipe (SDR 13.5) (closed system); max. 3" Aquarise CPVC (closed system)	2 Hr	CP 648E Wrap Strip and FS-ONE Intumescent Firestop Sealant	F-A-2026 *	1-1/4"	168
C	Max. 1 1/2" XFR PVC pipe	2 Hr	CP 648E Wrap Strip and FS-ONE Intumescent Firestop Sealant	F-A-2034 *	5-7/8"	169
C	Nominal 2" PVC	3 Hr	Firestop Drop in Flange	F-A-2156 *	-	170
C	Max. 6" PVC, CPVC, ABS or Max. 4" FRPP	2 or 3 Hr	CFS-DID Firestop Drop in Device	F-A-2214 *	-	172
C	Max. 2" PVC	2 Hr	CP 680-P Cast in Firestop Device	F-A-2219	-	174
C	Max. polypropylene (PP) pipe, max. 40mm Fusiotherm® pipe (closed or vented system)	2 Hr	CP 680-P Cast in Firestop Device	F-B-2006 *	-	203
C	Max. 4" PVC, RNC, ABS pipe (closed or vented system) or max. 4" CPVC (closed system only)	2 Hr	CP 648S Wrap Strip and FS-ONE Intumescent Firestop Sealant or CP 601S Elastomeric Firestop Sealant	F-B-2008 *	1"	204
C	Max. 4" PVC or CPVC	2 Hr	CP 680-P Cast in Firestop Device	F-B-2009 *	-	206
C	Max. 4" PVC, CPVC, ABS or FRPP	3 Hr	CFS-DID Firestop Drop in Device	F-B-2051 *	-	208
G	Max. 2" PVC, RNC or ABS pipe	1 Hr	FS-ONE Intumescent Firestop Sealant	HI/PV 60-01	1"	252
C	Max. 12" PVC or CPVC	1 or 2 Hr	CP 648E Wrap Strip	W-J-2019	-	258
C	Max. 2" polypropylene (PP) pipe, max. 110mm Fusiotherm® pipe (closed system)	2 Hr	CP 643N Firestop Collar and FS-ONE Intumescent Firestop Sealant	W-J-2028	5/8"	259
C	Max. 4" polypropylene (PP) pipe, max. 125mm Fusiotherm® pipe (closed system)	2 Hr	CP 648E Firestop Wrap Strip w/ retaining collar and FS-ONE Intumescent Firestop Sealant	W-J-2029	1/2"	260
C	Max. 1" PEX tubing	2 Hr	FS-ONE Intumescent Firestop Sealant	W-J-2030 *	3/8"	261
C	Max. 1" PEX tubing	1 or 2 Hr	FS-ONE Intumescent Firestop Sealant	W-J-2031 *	7/8"	262
C	Max. 1" PEX tubing (optional sleeve)	2 Hr	FS-ONE Intumescent Firestop Sealant	W-J-2032 *	1-3/8"	263
G	Max. 4" PVC, ABS or FRPP pipe (closed or vented system), max. 4" CPVC pipe (closed system only), max. 3" Aquarise CPVC (closed system only)	1 & 2 Hr	CP 648E Wrap Strip with retaining collar	W-L-2018 *	1/2"	298
G	Max. 2" PVC (vented system)	2 Hr	CP 648E Wrap Strip	W-L-2020 *	1/2"	300
G	Max. 12" PVC (closed or vented system), 12" CPVC (closed system only)(sleeved)	1 or 2 Hr	CP 648E Firestop Wrap Strip with FS-ONE Intumescent Firestop Sealant	W-L-2027 *	3/4"	301

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Base material	Penetrating item	Fire rating (F rating)	Hilti product used	System number	Maximum annular space	See page
> Plastic and Glass Pipe (continued)						
G	Max. 6" PVC, ABS, FRPP or CPVC (closed or vented system), max. 3" Aquarise CPVC (closed system only)	1 or 2 Hr	CP 643N Firestop Collar	W-L-2028 *	1/2"	302
G	One or more of the following: Max. 1-1/2" PVC or CPVC pipe, max. 1" PEX tubing (closed system only); max. 1-1/2" RNC conduit	1 or 2 Hr	FS-ONE Intumescent Firestop Sealant	W-L-2038	1"	304
G	Max. 1" Pex tubing (multiple tubes/max. of 6)	1 or 2 Hr	FS-ONE Intumescent Firestop Sealant	W-L-2047	1"	305
G	Max. 4" polypropylene (PP) pipe, max. 125mm Fusiotherm® pipe (closed system)	1 or 2 Hr	CP 648E Firestop Wrap Strip w/ retaining collar and FS-ONE Intumescent Firestop Sealant	W-L-2052	1/2"	306
G	Max. 1" PEX tubing	2 Hr	FS-ONE Intumescent Firestop Sealant	W-L-2060*	3/8"	307
G	Max. 2" PEX tubing	1 or 2 Hr	FS-ONE Intumescent Firestop Sealant	W-L-2061 *	7/8"	308
G	Max. 4" PVC, CPVC or ABS	1 or 2 Hr	CP 648E Wrap Strip	W-L-2565	-	309
W	Max. 1" PEX tubing (closed or vented system)	1 Hr	CP 648E Wrap Strip	F-C-2005	1/4"	218
W	Max. 4" PVC pipe (open or closed system), max. 4" CPVC pipe (closed system only), max. 3" Aquarise CPVC (closed system only)	1 Hr	CP 648E Wrap Strip with retaining collar	F-C-2007 *	1/4"	219
W	Max. 1-1/2" PVC or ABS pipe and drain fittings with PVC or ABS bathtub waste/overflow fittings	1 Hr	FS-ONE Intumescent Firestop Sealant or CP 606 Flexible Firestop Sealant	F-C-2009 *	1"	221
W	4" PVC or ABS pipe with closet flange	1 Hr	FS-ONE Intumescent Firestop Sealant or CP 606 Flexible Firestop Sealant	F-C-2010 *	-	222
W	Max. 4" PVC, ABS, or CPVC pipe (closed or vented system), max. 3" Aquarise CPVC (closed system only) (optional Chase Wall application)	1 Hr	CP 643N Firestop Collar	F-C-2011 *	1/2"	223
W	Max. 4" PVC, CPVC or ABS pipe	1 Hr	FS-ONE Intumescent Firestop Sealant	F-C-2044 *	1"	224
W	Max. 1" PEX tubing	1 Hr	FS-ONE Intumescent Firestop Sealant	F-C-2045 *	7/8"	225
W	Max. 2" PVC, CPVC, ABS or Aquarise CPVC pipe (closed system only)	1 Hr	FS-ONE Intumescent Firestop Sealant	F-C-2378	5/8"	226
> Cables/Cable Trays						
C	Max. 2" metal-clad TEK cable with PVC jacket	2 Hr	FS-ONE Intumescent Firestop Sealant	C-AJ-3007	4"	101
C	Cable bundle (various cables)	3 Hr	FS-ONE Intumescent Firestop Sealant;	C-AJ-3070	-	102
C	Cable bundle (various cables) (optional sleeve)	3 Hr	FS-ONE Intumescent Firestop Sealant	C-AJ-3095	-	103
C	Cable bundle (various cables) (optional sleeve)	3 Hr	FS-ONE Intumescent Firestop Sealant	C-AJ-3180	-	104
C	Cable bundle (various cables) (optional sleeve)	3 Hr	CP 606 Flexible Firestop Sealant	C-AJ-3181	1-7/8"	105
C	Cable bundle (various cables) (optional sleeve)	3 Hr	CP 604 Self-Leveling Firestop Sealant	C-AJ-3193	1"	106
C	Cable bundle (various cables) (optional sleeve)	2 Hr	CP 658 T Firestop Plug	C-AJ-3216	3"	107
C	Cable bundle (various cables) (optional sleeve)	3 Hr	FS-ONE Intumescent Firestop Sealant	C-AJ-3239	2-1/2"	108
C	Cable bundle (various cables)	2 Hr	CP 653 Speed Sleeve	C-AJ 3281	-	109
C	Cable bundle (various cables)	2 Hr	CP 653 Speed Sleeve	C-AJ 3284	-	111
C	Cable trays (various cables)	3 Hr	CFS-BL Firestop Block	C-AJ-4034	13-1/2"	113
C	Cable tray (various cables)	3 Hr	CFS-BL Firestop Block	C-AJ-4035	4"	115
C	Cable tray (various cables)	2 Hr	CP 620 Fire Foam	C-AJ-4054	5"	116
C	Cable tray (various cables)	2 Hr	FS-ONE Intumescent Firestop Sealant	C-AJ-4071	6"	117
C	Cable bundle (various cables)	2 Hr	CP 604 Self-Leveling Firestop Sealant	F-A-3002	5-3/4"	175
C	Cable bundle (various cables) (concrete floor/ceiling assembly including concrete over metal deck)	2 Hr	FS-ONE Intumescent Firestop Sealant	F-A-3005	-	176

* Tested with a 50 Pa pressure differential.

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Base material	Penetrating item	Fire rating (F rating)	Hilti product used	System number	Maximum annular space	See page
> Cables/Cable Trays (continued)						
C	Cable bundle (various cables)	3 Hr	CP 680-M/P Cast-In Firestop Device	F-A-3007	-	177
C	Cable bundle through concrete floor over metal deck (various cables) (optional sleeve)	3 Hr	FS-ONE Intumescent Firestop Sealant	F-A-3012	-	179
C	Cable bundle through concrete floor or concrete over metal deck (various cables)	3 Hr	CP 680- M/P Cast-In Firestop Device	F-A-3033	-	180
C	Copper conductor PVC jacketed aluminum or steel clad TEK cable	3 Hr	CP 680-M/P 2" Cast-In Firestop Device	F-A-3034	-	181
C	Cable bundle (various cables) (concrete floor/ ceiling assembly)	1 Hr	FS-ONE Intumescent Firestop Sealant	F-E 3005	3/4"	243
C	Max. 4/C 500 kcmil power cable (multiple)	2 Hr	FS-ONE Intumescent Firestop Sealant	HI/PHV 120-05	4"	251
C	Cable bundle (various cables) (optional sleeve)	2 Hr	FS-ONE Intumescent Firestop Sealant, CP 601S Elastomeric Firestop Sealant, CP 606 Flexible Firestop Sealant, or CP 618 Firestop Putty Stick	W-J-3060	1"	264
C	Cable bundle (various cables) (shaft wall)	1 or 2 Hr	FS-ONE Intumescent Firestop Sealant	W-J-3061	3/4"	265
C	Cable bundle with cable rack (various cables)	2 Hr	CFS-BL Firestop Block	W-J-3074	8"	266
C	Cable bundle (various cables) (optional sleeve)	2 Hr	CFS-PL Firestop Plug	W-J-3143	1"	268
C	Cable bundle (various cables)	2 Hr	CP 653 Speed Sleeve (multiple)	W-J-3189	-	269
C	Spine cable tray (various cables)	2 Hr	CFS-BL Firestop Block	W-J-4016	4-1/2"	272
C	Cable tray (various cables)	2 Hr	CFS-BL Firestop Block	W-J-4029	26"	273
C	Cable tray (various cables)	1 or 2 Hr	CP 620 Fire Foam	W-J-4030	5"	275
C	Cable tray (various cables)	2 Hr	FS-ONE Intumescent Firestop Sealant	W-J-4072	3"	276
C	Fiber optic cable tray (fiber optic cables)	2 Hr	CFS-BL Firestop Block	W-J-6003	4"	282
G	Cable bundle (various cables) (optional sleeve)	1 or 2 Hr	FS-ONE Intumescent Firestop Sealant, CP 601S Elastomeric Firestop Sealant, CP 606 Flexible Firestop Sealant, or CP 618 Putty Pad	W-L-3065	1"	310
G	Cable bundle (various cables) (Shaft Wall)	1 or 2 Hr	FS-ONE Intumescent Firestop Sealant	W-L-3161	3/4"	312
G	Cable rack with various cables (max. opening 24" x 16")	1 or 2 Hr	CFS-BL Firestop Block	W-L-3185	8"	313
G	Cable bundle (various cables) (optional sleeve)	1 or 2 Hr	CFS-PL Firestop Plug	W-L-3224	3"	315
G	Cable bundle (various cables) (sleeved)	1 or 2 Hr	CFS-PL Firestop Plug	W-L-3272	1"	317
G	Cable bundle (various cables) (shaft wall)	2 Hr	FS-ONE Intumescent Firestop Sealant	W-L-3278	1"	318
G	Cable bundle (various cables) (sleeved) (membrane penetration)	1 or 2 Hr	FS-ONE Intumescent Firestop Sealant, CP 601S Elastomeric Firestop Sealant, CP 606 Flexible Firestop Sealant, or CP 618 Firestop Putty Stick	W-L-3320	1"	319
G	Cable bundle (various cables)	1 or 2 Hr	CP 653 Speed Sleeve	W-L-3335	-	321
C	Cable bundle (various cables)	1 or 2 Hr	CP 653 Speed Sleeve (multiple)	W-L-3384	-	323
G	Cable tray (various cables) (opening size 30" x 9")	1 or 2 Hr	CFS-BL Firestop Block	W-L-4011	4"	326
G	Spine cable tray (various cables)	1 or 2 Hr	CFS-BL Firestop Block	W-L-4019	4-1/2"	327
G	Cable tray (various cables) (max. opening 30" x 9")	1 or 2 Hr	CP 620 Fire Foam	W-L-4034	5"	328
G	Cable tray (various cables)	1 or 2 Hr	FS-ONE Intumescent Firestop Sealant	W-L-4060	3"	329
G	Cable tray (various cables) (max. opening 30" x 30")	1 or 2 Hr	CFS-BL Firestop Block	W-L-4081	26"	330
G	Fiber optic cable tray (fiber optic cables) (max. opening 16" x 8")	1 or 2 Hr	CFS-BL Firestop Block	W-L-6017	4"	340
W	Cable bundle (various cables) (chase wall optional)	1 or 2 Hr	FS-ONE Intumescent Firestop Sealant	F-C-3012	-	227

C Concrete or concrete block **G** Gypsum **W** Wood

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Base material	Penetrating item	Fire rating (F rating)	Hilti product used	System number	Maximum annular space	See page
> Cables/Cable Trays (continued)						
W	Cable bundle (various cables) (chase wall optional)	1 Hr	FS-ONE Intumescent Firestop Sealant	F-C-3044	3/4"	228
W	Cable bundle (various cables) (chase wall optional)	1 Hr	CP 606 Flexible Firestop Sealant	F-C-3071	1"	229
W	Cable bundle (various cables) (chase wall optional)	1 Hr	CP 606 Flexible Firestop Sealant	F-C-3074	1"	230
W	Aluminum conductor SER cable with PVC jacket (one or more)	1 Hr	FS-ONE Intumescent Firestop Sealant	F-C-3094	1"	231
> Insulated Metal Pipe						
C	Max. 12" steel pipe or max. 6" copper pipe with max. 2" glass fiber insulation (optional sleeve)	2 Hr	FS-ONE Intumescent Firestop Sealant	C-AJ-5091	2-1/4"	118
C	Max. 24" steel pipe or max. 6" copper w/ 3" mineral fiber insulation	3 Hr	FS-ONE Intumescent Firestop Sealant, or CP 601S Elastomeric Firestop Sealant	C-AJ-5184	1-1/2"	119
C	Max. 24" steel or cast iron pipe, max. 4" copper pipe w/ 3" mineral fiber insulation installed above and below floor	3 Hr	FS-ONE Intumescent Firestop Sealant	C-AJ-5185	1-7/8"	120
C	Max. 4" steel or copper pipe w/ 3/4" AB/PVC insulation	2 Hr	FS-ONE Intumescent Firestop Sealant	C-AJ-5198	1-3/8"	121
C	Max. 6" steel pipe, copper, cast iron pipe with max. 2" glass fiber insulation (optional sleeve)	2 Hr	CP 606 Flexible Firestop Sealant	C-AJ-5265	1-5/8"	122
C	Max. 2" steel pipe, copper, cast iron pipe with nom. 1/2" - 1" AB/PVC insulation (optional sleeve)	3 Hr	CP 648E Wrap Strip and FS-ONE Intumescent Firestop Sealant	C-AJ-5289	3/4"	123
C	Max. 2" steel, cast iron or copper pipe/tubing with 1" glass-fiber pipe insulation	2 Hr	FS-ONE Intumescent Firestop Sealant	C-BJ-5015	1-7/8"	143
C	Max. 4" steel or copper pipe/tubing with 1" AB/PVC pipe insulation	3 Hr	FS-ONE Intumescent Firestop Sealant	C-BJ-5018	7/8"	144
C	Max. 6" steel or cast iron pipe with 1-1/2" glass-fiber pipe insulation	2 Hr	CP 604 Self-Leveling Firestop Sealant	F-A-5004	1-1/8"	182
C	Max. 4" steel, cast iron or copper pipe/tubing with 1" or 1-1/2" glass-fiber pipe insulation	2 Hr	CP 604 Self-Leveling Firestop Sealant	F-A-5005	5-1/8"	183
C	Max. 4" steel or copper pipe with nom. 3/4" or 1" AB/PVC insulation (includes Concrete over Metal Deck)	2 Hr	CP 680-M/P Cast-In Firestop Device	F-A-5015	-	184
C	Max. 4" steel or copper pipe with nom. 3/4" or 1" AB/PVC insulation (includes Concrete over Metal Deck)	3 Hr	CP 680-M/P Cast-In Firestop Device	F-A-5016	-	185
C	Max. 4" steel or copper pipe with max. 2" glass fiber insulation (includes Concrete over Metal Deck)	2 Hr	CP 680-M/P Cast-In Firestop Device	F-A-5017	-	186
C	Max. 4" steel or copper pipe w/ maximum 2" glass fiber insulation (includes Concrete over Metal Deck)	3 Hr	CP 680-M/P Cast-In Firestop Device	F-A-5018	-	187
C	Max. 4" steel or copper pipe w/ 3/4" AB/PVC insulation (includes Concrete over Metal Deck)	2 Hr	FS-ONE Intumescent Firestop Sealant	F-A-5019	1-3/8"	188
C	Max. 12" steel pipe, max. 6" copper pipe w/ 1-1/2" glass-fiber insulation (includes Concrete over Metal Deck) (optional sleeve)	2 Hr	FS-ONE Intumescent Firestop Sealant	F-A-5021	1-7/8"	189
C	Max. 4" steel, cast iron or copper w/ max. 1" AB/PVC or max. 2" glass fiber insulation	2 or 3 Hr	CFS-DID Firestop Drop in Device	F-A-5046	-	192
C	Max. 4" steel, cast iron or copper w/ max. 1" AB/PVC or max. 2" glass fiber insulation	3 Hr.	CFS-DID Firestop Drop in Device	F-B-5004	-	209
C	Max. 2" steel or copper w/ max. 1" AB/PVC or max. 1-1/2" glass fiber insulation	3 Hr	CFS-DID Firestop Drop in Device	F-B-5005	-	211

C Concrete or concrete block **G** Gypsum **W** Wood

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Base material	Penetrating item	Fire rating (F rating)	Hilti product used	System number	Maximum annular space	See page
> Insulated Metal Pipe (continued)						
C	Max. 2" steel or copper pipe w/ 1-1/2" glass-fiber insulation (Concrete Floor/Ceiling Assembly)	1 Hr	FS-ONE Intumescent Firestop Sealant	F-E-5002	1"	244
C	Max. 2" steel or copper pipe w/ 3/4" AB/PVC insulation (concrete floor/ceiling assembly)	1 Hr	FS-ONE Intumescent Firestop Sealant	F-E-5004	1"	245
C	Max. 12" steel pipe, max. 6" copper pipe, max. 4" steel conduit or EMT with 2" glass-fiber insulation	1 or 2 Hr	FS-ONE Intumescent Firestop Sealant	W-J-5042	1-1/2"	278
C	Max. 1" copper pipe with 3/4" AB/PVC insulation	1 or 2 Hr	FS-ONE Intumescent Firestop Sealant	W-J-5066	1-1/8"	279
C	Max. 1" copper pipe with 2" glass-fiber insulation	1 Hr	FS-ONE Intumescent Firestop Sealant	W-J-5067	1-1/8"	280
C	Max. 4" steel, cast iron/ductile or copper pipe with 1-1/2" glass-fiber pipe insulation	2 Hr	FS-ONE Intumescent Firestop Sealant, CP 601S Elastomeric Firestop Sealant, CP 606 Flexible Firestop Sealant	W-J-5134	7/8"	281
G	Max. 8" steel or cast iron pipe, max. 2" copper pipe/tubing with max. 2" glass fiber insulation (sleeved) (shaft wall)	1 or 2 Hr	CP 648E Wrap Strip and FS-ONE Intumescent Firestop Sealant	W-L-5010	13/16"	332
G	Max. 1" copper pipe w/ max. 3/4" AB/PVC insulation (shaft wall) (sleeved)	1 or 2 Hr	FS-ONE Intumescent Firestop Sealant	W-L-5011	1-1/8"	333
G	Max. 4" steel pipe, max. 2" copper pipe, max. 4" steel conduit or EMT with 3/4" AB/PVC insulation	1 or 2 Hr	FS-ONE Intumescent Firestop Sealant	W-L-5028	1-1/2"	334
G	Max. 12" steel pipe, max. 6" copper pipe, max. 4" steel conduit or EMT with max. 2" glass fiber insulation	1 or 2 Hr	FS-ONE Intumescent Firestop Sealant	W-L-5029	1-7/8"	335
G	Max. 12" steel pipe, max. 6" copper pipe with max. 2" glass fiber insulation	1 or 2 Hr	FS-ONE Intumescent Firestop Sealant	W-L-5096	1-7/8"	336
G	Max. 1" copper tubing w/ 2" glass-fiber insulation (sleeved) (shaft wall)	1 Hr	FS-ONE Intumescent Firestop Sealant	W-L-5144	1-1/8"	337
G	Max. 8" steel or cast iron pipe, max. 1" copper tubing w/ 1" or 1-1/2" glass-fiber insulation (shaft wall)	2 Hr	FS-ONE Intumescent Firestop Sealant	W-L-5240	1-1/8"	338
G	Max. 4" steel, cast iron or copper pipe/tubing with 1-1/2" glass-fiber insulation	1 or 2 Hr	FS-ONE Intumescent Firestop Sealant, CP 601S Elastomeric Firestop Sealant or CP 606 Flexible Firestop Sealant	W-L-5257	7/8"	339
W	Max. 2" copper or steel pipe with 1-1/2" glass fiber insulation (chase wall optional)	1 Hr	FS-ONE Intumescent Firestop Sealant	F-C-5036	1"	232
W	Max. 2" steel or copper pipe with 3/4" AB/PVC insulation (chase wall optional)	1 or 2 Hr	FS-ONE Intumescent Firestop Sealant	F-C-5037	1"	233
W	Max. 4" steel, cast iron or copper pipe with 3/4" AB/PVC insulation (chase wall optional)	1 Hr	CP 606 Flexible Firestop Sealant	F-C-5065	7/8"	234
W	Max. 4" steel, cast iron or copper pipe with 1-1/2" glass fiber insulation (chase wall optional)	1 Hr	CP 606 Flexible Firestop Sealant	F-C-5066	7/8"	235
> Insulated Plastic Pipe						
C	Max. 2" polypropylene (PP) pipe (closed or vented system); max. 2" Aquarise CPVC pipe (SDR 11) (closed system only), 1" thick AB/PVC pipe insulation	2 Hr	CP 648E Wrap Strip with retaining collar and FS-ONE Intumescent Firestop Sealant	C-AJ-2055 *	5/8"	92
C	Max. 2" polypropylene (PP) pipe (closed or vented system); max. 2" Aquarise CPVC pipe (SDR 11) (closed system only), 1-1/2" thick glass fiber pipe insulation	2 Hr	CP 648E Wrap Strip with retaining collar and FS-ONE Intumescent Firestop Sealant	C-AJ-2057 *	5/8"	95
> Electrical Busways						
C	Electrical Busway	2 Hr	CP 620 Fire Foam	C-AJ-6036	5-3/4"	124
G	Electrical Busway	1 or 2 Hr	FS-ONE Intumescent Firestop Sealant	W-L-6019	1-1/4"	341

* Tested with a 50 Pa pressure differential.

C Concrete or concrete block **G** Gypsum **W** Wood

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Base material	Penetrating item	Fire rating (F rating)	Hilti product used	System number	Maximum annular space	See page
> Metal Ducts / Misc. Mechanical						
C	Max. 30" x 30" sheet metal duct w/o damper	2 Hr	FS-ONE Intumescent Firestop Sealant	C-AJ-7111	1-3/4"	125
G	Mechanical support member (strut, steel cable, steel rod)	1 or 2 Hr	FS-ONE Intumescent Firestop Sealant or CP 606 Flexible Firestop Sealant	W-L-7130	7/8"	343
G	Max. 100" x 100" sheet metal duct w/o damper	1 or 2 Hr	FS-ONE Intumescent Firestop Sealant or CP 606 Flexible Firestop Sealant	W-L-7155	2"	344
W	Max 4" diameter sheet metal duct w/o damper (chase wall optional)	1 Hr	FS-ONE Intumescent Firestop Sealant	F-C-7013	3/4"	236
W	Max 10" diameter sheet metal duct w/o damper (Chase Wall Optional)	1 Hr	CP 606 Flexible Firestop Sealant	F-C-7025	1"	237
> Insulated Metal Duct						
G	Max. 30" x 24" steel air or grease duct w/ 1-/2" thick Firemaster® Fast Wrap	1 or 2 Hr	FS-ONE Intumescent Firestop Sealant	W-L-7121	2"	342
> Large Openings / Multiple Penetrations						
C	Multiple steel pipes (max. 12" diameter), multiple copper pipe, steel conduit or EMT (max. 4" diameter)	3 Hr	CP 637 Firestop Mortar	C-AJ-1140	-	72
C	Multiple insulated and non-insulated 3" steel and copper pipes or EMT (max. 1" glass fiber insulation)	3 Hr	FS-ONE Intumescent Firestop Sealant	C-AJ-8041	2-1/2"	126
C	"Multiple max. 26" steel pipe, max. 15" cast iron pipe, max. 6" copper pipe or steel conduit, max. 4" EMT, cable trays with various cables	4 Hr	CP 637 Firestop Mortar	C-AJ-8095	-	127
C	Multiple insulated or non-insulated steel pipe, cast iron, copper, conduit, or EMT pipes, cables, PVC pipe	2 Hr	CP 620 Fire Foam	C-AJ-8096 +	-	128
C	Combination of insulated or non-insulated max. 3" steel, cast iron, or copper pipe, max. 3" steel conduit or EMT and max. 1" flexible steel conduit, cable bundle	3 Hr	FS-ONE Intumescent Firestop Sealant	C-AJ-8099 +	5"	131
C	Multiple steel conduit or EMT pipes, cable bundles or PVC optical fiber raceway	3 Hr	CFS-BL Firestop Block	C-AJ-8107 +	11-1/4"	133
C	Non-insulated max. 8" steel or cast iron pipe, max. 4" copper pipe, max. 6" steel conduit or max. 4" EMT, fiber optic raceways, or cable trays	3 Hr	CFS-BL Firestop Block	C-AJ-8110 +	-	134
C	Combination of insulated or non-insulated max. 24" steel or cast iron, or ductile iron pipe, max. 6" copper pipe, max. 6" steel conduit, or max 4" EMT or cables (single or bundled)	2 Hr	FS-ONE Intumescent Firestop Sealant	C-AJ-8143	12"	136
C	HVAC line set (sleeve optional)	3 Hr	FS-ONE Intumescent Firestop Sealant	C-AJ-8166	1/2"	139
C	Multiple insulated or non-insulated steel pipe, cast iron, copper, conduit, or EMT pipes, cables, PVC pipe, sheet metal ducts	2 Hr	CP 648 E Firestop Wrap Strip and CP 637 Firestop Mortar	C-AJ-8177 +	-	140
C	Max. 1" steel, cast iron, or copper pipe, max. 1" steel conduit or EMT (includes concrete over metal deck)	3 Hr	CP 680-P/M Cast-In Firestop Device	F-A-1022	2"	153
C	Multiple insulated max. 3" steel, cast iron, or copper pipes w/ 1" glass fiber or 1" AB/PVC pipe insulation	2 Hr	CP 604 Self-Leveling Firestop Sealant	F-A-5032	2"	190

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C Concrete or concrete block **G** Gypsum **W** Wood

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Base material	Penetrating item	Fire rating (F rating)	Hilti product used	System number	Maximum annular space	See page
> Large Openings / Multiple Penetrations (continued)						
C	Multiple insulated max. 1-1/2" steel, cast iron, or copper pipes with 1" glass fiber or 1" AB/PVC pipe insulation	2 Hr	CP 604 Self-Leveling Firestop Sealant	F-A-5036	2"	191
C	Multiple insulated or non-insulated max. 24" steel, cast iron, or ductile iron pipe, max 6" copper pipe or steel conduit or max. 4" EMT pipes, or cables (single or bundled) (see details for pipe insulation)	2 Hr	CP 604 Self-Leveling Firestop Sealant	F-A-8002	12"	194
C	Max. 6" steel tube (16 ga.), multiple communication cables (includes concrete over metal deck)	2 Hr	FS-ONE Intumescent Firestop Sealant	F-A-8004	1-3/4"	196
C	Bundle of non-insulated steel and cables	3 Hr	CP 680-P Cast-In Firestop Device	F-A-8023 +	2"	197
C	Multiple HVAC line sets (closed or vented system)	1 Hr	FS-ONE Intumescent Firestop Sealant	F-E-8008 +	1"	246
C	"Insulated or non-insulated max. 12" steel or cast iron pipe, max. 6" copper pipe (max. 1-1/2" glass fiber insulation) or steel conduit or max. 4" EMT, cable tray or cables (single or bundled)	4 Hr	CFS-BL Firestop Block	W-J-8007	-	283
C	Multiple insulated or non-insulated steel, cast iron, or copper pipe, conduit, or EMT pipes, cables, PVC plastic pipe, flexible conduit, and sheet metal duct	1 or 2 Hr	CP 620 Fire Foam	W-J-8017 +	-	285
G	Single or multiple max. 1" EMT	1 or 2 Hr	FS-ONE Intumescent Firestop Sealant	W-L-1095	1"	291
G	Single or multiple max. 2" EMT or steel conduits	1 or 2 Hr	FS-ONE Intumescent Firestop Sealant	W-L-1176	2-3/8"	292
G	Max. 2" steel pipe, steel conduit or EMT	1 or 2 Hr	FS-ONE Intumescent Firestop Sealant, CP 606 Flexible Firestop Sealant (1 Hr only)	W-L-1389	1-3/8"	297
G	Multiple HVAC line sets	1 or 2 Hr	FS-ONE Intumescent Firestop Sealant	W-L-8001	4"	346
G	Multiple insulated or non-insulated max. 6" steel pipe, max. 4" copper pipe (max. 1-1/2" glass fiber insulation), max. 4" steel conduit or EMT pipes, cable tray or cables (single or bundled)	1 or 2 Hr	CFS-BL Firestop Block	W-L-8013 +	9-1/4"	347
G	Multiple insulated or non-insulated steel pipe, cast iron pipe, copper pipe, conduit, or EMT, cables, PVC plastic pipe, flexible conduit, and max. 6" sheet metal duct (see details)	1 or 2 Hr	CP 620 Fire Foam	W-L-8019 +	-	349
G	Multiple insulated or non-insulated steel pipe, cast iron pipe, copper pipe, conduit, or EMT, cables, PVC plastic pipe, flexible conduit (see details)	1 or 2 Hr	FS-ONE Intumescent Firestop Sealant	W-L-8065 +	5"	352
G	Max. 2" steel, cast iron, copper, steel conduit, EMT, cable bundle (various cables)	1 or 2 Hr	CP 653 Speed Sleeve	W-L-8086	-	354
W	HVAC line set (Chase Wall Required)	1 Hr	FS-ONE Intumescent Firestop Sealant	F-C-8014 +	3/4"	240
W	Multiple HVAC line sets (Chase Wall Optional)	1 Hr	CP 606 Flexible Firestop Sealant	F-C-8032	1"	241
> Wall Opening Protective Materials						
G	UL/cUL listed metallic or non-metallic outlet boxes	1 or 2 Hr	CP 617 Firestop Putty Pads	CLIV	-	356

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Joint

Base material	Type of joint — description	Fire rating (F rating)	Max. joint width (inches)	Movement capability	Hilti product used	System number	Sealant depth (inches)	See page
> Floor-to-floor, wall-to-floor, wall-to-wall joints								
C	Concrete floor to floor joint	2 Hr	6"	10%	CP 604	FF-D-1001	1/4"	361
C	Concrete floor to floor joint	3 Hr	3"	25%	CFS-SP WB	FF-D-1026	1/4"	362
C	Concrete floor to wall joint	2 Hr	6"	10%	CP 604	FW-D-1013	1/4"	361
C	Concrete floor to wall joint	2 Hr	6"	10%	CP 604	FW-D-1001	1/4"	363
C	Concrete stairs to concrete wall or block wall	2 Hr	3-3/4"	7%	CP 606	FW-D-1043	1/2"	365
C	Concrete or block wall to concrete over metal deck (includes roof deck) (top of wall)	2 Hr	3/4"	33%	CP 606	HW-D-0081	1/2"	366
C	Concrete or block wall to concrete floor (top-of-wall)	2 Hr	2"	14%	CFS-SP WB	HW-D-0097	1/8"	371
C	Concrete or block wall to concrete over metal deck w/ optional use of spray-on fireproofing (top-of-wall)	2 Hr	1"	12.50%	CFS-SP WB	HW-D-0181	1/8"	374
C	Concrete or block wall to concrete over metal deck w/spray-on fireproofing (top of wall) (I beam/bar joist through joint)	2 Hr	1"	25%	CFS-SP WB	HW-D-0258	1/8"	379
C	Concrete or block wall to concrete floor or hollow core floor (top of wall)	3 Hr	1"	12.50%	CP 606	HW-D-0268	1/2"	382
C	Concrete or block wall to concrete over metal deck (includes roof deck) (top of wall)	2 Hr	2"	12.50%	CFS-SP WB	HW-D-0285	1/8"	383
C	Concrete or block wall to concrete floor (top-of-wall) with 1 or more max. 2" steel pipes, max. 2" cast iron or ductile iron pipes, max 2" steel conduits or EMT penetrants	3 Hr	3-1/2"	7%	CP 606	HW-D-1003	1/4"	388
C	Concrete or block wall to concrete floor assembly	3 Hr	3-1/2"	14%	CP 601S	HW-D-1008	1/4"	389
C	Concrete or block wall to concrete over metal deck w/ optional use of spray-on fireproofing (top of wall)	2 Hr	3-1/2"	14%	CFS-SP WB	HW-D-1037	1/8"	390
C	Concrete block wall to concrete over metal deck w/ optional use of spray-on fireproofing (top-of-wall)	2 Hr	3-1/2"	14%	CFS-SP WB	HW-D-1044	1/8"	391
C	Concrete or block wall to concrete over metal deck (top-of-wall)	2 Hr	2-1/2"	40%	CFS-SP WB	HW-D-1069	1/8"	395
C	Concrete wall to wall joint	3 Hr	1"	12.50%	CP 606	WW-D-0032	1/2"	396
C	Concrete wall to wall joint	3 Hr	3-1/2"	14%	CP 601S	WW-D-1011	1/4"	398
C	Concrete wall to wall joint	2 Hr	3-3/4"	7%	CP 606	WW-D-1012	1/2"	399
G	Gypsum wall to concrete floor or hollow core concrete (bottom-of-wall)	1 or 2 Hr	3/4"	-	CP 601S CP 606 FS-ONE	BW-S-0002	5/8"	359
G	Gypsum shaft wall to concrete floor (bottom-of-wall)	1 or 2 Hr	1"	-	CP 606	BW-S-0023	-	360
G	Gypsum wall to concrete over metal deck w/ optional use of spray-on fireproofing (includes roof deck) (top-of-wall)	1 or 2 Hr	2"	20% or 12.5%	CFS-SP WB	HW-D-0087	1/8"	367

* Refer to UL System.

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Base material	Type of joint — description	Fire rating (F rating)	Max. joint width (inches)	Movement capability	Hilti product used	System number	Sealant depth (inches)	See page
> Floor-to-floor, wall-to-floor, wall-to-wall joints (continued)								
G	Gypsum wall to concrete over metal deck w/ optional use of spray-on fireproofing (includes roof deck) (top-of-wall)	1 or 2 Hr	2"	20% or 12.5%	CFS-SP WB	HW-D-0089	1/8"	369
G	Gypsum wall to concrete floor or hollow core concrete (top-of-wall)	1 or 2 Hr	2"	20%	CFS-SP WB	HW-D-0106	1/8"	372
G	Gypsum wall to concrete over metal deck (includes roof deck) (top-of-wall)	1 or 2 Hr	3/4"	17%	CP 606	HW-D-0154	1/4"	373
G	Gypsum wall to concrete over metal deck w/optional use of spray-on fireproofing (includes roof deck) (top-of-wall)	1 or 2 Hr	3/4"	17%	CP 601S CP 606	HW-D-0184	5/8"	375
G	Gypsum wall to concrete floor or hollow core concrete (top-of-wall)	1 or 2 Hr	3/4"	17%	CP 601S CP 606	HW-D-0209	5/8"	376
G	Gypsum wall to concrete over metal deck w/ spray-on fireproofing (top of wall) (beam/bar joist through joint)	1 or 2 Hr	1"	25%	CFS-SP WB	HW-D-0218	1/8"	377
G	Gypsum wall to concrete over metal deck (wall not centered under lower plane of flute)	1 or 2 Hr	1"	18.75%	CFS-SP WB	HW-D-0264	1/8"	381
G	Gypsum wall to concrete over metal deck (top-of-wall)	1 or 2 Hr	3/4"	17%	CP 606	HW-D-0324	5/8"	384
G	Gypsum wall to concrete floor assembly (top-of-wall) (shaft wall)	2 Hr	1"	8%	CP 606	HW-D-0342	1"	385
G	Gypsum wall to concrete over metal deck w/ conduit or EMT (top-of-wall)	1 Hr	2"	20% or 125%	CFS-SP WB	HW-D-0564 *	1/8"	386
G	Gypsum wall to concrete over metal deck (includes roof deck) (top-of-wall)	1 or 2 Hr	2-1/2"	40%	CFS-SP WB	HW-D-1066	1/8"	392
G	Gypsum wall to concrete over metal deck (includes roof deck) (top-of-wall)	1 or 2 Hr	2-1/2"	40%	CFS-SP WB	HW-D-1067	1/8"	393
G	Gypsum wall to concrete floor assembly (top-of-wall)	1 or 2 Hr	2-1/2"	40%	CFS-SP WB	HW-D-1068	1/8"	394
G	Gypsum wall to concrete or block wall joint	1 or 2 Hr	3/4"	17%	CP 601S CP 606	WW-D-0040	5/8"	397

* Refer to UL System.

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Firestop System Drawings

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Most Common Systems for Through Penetrations

Concrete Floor/Wall or Block Wall

Description	FS ONE	Page	CP 606	Page	CP 604	Page	CP 680-P	Page	CP 680-M	Page
Blank opening	C-AJ-0004	64	-	-	F-A-0001	145	F-A-8003	238	-	-
	C-AJ-0090	66	-	-	F-A-0012	147	F-A-0014	148	F-A-0014	148
Metal pipe	F-B-2009	206	W-L-3384	323	C-AJ-1425	77	F-A-1016	150	F-A-1016	150
	C-AJ-1291	73	C-AJ-1453	78	-	-	-	-	-	-
	W-J-1067	254	-	-	-	-	-	-	-	-
Plastic pipe	C-AJ-2061	97	-	-	-	-	* F-A-2012	136	-	-
Cable bundle	C-AJ-3095	104	C-AJ-3181	105	C-AJ-3193	106	F-A-3007	177	F-A-3007	177
	C-AJ-3180	103	W-J-3060	264	F-A-8002	194	F-A-3033	180	F-A-3033	180
	W-J-3060	264	-	-	-	-	-	-	-	-
Metal pipe with glass-fiber insulation	C-AJ-5091	118	-	-	-	-	F-A-5017	186	F-A-5017	186
	W-J-5042	278	C-AJ-5265	122	F-A-8002	194	-	-	-	-
Metal pipe with AB/PVC insulation	C-AJ-5198	121	-	-	F-A-5032	190	F-A-5015	184	F-A-5015	184
	-	-	-	-	F-A-8002	194	-	-	-	-
Sheet metal duct (rectangular)	C-AJ-7111	125	-	-	-	-	-	-	-	-
Multiple penetrants	C-AJ-8099	131	-	-	F-A-8002	194	F-A-1022	153	F-A-1022	153
	C-AJ-8143	136	-	-	F-A-5032	190	+ F-A-8023	197	-	-

Gypsum Walls

Description	FS ONE	Page	CP 606	Page
Metal pipe	W-L-1054	290	W-L-1297	295
Plastic pipe	W-L-2038	304	-	-
Cable bundle	W-L-3065	310	W-L-3065	310
Metal pipe with glass-fiber insulation	W-L-5029	335	W-L-5257	339
Metal pipe with AB/PVC insulation	W-L-5028	334	-	-
Sheet metal duct (rectangular)	W-L-7155	344	W-L-7155	344
Multiple penetrants	+ W-L- 8065	352	-	-

Gypsum Shaft Walls

Description	FS ONE	Page
Metal pipe	W-L-1206	293
Cable bundle	W-L-3161	312
Metal pipe with glass-fiber insulation	W-L-5010	332
	W-L-5240	338
Metal pipe with AB/PVC insulation	W-L-5011	333

Wood Floors

Description	FS ONE	Page	CP 606	Page
Metal pipe	F-C-1009	213	F-C-1009	213
	F-C-1059	214	F-C-1106	215
Plastic pipe	F-C-2044	224	-	-
Cable bundle	* F-C-3012	227	F-C-3071	230
	F-C-3044	228	F-C-3074	229
Metal pipe with glass-fiber insulation	F-C-5036	232	F-C-5066	235
Metal pipe with AB/PVC insulation	F-C-5037	233	F-C-5065	234
Sheet metal duct (round)	F-C-7013	236	F-C-7025	237
HVAC line set	F-C-8014	240	F-C-8032	241

+ Vented piping systems described in the UL Fire Resistance Directory are limited to closed piping systems based on the Canadian Building code requirements.

Closed piping systems described in the UL Fire Resistance Directory are not applicable to the Canadian requirements

* Tested with a 50 Pa Pressure Differential



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Most Common Systems for Construction Joints

Gypsum Walls

Description	CFS-SP WB	Page	CP 606	Page
Perpendicular to metal deck	HW-D-1066	392	HW-D-0154	373
Parallel to metal deck	HW-D-1067	393	HW-D-0184	375
Flat concrete	HW-D-0106	372	HW-D-0209	376
Cut to profile	-	-	HW-D-0324	384
Shaft wall to flat concrete	-	-	HW-D-0342	385

Concrete or Block Walls

Description	CFS-SP WB	Page	CP 606	Page
Perpendicular to metal deck	HW-D-1037	390	HW-D-0081	366
Parallel to metal deck	HW-D-0181	374	HW-D-0081	366
Flat concrete	HW-D-1068	394	HW-D-0268	382



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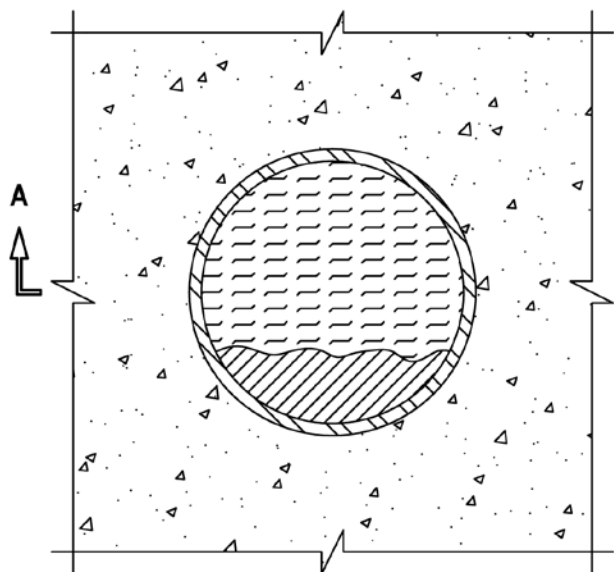
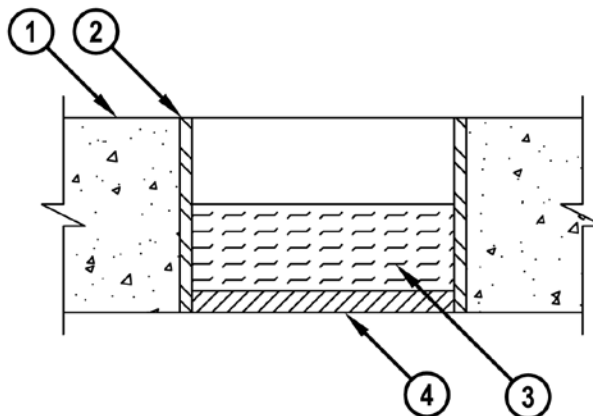
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cUL SYSTEM NO. C-AJ-0004

**BLANK OPENING THROUGH 3-HR. CONCRETE FLOOR/WALL OR BLOCK WALL**

F-RATING = 3-HR.
 FT-RATING = 1-1/2-HR.
 FH AND FTH-RATING = 0-HR.

cUL CAJ0004a.021805

TOP VIEW**SECTION A-A**

1. CONCRETE FLOOR OR WALL ASSEMBLY (3-HR. FIRE-RATING):
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MINIMUM 4-1/2" THICK).
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. (OPTIONAL). MAXIMUM 6" NOMINAL DIAMETER STEEL PIPE SLEEVE (SCHEDULE 10 OR HEAVIER).
3. MINIMUM 2" THICKNESS MINERAL WOOL (MINIMUM 4 PCF DENSITY) TIGHTLY PACKED.
4. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT FLUSH WITH BOTTOM OF FLOOR.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 6".
 2. MINIMUM 1/2" DEPTH HILTI FS-OE INTUMESCENT FIRESTOP SEALANT IS REQUIRED ON BOTH SIDES OF A WALL ASSEMBLY.



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UL/cUL SYSTEM NO. C-AJ-0082

BLANK OPENING IN CONCRETE FLOOR/WALL OR BLOCK WALL

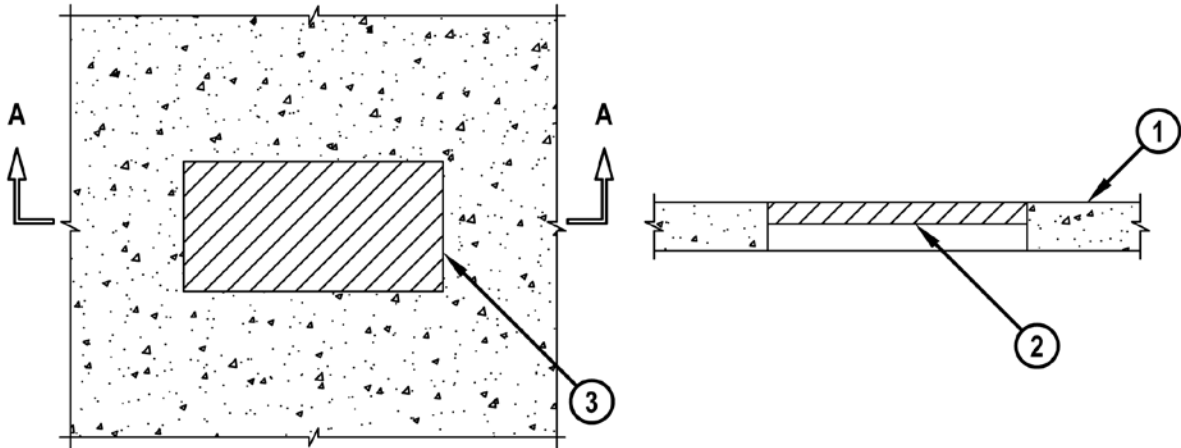
F-RATING = 3-HR.

T-RATING = 2-HR.

CAJ0082b.022102

TOP VIEW

SECTION A-A



1. CONCRETE FLOOR OR WALL ASSEMBLY (3-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MINIMUM 4-1/2" THICK).
 - B. ANY UL/ULC CLASSIFIED CONCRETE BLOCK WALL.
2. FORMING NOT SHOWN. USE A RIGID BOARD MATERIAL TO SUPPORT HILTI CP 637 FIRESTOP MORTAR DURING ITS INITIAL CURE.
3. MINIMUM 2" DEPTH HILTI CP 637 FIRESTOP MORTAR.

NOTE : MAXIMUM AREA OF OPENING = 288 SQ. IN. WITH A MAX. DIM. OF 24".



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UL/cUL SYSTEM NO. C-AJ-0090

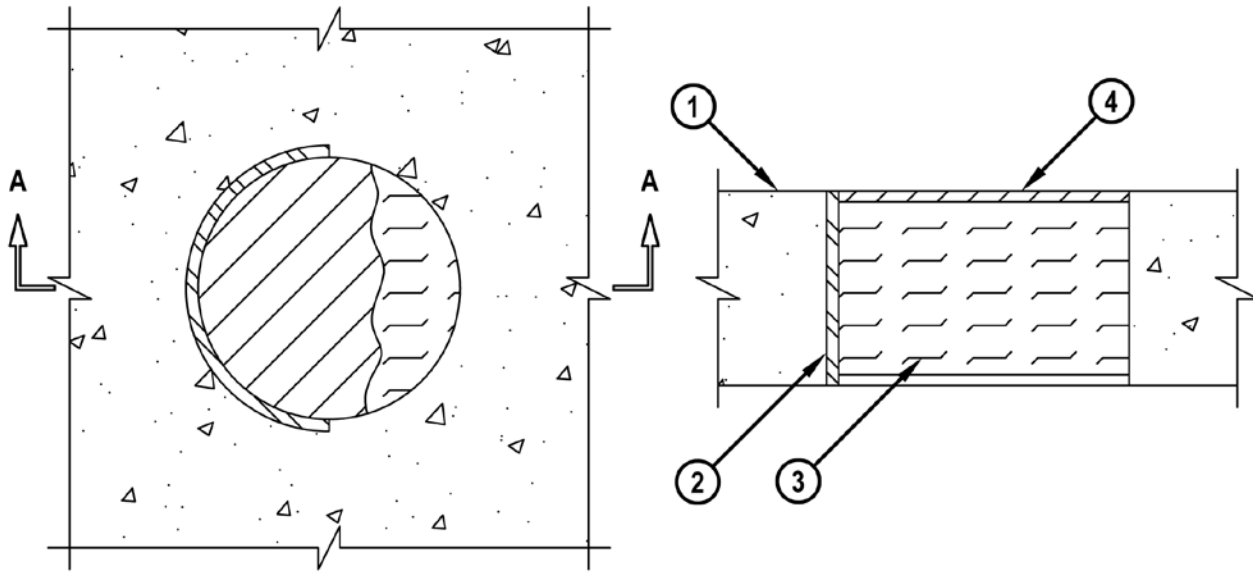
BLANK OPENING IN CONCRETE FLOOR/WALL OR BLOCK WALL

F-RATING = 2-HR.

T-RATING = 1-1/2-HR.

TOP VIEW

SECTION A-A



CAJ0090a.070302

1. CONCRETE FLOOR OR WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MINIMUM 4-1/2" THICK).
 - B. ANY UL/ULC CLASSIFIED CONCRETE BLOCK WALL.
2. OPTIONAL : MAXIMUM 6" NOMINAL DIAMETER STEEL PIPE SLEEVE (SCHEDULE 40 OR HEAVIER).
3. MINIMUM 4" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED.
4. MINIMUM 1/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 6".
 2. MINIMUM 1/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT IS REQUIRED ON BOTH SIDES OF A WALL ASSEMBLY.



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UL/cUL SYSTEM NO. C-AJ-0097

BLANK OPENING IN CONCRETE FLOOR/WALL OR BLOCK WALL ASSEMBLY

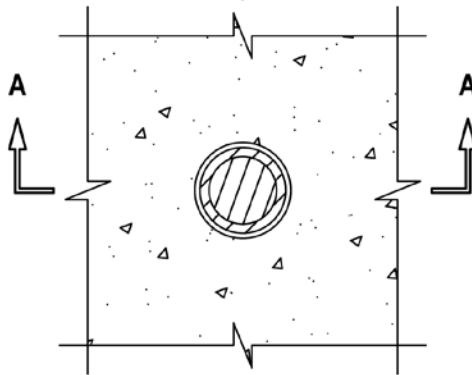
F-RATING = 2-HR.

T-RATING = 0-HR. OR 1/2-HR.

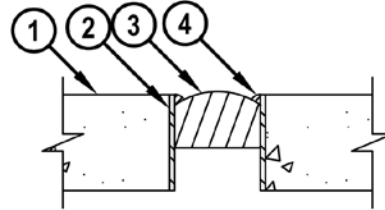
L-RATING AT AMBIENT = LESS THAN 1 CFM/SQ. FT.

L-RATING AT 400°F = LESS THAN 1 CFM/SQ. FT.

TOP VIEW



SECTION A-A



1. CONCRETE FLOOR OR WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MINIMUM 4-1/2" THICK).
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. MAXIMUM 4" NOMINAL DIAMETER STEEL PIPE SLEEVE (SCHEDULE 5 OR HEAVIER) (SEE TABLE BELOW).
SLEEVE MAY EXTEND MAXIMUM 2" BEYOND TOP SURFACE OF FLOOR OR BOTH SURFACES OF WALL.
3. HILTI CFS-PL FIRESTOP PLUG OR HILTI CP 658T FIRESTOP PLUG INSERTED INTO PIPE SLEEVE AND RECESSED TO ACCOMMODATE FIRESTOP PUTTY.
4. MINIMUM 1/2" BEAD HILTI CP 618 FIRESTOP PUTTY STICK APPLIED AROUND PERIPHERY OF FIRESTOP PLUG WHERE IT INTERFACES WITH INSIDE OF PIPE SLEEVE.

SLEEVE/OPENING DIAM IN. (MM)	NOM PLUG SIZE, IN. (MM)	
	CP 658T	CFS-PL
1-1/2 (38)	2.5 (63) *	2 (51) *
2 (51)	2.5 (63) *	2 (51)
3 (76)	4 (102) *	4 (102) *
4 (102)	4 (102)	4 (102)
* CUT WEDGE FROM PLUG TO FIT SLEEVE/OPENING SIZE. SEE HILTI INSTALLATION INSTRUCTIONS FOR SPECIFIC SIZE OF WEDGE CUTS REQUIRED.		

NOTES : 1. NOMINAL DIAMETER OF OPENING = 1-1/2", 2", 3", OR 4".
 2. HILTI FIRESTOP PLUG AND CP 618 FIRESTOP PUTTY STICK ARE REQUIRED ON BOTH SIDES OF A WALL ASSEMBLY.
 3. SLEEVE IS OPTIONAL WHEN HILTI CFS-PL FIRESTOP PLUG IS USED.

cUL SYSTEM NO. C-AJ-1010

METAL PIPE THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL

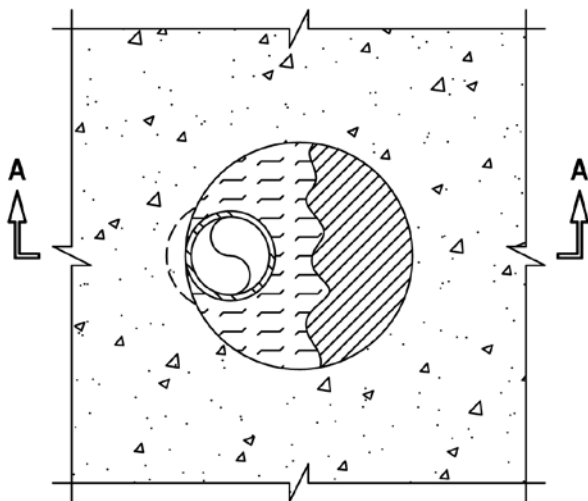
F-RATING = 2-HR.

FT, FH, AND FTH-RATING = 0-HR.

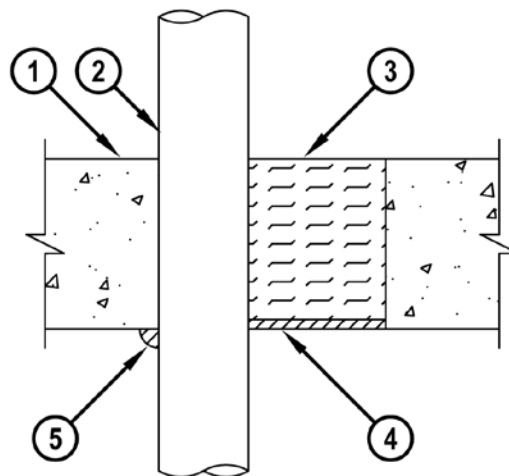


cUL CAJ1010b.091802

TOP VIEW



SECTION A-A



1. CONCRETE FLOOR OR WALL ASSEMBLY (2-HR. FIRE-RATING):
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MINIMUM 4-1/2" THICK).
 - B. ANY UL/ULC CLASSIFIED CONCRETE BLOCK WALL.
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING:
 - A. MAXIMUM 2" NOMINAL DIAMETER STEEL PIPE.
 - B. MAXIMUM 2" NOMINAL DIAMETER CAST IRON PIPE.
 - C. MAXIMUM 2" NOMINAL DIAMETER COPPER PIPE.
 - D. MAXIMUM 2" NOMINAL DIAMETER STEEL CONDUIT.
 - E. MAXIMUM 2" NOMINAL DIAMETER EMT.
3. MINIMUM 4-1/4" THICKNESS MINERAL WOOL (MINIMUM 4 PCF DENSITY) TIGHTLY PACKED AND RECESSED TO ACCOMMODATE FIRESTOP SEALANT.
4. MINIMUM 1/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT, CP 601S ELASTOMERIC FIRESTOP SEALANT, OR CP 606 FLEXIBLE FIRESTOP SEALANT.
5. MINIMUM 1/4" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT, CP 601S ELASTOMERIC FIRESTOP SEALANT, OR CP 606 FLEXIBLE FIRESTOP SEALANT APPLIED AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 6".
 2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 3-7/8".



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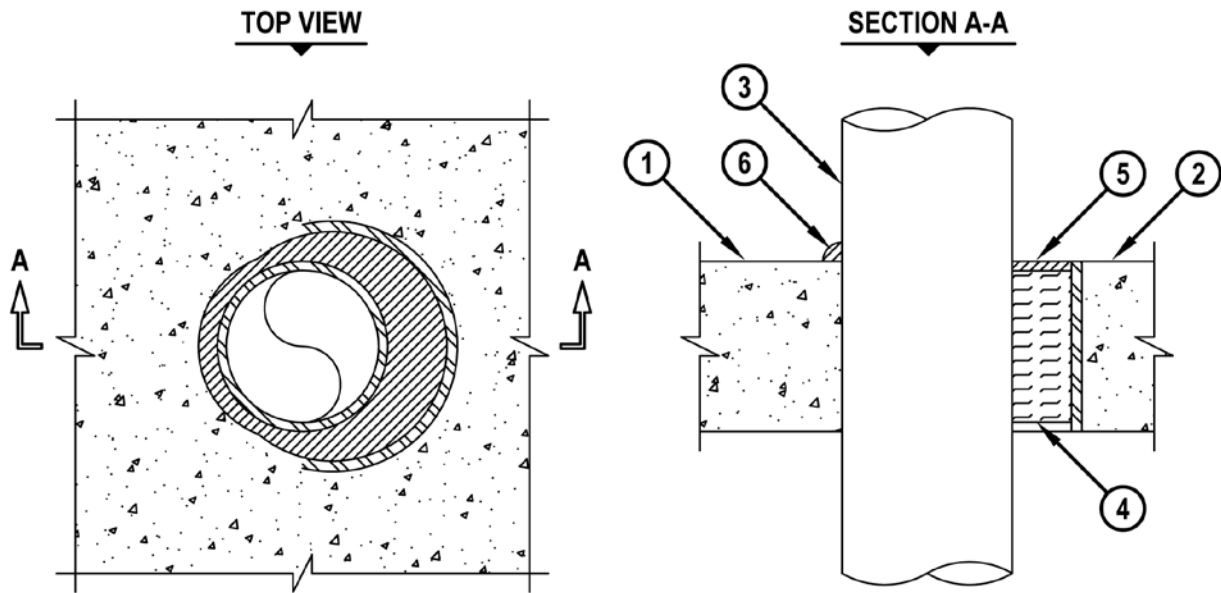
cUL SYSTEM NO. C-AJ-1011

METAL PIPE THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL

F-RATING = 2 AND 3-HR.
FT, FH AND FTH-RATING = 0-HR.



cULCAJ1011a.013103



1. CONCRETE FLOOR OR WALL ASSEMBLY (2-HR. OR 3-HR. FIRE-RATING):
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MINIMUM 4-1/2" THICK).
 - B. ANY ULC CLASSIFIED CONCRETE BLOCK WALL.
2. OPTIONAL : MAXIMUM 6" NOMINAL DIAMETER STEEL PIPE SLEEVE (SCHEDULE 40 OR HEAVIER)
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING:
 - A. MAXIMUM 4" DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER)
 - B. MAXIMUM 4" DIAMETER CAST IRON PIPE.
 - C. MAXIMUM 4" NOMINAL DIAMETER COPPER PIPE.
 - D. MAXIMUM 4" NOMINAL DIAMETER STEEL CONDUIT.
 - E. MAXIMUM 4" NOMINAL DIAMETER EMT.
4. MINIMUM 4" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED.
5. MINIMUM 1/4" DEPTH HILTI CP 604 SELF-LEVELING FIRESTOP SEALANT OR HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
6. MINIMUM 1/4" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT APPLIED AT POINT OF CONTACT (NOT REQUIRED WHEN HILTI CP 604 FIRESTOP SEALANT IS USED, ITEM NO. 5).

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 6".
 2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 5-3/8".
 3. MINIMUM 1/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT IS REQUIRED ON EACH SIDE OF A WALL ASSEMBLY.
 4. F-RATING IS 3-HR. WHEN HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT IS USED, AND 2-HR. WHEN HILTI CP 604 SELF-LEVELING FIRESTOP SEALANT IS USED.



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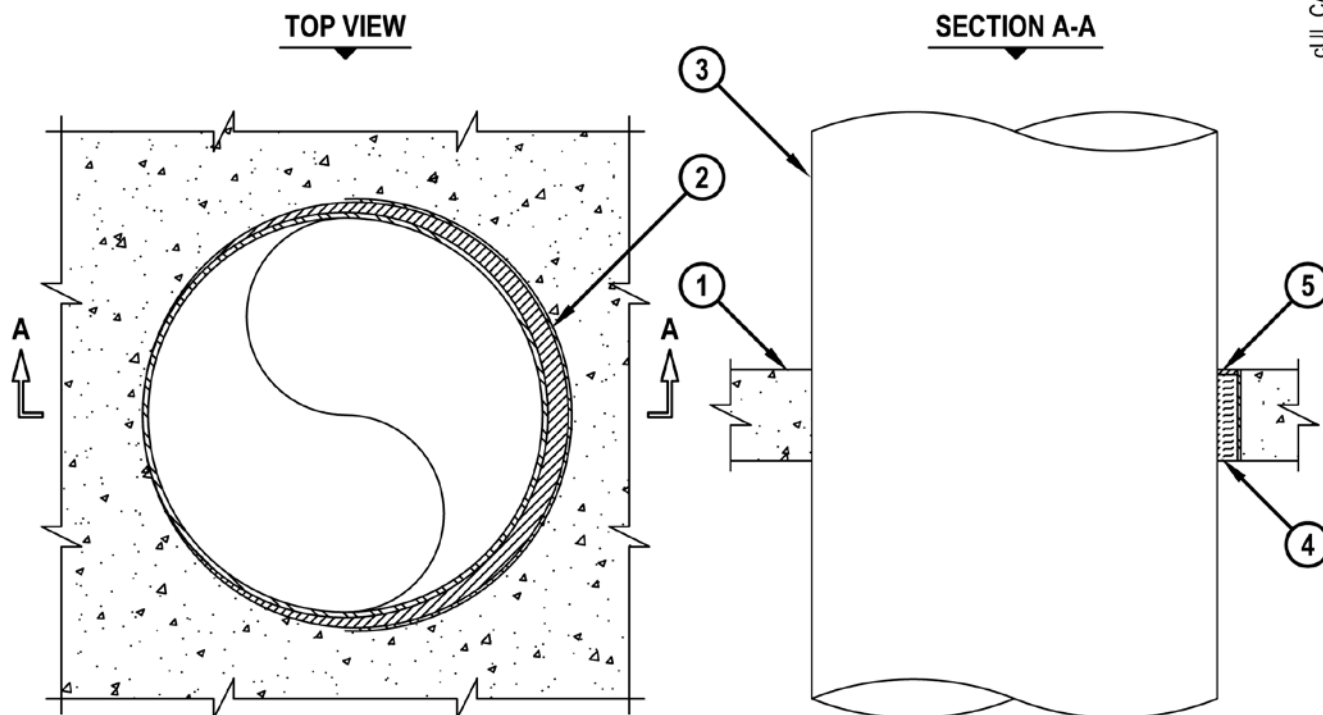
cUL SYSTEM NO. C-AJ-1012

METAL PIPE THROUGH CONCRETE FLOOR ASSEMBLY

F-RATING = 3-HR.
FT, FH AND FTH-RATING = 0-HR.



cUL CAJ1012a.013103



1. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR ASSEMBLY (MINIMUM 4-1/2" THICK) (3-HR. FIRE-RATING).
2. OPTIONAL: MAXIMUM 32" NOMINAL DIAMETER STEEL PIPE SLEEVE (SCHEDULE 40 OR HEAVIER).
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING:
 - A. MAXIMUM 30" DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 30" DIAMETER CAST IRON PIPE.
 - C. MAXIMUM 6" NOMINAL DIAMETER COPPER PIPE.
 - D. MAXIMUM 6" NOMINAL DIAMETER STEEL CONDUIT.
 - E. MAXIMUM 4" NOMINAL DIAMETER EMT.
4. MINIMUM 4" THICKNESS MINERAL WOOL (MINIMUM 4 PCF DENSITY) TIGHTLY PACKED.
5. MINIMUM 1/4" DEPTH HILTI CP 604 SELF-LEVELING FIRESTOP SEALANT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 32".
2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 2".



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cUL SYSTEM NO. C-AJ-1016

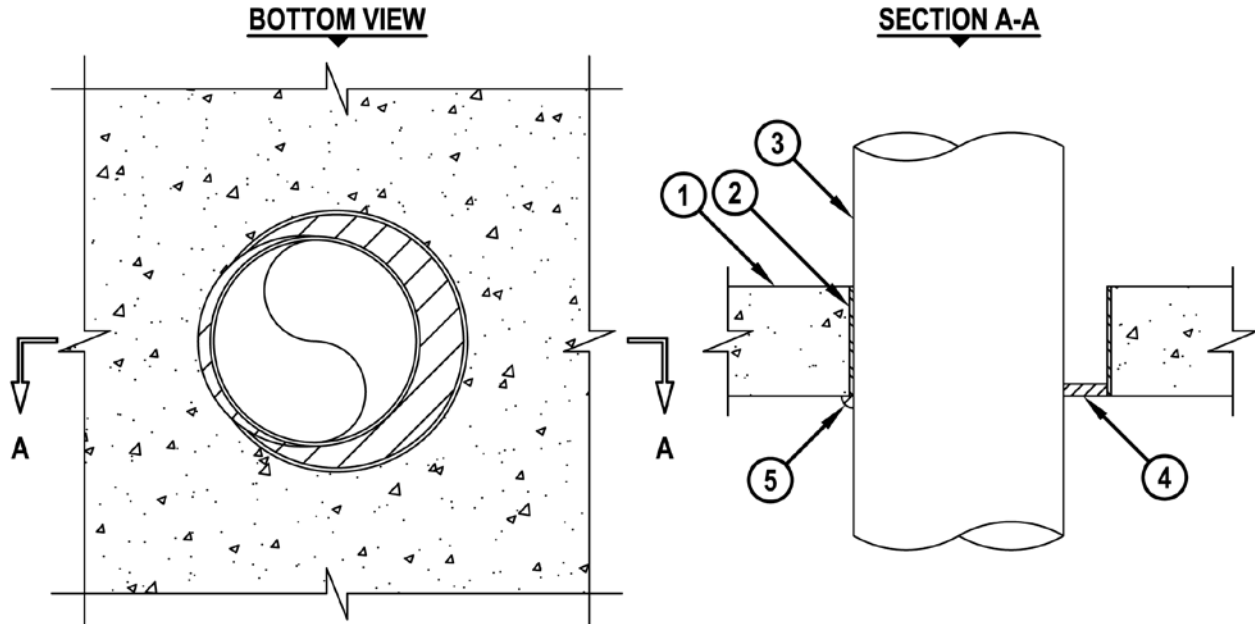


METAL PIPE THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL ASSEMBLY

F-RATING = 2-HR.

FT, FH AND FTH-RATINGS = 0-HR.

cUL CAJ1016c.032807



1. CONCRETE FLOOR OR WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MINIMUM 4-1/2" THICK).
 - B. PRECAST (HOLLOW-CORE) CONCRETE FLOOR (MINIMUM 6" THICK).
 - C. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. [OPTIONAL] MAXIMUM 10" NOMINAL DIAMETER STEEL PIPE SLEEVE (SCHEDULE 10 OR HEAVIER) (SEE NOTE NO. 4 BELOW).
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 8" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 8" NOMINAL DIAMETER CAST OR DUCTILE IRON PIPE.
 - C. MAXIMUM 6" NOMINAL DIAMETER STEEL CONDUIT.
 - D. MAXIMUM 4" NOMINAL DIAMETER COPPER PIPE OR TUBING.
 - E. MAXIMUM 4" NOMINAL DIAMETER EMT.
4. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT FLUSH WITH BOTTOM OF FLOOR ASSEMBLY.
5. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT APPLIED AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 10" FOR NORMAL CONCRETE AND BLOCK WALL, 7" FOR PRECAST (HOLLOW-CORE) CONCRETE.
 2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1-7/8".
 3. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT IS REQUIRED ON BOTH SIDES OF A WALL ASSEMBLY.
 4. STEEL SLEEVE NOT SUITABLE FOR USE IN HOLLOW-CORE FLOORS.



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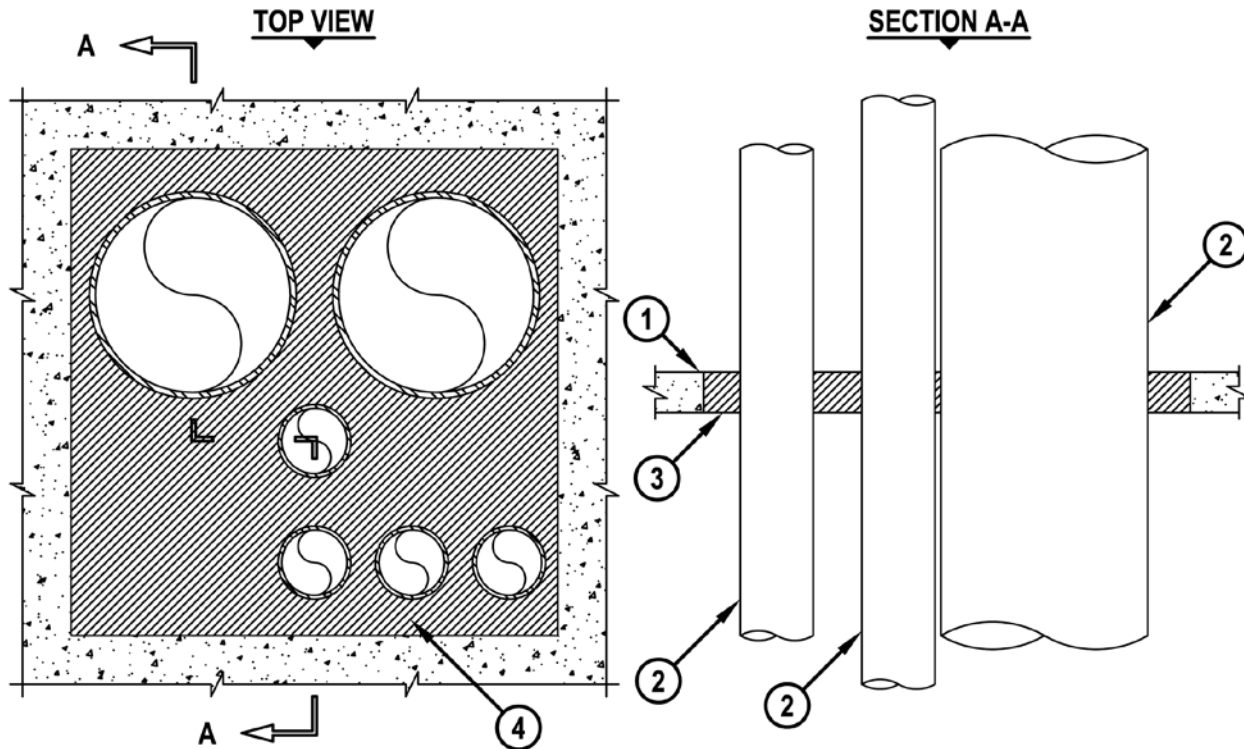
UL/cUL SYSTEM NO. C-AJ-1140

MULTIPLE METAL PIPES THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL

F-RATING = 3-HR.

T-RATING = 0-HR.

CAJ114j.061608



1. CONCRETE FLOOR OR WALL ASSEMBLY (3-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MINIMUM 2-1/2" THICK).
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. ONE OR MORE OF THE FOLLOWING PENETRATING ITEMS MAY BE INSTALLED WITHIN THE OPENING :
 - A. MAXIMUM 12" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 4" NOMINAL DIAMETER COPPER PIPE, STEEL CONDUIT, OR EMT.
3. [FORMING NOT SHOWN] USE A RIGID BOARD MATERIAL TO SUPPORT HILTI CP 637 FIRESTOP MORTAR DURING ITS INITIAL CURE (MINIMUM 24 HOURS) (SEE NOTE NO. 5 BELOW).
4. MINIMUM 2-1/2" DEPTH HILTI CP 637 FIRESTOP MORTAR.

NOTES : 1. MAXIMUM AREA OF OPENING = 1024 SQ. IN. WITH A MAXIMUM DIMENSION OF 32".

2. MINIMUM CLEARANCE BETWEEN PIPES = 0".

3. MINIMUM CLEARANCE BETWEEN 4" PIPES (OR SMALLER) AND PERIPHERY OF OPENING = 0".

4. MINIMUM CLEARANCE BETWEEN PIPES LARGER THAN 4" AND PERIPHERY OF OPENING = 1".

5. AS AN ALTERNATE TO RIGID BOARD MATERIAL, MINERAL WOOL MAY BE USED IN FLOORS GREATER THAN 2-1/2" THICK. THE MINERAL WOOL IS TO BE TIGHTLY PACKED WITHIN THE OPENING AS TEMPORARY OR PERMANENT FORMING AND RECESSED FROM TOP SURFACE OF CONCRETE FLOOR TO ACCOMMODATE FIRESTOP MORTAR.



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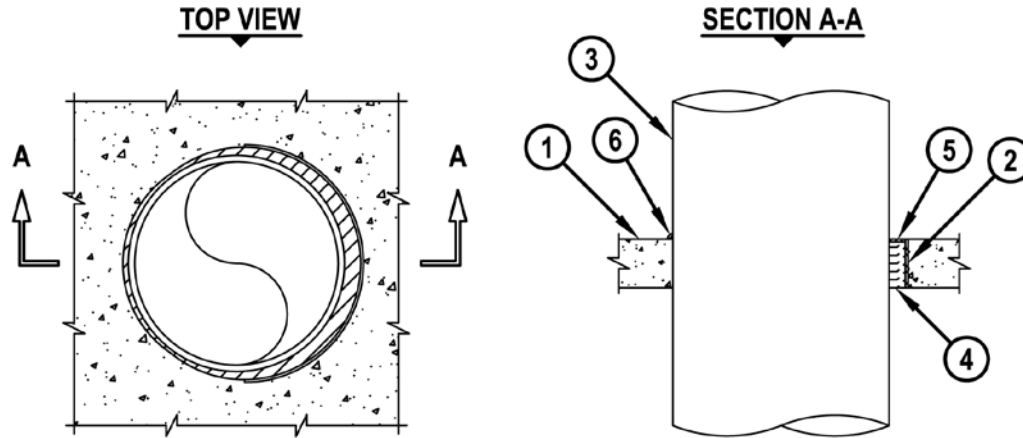
UL/cUL SYSTEM NO. C-AJ-1226

METAL PIPE THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL

F-RATING = 3-HR.
T-RATING = 0-HR.

L-RATING AT AMBIENT = LESS THAN 1 CFM/SQ. FT.
L-RATING AT 400° F = 4 CFM/SQ. FT.

CAJ1226m.080107



1. CONCRETE FLOOR OR WALL ASSEMBLY (3-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MINIMUM 4-1/2" THICK).
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. [OPTIONAL] ANY OF THE FOLLOWING STEEL SLEEVES MAY BE USED :
 - A. MAXIMUM 32" NOMINAL DIAMETER STEEL PIPE SLEEVE (SCHEDULE 40 OR HEAVIER) MAY EXTEND MAXIMUM 3" ABOVE FLOOR OR BEYOND BOTH SURFACES OF WALL.
 - B. MAXIMUM 6" (MIN. 26 GA.) OR 12" (MIN. 24 GA.) DIAMETER GALVANIZED STEEL SLEEVE WITH SQUARE FLANGE SPOT WELDED TO BOTTOM OR MID-HEIGHT OF SLEEVE AND SIZED MINIMUM 2" LARGER THAN SLEEVE DIAMETER. SLEEVE MAY EXTEND MAXIMUM 1" ABOVE TOP SURFACE OF FLOOR, AND MAXIMUM 4" BELOW BOTTOM SURFACE OF FLOOR.
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 30" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 30" NOMINAL DIAMETER CAST IRON PIPE.
 - C. MAXIMUM 6" NOMINAL DIAMETER COPPER PIPE.
 - D. MAXIMUM 6" NOMINAL DIAMETER STEEL CONDUIT.
 - E. MAXIMUM 4" NOMINAL DIAMETER EMT.
4. MINIMUM 4" THICKNESS MINERAL WOOL (MINIMUM 4 PCF DENSITY) TIGHTLY PACKED AND RECESSED TO ACCOMMODATE FIRESTOP SEALANT.
5. MINIMUM 1/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT FLUSH WITH TOP SURFACE OF PIPE SLEEVE OR FLOOR ASSEMBLY.
6. MINIMUM 1/4" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 32".
2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1-7/8".
3. MINIMUM 1/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT IS REQUIRED ON BOTH SIDES OF A WALL ASSEMBLY.
4. PIPE MAY BE INSTALLED WITH CONTINUOUS POINT OF CONTACT.



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UL/cUL SYSTEM NO. C-AJ-1346

FLEXIBLE STEEL CONDUIT THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL

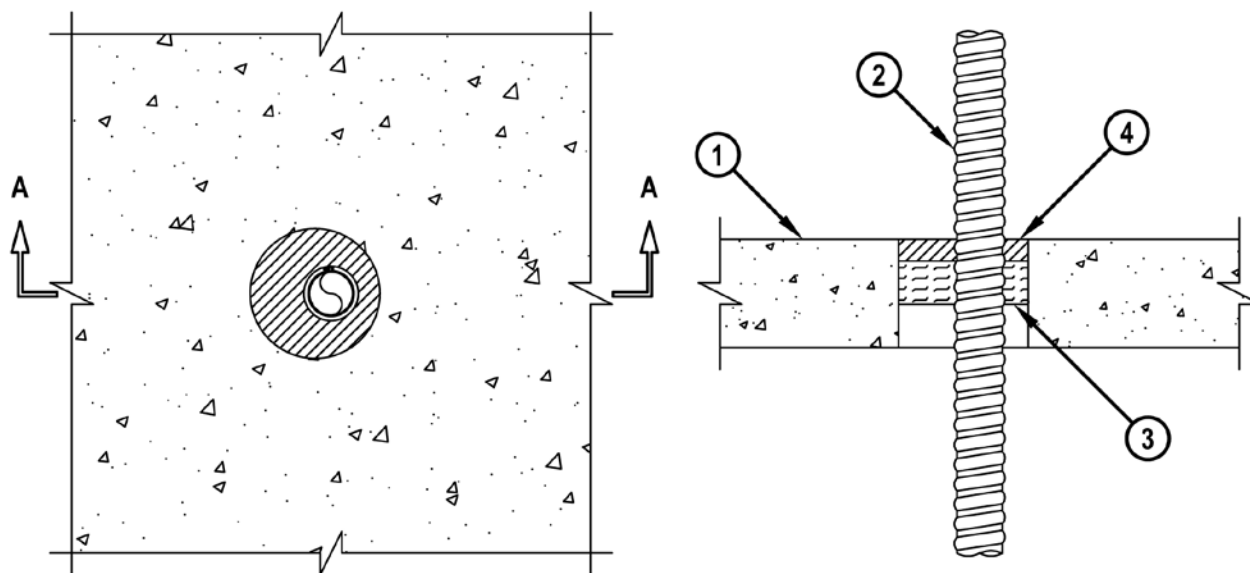
F-RATING = 2-HR.

T-RATING = 0-HR.

CAJ1346c.060804

TOP VIEW

SECTION A-A



1. CONCRETE FLOOR ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MINIMUM 2-1/2" THICK).
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 1" NOMINAL DIAMETER FLEXIBLE STEEL CONDUIT.
 - B. MAXIMUM 1" NOMINAL DIAMETER FLEXIBLE STEEL GAS PIPING (WITH OR WITHOUT PLASTIC COVERING) MANUFACTURED BY OMEGA FLEX INC., TITEFLEX CORP., OR WARD MFG. INC.
3. MINIMUM 1" THICKNESS MINERAL WOOL (MINIMUM 4 PCF DENSITY) TIGHTLY PACKED.
4. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 3".
 2. ANNULAR SPACE = MINIMUM 1/2", MAXIMUM 1-1/4".



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UL/cUL SYSTEM NO. C-AJ-1372

METAL PIPE THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL

F-RATING = 3-HR.

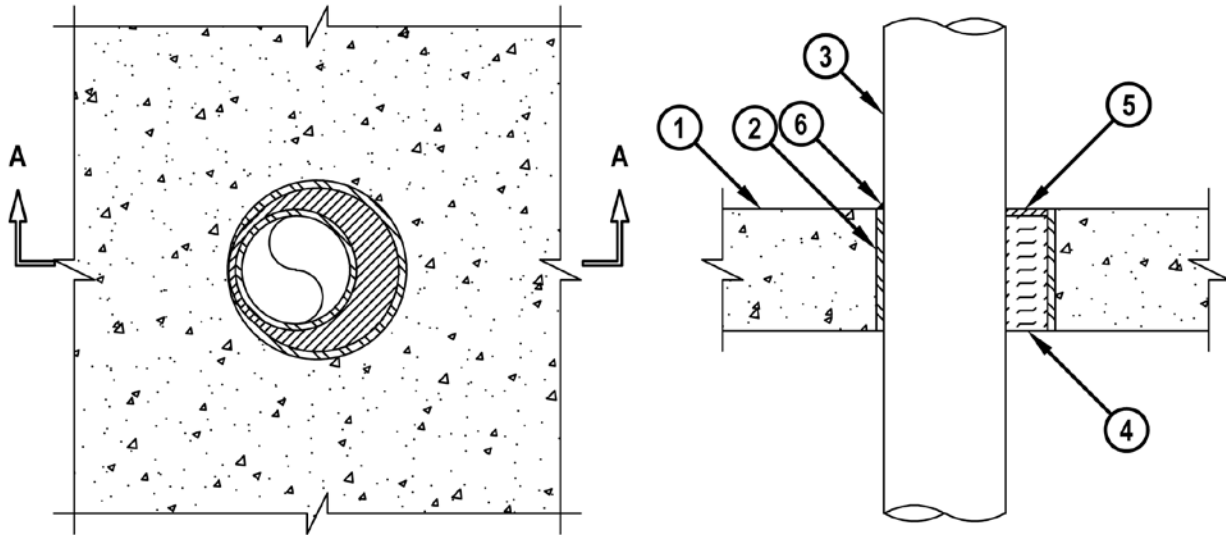
T-RATING = 0-HR.

L-RATING AT AMBIENT = LESS THAN 1 CFM/SQ. FT.

L-RATING AT 400° F = 4 CFM/ SQ. FT.

TOP VIEW

SECTION A-A



1. CONCRETE FLOOR OR WALL ASSEMBLY (3-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MIN. 4-1/2" THICK).
 - B. ANY UL/ULC CLASSIFIED CONCRETE BLOCK WALL.
2. OPTIONAL : MAXIMUM 10" NOMINAL DIAMETER STEEL PIPE SLEEVE (SCHEDULE 40 OR HEAVIER).
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 8" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 8" NOMINAL DIAMETER CAST IRON PIPE.
 - C. MAXIMUM 4" NOMINAL DIAMETER COPPER PIPE.
 - D. MAXIMUM 4" NOMINAL DIAMETER STEEL CONDUIT.
 - E. MAXIMUM 4" NOMINAL DIAMETER EMT.
4. MINIMUM 4-1/4" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED.
5. MINIMUM 1/4" DEPTH HILTI CP 606 FLEXIBLE FIRESTOP SEALANT.
6. MINIMUM 1/4" BEAD HILTI CP 606 FLEXIBLE FIRESTOP SEALANT AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 10-1/2".
 2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1-7/8".
 3. MINIMUM 1/4" DEPTH HILTI CP 606 FLEXIBLE FIRESTOP SEALANT IS REQUIRED ON BOTH SIDES OF A WALL ASSEMBLY.

UL/cUL SYSTEM NO. C-AJ-1380

METAL PIPE THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL ASSEMBLY

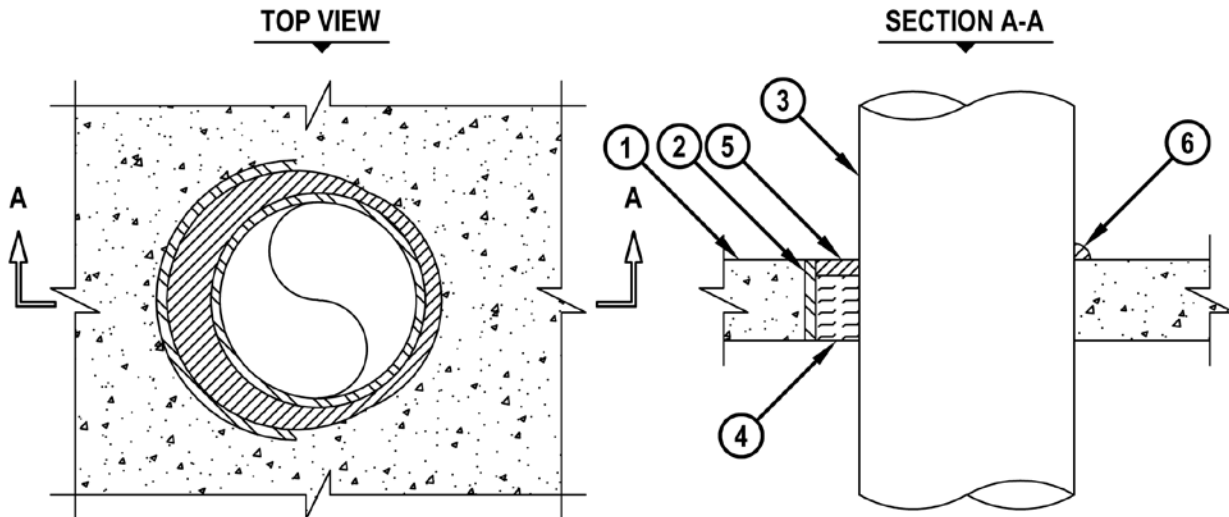
F-RATING = 2-HR.

T-RATING = 0-HR.

L-RATING AT AMBIENT = LESS THAN 1 CFM/SQ. FT.

L-RATING AT 400° F = 4 CFM/ SQ. FT.

CAJ1380b110402



1. CONCRETE FLOOR OR WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MIN. 2-1/2" THICK).
 - B. ANY UL/ULC CLASSIFIED CONCRETE BLOCK WALL.
2. OPTIONAL : MAXIMUM 32" NOMINAL DIAMETER STEEL PIPE SLEEVE (SCHEDULE 40).
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 30" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 30" NOMINAL DIAMETER CAST IRON PIPE.
 - C. MAXIMUM 6" NOMINAL DIAMETER COPPER PIPE.
 - D. MAXIMUM 6" NOMINAL DIAMETER STEEL CONDUIT.
 - E. MAXIMUM 4" NOMINAL DIAMETER EMT.
4. MINIMUM 2" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED.
5. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
6. MINIMUM 1/2" CROWN HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 31-7/8".
 2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1-7/8".
 3. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT IS REQUIRED ON BOTH SIDES OF A WALL ASSEMBLY.



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UL/cUL SYSTEM NO. C-AJ-1425

METAL PIPE THROUGH CONCRETE FLOOR ASSEMBLY

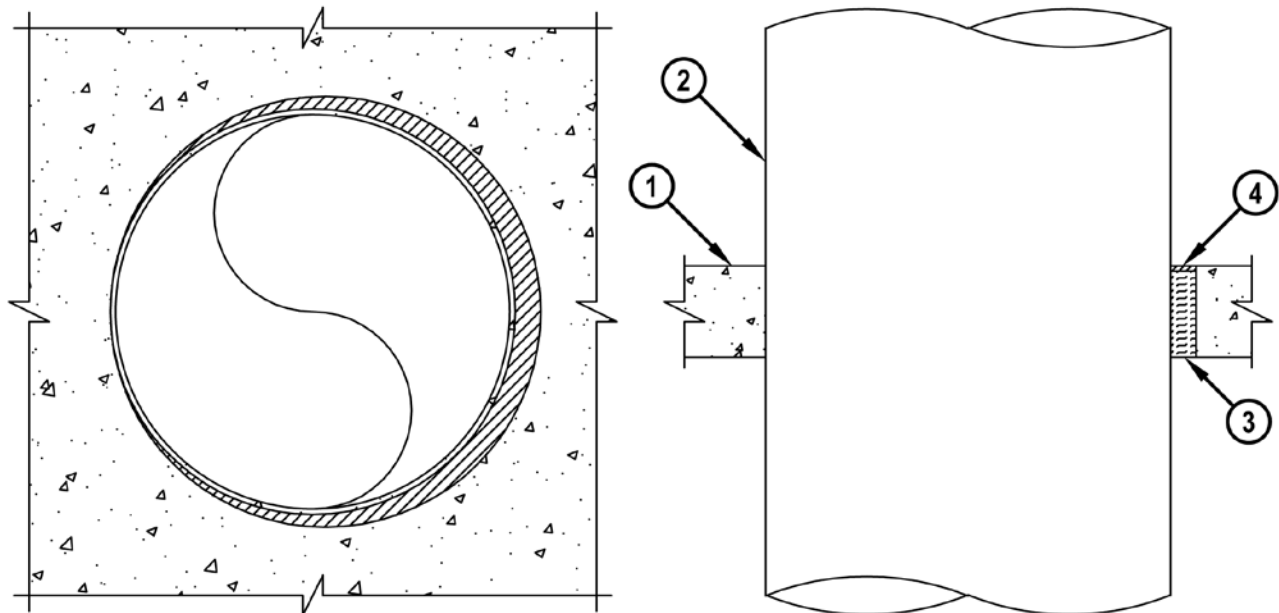
F-RATING = 3-HR.

T-RATING = 0-HR.

W-RATING = CLASS I

TOP VIEW

SECTION A-A



CAJ1425c.102104

1. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR ASSEMBLY (MINIMUM 4-1/2" THICK) (3-HR. FIRE-RATING).
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING:
 - A. MAXIMUM 30" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 30" NOMINAL DIAMETER CAST IRON PIPE.
 - C. MAXIMUM 6" NOMINAL DIAMETER COPPER PIPE OR TUBING.
 - D. MAXIMUM 6" NOMINAL DIAMETER STEEL CONDUIT.
 - E. MAXIMUM 4" NOMINAL DIAMETER EMT.
3. MINIMUM 4" THICKNESS MINERAL WOOL (MINIMUM 4 PCF DENSITY) TIGHTLY PACKED AND RECESSED TO ACCOMMODATE FIRESTOP SEALANT.
4. MINIMUM 1/4" DEPTH HILTI CP 604 SELF-LEVELING FIRESTOP SEALANT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 31-7/8".
2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1-7/8".



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UL/cUL SYSTEM NO. C-AJ-1453

METAL PIPE THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL

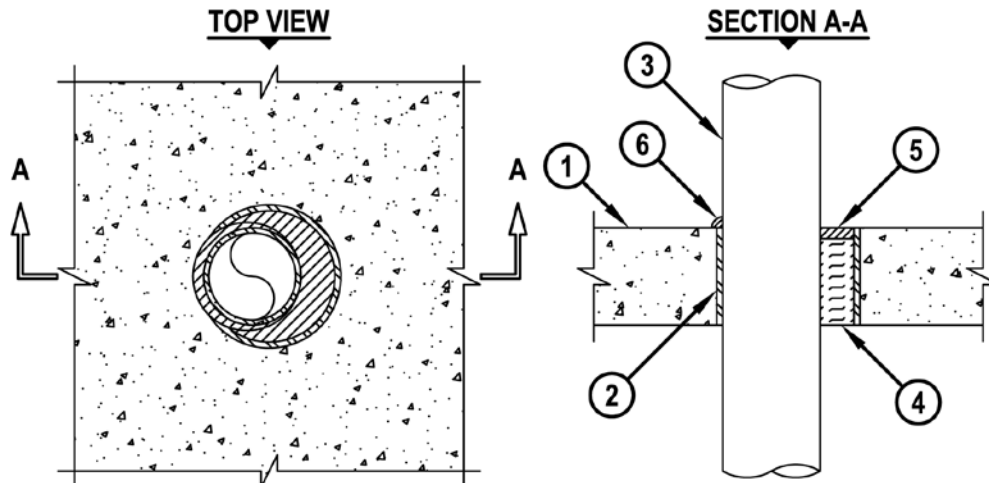
F-RATING = 2-HR.

T-RATING = 0-HR. OR 1/4-HR.

L-RATING AT AMBIENT = LESS THAN 1 CFM/SQ. FT.

L-RATING AT 400°F = 4 CFM/SQ. FT.

CAJ1453d.022412



1. CONCRETE FLOOR OR WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MINIMUM 4-1/2" THICK).
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. [OPTIONAL] ANY OF THE FOLLOWING STEEL SLEEVES MAY BE USED :
 - A. MAXIMUM 32" NOMINAL DIAMETER STEEL PIPE SLEEVE (SCHEDULE 5 OR HEAVIER) MAY EXTEND MAXIMUM 3" ABOVE FLOOR OR BEYOND BOTH SURFACES OF WALL.
 - B. MAXIMUM 6" (MIN. 26 GA.) OR 12" (MIN. 24 GA.) DIAMETER GALVANIZED STEEL SLEEVE WITH SQUARE FLANGE SPOT WELDED TO BOTTOM OR MID-HEIGHT OF SLEEVE AND SIZED MINIMUM 2" LARGER THAN SLEEVE DIAMETER. SLEEVE MAY EXTEND MAXIMUM 1" ABOVE TOP SURFACE OF FLOOR, AND MAXIMUM 4" BELOW BOTTOM SURFACE OF FLOOR.
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 30" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 30" NOMINAL DIAMETER CAST IRON PIPE.
 - C. MAXIMUM 6" NOMINAL DIAMETER COPPER PIPE.
 - D. MAXIMUM 6" NOMINAL DIAMETER STEEL CONDUIT.
 - E. MAXIMUM 4" NOMINAL DIAMETER EMT.
4. MINIMUM 4" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED.
5. MINIMUM 1/2" DEPTH HILTI CP 606 FLEXIBLE FIRESTOP SEALANT.
6. MINIMUM 1/4" BEAD HILTI CP 606 FLEXIBLE FIRESTOP SEALANT APPLIED AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 31-7/8".
 2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 2".
 3. MINIMUM 1/2" DEPTH HILTI CP 606 FLEXIBLE FIRESTOP SEALANT IS REQUIRED ON BOTH SIDES OF A WALL ASSEMBLY.



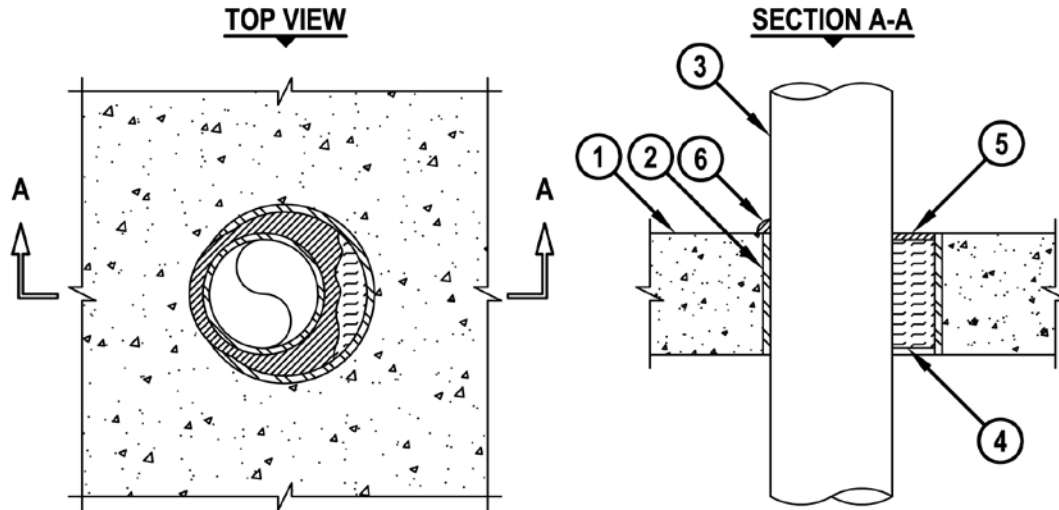
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UL/cUL SYSTEM NO. C-AJ-1498

METAL PIPE THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL

F-RATING = 2-HR.
T-RATING = 0-HR.
W-RATING = CLASS I



1. CONCRETE FLOOR OR WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MINIMUM 4-1/2" THICK).
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. [OPTIONAL] ANY OF THE FOLLOWING STEEL SLEEVES MAY BE USED :
 - A. MAXIMUM 10" NOMINAL DIAMETER STEEL PIPE SLEEVE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 6" (MIN. 26 GA.) OR 10" (MIN. 24 GA.) DIAMETER GALVANIZED STEEL SLEEVE WITH SQUARE FLANGE SPOT WELDED TO BOTTOM OR MID-HEIGHT OF SLEEVE AND SIZED MINIMUM 2" LARGER THAN SLEEVE DIAMETER. SLEEVE MAY EXTEND MAXIMUM 1" ABOVE TOP SURFACE OF FLOOR, AND MAXIMUM 4" BELOW BOTTOM SURFACE OF FLOOR.
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING:
 - A. MAXIMUM 8" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 8" NOMINAL DIAMETER CAST IRON PIPE.
 - C. MAXIMUM 4" NOMINAL DIAMETER COPPER PIPE OR TUBING.
 - D. MAXIMUM 6" NOMINAL DIAMETER STEEL CONDUIT.
 - E. MAXIMUM 4" NOMINAL DIAMETER EMT.
4. MINIMUM 4" THICKNESS MINERAL WOOL (MINIMUM 4 PCF DENSITY) TIGHTLY PACKED AND RECESSED TO ACCOMMODATE FIRESTOP SEALANT.
5. MINIMUM 1/4" DEPTH HILTI CP 601S ELASTOMERIC FIRESTOP SEALANT.
6. MINIMUM 1/4" BEAD HILTI CP 601S ELASTOMERIC FIRESTOP SEALANT AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 10".
2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 2".
3. MINIMUM 1/4" DEPTH HILTI CP 601S ELASTOMERIC FIRESTOP SEALANT IS REQUIRED ON EACH SIDE OF A WALL ASSEMBLY.

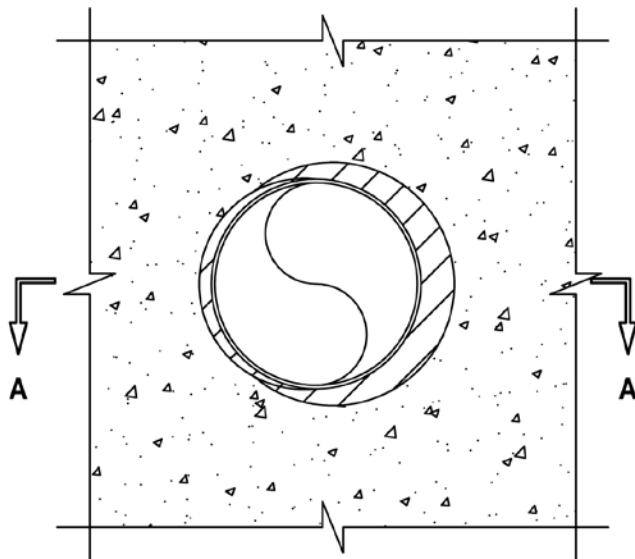
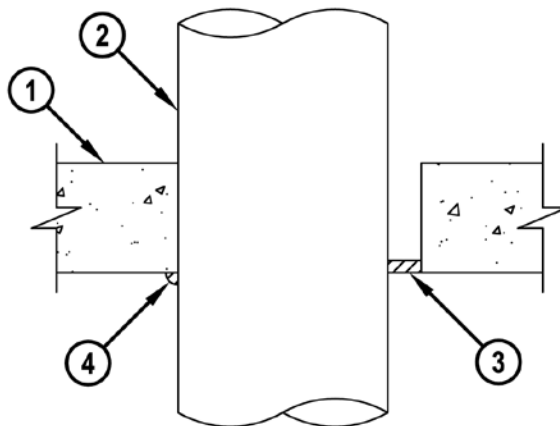
UL/cUL SYSTEM NO. C-AJ-1534

METAL PIPE THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL ASSEMBLY

F-RATING = 2-HR.

T-RATING = 0-HR.

CAJ1534a.032805

BOTTOM VIEW**SECTION A-A**

1. CONCRETE FLOOR OR WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MINIMUM 4-1/2" THICK).
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 8" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 8" NOMINAL DIAMETER CAST OR DUCTILE IRON PIPE.
 - C. MAXIMUM 6" NOMINAL DIAMETER STEEL CONDUIT.
 - D. MAXIMUM 4" NOMINAL DIAMETER COPPER PIPE OR TUBING.
 - E. MAXIMUM 4" NOMINAL DIAMETER EMT.
3. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT FLUSH WITH BOTTOM OF FLOOR ASSEMBLY.
4. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT APPLIED AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 10".
 2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1-7/8".
 3. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT IS REQUIRED ON BOTH SIDES OF A WALL ASSEMBLY.



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UL/cUL SYSTEM NO. C-AJ-1597

METAL PIPE THROUGH CONCRETE FLOOR/WALL OR CONCRETE BLOCK WALL

F-RATING = 3-HR.

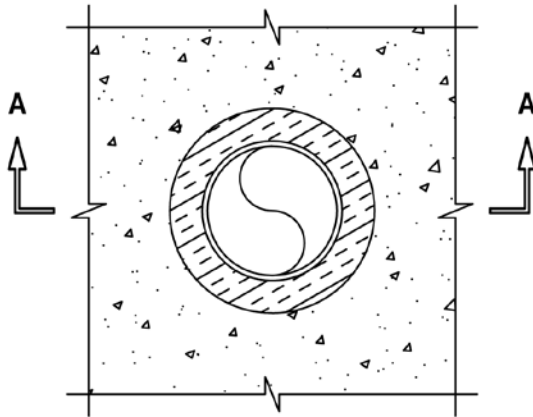
T-RATING = 2-HR. OR 2 3/4-HR. (SEE NOTES BELOW)

L-RATING AT AMBIENT = LESS THAN 1 CFM/SQ FT

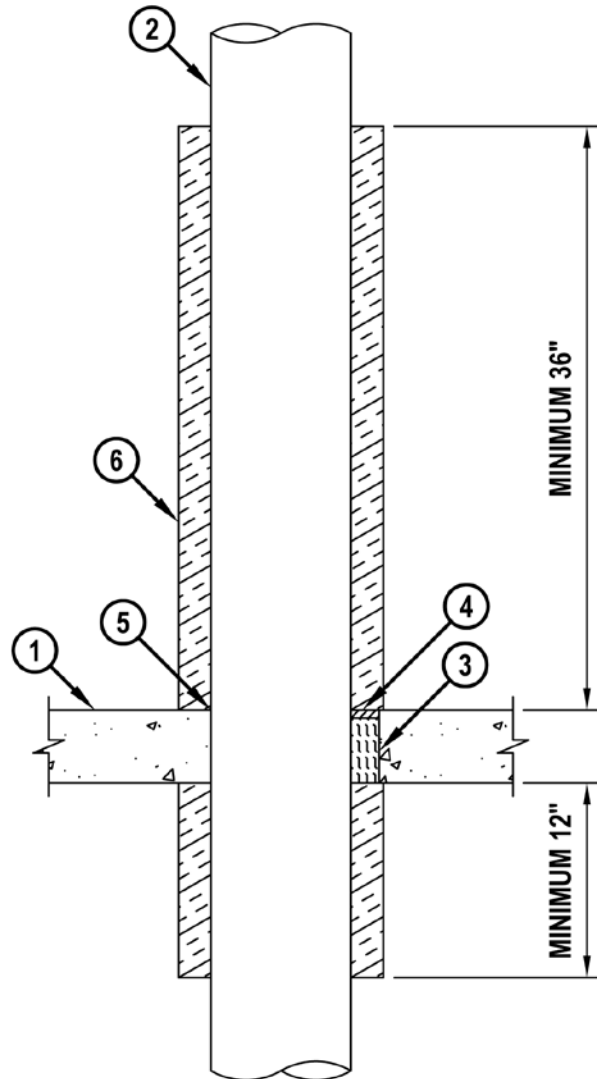
L-RATING AT 400°F = LESS THAN 1 CFM/SQ FT

CAJ1597b.061412

TOP VIEW



SECTION A-A



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UL/cUL SYSTEM NO. C-AJ-1597

METAL PIPE THROUGH CONCRETE FLOOR/WALL OR CONCRETE BLOCK WALL

F-RATING = 3-HR.

T-RATING = 2-HR. OR 2 3/4-HR. (SEE NOTES BELOW)

L-RATING AT AMBIENT = LESS THAN 1 CFM/SQ FT

L-RATING AT 400°F = LESS THAN 1 CFM/SQ FT

CAJ1597b.061412

1. CONCRETE FLOOR OR WALL ASSEMBLY (3-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MINIMUM 4-1/2" THICK).
 - B. ANY UL/cUL CLASSIFIED PRECAST (HOLLOW-CORE) CONCRETE FLOOR (MINIMUM 6" THICK).
 - C. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 8" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 8" NOMINAL DIAMETER CAST OR DUCTILE IRON PIPE.
 - C. MAXIMUM 4" NOMINAL DIAMETER COPPER PIPE OR TUBING.
 - D. MAXIMUM 6" NOMINAL DIAMETER STEEL CONDUIT.
 - E. MAXIMUM 4" NOMINAL DIAMETER EMT.
3. MINIMUM 4" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED.
4. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT OR HILTI CP 604 SELF LEVELING FIRESTOP SEALANT.
5. [NOT SHOWN] MINIMUM 1/4" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT APPLIED AT POINT OF CONTACT (NON REQUIRED WHEN CP 604 SELF LEVELING FIRESTOP SEALANT IS USED).
6. NOMINAL 1-1/2" OR 2" THICK DUCT WRAP (FYREWAP DUCT OR FYREWAP DUCT 1.5 INSULATION MANUFACTURED BY UNIFRAX, OR FIREMASTER FASTWRAP XL MANUFACTURED BY THERMAL CERAMICS) WRAPPED AROUND PENETRANT, EXTENDING MINIMUM 36" ABOVE FLOOR AND MINIMUM 12" BELOW FLOOR OR MINIMUM 36" BEYOND BOTH SIDES OF WALL ASSEMBLY. THE ENDS ARE TO BE TIGHTLY BUTTED TOGETHER AND TAPED ON TOP SIDE OF FLOOR AND BOTH SIDES OF WALL. THE EXPOSED EDGES OF THE FACED BLANKETS ARE TO BE TAPED WITH 4" WIDE PRESSURE-SENSITIVE ALUMINUM FOIL TAPE. ON THE BOTTOM SURFACE OF THE FLOOR ENDS ARE TO BE TIGHTLY BUTTED AND WIRE BOUND.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 10" FOR NORMAL CONCRETE, 7" FOR PRECAST (HOLLOW-CORE) CONCRETE.

2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 2".

3. HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT IS REQUIRED ON BOTH SIDES OF A WALL.

4. MINERAL WOOL REQUIRED TO BE INSTALLED FLUSH WITH BOTTOM FLOOR SURFACE WHEN INSTALLED IN PRECAST (HOLLOW-CORE) CONCRETE.

5. T-RATING EQUALS 2-HR. WHEN 1-1/2" THICK DUCT INSULATION IS USED.



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PLASTIC PIPE THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL

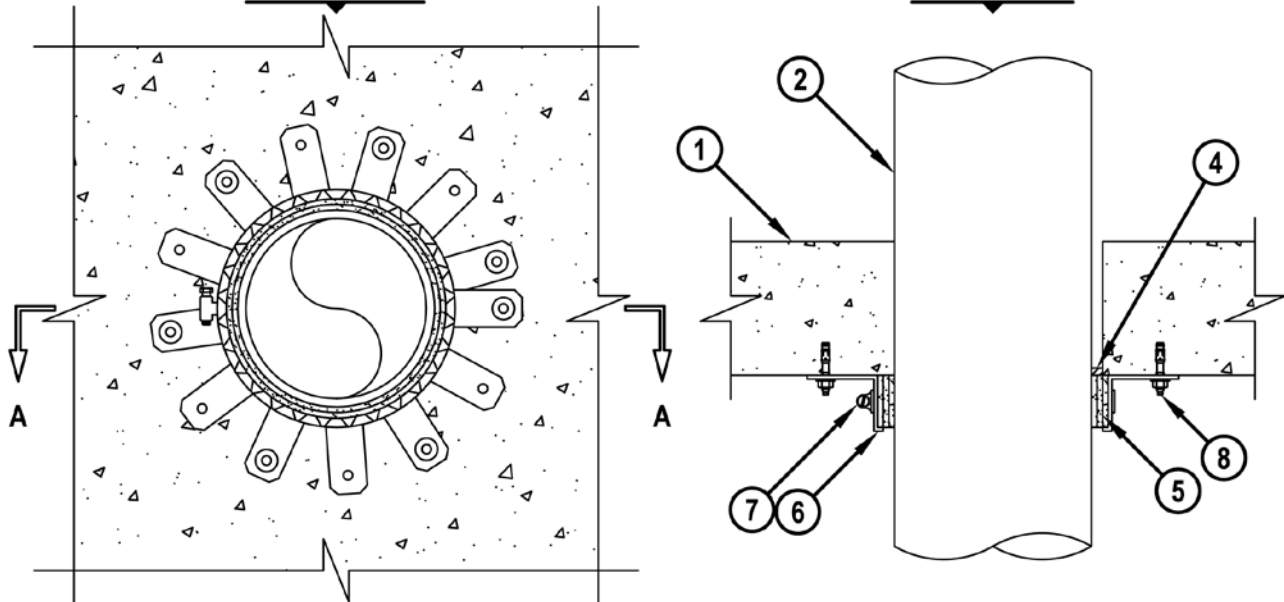
F-RATING = 2-HR. OR 3-HR.

FH-RATING = 0-HR., 2-HR., OR 3-HR.

FT-RATING = 0-HR., 2-HR., OR 3-HR.

FTH-RATING = 0-HR., 1 1/4-HR., 2-HR., OR 3-HR.

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL

BOTTOM VIEW
SECTION A-A


1. CONCRETE FLOOR OR WALL ASSEMBLY (2-HR. OR 3-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MINIMUM 4-1/2" THICK).
 - B. PRECAST (HOLLOW CORE) CONCRETE FLOOR (MINIMUM 6" THICK).
 - C. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 6" NOMINAL DIAMETER PVC PLASTIC PIPE (CELLULAR OR SOLID CORE).
 - B. MAXIMUM 6" NOMINAL DIAMETER ABS PLASTIC PIPE (CELLULAR OR SOLID CORE).
 - C. MAXIMUM 6" NOMINAL DIAMETER CPVC PLASTIC PIPE (SDR 11 OR SDR 13.5) (CLOSED PIPING SYSTEM ONLY).
 - D. MAXIMUM 4" NOMINAL DIAMETER FRPP PLASTIC PIPE.
 - E. MAXIMUM 6" NOMINAL DIAMETER AQUARISE CPVC PLASTIC PIPE (SDR 11) MANUFACTURED BY IPEX, INC. (CLOSED PIPING SYSTEM ONLY).
 - F. MAXIMUM 4" NOMINAL DIAMETER RIGID NONMETALLIC CONDUIT (SCH 40 PVC).
3. [OPTIONAL FOR PVC OR ABS PIPES ONLY] MAXIMUM 4" NOMINAL DIAMETER PVC OR ABS PIPE COUPLING TO EXTEND MAXIMUM 1" INTO OPENING OF FLOOR ASSEMBLY OR EITHER SIDE OF WALL.
4. MINIMUM 1/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT (MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT IS REQUIRED WHEN OPTIONAL COUPLING IS USED).
5. HILTI CP 648E WRAP STRIP CONTINUOUSLY WRAPPED AROUND THE OUTER CIRCUMFERENCE OF THE PIPE, AS SPECIFIED IN TABLE BELOW, WITH ENDS BUTTED AND HELD IN PLACE WITH TAPE. WRAP STRIP TO BE BUTTED TIGHTLY AGAINST BOTTOM SURFACE OF CONCRETE FLOOR.



cUL CAJ2021k.022112


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cUL SYSTEM NO. C-AJ-2021

PLASTIC PIPE THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL

F-RATING = 2-HR. OR 3-HR.

FH-RATING = 0-HR., 2-HR., OR 3-HR.

FT-RATING = 0-HR., 2-HR., OR 3-HR.

FTH-RATING = 0-HR., 1 1/4-HR., 2-HR., OR 3-HR.

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL



cUL CAJ2021k.022112

5. HILTI RETAINING COLLAR (SIZED TO MATCH WRAP STRIP) WRAPPED OVER THE WRAP STRIPS, OVERLAPPING MINIMUM 1".
7. NOMINAL 1/2" WIDE STAINLESS STEEL HOSE CLAMP(S) SECURED AT MID-HEIGHT OF RETAINING COLLAR.
3. EVERY OTHER TAB OF RETAINING COLLAR SECURED TO BOTTOM OF FLOOR WITH 1/4" x 1-3/4" LONG STEEL EXPANSION BOLTS, 1-1/2" LONG CONCRETE SCREW ANCHORS OR 0.145" DIAMETER x 1-1/4" LONG POWDER ACTUATED FASTENERS IN CONJUNCTION WITH 1-7/16" DIAMETER STEEL WASHERS (EX. HILTI KWIK-BOLT 3, KWIK-CON OR DX PINS).

NOMINAL PIPE DIAMETER (OR SMALLER)	ANNULAR SPACE		F RATINGS	FT AND FTH RATINGS	FH RATINGS
	MINIMUM	MAXIMUM			
1-1/2"	0"	1/4"	3	2	3
2"	0"	1/4"	3	2	3
3"	0"	1/2"	3	2	3
4"	0"	1/2"	3	2	3
4" WITH OPTIONAL COUPLING	0"	1/2"	2	1 1/4	2
6"	0"	3/8"	3	3	3

MAXIMUM PIPE DIAMETER	FIRESTOP PRODUCT	NUMBER OF LAYERS
3"	CP 648E W25/1"	2
3"	CP 648E W45/1-3/4"	1
4"	CP 648E W25/1"	3
4"	CP 648E W45/1-3/4"	2
4" WITH OPTIONAL COUPLING	CP 648E W45/1-3/4"	3
6"	CP 648E W45/1-3/4"	3

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 7".

2. HILTI CP 648E WRAP STRIP(S) WITH RETAINING COLLAR AND FS-ONE INTUMESCENT FIRESTOP SEALANT ARE REQUIRED ON BOTH SIDES OF A WALL ASSEMBLY.

3. CLOSED OR VENTED PIPING SYSTEM (PVC, ABS & FRPP = SCH 40; CPVC = SDR 11 OR 13.5).

4. WHEN FRPP PIPE IS USED, FT, FH, AND FTH RATINGS ARE 0-HR.



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cUL SYSTEM NO. C-AJ-2022



PLASTIC PIPE THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL ASSEMBLY

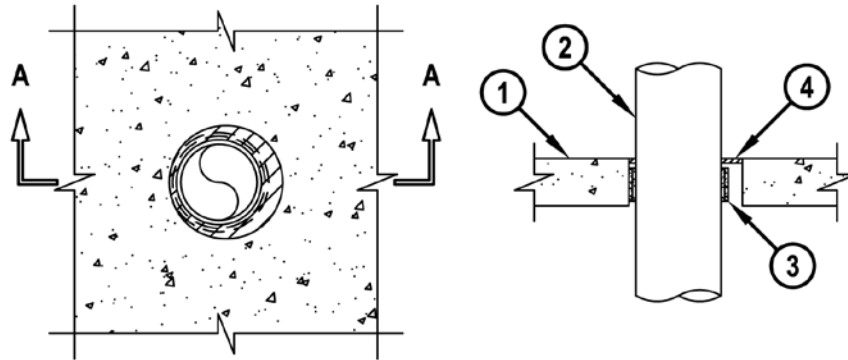
F-RATING = 2-HR.

FT, FH AND FTH-RATING = 0-HR.

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL

TOP VIEW

SECTION A-A



1. CONCRETE FLOOR OR WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MINIMUM 2-1/2" THICK).
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 4" NOMINAL DIAMETER PVC PLASTIC PIPE (CELLULAR OR SOLID CORE).
 - B. MAXIMUM 4" NOMINAL DIAMETER ABS PLASTIC PIPE (CELLULAR OR SOLID CORE).
 - C. MAXIMUM 4" NOMINAL DIAMETER FRPP PLASTIC PIPE.
 - D. MAXIMUM 4" NOMINAL DIAMETER CPVC PLASTIC PIPE (SDR 11 OR SDR 13.5) (CLOSED PIPING SYSTEM ONLY).
 - E. MAXIMUM 4" NOMINAL DIAMETER AQUARISE CPVC PLASTIC PIPE (SDR 11) MANUFACTURED BY IPEX, INC. (CLOSED PIPING SYSTEM ONLY).
 - F. MAXIMUM 4" NOMINAL DIAMETER RIGID NONMETALLIC CONDUIT (SCH 40 PVC).
3. HILTI CP 648E WRAP STRIP (NOMINAL 3/16" THICK x 1-3/4" WIDE) WRAPPED CONTINUOUSLY AROUND THE OUTER CIRCUMFERENCE OF PIPE, AS SPECIFIED IN THE TABLE BELOW, WITH ENDS BUTTED AND HELD IN PLACE WITH TAPE. WRAP STRIP TO BE INSERTED INTO ANNULAR SPACE AND POSITIONED 1/4" FROM BOTTOM SURFACE OF CONCRETE FLOOR.
4. MINIMUM 1/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.

MAXIMUM PIPE DIAMETER	MAXIMUM DIAMETER OF OPENING	ANNULAR SPACE		NO. OF HILTI CP 648E WRAP STRIPS
		MINIMUM	MAXIMUM	
2"	3-1/2"	3/16"	7/8"	1
3"	5"	3/8"	1-1/8"	2
4"	6"	3/8"	1-1/8"	2

NOTES : 1. HILTI CP 648E WRAP STRIP(S) AND HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT ARE REQUIRED ON BOTH SIDES OF A WALL ASSEMBLY.
2. CLOSED OR VENTED PIPING SYSTEM (PVC, ABS, FRPP = SCH 40; CPVC = SDR 11 OR 13.5).



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cUL SYSTEM NO. C-AJ-2035

PLASTIC PIPE THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL

F-RATING = 2-HR. OR 3-HR.

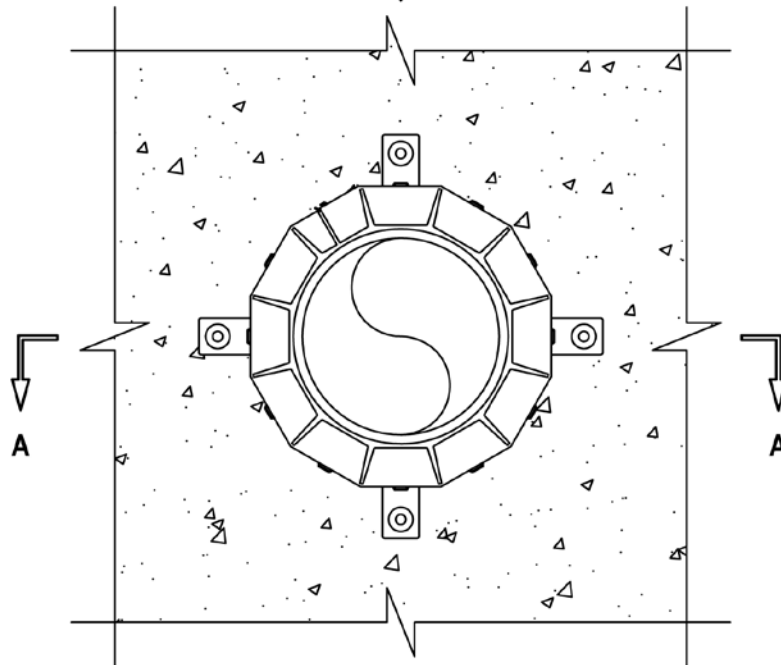
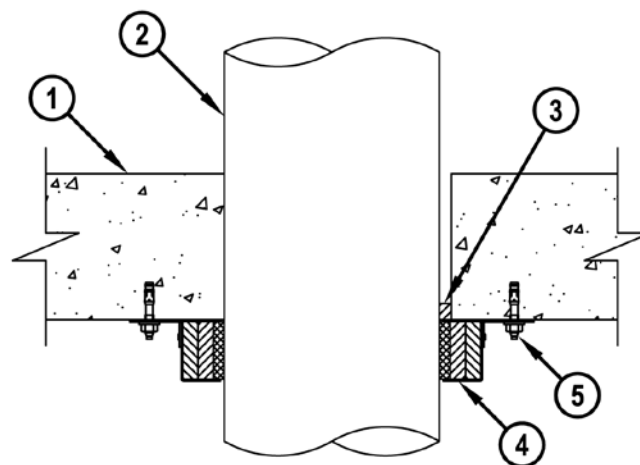
FT-RATING = 1-HR. OR 2-HR.

FH AND FTH-RATINGS = 0-HR.

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL



cUL CAJ2035g.022112

BOTTOM VIEW**SECTION A-A**Classified by
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cUL SYSTEM NO. C-AJ-2035

PLASTIC PIPE THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL

F-RATING = 2-HR. OR 3-HR.

FT-RATING = 1-HR. OR 2-HR.

FH AND FTH-RATINGS = 0-HR.

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL



cUL CAJ2035g.022112

1. CONCRETE FLOOR OR WALL ASSEMBLY :

A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MINIMUM 2-1/2" THICK) (2-HR. FIRE-RATING).

B. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MINIMUM 4-1/2" THICK) (3-HR. FIRE-RATING).

C. PRECAST (HOLLOW CORE) CONCRETE FLOOR (MINIMUM 6" THICK) (3-HR. FIRE-RATING).

D. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL (3-HR. FIRE-RATING).

2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING (ALSO SEE NOTE NO. 3 BELOW) :

A. MAXIMUM 6" NOMINAL DIAMETER PVC PLASTIC PIPE (CELLULAR OR SOLID CORE).

B. MAXIMUM 6" NOMINAL DIAMETER CPVC PLASTIC PIPE (SDR 11 OR SDR 13.5) (CLOSED PIPING SYSTEM ONLY).

C. MAXIMUM 6" NOMINAL DIAMETER ABS PLASTIC PIPE (CELLULAR OR SOLID CORE).

D. MAXIMUM 6" NOMINAL DIAMETER FRPP PLASTIC PIPE.

E. MAXIMUM 6" NOMINAL DIAMETER AQUARISE CPVC PLASTIC PIPE (SDR 11) MANUFACTURED BY IPEX, INC. (CLOSED PIPING SYSTEM ONLY).

F. MAXIMUM 4" NOMINAL DIAMETER RIGID NONMETALLIC CONDUIT (SCH 40 PVC).

3. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.**4. HILTI CP 643N FIRESTOP COLLAR WITH FASTENING HOOKS (SEE TABLE BELOW).****5. EACH FASTENING HOOK SECURED TO BOTTOM OF FLOOR WITH 1/4" x 1-3/4" LONG STEEL EXPANSION BOLTS OR STEEL CONCRETE SCREW ANCHORS IN CONJUNCTION WITH 3/4" DIAMETER STEEL WASHERS, OR 0.145" DIAMETER x 1-1/4" LONG POWDER ACTUATED FASTENERS IN CONJUNCTION WITH 1-7/16" DIAMETER STEEL WASHERS (EX. HILTI KWIK-BOLT 3, KWIK-CON, OR DX PINS).**

NOMINAL PIPE DIAMETER	PRODUCT DESCRIPTION	NO. OF FASTENING HOOKS	MAXIMUM HOLE SIZE
1-1/2"	CP 643 50/1.5" N	2	2-1/8"
2"	CP 643 63/2" N	2	2-5/8"
3"	CP 643 90/3" N	3	4"
4"	CP 643 110/4" N	3	5"
6"	CP 643 160/6" N	4	7"

NOTES : 1. HILTI CP 643N FIRESTOP COLLARS AND FS-ONE FIRESTOP SEALANT ARE REQUIRED ON BOTH SIDES OF A WALL ASSEMBLY.**2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1/2".****3. CLOSED OR VENTED PIPING SYSTEM (PVC, ABS, AND FRPP = SCHEDULE 40; CPVC = SDR 11 OR 13.5).****4. FT RATINGS ARE 1-HR AND 2-HR FOR 2-HR AND 3-HR FIRE-RATED ASSEMBLY, RESPECTIVELY.**Classified by
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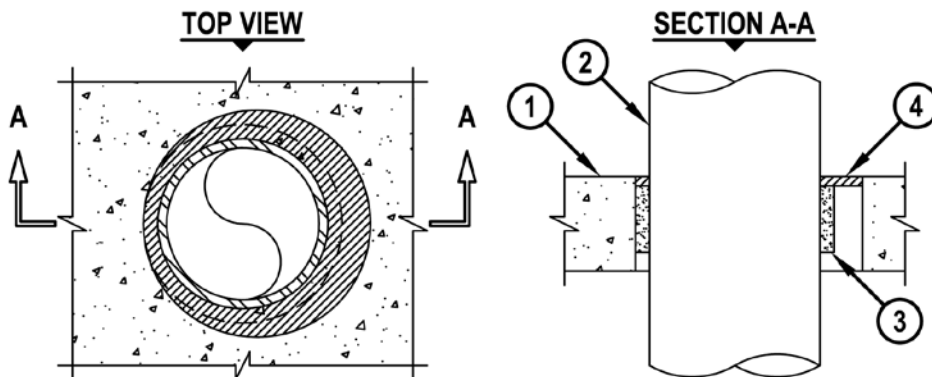
cUL SYSTEM NO. C-AJ-2036

PLASTIC PIPE THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL

F-RATING = 2-HR.

FT, FH AND FTH-RATINGS = 0-HR.

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL



cUL CAJ2036e.022212

1. CONCRETE FLOOR OR WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 2-1/2" THICK).
 - B. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 5" THICK).
 - C. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING (SEE NOTE NO. 2 BELOW) :
 - A. MAXIMUM 4" NOMINAL DIAMETER PVC PLASTIC PIPE (CELLULAR OR SOLID CORE).
 - B. MAXIMUM 4" NOMINAL DIAMETER ABS PLASTIC PIPE (CELLULAR OR SOLID CORE).
 - C. MAXIMUM 4" NOMINAL DIAMETER CPVC PLASTIC PIPE (SDR 11 OR SDR 13.5) (CLOSED PIPING SYSTEM ONLY).
 - D. MAXIMUM 4" NOMINAL DIAMETER AQUARISE CPVC PLASTIC PIPE (SDR 11) MANUFACTURED BY IPEX, INC. (CLOSED PIPING SYSTEM ONLY).
 - E. MAXIMUM 4" NOMINAL DIAMETER RIGID NONMETALLIC CONDUIT (SCH 40 PVC).
3. HILTI CP 648S WRAP STRIP WRAPPED CONTINUOUSLY AROUND CIRCUMFERENCE OF PIPE, AND HELD IN PLACE WITH INTEGRATED FASTENING TAPE. WRAP STRIP TO BE RECESSED MINIMUM 1/4" FROM TOP SIDE OF FLOOR OR BOTH SIDES OF A WALL (SEE TABLE BELOW).
4. MINIMUM 1/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.

NOMINAL PIPE DIAMETER	PRODUCT DESCRIPTION	MAXIMUM DIAMETER OF OPENING	ANNULAR SPACE	
			MINIMUM	MAXIMUM
1-1/2"	CP 648S - 1.5" US	3"	3/16"	3/4"
2"	CP 648S - 2" US	3-1/2"	3/16"	15/16"
3"	CP 648S - 3" US	4"	3/16"	5/16"
4"	CP 648S - 4" US	6"	3/16"	1-1/8"

NOTES : 1. HILTI CP 648S FIRESTOP WRAP STRIPS AND FS-ONE INTUMESCENT FIRESTOP SEALANT ARE REQUIRED ON EACH SIDE OF A WALL ASSEMBLY.
 2. CLOSED OR VENTED PIPING SYSTEM (PVC, ABS = SCHEDULE 40; CPVC = SDR 11 OR 13.5).



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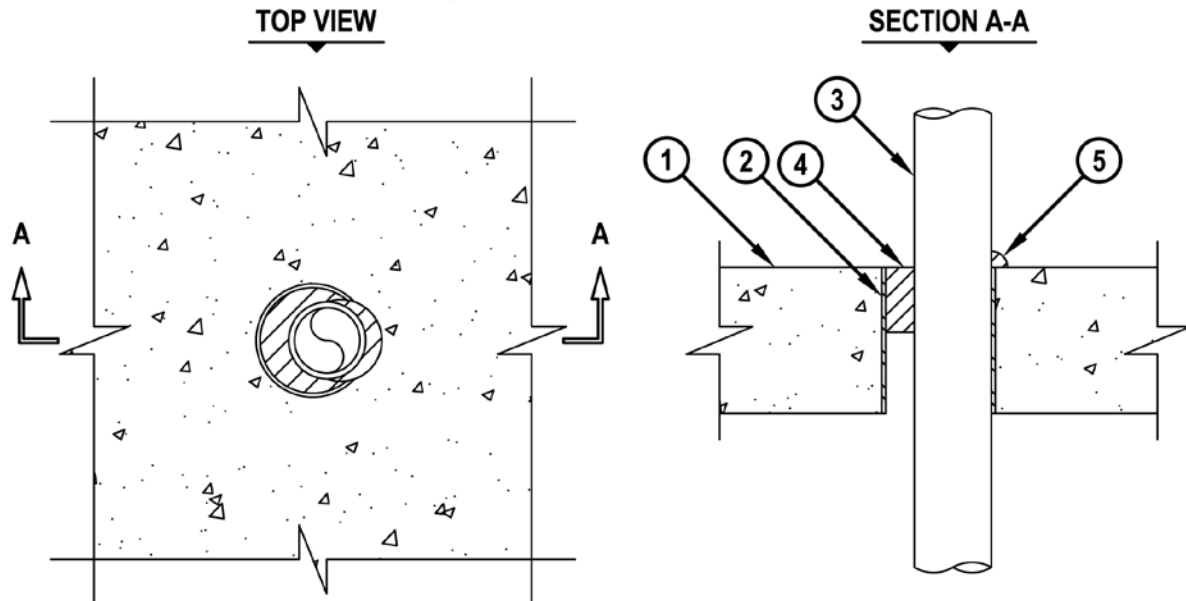


cUL SYSTEM NO. C-AJ-2042



BLAZEMASTER® PIPE THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.
FT, FH AND FTH-RATINGS = 0-HR.



cULCAJ2042a.050505

1. CONCRETE FLOOR OR WALL ASSEMBLY (1-HR. OR 2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MINIMUM 4-1/2" THICK).
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. OPTIONAL : MAXIMUM 3" NOMINAL DIAMETER STEEL PIPE SLEEVE (SCHEDULE 10 OR HEAVIER).
(SEE NOTE NO. 3 BELOW).
3. MAXIMUM 2" NOMINAL DIAMETER BLAZEMASTER® CPVC PIPE (SDR 13.5) (CLOSED PIPING SYSTEM ONLY).
4. MINIMUM 2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
5. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 3".
2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 5/8".
3. WHEN STEEL SLEEVE IS USED, THE F-RATING IS 1-HR., OTHERWISE, F-RATING IS 2-HR.
4. MINIMUM 2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT IS REQUIRED ON BOTH SIDES OF A WALL ASSEMBLY.

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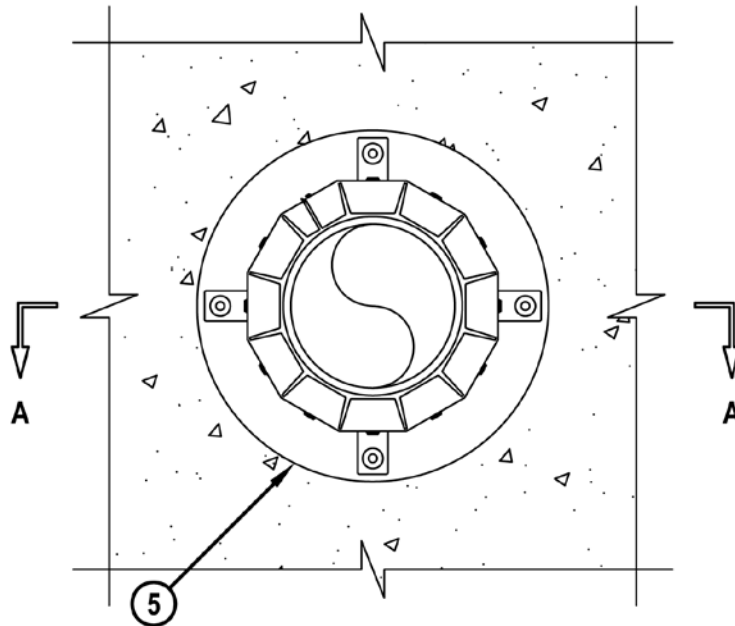
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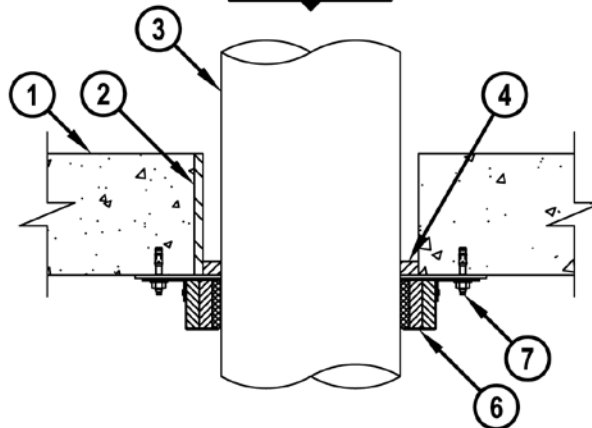
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cUL CAJ2053a.080206

BOTTOM VIEW



SECTION A-A



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**PLASTIC PIPE THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL ASSEMBLY**

F-RATING = 3-HR.
 FT-RATING = 0-HR. OR 2-HR.
 FH-RATING = 3-HR.
 FTH-RATING = 0-HR. OR 2-HR.

L-RATING AT AMBIENT = LESS THAN 1 CFM/SQ. FT.
 L-RATING AT 400°F = LESS THAN 1 CFM/SQ. FT.
 W-RATING = CLASS I (SEE NOTES NO. 6 AND 7 BELOW)
 NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL

cUL CAJ2053a.080206

3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING (ALSO SEE NOTE NO. 3 BELOW) :
 - A. MAXIMUM 6" NOMINAL DIAMETER PVC PLASTIC PIPE (CELLULAR OR SOLID CORE).
 - B. MAXIMUM 6" NOMINAL DIAMETER ABS PLASTIC PIPE (CELLULAR OR SOLID CORE).
 - C. MAXIMUM 6" NOMINAL DIAMETER FRPP PLASTIC PIPE.
 - D. MAXIMUM 6" NOMINAL DIAMETER CPVC PLASTIC PIPE.
4. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT, HILTI CP 606 FLEXIBLE FIRESTOP SEALANT OR HILTI CP 601S ELASTOMERIC FIRESTOP SEALANT.
5. SHEET METAL COVER PLATE (MINIMUM 18 GA.) PLACED OVER OPENING PRIOR TO ATTACHING FIRESTOP COLLAR (SEE NOTE NO. 4 BELOW).
6. HILTI CP 643N FIRESTOP COLLAR WITH FASTENING HOOKS (SEE TABLE BELOW).
7. EACH FASTENING HOOK SECURED TO BOTTOM OF FLOOR WITH 1/4" x 1-1/4" LONG STEEL EXPANSION BOLTS, 1/4" x 1-1/4" HILTI KWIK-CON II+ CONCRETE SCREW ANCHOR, OR 1/4" x 1-3/4" HILTI KWIK-BOLT 3 STEEL EXPANSION ANCHOR.
8. [NOT SHOWN] ADDITIONAL 1/4" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT, HILTI CP 606 FLEXIBLE FIRESTOP SEALANT OR HILTI CP 601S ELASTOMERIC FIRESTOP SEALANT TO BE APPLIED BETWEEN CONCRETE AND COVER PLATE AND BETWEEN COVER PLATE AND CP 643N FIRESTOP COLLAR.

NOMINAL PIPE DIAMETER	PRODUCT DESCRIPTION	NO. OF FASTENING HOOKS
1-1/2"	CP 643 50/1.5" N	2
2"	CP 643 63/2" N	2
3"	CP 643 90/3" N	3
4"	CP 643 110/4" N	3
6"	CP 643 160/6" N	4

- NOTES :**
1. MAXIMUM DIAMETER OF OPENING = 8".
 2. ANNULAR SPACE = MINIMUM 1/4", MAXIMUM 1-1/4".
 3. CLOSED OR VENTED PIPING SYSTEM (PVC, ABS, FRPP = SCHEDULE 40; CPVC = SDR 17).
 4. INSIDE DIAMETER OF COVER PLATE SHOULD BE MAXIMUM 1/4" LARGER THAN OUTSIDE DIAMETER OF PIPE. OUTSIDE DIAMETER OF COVER PLATE SHOULD BE MINIMUM 6" LARGER THAN OUTSIDE DIAMETER OF PIPE.
 5. HILTI CP 643N FIRESTOP COLLARS, SHEET METAL COVER PLATE AND HILTI FIRESTOP SEALANT ARE REQUIRED ON BOTH SIDES OF A WALL ASSEMBLY.
 6. W-RATING DOES NOT APPLY IN SLEEVED OPENINGS.
 7. W-RATING APPLIES ONLY WHEN THE PIPE DIAMETER IS 6" OR SMALLER, ANNULAR SPACE IS MINIMUM 0", MAXIMUM 1/2", AND HILTI CP 601S ELASTOMERIC FIRESTOP SEALANT IS USED.
 8. T-RATING IS 0-HR. WHEN STEEL SLEEVE IS USED.



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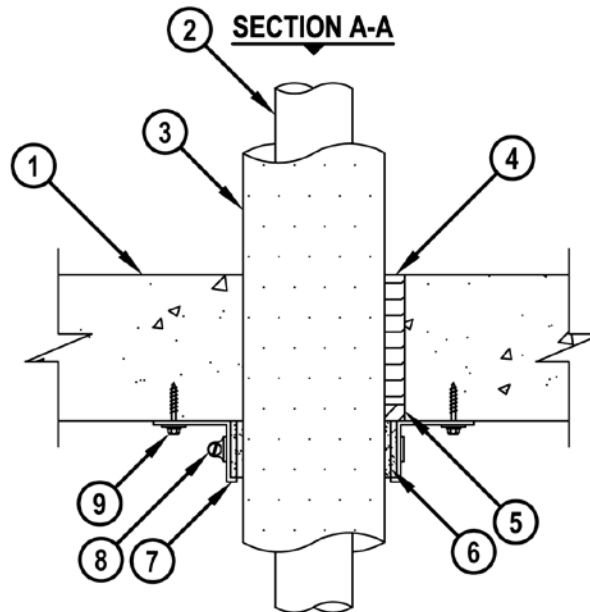
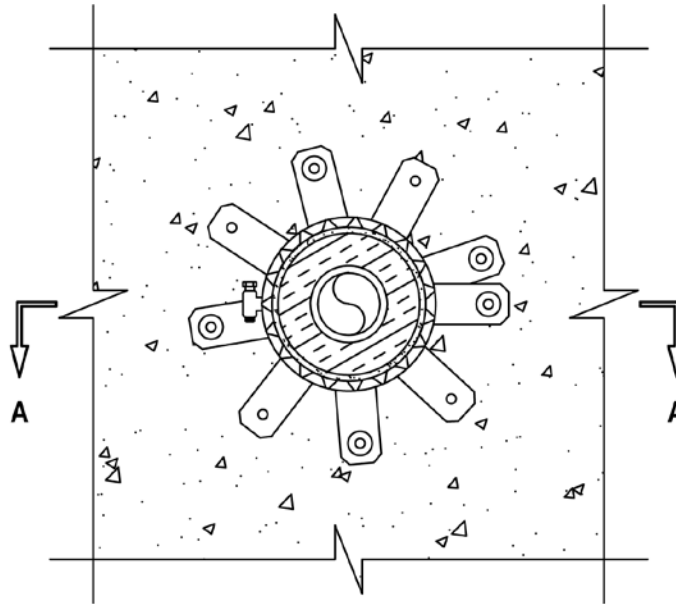
INSULATED PLASTIC PIPE THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL ASSEMBLY

F AND FT-RATINGS = 2-HR.

FH AND FTH-RATINGS = 0-HR.

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL

BOTTOM VIEW



cUL CAJ2055b.092806



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cUL SYSTEM NO. C-AJ-2055

**INSULATED PLASTIC PIPE THROUGH CONCRETE FLOOR/WALL OR
BLOCK WALL ASSEMBLY**

F AND FT-RATINGS = 2-HR.

FH AND FTH-RATINGS = 0-HR.

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL



cUL CAJ2055b.092806

1. CONCRETE FLOOR OR WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 4-1/2" THICK).
 - B. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 5" THICK).
 - C. PRECAST (HOLLOW-CORE) CONCRETE FLOOR (MINIMUM 6" THICK).
 - D. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 2" NOMINAL DIAMETER POLYPROPYLENE (PP) PLASTIC PIPE (SCHEDULE 80) (CLOSED OR VENTED PIPING SYSTEM).
 - B. MAXIMUM 2" NOMINAL DIAMETER AQUARISE CPVC PLASTIC PIPE (SDR 11) MANUFACTURED BY IPEX, INC. (CLOSED PIPING SYSTEM ONLY).
3. NOMINAL 1" THICK AB/PVC PIPE INSULATION.
4. MINIMUM 4" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED, RECESSED FROM BOTTOM OF FLOOR.
5. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
6. HILTI CP 648E WRAP STRIP (NOMINAL 3/16" THICK x 1-3/4" WIDE) CONTINUOUSLY WRAPPED AROUND THE OUTER CIRCUMFERENCE OF THE PIPE, COVERING TWO TIMES, WITH ENDS BUTTED AND HELD IN PLACE WITH TAPE. WRAP STRIP TO BE BUTTED TIGHTLY AGAINST BOTTOM SURFACE OF FLOOR.
7. HILTI 1-3/4" RETAINING COLLAR WRAPPED OVER THE WRAP STRIPS, OVERLAPPING MINIMUM 1".
8. HILTI COLLAR CLAMP FASTENED AT MID-HEIGHT OF RETAINING COLLAR.
9. EVERY OTHER TAB OF RETAINING COLLAR SECURED TO BOTTOM OF FLOOR WITH 1/4" x 1-3/4" LONG STEEL EXPANSION BOLTS, 3/16" x 1-1/4" LONG STEEL CONCRETE SCREW ANCHORS OR 0.145 DIAMETER x 1-1/4" LONG POWDER ACTUATED FASTENERS IN CONJUNCTION WITH WITH 15mm DIAMETER STEEL WASHERS (EX. HILTI KWIK-BOLT 3, KWIK-CON OR DX PINS).

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 5".
2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 5/8".
3. HILTI CP 648E WRAP STRIP WITH RETAINING COLLAR, AND HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT ARE REQUIRED ON BOTH SIDES OF A WALL.



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**PLASTIC PIPE THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL ASSEMBLY**

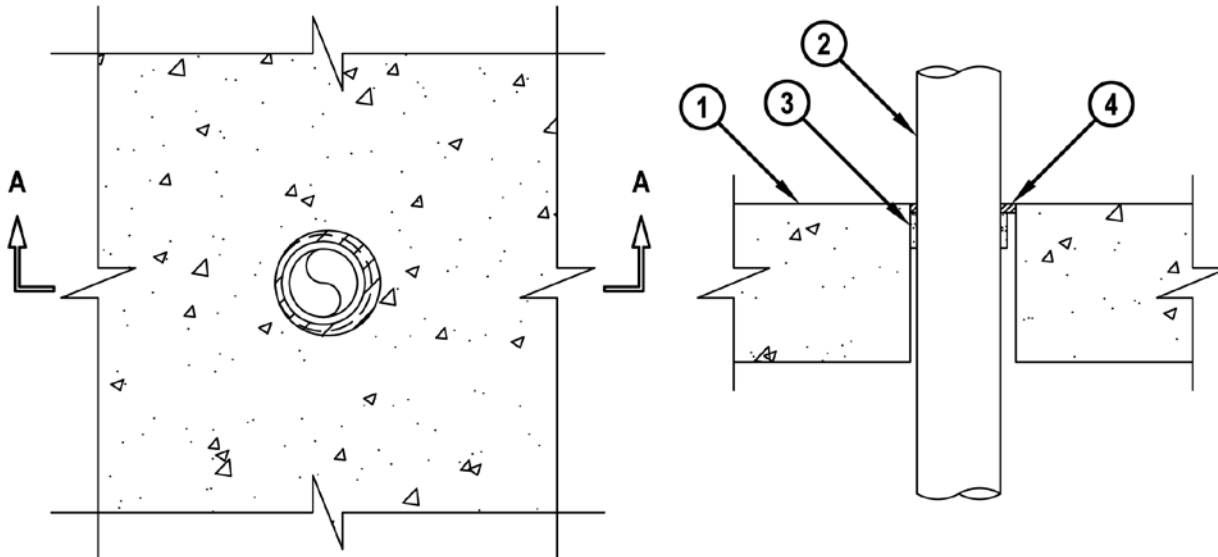
F-RATING = 2-HR.

FT-RATING = 1/4-HR.

FH AND FTH-RATINGS = 0-HR.

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL

cUL CAJ2056a.020906

TOP VIEW**SECTION A-A**

1. CONCRETE FLOOR OR WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MINIMUM 4-1/2" THICK).
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. MAXIMUM 2" NOMINAL DIAMETER POLYPROPYLENE (PP) PLASTIC PIPE (SCHEDULE 80) (CLOSED OR VENTED PIPING SYSTEM).
3. HILTI CP 648S WRAP STRIP WRAPPED CONTINUOUSLY AROUND CIRCUMFERENCE OF PIPE, AND HELD IN PLACE WITH INTEGRATED TAPE. BOTTOM EDGE OF WRAP STRIP TO BE RECESSED 3-1/4" FROM BOTTOM SURFACE OF CONCRETE OR 1/4" FROM EACH SIDE OF WALL (SEE TABLE BELOW).
4. MINIMUM 1/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.

NOMINAL PIPE DIAMETER	PRODUCT DESCRIPTION	MAXIMUM DIAMETER OF OPENING	ANNULAR SPACE	
			MINIMUM	MAXIMUM
1-1/2"	CP 648S - 1.5" US	2-1/2"	3/16"	7/16"
2"	CP 648S - 2" US	3"	3/16"	7/16"

NOTE : HILTI CP 648S FIRESTOP WRAP STRIPS AND HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT ARE REQUIRED ON BOTH SIDES OF A WALL.



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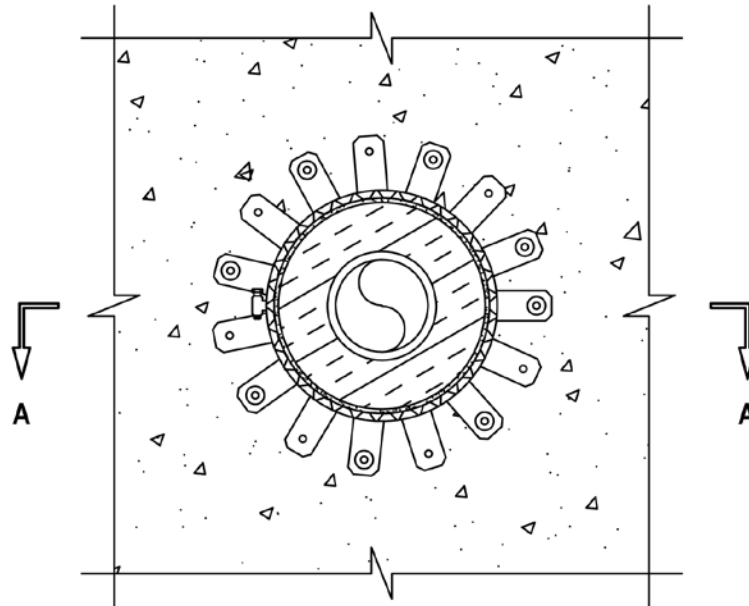
INSULATED PLASTIC PIPE THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL ASSEMBLY

F AND FT-RATINGS = 2-HR.

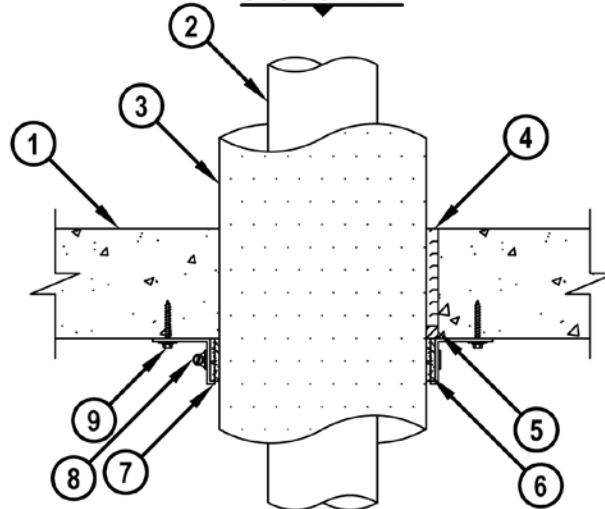
FH AND FTH-RATINGS = 0-HR.

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL

BOTTOM VIEW



SECTION A-A



cUL C-AJ-2057c.092806



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**INSULATED PLASTIC PIPE THROUGH CONCRETE FLOOR/WALL OR
BLOCK WALL ASSEMBLY**

F AND FT-RATINGS = 2-HR.

FH AND FTH-RATINGS = 0-HR.

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL



cUL C-AJ-2057c.092806

1. CONCRETE FLOOR OR WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 4-1/2" THICK).
 - B. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 5" THICK).
 - C. PRECAST (HOLLOW-CORE) CONCRETE FLOOR (MINIMUM 6" THICK).
 - D. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 2" NOMINAL DIAMETER POLYPROPYLENE (PP) PLASTIC PIPE (SCHEDULE 80) (CLOSED OR VENTED PIPING SYSTEM).
 - B. MAXIMUM 2" NOMINAL DIAMETER AQUARISE CPVC PLASTIC PIPE (SDR 11) MANUFACTURED BY IPEX, INC. (CLOSED PIPING SYSTEM ONLY).
3. NOMINAL 1-1/2" THICK GLASS-FIBER PIPE INSULATION.
4. MINIMUM 4" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED, RECESSED FROM BOTTOM OF FLOOR.
5. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
6. HILTI CP 648E WRAP STRIP (NOMINAL 3/16" THICK x 1-3/4" WIDE) CONTINUOUSLY WRAPPED AROUND THE OUTER CIRCUMFERENCE OF THE PIPE, COVERING TWO TIMES, WITH ENDS BUTTED AND HELD IN PLACE WITH TAPE. WRAP STRIP TO BE BUTTED TIGHTLY AGAINST BOTTOM SURFACE OF FLOOR.
7. HILTI 1-3/4" RETAINING COLLAR WRAPPED OVER THE WRAP STRIPS, OVERLAPPING MINIMUM 1".
8. HILTI COLLAR CLAMP FASTENED AT MID-HEIGHT OF RETAINING COLLAR.
9. EVERY OTHER TAB OF RETAINING COLLAR SECURED TO BOTTOM OF FLOOR WITH 1/4" x 1-3/4" LONG STEEL EXPANSION BOLTS, 3/16" x 1-1/4" LONG STEEL CONCRETE SCREW ANCHORS OR 0.145 DIAMETER x 1-1/4" LONG POWDER ACTUATED FASTENERS IN CONJUNCTION WITH WITH 15mm DIAMETER STEEL WASHERS (EX. HILTI KWIK-BOLT 3, KWIK-CON OR DX PINS).

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 6".
2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 5/8".
3. HILTI CP 648E WRAP STRIP WITH RETAINING COLLAR, AND HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT ARE REQUIRED ON BOTH SIDES OF A WALL.



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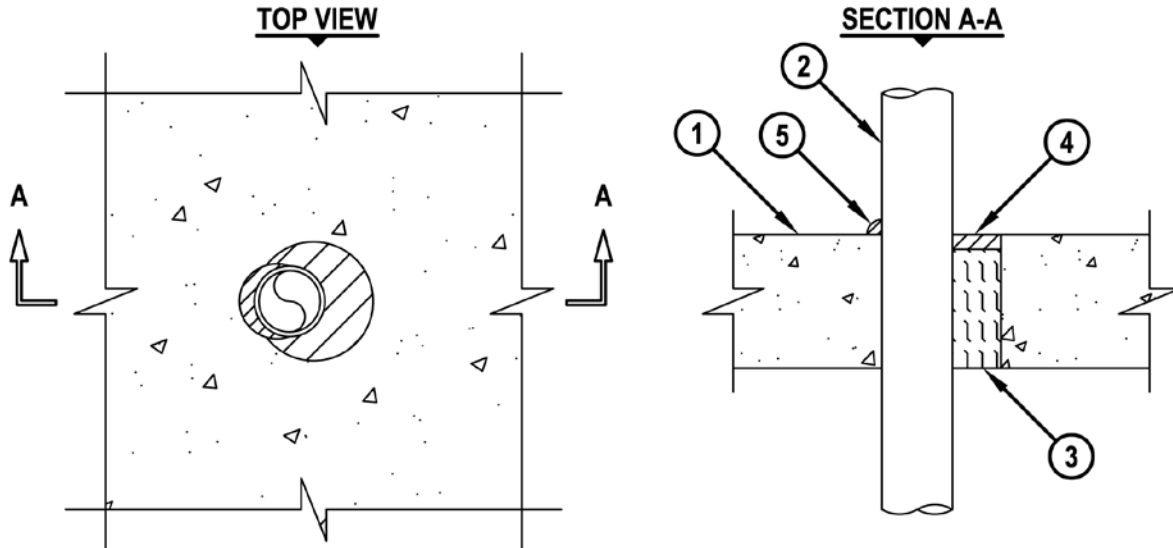
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PLASTIC PIPE THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL ASSEMBLY

F, FT, FH AND FTH-RATINGS = 2-HR.
L-RATING AT AMBIENT - LESS THAN 5.1 L/S/M²
L-RATING AT 204°C - 20.3 L/S/M²

cUL CAJ2061b.061708



1. CONCRETE FLOOR OR WALL ASSEMBLY (2-HR. FIRE-RATING).
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 4-1/2" THICK).
 - B. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 5" THICK).
 - C. PRECAST (HOLLOW-CORE) CONCRETE FLOOR (MINIMUM 6" THICK).
 - D. ANY UL CLASSIFIED CONCRETE BLOCK WALL.
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING (CLOSED PIPING SYSTEM ONLY) :
 - A. MAXIMUM 2" NOMINAL DIAMETER PVC PLASTIC PIPE (CELLULAR OR SOLID CORE).
 - B. MAXIMUM 2" NOMINAL DIAMETER CPVC PLASTIC PIPE.
 - C. MAXIMUM 2" NOMINAL DIAMETER RIGID NONMETALLIC CONDUIT (RNC).
 - D. MAXIMUM 2" NOMINAL DIAMETER CROSS-LINKED POLYETHYLENE (PEX) TUBING.
 - E. MAXIMUM 2" NOMINAL DIAMETER AQUARISE CPVC PLASTIC PIPE (SDR 11) MANUFACTURED BY IPEX, INC. (CLOSED PIPING SYSTEM ONLY).
3. MINIMUM 4" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED.
4. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
5. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT APPLIED AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 4".
2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1-5/8".
3. WHEN HOLLOW-CORE FLOOR ARE USED, MINERAL WOOL MUST BE INSTALLED FLUSH WITH BOTTOM SURFACE OF FLOOR.
4. CLOSED PIPING SYSTEM ONLY (PVC, RNC = SCHEDULE 40; CPVC = SDR 13.5; PEX = SDR 9).
5. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT IS REQUIRED ON BOTH SIDES OF A WALL.



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cUL SYSTEM NO. C-AJ-2078

PLASTIC PIPE THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL

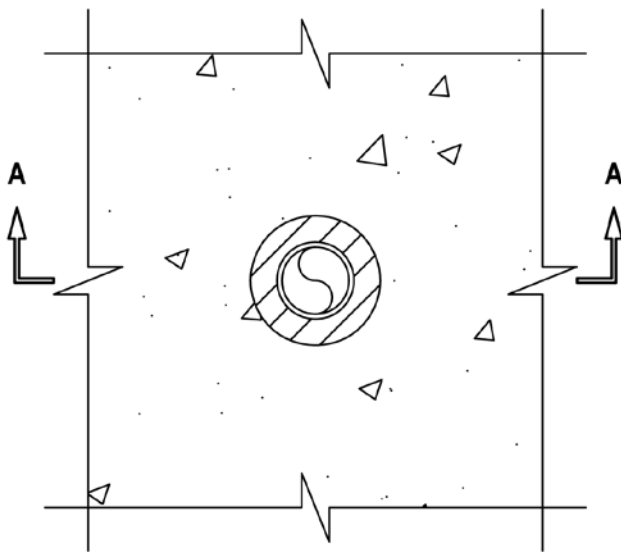
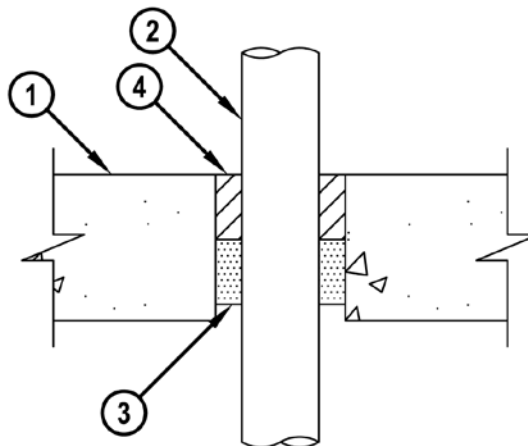
F-RATING = 2-HR.

FT, FH, AND FTH-RATINGS = 0-HR.

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL



cUL CAJ2078a.041910

TOP VIEW**SECTION A-A**

1. CONCRETE FLOOR OR WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 4-1/2" THICK).
 - B. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 6" THICK).
 - C. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 2" NOMINAL DIAMETER PVC PLASTIC PIPE (CELLULAR OR SOLID CORE) (SCH 40) (CLOSED OR VENTED PIPING SYSTEM).
 - B. MAXIMUM 2" NOMINAL DIAMETER CPVC PLASTIC PIPE (CLOSED OR VENTED PIPING SYSTEM).
3. MINIMUM 2" DEPTH HILTI CF 810 CRACK AND JOINT PRO INSULATING FILLER FOAM RECESSED 2" FROM TOP SURFACE OF CONCRETE FLOOR OR BOTH SURFACES OF A WALL.
4. MINIMUM 2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 4".
 2. ANNULAR SPACE = NOMINAL 13/16".
 3. HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT IS REQUIRED ON BOTH SIDES OF A WALL.



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cUL SYSTEM NO. C-AJ-2079

PLASTIC PIPE THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL

F-RATING = 2-HR.

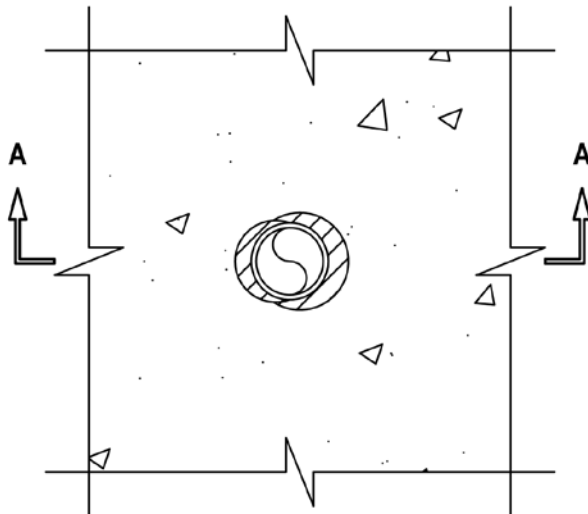
FT, FH, AND FTH-RATINGS = 0-HR.

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL

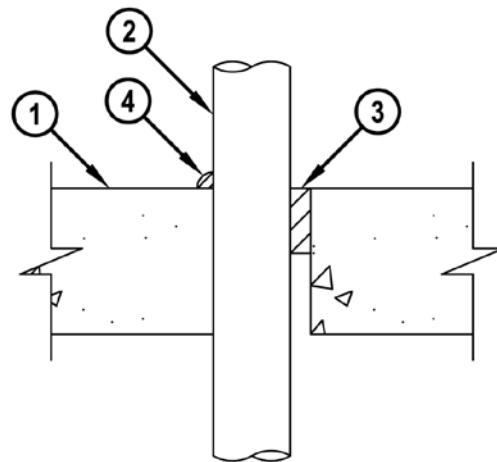


cUL CAJ2079a.052510

TOP VIEW



SECTION A-A



1. CONCRETE FLOOR OR WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MINIMUM 4-1/2" THICK).
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 2" NOMINAL DIAMETER PVC PLASTIC PIPE (CELLULAR CORE) (SCH 40) (CLOSED OR VENTED PIPING SYSTEM).
 - B. MAXIMUM 2" NOMINAL DIAMETER CPVC PLASTIC PIPE (SCH 40) (CLOSED PIPING SYSTEM).
3. MINIMUM 2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT FLUSH WITH TOP SURFACE OF CONCRETE FLOOR OR BOTH SURFACES OF A WALL.
4. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT APPLIED AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 3".
 2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 5/8".
 3. HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT IS REQUIRED ON BOTH SIDES OF A WALL.



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cUL SYSTEM NO. C-AJ-2080

PLASTIC PIPE THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL

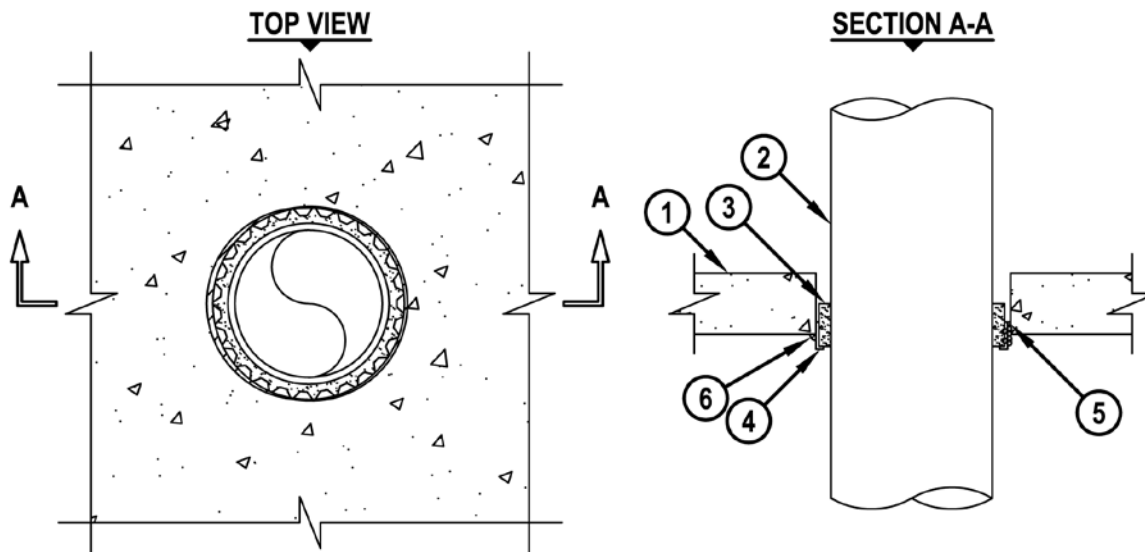
F-RATING = 1-HR.

FT, FH, AND FTH-RATINGS = 0-HR.

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL



cUL CAJ2080a.052510



1. CONCRETE FLOOR OR WALL ASSEMBLY (1-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MINIMUM 2-1/2" THICK).
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 6" NOMINAL DIAMETER PVC PLASTIC PIPE (CELLULAR OR SOLID CORE) (SCH 40) (CLOSED OR VENTED PIPING SYSTEM).
 - B. MAXIMUM 6" NOMINAL DIAMETER CPVC PLASTIC PIPE (CLOSED PIPING SYSTEM).
3. HILTI CP 648S/6" WRAP STRIP WRAPPED CONTINUOUSLY AROUND CIRCUMFERENCE OF PIPE, AND HELD IN PLACE WITH INTEGRATED FASTENING TAPE. WRAP STRIP (WITH RETAINING COLLAR) TO EXTEND 1/2" FROM BOTTOM SURFACE OF FLOOR OR BOTH SURFACES OF WALL.
4. HILTI 1-3/4" RETAINING COLLAR WRAPPED OVER THE WRAP STRIP, OVERLAPPING MINIMUM 1/2" AND SECURED WITH TWO NO. 8 SHEET METAL SCREWS.
5. MINIMUM 1/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT FLUSH WITH BOTTOM SURFACE OF FLOOR.
6. MINIMUM 1/4" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT APPLIED AT RETAINING COLLAR/CONCRETE FLOOR INTERFACE.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 8".

2. ANNULAR SPACE = MINIMUM 1/2", MAXIMUM 7/8".

3. HILTI CP 648S FIRESTOP WRAP STRIP WITH RETAINING COLLAR AND FS-ONE INTUMESCENT FIRESTOP SEALANT ARE REQUIRED ON BOTH SIDES OF A WALL ASSEMBLY.



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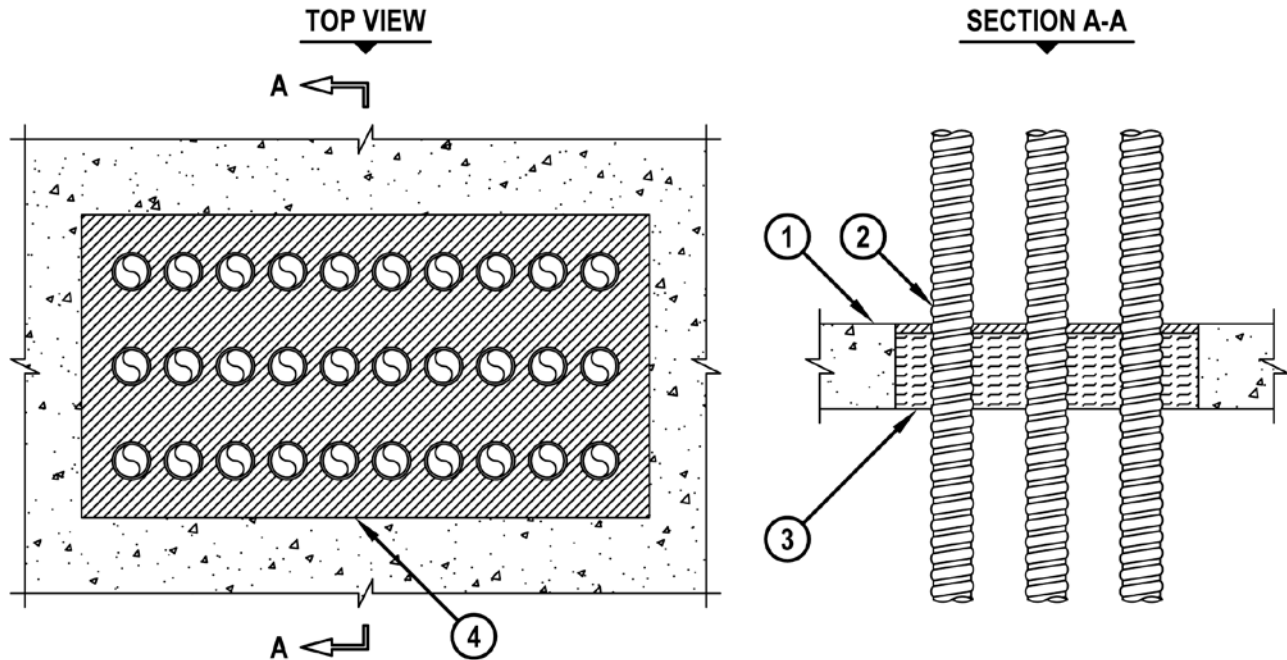
cUL SYSTEM NO. C-AJ-3007



MULTIPLE CABLES THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL

F-RATING = 2-HR.
FT, FH, AND FTH-RATING = 0-HR.

cUL CAJ3007b.091102



1. CONCRETE FLOOR OR WALL ASSEMBLY (2-HR. FIRE-RATING):
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MINIMUM 4-1/2" THICK).
 - B. ANY UL CLASSIFIED CONCRETE BLOCK WALL ASSEMBLY.
2. ONE OR MORE MAXIMUM 2" NOMINAL DIAMETER METAL-CLAD TEK CABLE WITH PVC JACKET.
3. MAXIMUM 4" THICKNESS MINERAL WOOL (MINIMUM 4 PCF DENSITY) TIGHTLY PACKED.
4. MINIMUM 1/2" DEPTH HILTI CP 604 SELF-LEVELING FIRESTOP SEALANT OR FS-ONE INTUMESCENT FIRESTOP SEALANT.

NOTES : 1. MAXIMUM SIZE OF OPENING = 30" x 16".
2. ANNULAR SPACE = MINIMUM 1/2", MAXIMUM 4".
3. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT IS REQUIRED ON EACH SIDE OF A WALL ASSEMBLY.



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UL/cUL SYSTEM NO. C-AJ-3070

CABLE BUNDLE THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL

F-RATING = 3-HR.

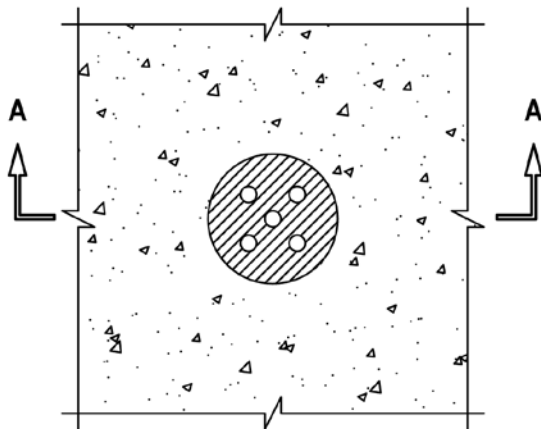
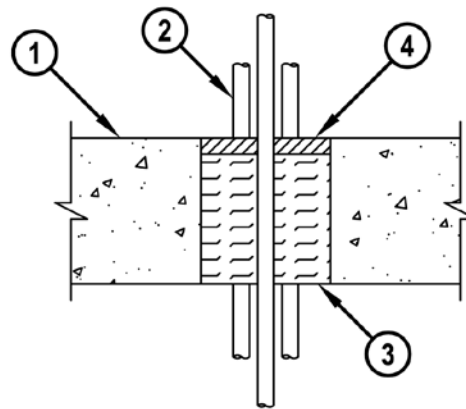
T-RATING = 0-HR.

L-RATING AT AMBIENT = LESS THAN 1 CFM/SQ. FT.

L-RATING AT 400° F = 4 CFM/SQ. FT.

W-RATING = CLASS I (SEE NOTE NO. 4 BELOW)

CAJ3070g.101904

TOP VIEW**SECTION A-A**

1. CONCRETE FLOOR OR WALL ASSEMBLY (3-HR. FIRE-RATING):
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 4-1/2" THICK).
 - B. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 5" THICK).
 - C. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. CABLES (MAXIMUM 7/C NO. 12 AWG WITH PVC JACKET) SPACED APART MINIMUM 1/2" (SEE NOTE NO. 2 BELOW).
3. MINIMUM 4" THICKNESS MINERAL WOOL (MINIMUM 4 PCF DENSITY) TIGHTLY PACKED AND RECESSED TO ACCOMMODATE FIRESTOP SEALANT.
4. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT, CP 601S ELASTOMERIC FIRESTOP SEALANT, CP 604 SELF-LEVELING FIRESTOP SEALANT, OR CP 606 FLEXIBLE FIRESTOP SEALANT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 4".
 2. CABLES TO FILL MINIMUM 7%, TO MAXIMUM 20%, OF CROSS-SECTIONAL AREA OF OPENING.
 3. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT, CP 601S ELASTOMERIC FIRESTOP SEALANT, CP 604 SELF-LEVELING FIRESTOP SEALANT, OR CP 606 FLEXIBLE FIRESTOP SEALANT.
 4. W-RATING APPLIES ONLY WHEN CP 601S ELASTOMERIC FIRESTOP SEALANT OR CP 604 SELF-LEVELING FIRESTOP SEALANT IS USED.

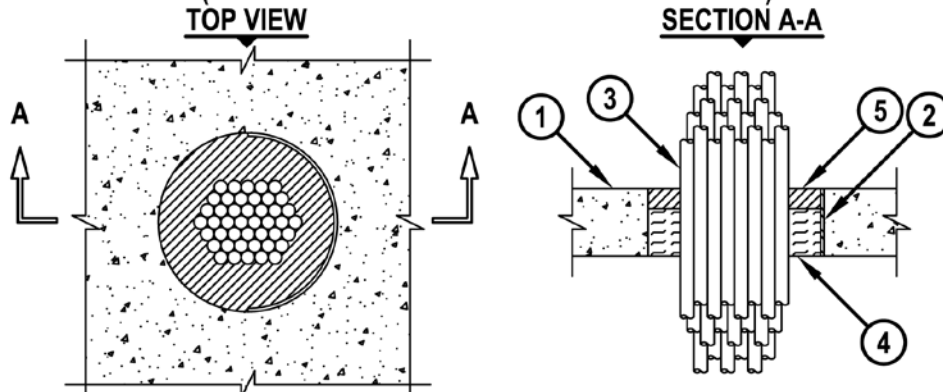
UL/cUL SYSTEM NO. C-AJ-3095

CABLE BUNDLE THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL ASSEMBLY

F-RATING = 3-HR.

T-RATING = 0-HR, 1/2-HR, & 3/4-HR.

(SEE UL FIRE RESISTANCE DIRECTORY VOL. 2)



1. CONCRETE FLOOR OR WALL ASSEMBLY (3-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MIN. 2-1/2" THICK).
 - B. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MIN. 3" THICK).
 - C. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. [OPTIONAL] MAXIMUM 6" NOMINAL DIAMETER STEEL PIPE SLEEVE (SCHEDULE 10 OR HEAVIER) MAY EXTEND MAXIMUM 3" ABOVE FLOOR, OR BOTH SURFACES OF WALL.
3. CABLE BUNDLE TO BE A COMBINATION OF ANY OF THE FOLLOWING :
 - A. MAXIMUM 300 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
 - B. MAXIMUM 500 KCMIL POWER CABLE WITH PVC JACKET (COPPER CONDUCTOR).
 - C. MAXIMUM 350 KCMIL POWER CABLE WITH PVC JACKET (ALUMINUM OR COPPER CONDUCTOR).
 - D. MAXIMUM 7/C NO. 12 AWG POWER CABLE WITH PVC JACKET.
 - E. MAXIMUM 1/2" DIAMETER FIBER-OPTIC CABLE (24 FIBER).
 - F. MAXIMUM 3/C NO. 12 AWG METAL-CLAD CABLE.
 - G. MAXIMUM 3/C (+GROUND) 2/0 AWG COPPER CONDUCTOR SER CABLE WITH PVC JACKET.
 - H. MAXIMUM RG/U COAXIAL CABLE WITH FLUORINATED ETHYLENE JACKET.
 - I. MAXIMUM 3/C NO. 6 AWG CABLE WITH PVC JACKET.
 - J. MAXIMUM 1-1/4" DIAMETER SINGLE OR MULTIPLE CONDUCTOR TYPE MI CABLE (SEE NOTE NO. 4 BELOW).
 - K. ANY CABLES, METAL-CLAD CABLES, OR ARMORED CABLES CURRENTLY LISTED UNDER THE THROUGH PENETRATING PRODUCTS CATEGORY.
4. MINIMUM 2" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED.
5. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.

- NOTES :**
1. MAXIMUM DIAMETER OF OPENING = 6".
 2. CABLES TO FILL MINIMUM 25%, TO MAXIMUM 45% OF CROSS-SECTIONAL AREA OF OPENING.
 3. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT IS REQUIRED ON BOTH SIDES OF A WALL.
 4. A MINIMUM 1/8" SEPARATION SHOULD BE MAINTAINED BETWEEN MI CABLES AND ANY OTHER TYPES OF CABLE.

CAJ3095q.060408

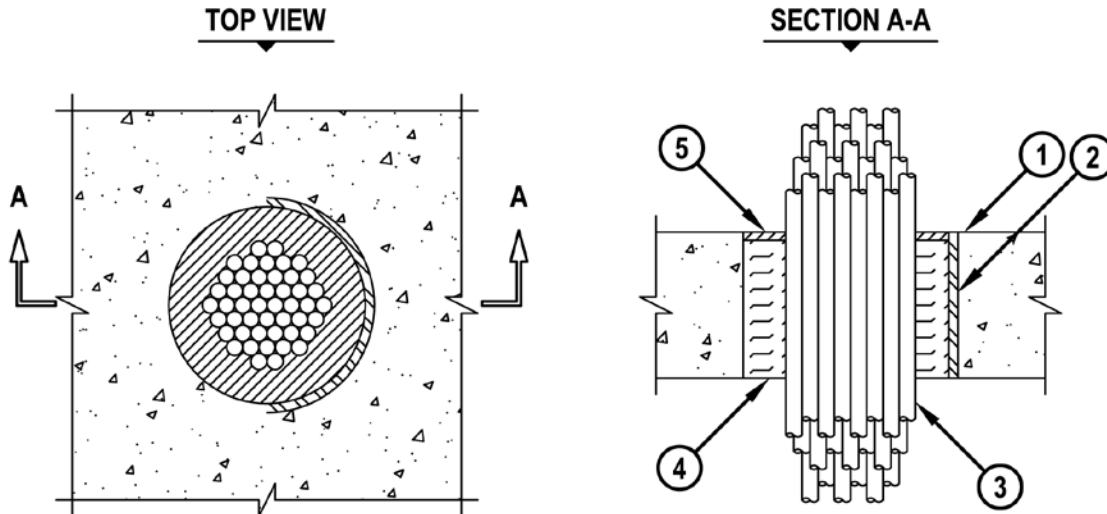
UL/cUL SYSTEM NO. C-AJ-3180

CABLE BUNDLE THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL

F-RATING = 3-HR.

T-RATING = 0-HR.

CAJ3180d.011703



1. CONCRETE FLOOR OR WALL ASSEMBLY (3-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MIN. 4-1/2" THICK).
 - B. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MIN. 4-3/4" THICK).
 - C. ANY UL/ULC CLASSIFIED CONCRETE BLOCK WALL.
2. OPTIONAL : MAXIMUM 6" NOMINAL DIAMETER STEEL PIPE SLEEVE (SCHEDULE 40 OR HEAVIER).
3. CABLE BUNDLE TO CONSIST OF ANY OF THE FOLLOWING :
 - A. MAXIMUM 500 KCMIL POWER CABLE WITH PVC JACKET.
 - B. MAXIMUM 300 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
 - C. MAXIMUM 7/C NO. 12 AWG POWER CABLE WITH PVC JACKET.
 - D. MAXIMUM 1/2" DIAMETER FIBER-OPTIC CABLE WITH PVC JACKET.
 - E. MAXIMUM 3/C (+GROUND) NO. 12 AWG STEEL METAL-CLAD CABLE WITH PVC JACKET.
 - F. MAXIMUM 3/C (+GROUND) 2/0 AWG COPPER SER CABLE WITH PVC JACKET.
 - G. TYPE RG/U COAXIAL CABLE.
4. MINIMUM 4-1/4" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED.
5. MINIMUM 1/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 6".
 2. CABLES TO FILL MAXIMUM 45% OF CROSS-SECTIONAL AREA OF OPENING.
 3. MINIMUM 1/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT IS REQUIRED ON BOTH SIDES OF A WALL ASSEMBLY.



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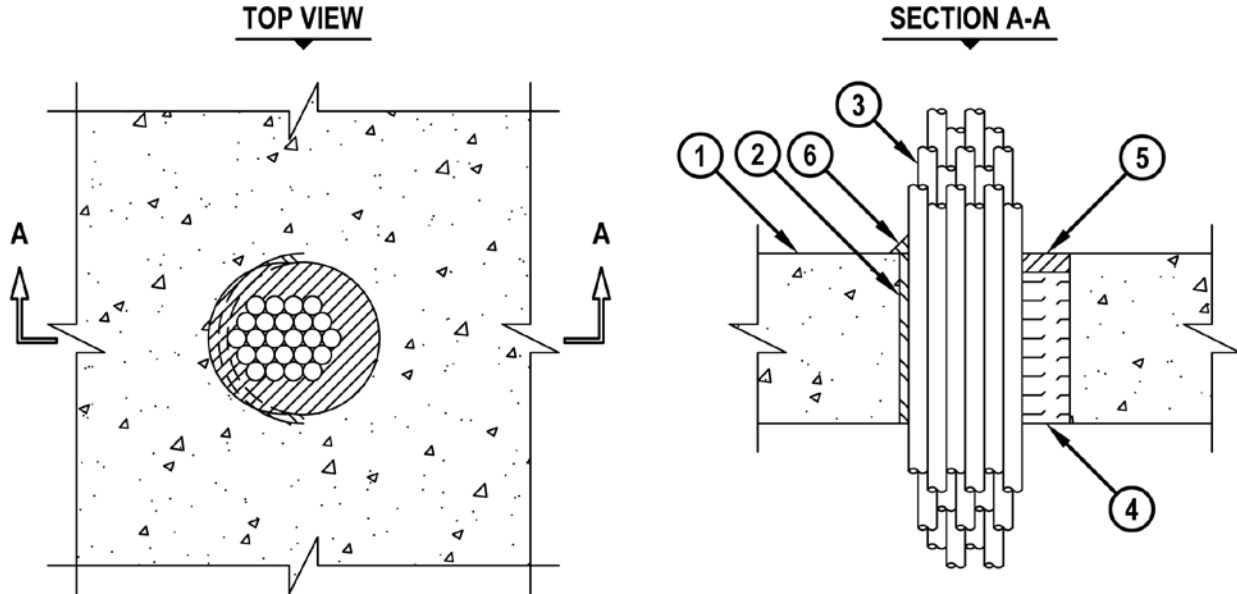
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UL/cUL SYSTEM NO. C-AJ-3181

CABLE BUNDLE THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL

F-RATING = 3-HR.

T-RATING = 0-HR.



1. CONCRETE FLOOR OR WALL ASSEMBLY (3-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MIN. 4-1/2" THICK).
 - B. ANY UL/ULC CLASSIFIED CONCRETE BLOCK WALL.
2. OPTIONAL : MAXIMUM 4" NOMINAL DIAMETER STEEL PIPE SLEEVE (SCHEDULE 40 OR HEAVIER).
3. CABLE BUNDLE TO BE A COMBINATION OF ANY OF THE FOLLOWING :
 - A. MAXIMUM 300 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
 - B. MAXIMUM 500 KCMIL POWER CABLE WITH PVC JACKET.
 - C. MAXIMUM 7/C NO. 12 AWG POWER CABLE WITH PVC JACKET.
 - D. MAXIMUM 1/2" DIAMETER FIBER-OPTIC CABLE (24 FIBER).
 - E. MAXIMUM 3/C NO. 12 AWG METAL-CLAD CABLE.
 - F. MAXIMUM 3/C (+GROUND) 2/0 AWG COPPER SER CABLE WITH PVC JACKET.
 - G. TYPE RG/U COAXIAL CABLE.
4. MINIMUM 4" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED.
5. MINIMUM 1/2" DEPTH HILTI CP 606 FLEXIBLE FIRESTOP SEALANT.
6. MINIMUM 1/2" CROWN HILTI CP 606 FLEXIBLE FIRESTOP SEALANT AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 4".
 2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1-7/8".
 3. CABLES TO FILL MIN. 25%, TO MAX. 60% OF CROSS-SECTIONAL AREA OF OPENING.
 4. MINIMUM 1/2" DEPTH HILTI CP 606 FLEXIBLE FIRESTOP SEALANT IS REQUIRED ON BOTH SIDES OF A WALL ASSEMBLY.

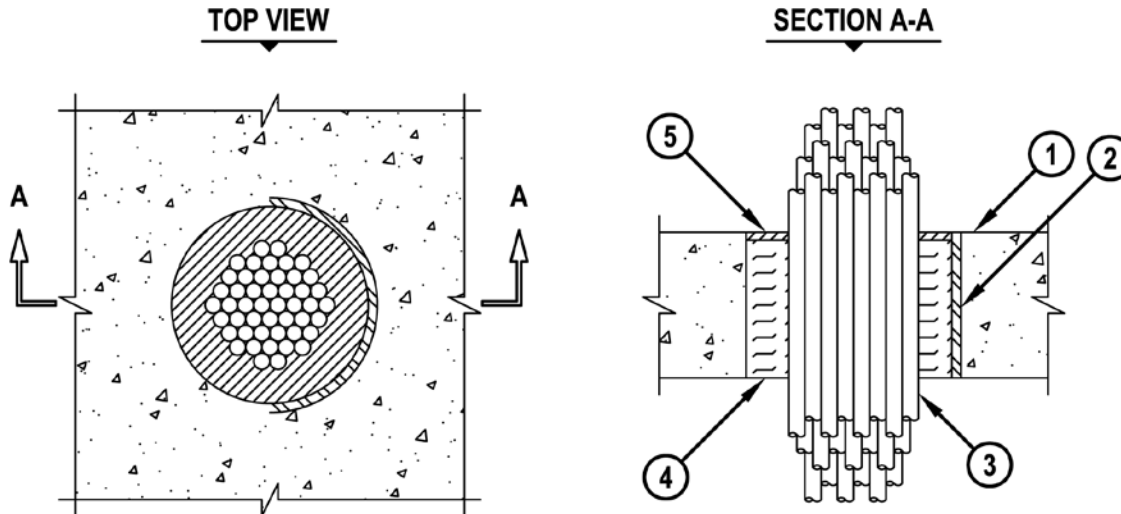
UL/cUL SYSTEM NO. C-AJ-3193

CABLE BUNDLE THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL

F-RATING = 3-HR.

T-RATING = 0-HR.

CAJ3193d.101205



1. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 4-1/2" THICK (3-HR. FIRE-RATING).
2. OPTIONAL : MAXIMUM 6" NOMINAL DIAMETER STEEL PIPE SLEEVE (SCHEDULE 40 OR HEAVIER).
3. CABLE BUNDLE TO CONSIST OF ANY OF THE FOLLOWING :
 - A. MAXIMUM 500 KCMIL POWER CABLE WITH PVC JACKET.
 - B. MAXIMUM 300 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
 - C. MAXIMUM 7/C NO. 12 AWG POWER CABLE WITH PVC JACKET.
 - D. MAXIMUM 1/2" DIAMETER FIBER-OPTIC CABLE WITH PVC JACKET.
 - E. MAXIMUM 3/C (+GROUND) NO. 12 AWG STEEL METAL-CLAD CABLE WITH PVC JACKET.
 - F. MAXIMUM 1" DIAMETER METAL-CLAD TEK CABLE WITH PVC JACKET.
 - G. MAXIMUM 3/C (+GROUND) 2/0 AWG COPPER SER CABLE WITH PVC JACKET.
 - H. TYPE RG/U COAXIAL CABLE.
4. MINIMUM 4" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED.
5. MINIMUM 1/4" DEPTH HILTI CP 604 SELF-LEVELING FIRESTOP SEALANT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 6".
 2. ANNULAR SPACE = NOMINAL 1".
 3. CABLES TO FILL MAXIMUM 45% OF CROSS-SECTIONAL AREA OF OPENING.



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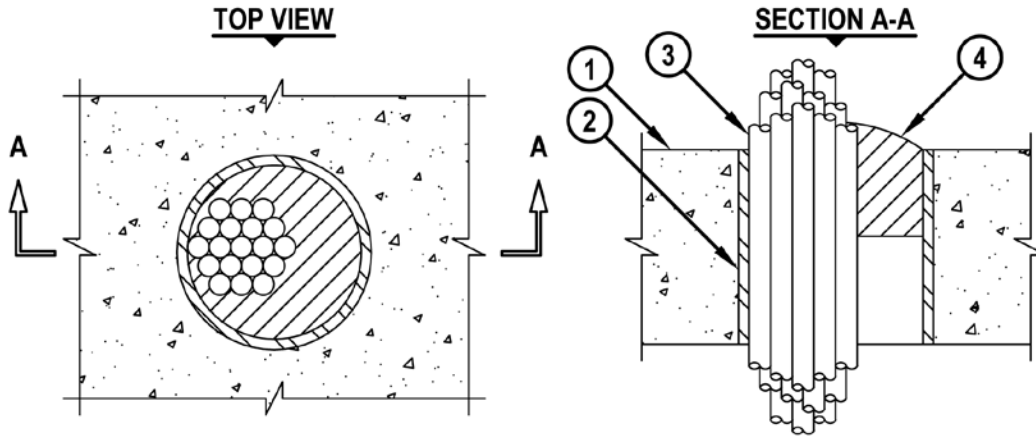
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UL/cUL SYSTEM NO. C-AJ-3216

CABLE BUNDLE THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL ASSEMBLY

F-RATING = 2-HR.

T-RATING = 0-HR. OR 1/2-HR.



CAJ3216d.011112

1. CONCRETE FLOOR OR WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MINIMUM 4-1/2" THICK).
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. [OPTIONAL] NOMINAL 2" OR 4" DIAMETER STEEL PIPE SLEEVE (SCHEDULE 5 OR HEAVIER), STEEL CONDUIT, EMT, OR PVC PLASTIC PIPE SLEEVE (SCHEDULE 40 OR HEAVIER) CAST OR GROUTED INTO FLOOR OR WALL ASSEMBLY.
3. CABLE BUNDLE TO BE A COMBINATION OF ANY OF THE FOLLOWING :
 - A. MAXIMUM 300 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC INSULATION AND JACKET.
 - B. MAXIMUM 750 KCMIL POWER CABLE WITH THERMOPLASTIC INSULATION AND PVC JACKET.
 - C. MAXIMUM 7/C NO. 12 AWG POWER CABLE WITH PVC OR XLPE INSULATION AND PVC JACKET.
 - D. MAXIMUM 1/2" DIAMETER FIBER-OPTIC CABLE (MAXIMUM 24 FIBER).
 - E. MAXIMUM 3/C NO. 12 AWG METAL-CLAD CABLE WITH PVC JACKET.
 - F. MAXIMUM 1" DIAMETER METAL-CLAD TEK CABLE WITH PVC JACKET.
 - G. MAXIMUM 2/0 ALUMINUM SER CABLE.
 - H. RG 59 COAXIAL CABLE WITH PE INSULATION AND PVC JACKET.
4. HILTI CFS-PL FIRESTOP PLUG OR HILTI CP 658T FIRESTOP PLUG CUT TO FIT AROUND THE CABLE BUNDLE AND INSTALLED TIGHTLY WITHIN SLEEVE, SUCH THAT THE OUTER CIRCUMFERENCE OF THE DOME SHAPED PLUG IS FLUSH WITH THE TOP SURFACE OF THE FLOOR OR SLEEVE.

NOTES : 1. NOMINAL DIAMETER OF OPENING = 2" OR 4".
 2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 3".
 3. CABLES TO FILL MAXIMUM 60% OF CROSS-SECTIONAL AREA OF OPENING.
 4. OPTIONAL : HILTI CP 618 FIRESTOP PUTTY STICK MAY BE FORCED INTO INTERSTICES OF CABLES.
 5. STEEL SLEEVES MAY EXTEND MAXIMUM 2" BEYOND TOP SURFACE OF FLOOR OR BOTH SURFACES OF WALL.
 6. HILTI FIRESTOP PLUG IS REQUIRED ON BOTH SIDES OF A WALL ASSEMBLY.


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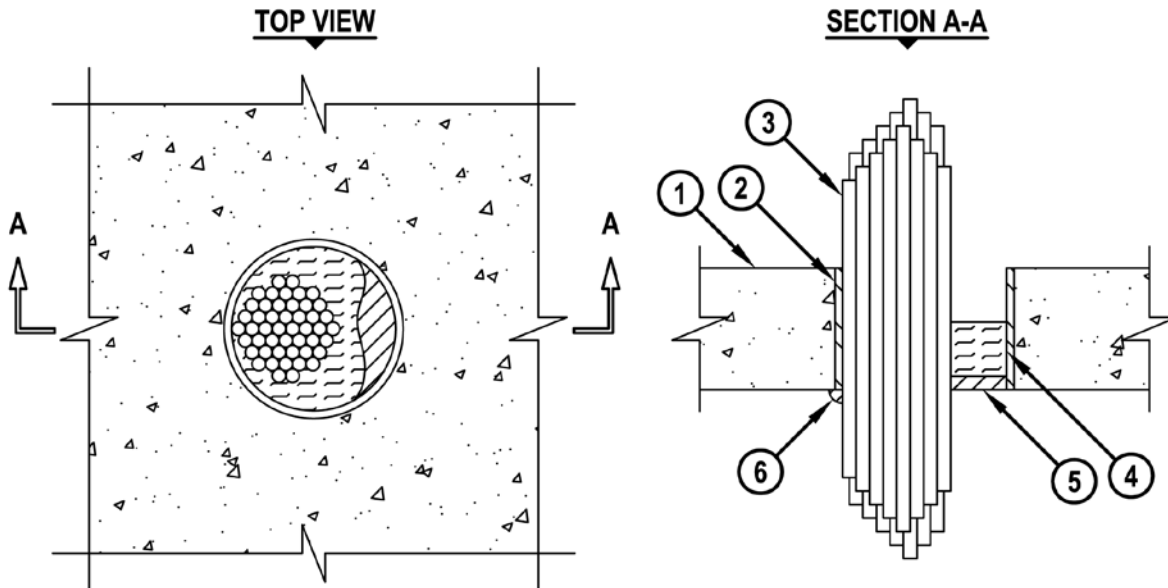
UL/cUL SYSTEM NO. C-AJ-3239

CABLE BUNDLE THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL

F-RATING = 3-HR.

T-RATING = 0-HR., 1/2-HR., 3/4-HR. OR 1-HR.

CAJ3239b.073106



1. CONCRETE FLOOR OR WALL ASSEMBLY (3-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MINIMUM 4-1/2" THICK).
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. [OPTIONAL] MAXIMUM 6" NOMINAL DIAMETER STEEL PIPE SLEEVE (SCHEDULE 10 OR HEAVIER).
3. CABLE BUNDLE TO CONSIST OF ANY COMBINATION OF THE FOLLOWING :
 - A. MAXIMUM 7/C NO. 12 AWG POWER CABLE WITH PVC JACKET.
 - B. MAXIMUM 300 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
 - C. TYPE RG/6 COAXIAL CABLE WITH FLUORINATED ETHYLENE JACKET.
 - D. MAXIMUM 3/C NO. 12 AWG METAL CLAD CABLE.
 - E. MAXIMUM 3/C (+GROUND) 2/0 AWG ALUMINUM CONDUCTOR SER CABLE.
 - F. MAXIMUM 1/2" DIAMETER FIBER-OPTIC CABLE WITH PVC JACKET.
 - G. MAXIMUM 1/C 750 KCMIL POWER CABLE WITH PVC JACKET.
 - H. MAXIMUM 1" DIAMETER METAL CLAD TEK CABLE WITH PVC JACKET.
4. MINIMUM 2" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED.
5. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT FLUSH WITH BOTTOM OF FLOOR.
6. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT APPLIED AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 6".
 2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 2-1/2".
 3. CABLES TO FILL MAXIMUM 33% OF CROSS-SECTIONAL AREA OF OPENING.
 4. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT IS REQUIRED ON BOTH SIDES OF A WALL ASSEMBLY.



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UL/cUL SYSTEM NO. C-AJ-3281

CABLE BUNDLE THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL ASSEMBLY

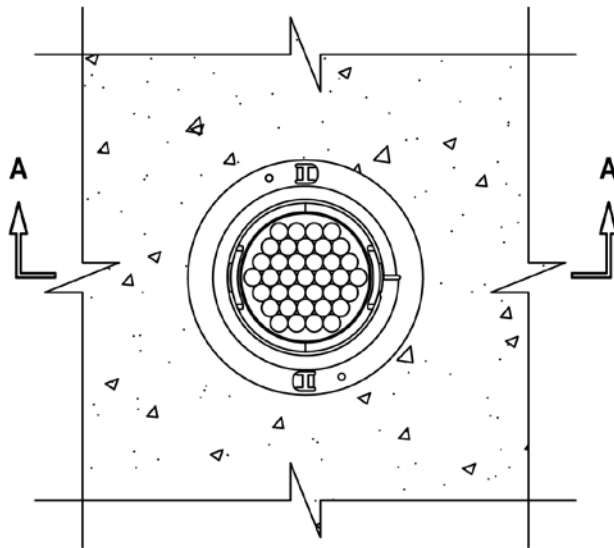
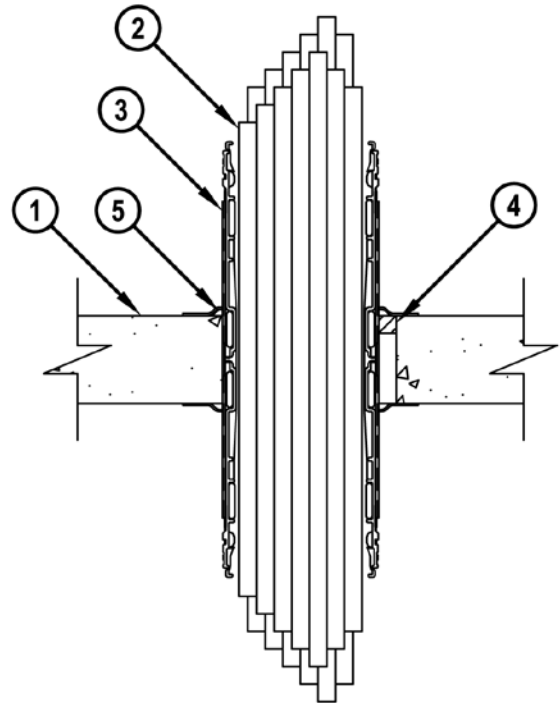
F-RATING = 2-HR.

T-RATING = 3/4-HR.

L-RATING AT AMBIENT = LESS THAN 1 CFM (SEE TABLE)

L-RATING AT 400°F = LESS THAN 1 CFM (SEE TABLE)

CAJ3281b.031612

TOP VIEWSECTION A-A

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UL/cUL SYSTEM NO. C-AJ-3281

CABLE BUNDLE THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL ASSEMBLY

F-RATING = 2-HR.

T-RATING = 3/4-HR.

L-RATING AT AMBIENT = LESS THAN 1 CFM (SEE TABLE)

L-RATING AT 400°F = LESS THAN 1 CFM (SEE TABLE)

CAJ3281b.031612

1. CONCRETE FLOOR OR WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MINIMUM 2-1/2" THICK).
 - B. ANY UL/cUL CLASSIFIED PRECAST (HOLLOW-CORE) CONCRETE FLOOR (MINIMUM 6" THICK).
 - C. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. CABLE BUNDLE TO BE A COMBINATION OF ANY OF THE FOLLOWING :
 - A. MAXIMUM 100 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
 - B. MAXIMUM 7/C NO. 12 AWG COPPER CONDUCTOR CONTROL CABLE WITH PVC OR XLPE JACKET AND INSULATION.
 - C. MAXIMUM 4/0 AWG SHIELDED PRINTER CABLE WITH PVC JACKET.
 - D. MAXIMUM 4 PAIR NO. 22 AWG CAT 6 COMPUTER CABLE.
 - E. MAXIMUM RG 6/U COAXIAL CABLE.
 - F. MAXIMUM 1/2" DIAMETER FIBER-OPTIC CABLE (24 FIBER) WITH PVC OR PE JACKET AND INSULATION.
 - G. MAXIMUM 20/C NO. 22 AWG SHIELDED PRINTER CABLE WITH PVC JACKET.
 - H. MAXIMUM 2/C NO. 18 AWG POWER OR NON-POWER LIMITED FIRE ALARM CABLE WITH OR WITHOUT METAL JACKET (MANUFACTURED BY AFC CABLE SYSTEMS, INC).
 - I. MAXIMUM 1/4" DIAMETER S-VIDEO CABLE CONSISTING OF MAXIMUM 24 AWG 75 OHM COAX OR TWISTED PAIR CABLE WITH PE INSULATION AND PVC JACKET.
3. HILTI CP 653 SPEED SLEEVE (2" OR 4") SLID INTO AND CENTERED WITHIN FLOOR OR WALL. DEVICE FLANGES SPUN CLOCKWISE ONTO DEVICE THREADS, BUTTING TIGHTLY TO BOTH SIDES OF FLOOR OR WALL.
4. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT OR HILTI CP 606 FLEXIBLE FIRESTOP SEALANT FLUSH WITH TOP SURFACE OF FLOOR.
5. MINIMUM 1/4" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT OR HILTI CP 606 FLEXIBLE FIRESTOP SEALANT APPLIED AT POINT OF CONTACT.

MAX CABLE FILL	CABLE TYPE	L RATING, CFM/SQ FT		L RATING, CFM	
		AMBIENT	400°F	AMBIENT	400°F
0%	—	1	2	LESS THAN 1	LESS THAN 1
100%	ANY CABLES (ITEM NO. 2) IN ANY COMBINATION	7	7	LESS THAN 1	LESS THAN 1

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 2-1/2" (FOR 2" DEVICE) OR 4-1/2" (FOR 4" DEVICE).
 2. CABLES MAY REPRESENT 0 TO 100% VISUAL FILL OF DEVICE.
 3. MINIMUM ANNULAR SPACE BETWEEN DEVICE AND PERIPHERY OF OPENING = 0".
 4. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT OR HILTI CP 606 FLEXIBLE FIRESTOP SEALANT IS REQUIRED ON BOTH SIDES OF A WALL.



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UL/cUL SYSTEM NO. C-AJ-3284

CABLE BUNDLE THROUGH CONCRETE/FLOOR OR BLOCK WALL ASSEMBLY

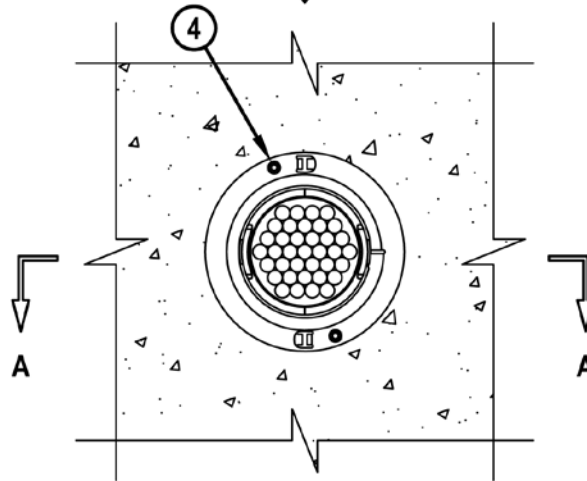
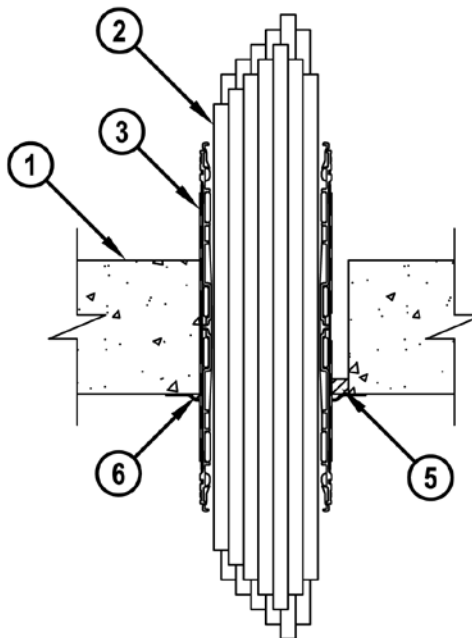
F-RATING = 2-HR.

T-RATING = 1/2-HR.

L-RATING AT AMBIENT = LESS THAN 1 CFM (SEE TABLE)

L-RATING AT 400°F = LESS THAN 1 CFM (SEE TABLE)

CAJ3284b.031612

BOTTOM VIEW**SECTION A-A**

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UL/cUL SYSTEM NO. C-AJ-3284

CABLE BUNDLE THROUGH CONCRETE/FLOOR OR BLOCK WALL ASSEMBLY

F-RATING = 2-HR.

T-RATING = 1/2-HR.

L-RATING AT AMBIENT = LESS THAN 1 CFM (SEE TABLE)

L-RATING AT 400°F = LESS THAN 1 CFM (SEE TABLE)

CAJ3284b.031612

1. CONCRETE FLOOR OR WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MINIMUM 4-1/2" THICK).
 - B. ANY UL/cUL CLASSIFIED PRECAST (HOLLOW-CORE) CONCRETE FLOOR (MINIMUM 6" THICK).
 - C. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. CABLE BUNDLE TO BE A COMBINATION OF ANY OF THE FOLLOWING :
 - A. MAXIMUM 100 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
 - B. MAXIMUM 7/C NO. 12 AWG COPPER CONDUCTOR CONTROL CABLE WITH PVC OR XLPE JACKET AND INSULATION.
 - C. MAXIMUM 4/0 AWG TYPE RHH GROUND CABLE.
 - D. MAXIMUM 4 PAIR NO. 22 AWG CAT 6 COMPUTER CABLE.
 - E. MAXIMUM RG 6/U COAXIAL CABLE.
 - F. MAXIMUM 1/2" DIAMETER FIBER-OPTIC CABLE (24 FIBER) WITH PVC OR PE JACKET AND INSULATION.
 - G. MAXIMUM 20/C NO. 22 AWG SHIELDED PRINTER CABLE WITH PVC JACKET.
 - H. MAXIMUM 2/C NO. 18 AWG POWER OR NON-POWER LIMITED FIRE ALARM CABLE WITH OR WITHOUT METAL JACKET (MANUFACTURED BY AFC CABLE SYSTEMS, INC.).
 - I. MAXIMUM 1/4" DIAMETER S-VIDEO CABLE CONSISTING OF TWO MAXIMUM 24 AWG 75 OHM COAX OR TWISTED PAIR CABLE WITH PE INSULATION AND PVC JACKET.
3. HILTI CP 653 SPEED SLEEVE (2" OR 4") SLID INTO AND CENTERED WITHIN FLOOR OR WALL. DEVICE FLANGES SPUN CLOCKWISE ONTO DEVICE THREADS, BUTTING TIGHTLY TO BOTTOM SIDE OF FLOOR, OR BOTH SIDES OF WALL.
4. SECURE DEVICE FLANGE TO BOTTOM OF FLOOR WITH TWO 1-1/4" LONG CONCRETE SCREWS OR ANCHORS.
5. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT OR 1" DEPTH CP 618 FIRESTOP PUTTY STICK FLUSH WITH BOTTOM SURFACE OF FLOOR, OR BOTH SURFACES OF WALL.
6. [FOR L-RATING] MINIMUM 1/4" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT APPLIED AT POINT OF CONTACT.

MAX CABLE FILL	CABLE TYPE	L RATING, CFM/SQ FT		L RATING, CFM	
		AMBIENT	400°F	AMBIENT	400°F
0%	—	1	2	LESS THAN 1	LESS THAN 1
100%	ANY CABLES (ITEM NO. 2) IN ANY COMBINATION	7	7	LESS THAN 1	LESS THAN 1

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 3" (FOR 2" DEVICE) OR 5" (FOR 4" DEVICE).
 2. CABLES MAY REPRESENT 0% TO 100% VISUAL FILL OF DEVICE.
 3. ANNULAR SPACE BETWEEN DEVICE AND PERIPHERY OF OPENING = MINIMUM 0".
 4. L-RATING APPLIES ONLY WHEN HILTI FS-ONE FIRESTOP SEALANT IS USED.
 5. HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT IS REQUIRED ON BOTH SIDES OF A WALL.



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UL/cUL SYSTEM NO. C-AJ-4034

MULTIPLE CABLE TRAYS THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL

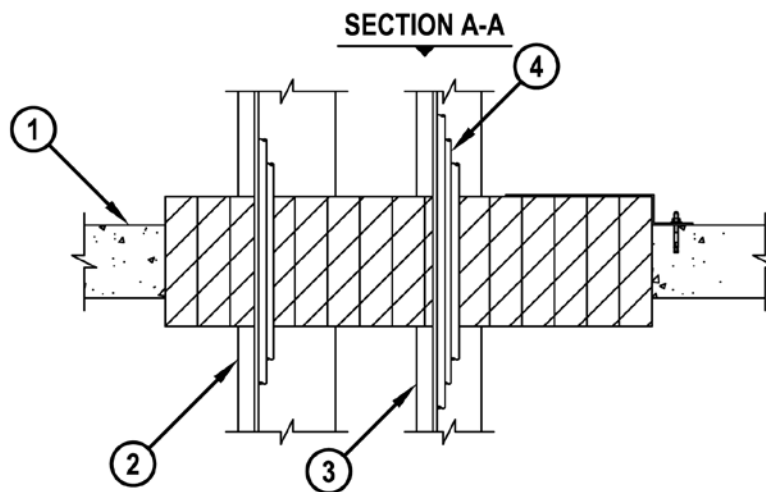
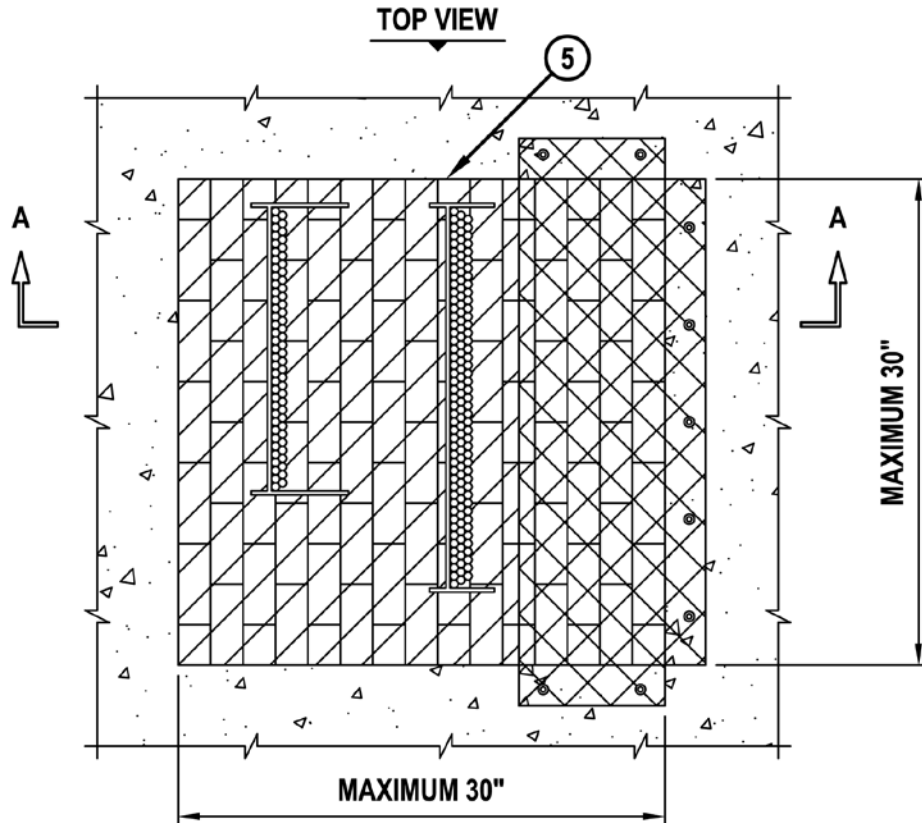
F RATING = 3-HR.

T RATING = 0-HR.

L RATING AT AMBIENT = 5 CFM/SQ. FT.

L RATING AT 400° F = 2 CFM/SQ. FT.

CAJ4034c.010512



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UL/cUL SYSTEM NO. C-AJ-4034

MULTIPLE CABLE TRAYS THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL

F RATING = 3-HR.

T RATING = 0-HR.

L RATING AT AMBIENT = 5 CFM/SQ. FT.

L RATING AT 400° F = 2 CFM/SQ. FT.

CAJ4034c.010512

1. CONCRETE FLOOR OR WALL ASSEMBLY (3-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MINIMUM 4-1/2" THICK).
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. MAXIMUM 18" x 6" ALUMINUM OR STEEL OPEN-LADDER CABLE TRAY.
3. MAXIMUM 24" x 4" ALUMINUM OR STEEL OPEN-LADDER CABLE TRAY.
4. ANY OF THE FOLLOWING TYPES OF CABLES MAY BE USED :
 - A. MAXIMUM 7/C NO. 12 AWG COPPER CONDUCTOR CABLES.
 - B. MAXIMUM 300 PAIR NO. 24 AWG TELEPHONE CABLES.
 - C. MAXIMUM 350 KCMIL SINGLE CONDUCTOR POWER CABLES.
 - D. MAXIMUM 500 KCMIL SINGLE CONDUCTOR POWER CABLES.
 - E. 24 FIBER-OPTIC CABLES.
5. HILTI CFS-BL FIRESTOP BLOCK OR HILTI FS 657 FIRE BLOCK (2" TALL, 5" WIDE, 8" DEEP, REFERENCE : TOP VIEW) FIRMLY PACKED. EITHER ONE OR A COMBINATION OF THE BLOCK TYPES MAY BE USED.

NOTES : 1. MAXIMUM AREA OF OPENING = 900 SQ. IN., WITH A MAXIMUM DIMENSION OF 30".

2. FOR A 18" x 6" CABLE TRAY, MAX. AREA OF CABLES SHALL BE 20% OF THE CROSS-SECTIONAL AREA. FOR A 24" x 4" CABLE TRAY, MAXIMUM AREA OF CABLES SHALL BE 40% OF THE CROSS-SECTIONAL AREA.

3. ANNULAR SPACE = MINIMUM 1-1/2", MAXIMUM 13-1/2".

4. SPACE BETWEEN CABLE TRAYS = 5".

5. APPLY HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT INTO INTERSTICES OF CABLES BETWEEN CABLES AND CABLE TRAYS, AND ANY VOIDS TO MAXIMUM EXTENT POSSIBLE.

6. IF THE ANNULAR SPACE IS GREATER THAN 5", THEN ATTACH A STEEL WIRE MESH (NOMINAL 2" SQUARES, NO. 16 SWG) WITH 1/4" DIAMETER x 1" LONG STEEL CONCRETE ANCHORS AND 1-1/2" DIAMETER FENDER WASHERS (SPACED MAXIMUM 8" C/C) ON TOP SURFACE OF FLOOR, OR ON BOTH SIDES OF WALL. STEEL WIRE MESH SHALL BEGIN MAXIMUM 2-1/2" FROM THE PENETRANT AND OVERLAP MINIMUM 3" BEYOND THE PERIPHERY OF THE OPENING.



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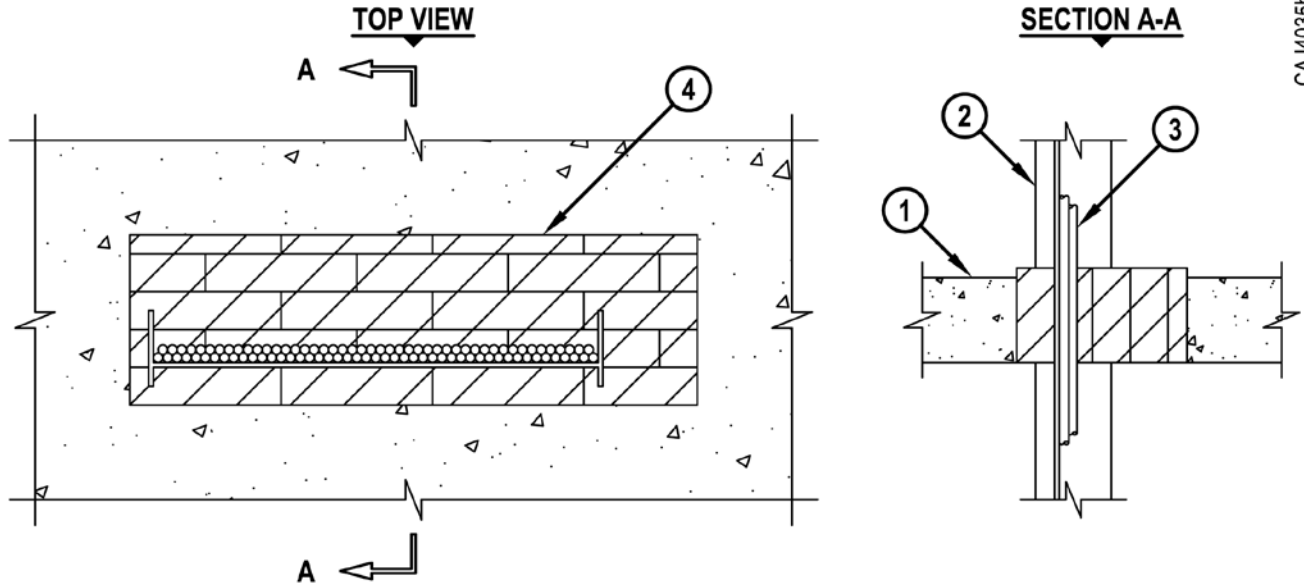
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UL/cUL SYSTEM NO. C-AJ-4035

CABLE TRAY THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL

F-RATING = 3-HR.

T-RATING = 0-HR.



CAJ4035h.010512

1. CONCRETE FLOOR OR WALL ASSEMBLY (3-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MINIMUM 4-1/2" THICK).
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. MAXIMUM 24" x 4", ALUMINUM OR STEEL, OPEN LADDER OR SOLID BACK CABLE TRAY.
3. CABLES TO BE A COMBINATION OF ANY OF THE FOLLOWING (SEE NOTE NO. 4 BELOW) :
 - A. MAXIMUM 300 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
 - B. MAXIMUM 500 KCMIL SINGLE CONDUCTOR POWER CABLE WITH PVC JACKET.
 - C. MAXIMUM 1/2" DIAMETER FIBER-OPTIC CABLE (24 FIBER) WITH PVC JACKET.
 - D. MAXIMUM 3/C NO. 12 AWG METAL CLAD CABLE.
4. HILTI CFS-BL FIRESTOP BLOCK OR HILTI FS 657 FIRE BLOCKS (2" THICK x 8" WIDE x 5" DEEP, REFERENCE : TOP VIEW) FLUSH WITH BOTTOM OF FLOOR. EITHER ONE OR A COMBINATION OF THE BLOCK TYPES MAY BE USED.

NOTES : 1. MAXIMUM AREA OF OPENING = 270 SQ. IN., WITH A MAXIMUM DIMENSION OF 30".
 2. ANNULAR SPACE = MINIMUM 1", MAXIMUM 4".
 3. APPLY HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT OR CP 618 FIRESTOP PUTTY STICK INTO INTERSTICES OF CABLES, BETWEEN CABLES AND CABLE TRAY, AND ANY VOIDS TO MAXIMUM EXTENT POSSIBLE.
 4. MAXIMUM AREA OF CABLES SHALL BE 40% OF CROSS-SECTIONAL AREA OF CABLE TRAY.
 5. FOR BLOCK WALLS, FIRESTOP BLOCKS TO FILL ENTIRE THICKNESS OF WALL UNLESS WALL IS SOLID FILLED.



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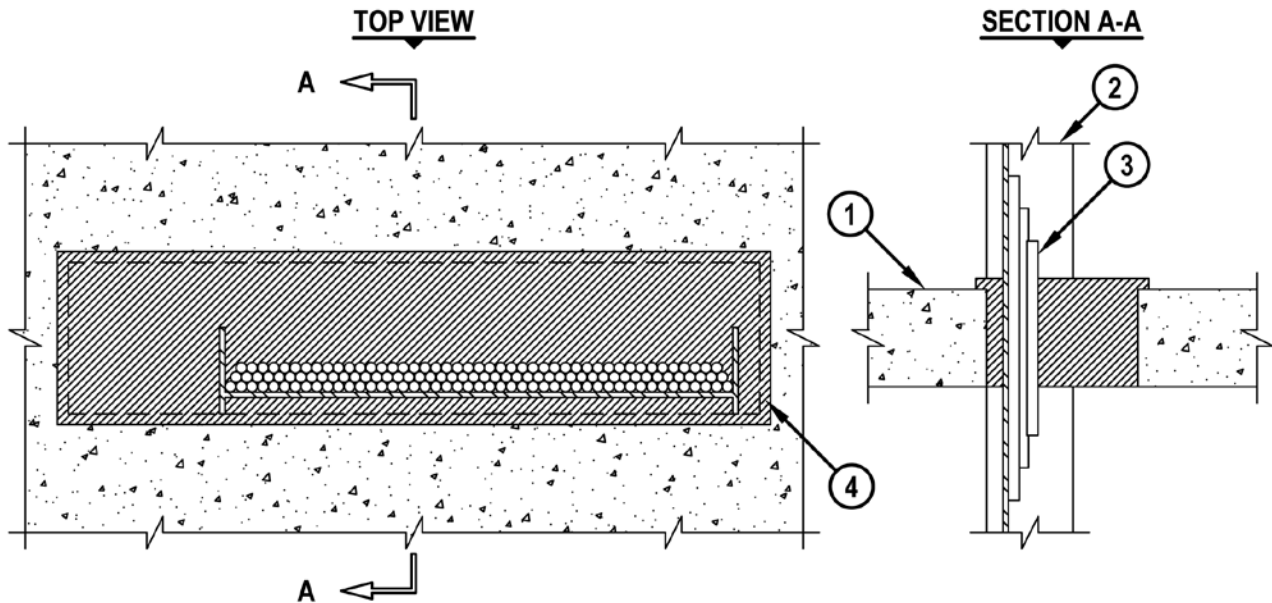
UL/cUL SYSTEM NO. C-AJ-4054

CABLE TRAY THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL ASSEMBLY

F-RATING = 2-HR.

T-RATING = 0-HR.

CAJ4054b.011112



1. CONCRETE FLOOR OR WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MINIMUM 4-1/2").
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. MAXIMUM 24" x 4" ALUMINUM OPEN LADDER CABLE TRAY.
3. CABLES TO A COMBINATION OF ANY OF THE FOLLOWING (SEE NOTE NO. 3 BELOW) :
 - A. MAXIMUM 300 PAIR NO. 24 AWG TELEPHONE CABLE.
 - B. MAXIMUM 500 KCMIL SINGLE CONDUCTOR POWER CABLE.
 - C. MAXIMUM 3/8" DIAMETER FIBER-OPTIC CABLE.
 - D. MAXIMUM 3/C NO. 12 AWG METAL-CLAD CABLE.
4. MINIMUM 5" DEPTH HILTI CP 620 FIRE FOAM EXTENDING ABOVE THE TOP SURFACE OF THE FLOOR OR BOTH SURFACES OF WALL AND OVERLAPPING THE CONCRETE 1/2" ON ALL SIDES OF OPENING.

NOTES : 1. MAXIMUM AREA OF OPENING = 224 SQ. IN. WITH A MAXIMUM DIMENSION OF 32".
 2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 5".
 3. MAXIMUM AREA OF CABLES SHALL BE 45% OF CROSS-SECTIONAL AREA OF CABLE TRAY.
 4. [OPTIONAL - NOT SHOWN] HILTI CFS-BL FIRESTOP BLOCKS OR HILTI FS 657 FIRE BLOCKS MAY BE APPLIED IN A SINGLE LAYER ABOVE CABLES WITHIN CABLE TRAY (2" THICK x 8" WIDE x 5" DEEP) FIRMLY PACKED WITHIN OPENING.



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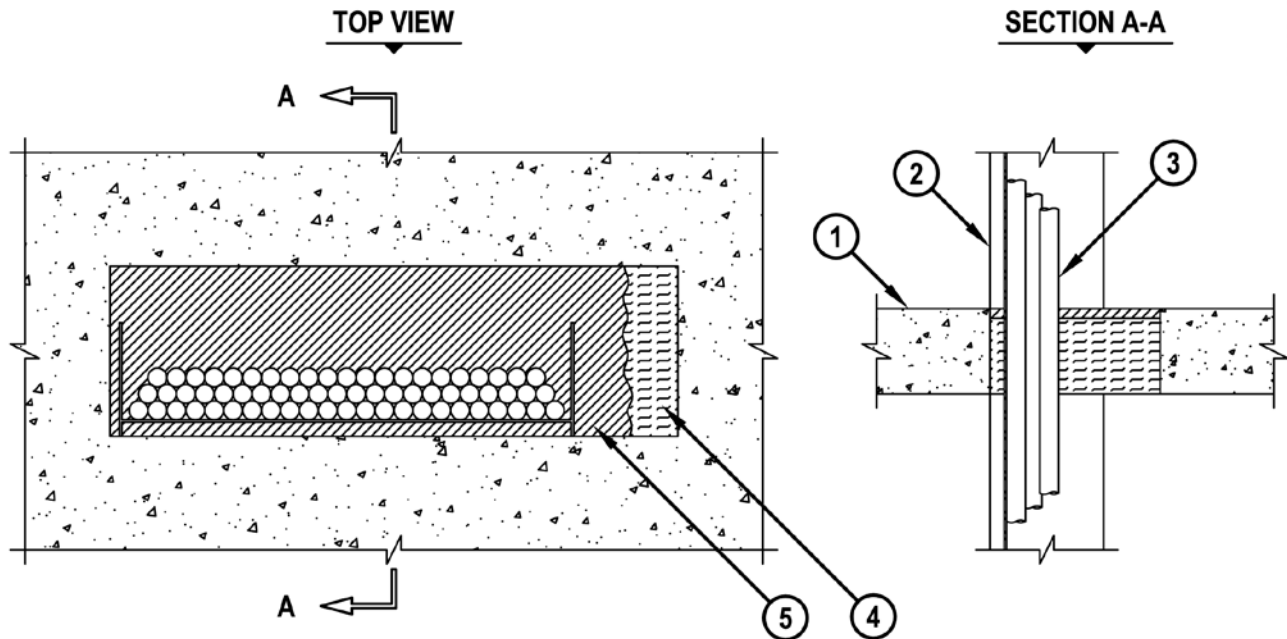
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UL/cUL SYSTEM NO. C-AJ-4071

CABLE TRAY THROUGH 2-HR. CONCRETE FLOOR/WALL OR BLOCK WALL

F-RATING = 2-HR.

T-RATING = 0-HR.



1. CONCRETE FLOOR OR WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 4-1/2" THICK).
 - B. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 5" THICK).
 - C. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. MAXIMUM 24" x 6", ALUMINUM OR STEEL, OPEN LADDER CABLE TRAY.
3. CABLES TO CONSIST OF ANY OF THE FOLLOWING :
 - A. MAXIMUM 300 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
 - B. MAXIMUM 500 KCMIL POWER CABLE WITH PVC JACKET.
 - C. MAXIMUM 1/2" DIAMETER FIBER-OPTIC CABLE (MAXIMUM 24 FIBER) WITH PVC JACKET.
 - D. MAXIMUM 3/C NO. 12 AWG STEEL-CLAD CABLE.
 - E. MAXIMUM 7/C NO. 12 AWG POWER CABLE WITH PVC JACKET.
4. MINIMUM 4" THICKNESS MINERAL WOOL (MINIMUM 4 PCF DENSITY) TIGHTLY PACKED AND RECESSED TO ACCOMMODATE FIRESTOP SEALANT.
5. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT FLUSH WITH TOP SURFACE OF FLOOR.

NOTES : 1. MAXIMUM SIZE OF OPENING = 30" x 9".
 2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 6".
 3. CABLES TO FILL MAXIMUM 67% OF CROSS-SECTIONAL AREA OF CABLE TRAY.
 4. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT IS REQUIRED ON EACH SIDE OF A WALL ASSEMBLY.



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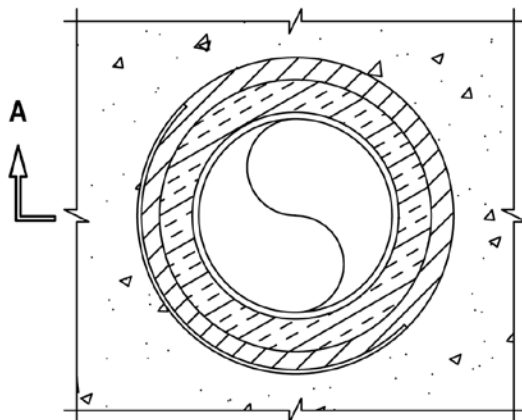
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UL/cUL SYSTEM NO. C-AJ-5091

INSULATED METAL PIPE THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL ASSEMBLY

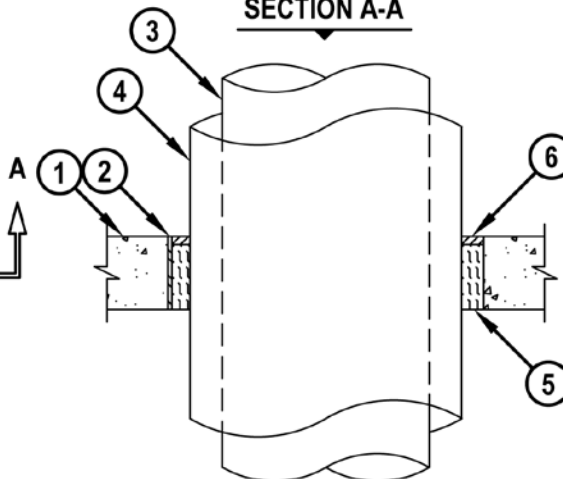
F-RATING = 2-HR.
T-RATING = 0-HR. OR 1-HR.

TOP VIEW



L-RATING AT AMBIENT = 4 CFM/SQ. FT.
L-RATING AT 400° F = LESS THAN 1 CFM/SQ. FT.

SECTION A-A



CAJ5091n.082611

1. CONCRETE FLOOR OR WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MINIMUM 4-1/2" THICK).
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL ASSEMBLY.
2. [OPTIONAL] ANY OF THE FOLLOWING STEEL SLEEVES MAY BE USED :
 - A. MAXIMUM 30" NOMINAL DIAMETER STEEL PIPE SLEEVE (SCHEDULE 10 OR HEAVIER) MAY EXTEND MAXIMUM 3" ABOVE FLOOR, OR BOTH SURFACES OF WALL.
 - B. MAXIMUM 6" (MIN. 26 GA.) OR 12" (MIN. 24 GA.) DIAMETER GALVANIZED STEEL SLEEVE WITH SQUARE FLANGE SPOT WELDED TO BOTTOM OF SLEEVE AND SIZED MINIMUM 2" LARGER THAN SLEEVE DIAMETER. SLEEVE MAY EXTEND MAXIMUM 1" ABOVE TOP SURFACE OF FLOOR.
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 12" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 12" NOMINAL DIAMETER CAST OR DUCTILE IRON PIPE.
 - C. MAXIMUM 6" NOMINAL DIAMETER COPPER PIPE OR TUBING.
4. MINIMUM 1/2" TO MAXIMUM 2" THICKNESS GLASS-FIBER PIPE INSULATION OR MAXIMUM 2" THICKNESS CALCIUM SILICATE PIPE INSULATION (SEE NOTE NO. 3 BELOW).
5. MINIMUM 4" THICKNESS MINERAL WOOL (MINIMUM 4 PCF DENSITY) TIGHTLY PACKED AND RECESSED TO ACCOMMODATE SEALANT.
6. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 29".
 2. ANNULAR SPACE = MINIMUM 1/2", MAXIMUM 12".
 3. WHEN CALCIUM SILICATE PIPE INSULATION IS USED, SECURE INSULATION TO PIPE WITH STAINLESS STEEL BANDS OR MINIMUM 8 AWG STAINLESS STEEL WIRE AT MAX. 12" O.C.
 4. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT IS REQUIRED ON BOTH SIDES OF A WALL ASSEMBLY.



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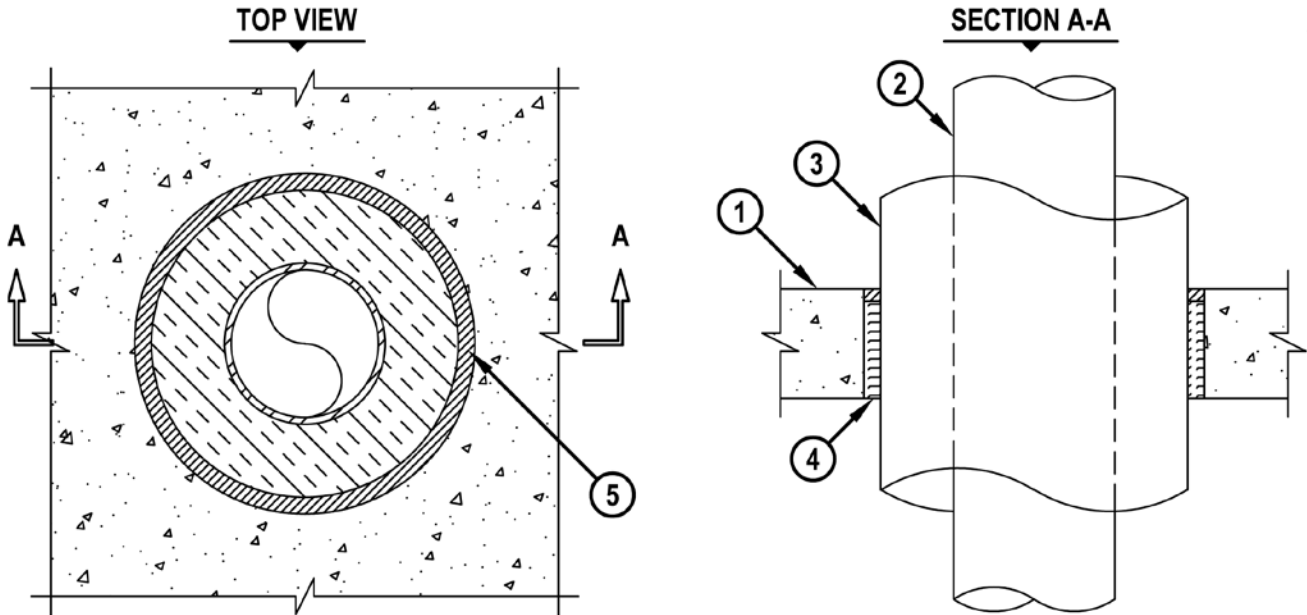
UL/cUL SYSTEM NO. C-AJ-5184

INSULATED METAL PIPE THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL ASSEMBLY

F-RATING = 3-HR.

T-RATING = 1-3/4-HR. AND 2-HR.

CAJ5184b.070102



1. CONCRETE FLOOR OR WALL ASSEMBLY (3-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MIN. 4-1/2" THICK).
 - B. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MIN. 5" THICK).
 - C. ANY UL/ULC CLASSIFIED CONCRETE BLOCK WALL.
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 24" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER) (T-RATING = 2-HR.).
 - B. MAXIMUM 6" NOMINAL DIAMETER COPPER PIPE (T-RATING = 1-3/4-HR.).
3. NOMINAL 3" THICKNESS UNFACED MINERAL FIBER PIPE INSULATION (SEE NOTE NO. 3 BELOW).
4. MINIMUM 4" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED.
5. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT OR CP 601S ELASTOMERIC FIRESTOP SEALANT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 32".
 2. ANNULAR SPACE = MINIMUM 1/2", MAXIMUM 1-1/2".
 3. MINERAL FIBER PIPE INSULATION TO BE MANUFACTURED BY OWENS CORNING. INSULATION SECURED WITH NOMINAL 16 AWG STEEL WIRE SPACED MAXIMUM 12" ON CENTER.
 4. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT OR CP 601S ELASTOMERIC FIRESTOP SEALANT IS REQUIRED ON BOTH SIDES OF A WALL ASSEMBLY.



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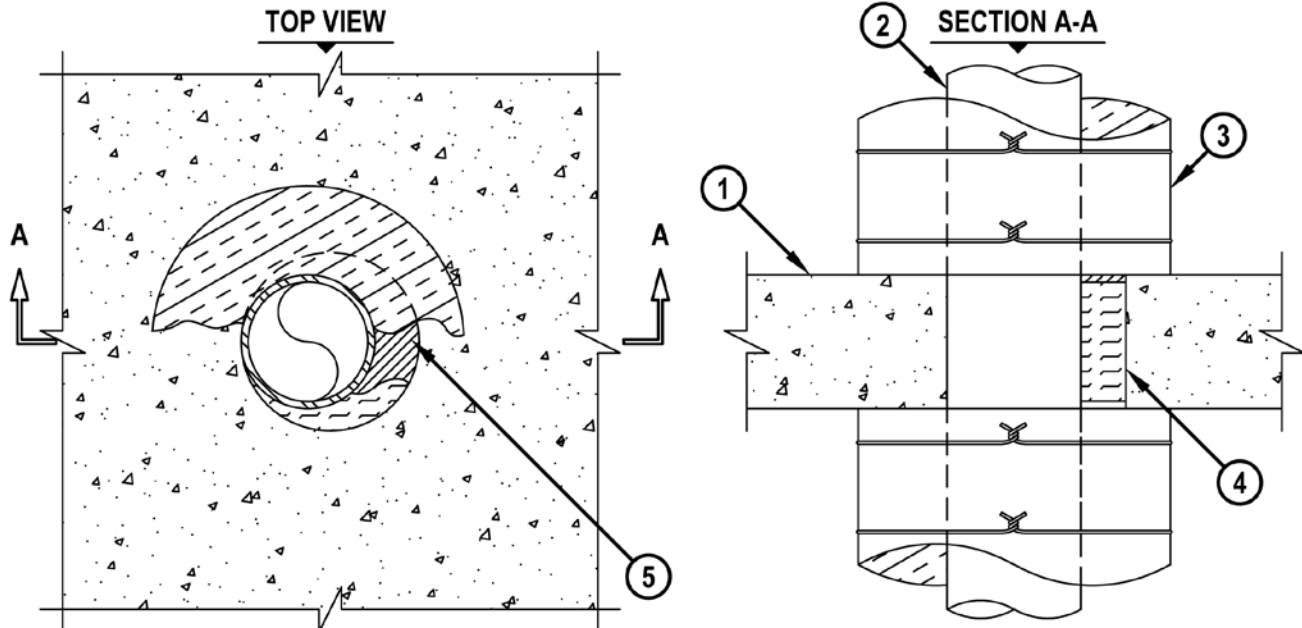
UL/cUL SYSTEM NO. C-AJ-5185

INSULATED METAL PIPE THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL

F-RATING = 3-HR.

T-RATING = 1-HR. AND 2-HR.

CAJ5185c.110702



1. CONCRETE FLOOR OR WALL ASSEMBLY (3-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MIN. 4-1/2" THICK).
 - B. ANY UL/ULC CLASSIFIED CONCRETE BLOCK WALL.
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 24" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 24" NOMINAL DIAMETER CAST IRON PIPE.
 - C. MAXIMUM 4" NOMINAL DIAMETER COPPER PIPE.
3. NOMINAL 3" THICKNESS MINERAL FIBER PIPE INSULATION BUTTED UP TO FIRESTOP SYSTEM ON BOTH SIDES OF ASSEMBLY (SEE NOTE NO. 3 AND 4 BELOW).
4. MINIMUM 4" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED.
5. MINIMUM 1/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 25-7/8".

2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1-7/8".

3. WHEN PIPE INSULATION EXTENDS THE ENTIRE LENGTH OF THE PIPE, ON BOTH SIDES OF THE FLOOR, THE T-RATING IS 2-HR. WHEN THE PIPE INSULATION EXTENDS ONLY 12" ABOVE AND BELOW THE FLOOR, THE T-RATING IS 1-HR.

4. MINERAL FIBER PIPE INSULATION TO BE MANUFACTURED BY OWENS CORNING. INSULATION SECURED WITH NOMINAL 16 AWG STEEL WIRE, SPACED MAXIMUM 12" ON CENTER WHEN INSULATION EXTENDS THE ENTIRE LENGTH OF PIPE AND AT 3" AND 9" ABOVE AND BELOW FLOOR WHEN INSULATION EXTENDS ONLY 12" ABOVE AND BELOW FLOOR.

5. MINIMUM 1/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT IS REQUIRED ON BOTH SIDES OF A WALL ASSEMBLY.



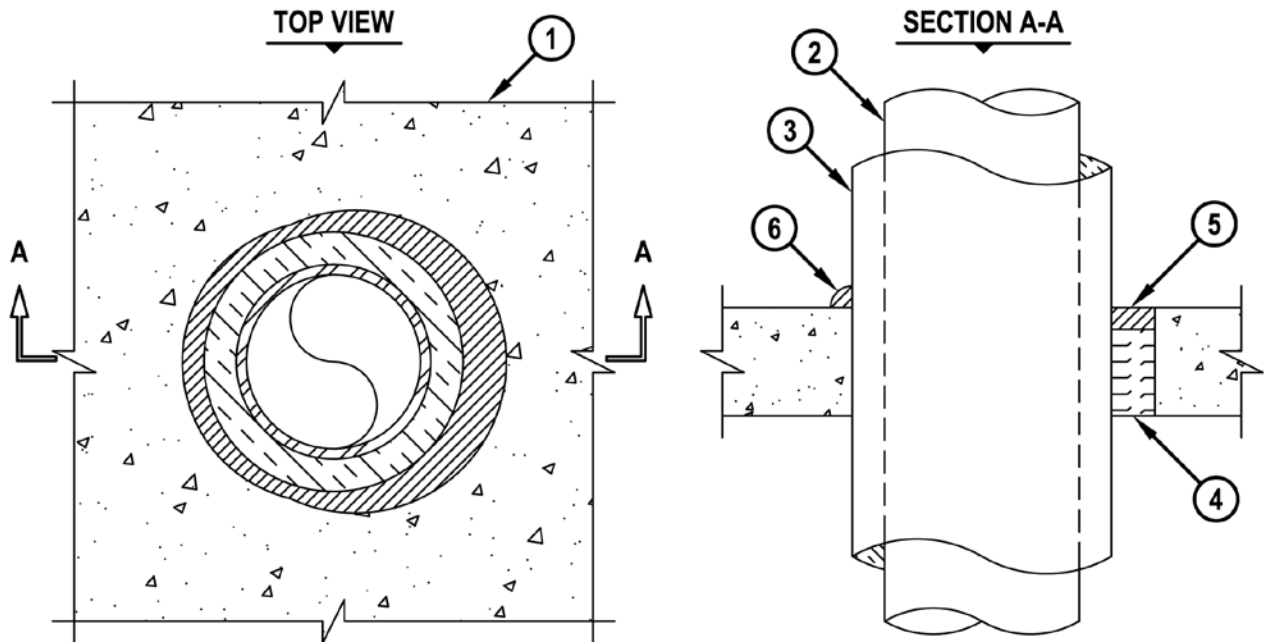
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UL/cUL SYSTEM NO. C-AJ-5198
**INSULATED METAL PIPE THROUGH CONCRETE FLOOR/WALL
 OR BLOCK WALL ASSEMBLY**

F-RATING = 2-HR.
 T-RATING = 0-HR. OR 1/2-HR.



1. CONCRETE FLOOR OR WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 2-1/2" THICK).
 - B. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 3" THICK).
 - C. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 4" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 4" NOMINAL DIAMETER COPPER PIPE.
3. MINIMUM 1/2" TO MAXIMUM 3/4" THICK AB/PVC PIPE INSULATION.
4. MINIMUM 2" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED.
5. MINIMUM 1/2" DEPTH HILTI FS-ONE HIGH PERFORMANCE INTUMESCENT FIRESTOP SEALANT.
6. MINIMUM 1/2" BEAD HILTI FS-ONE HIGH PERFORMANCE INTUMESCENT FIRESTOP SEALANT APPLIED AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 7".
 2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1-3/8".
 3. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT IS REQUIRED ON BOTH SIDES OF A WALL ASSEMBLY.



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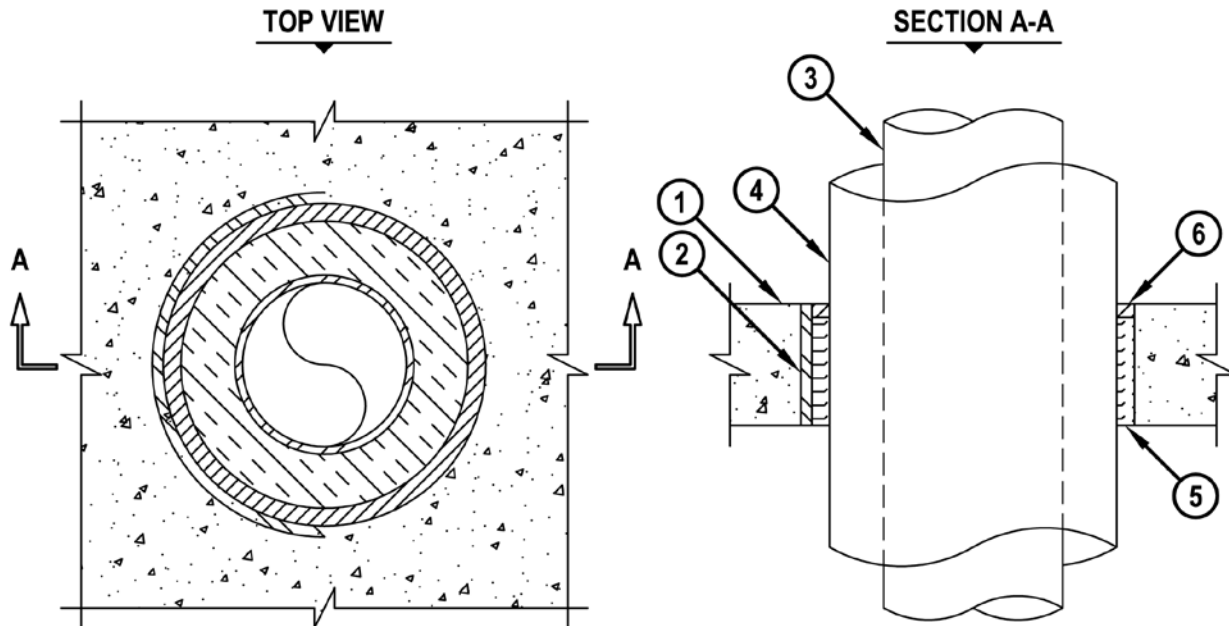
UL/cUL SYSTEM NO. C-AJ-5265

INSULATED METAL PIPE THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL

F-RATING = 2-HR.

T-RATING = 0 AND 1/2-HR.

CAJ5265aq.032404



1. CONCRETE FLOOR OR WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 4-1/2" THICK).
 - B. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 5" THICK).
 - C. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. OPTIONAL : MAXIMUM 12" NOMINAL DIAMETER STEEL PIPE SLEEVE (SCHEDULE 10 OR HEAVIER).
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 6" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 6" NOMINAL DIAMETER CAST OR DUCTILE IRON PIPE.
 - C. MAXIMUM 6" NOMINAL DIAMETER COPPER PIPE.
4. MAXIMUM 2" THICK GLASS-FIBER PIPE INSULATION.
5. MINIMUM 4" THICKNESS MINERAL WOOL (MINIMUM 4 PCF DENSITY) TIGHTLY PACKED.
6. MINIMUM 1/2" DEPTH HILTI CP 606 FLEXIBLE FIRESTOP SEALANT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 12".
 2. ANNULAR SPACE = MINIMUM 1/4", MAXIMUM 1-5/8".
 3. T-RATING = 0-HR. WHEN GLASS FIBER INSULATION IS LESS THAN 2" THICK.
 4. MINIMUM 1/2" DEPTH HILTI CP 606 FLEXIBLE FIRESTOP SEALANT IS REQUIRED ON BOTH SIDES OF A WALL ASSEMBLY.



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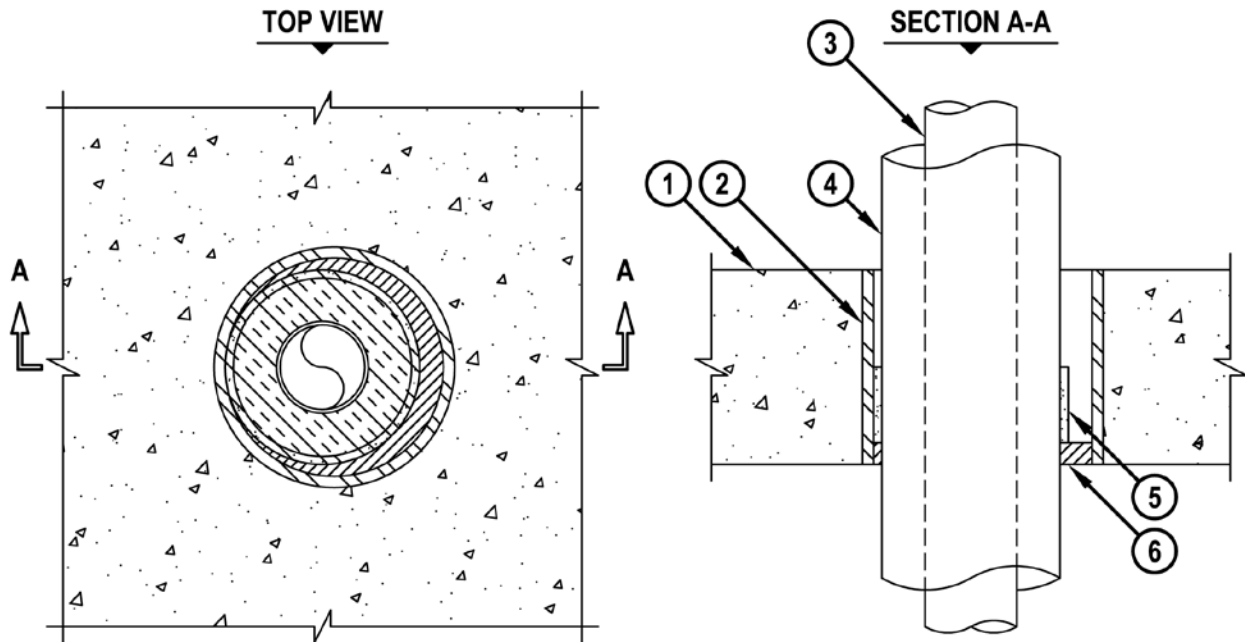
UL/cUL SYSTEM NO. C-AJ-5289

INSULATED PIPE THROUGH SLEEVE IN 3-HR. CONCRETE FLOOR ASSEMBLY

F-RATING = 3-HR.

T-RATING = 0-HR. AND 3/4-HR.

CAJ5289a.122904



1. CONCRETE FLOOR OR WALL ASSEMBLY (3-HR. FIRE-RATING):
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MINIMUM 4-1/2" THICK).
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. (OPTIONAL). MAXIMUM 5" NOMINAL DIAMETER STEEL PIPE SLEEVE (SCHEDULE 10 OR HEAVIER).
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING:
 - A. MAXIMUM 2" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 2" NOMINAL DIAMETER CAST OR DUCTILE IRON PIPE.
 - C. MAXIMUM 2" NOMINAL DIAMETER COPPER PIPE OR TUBING.
4. NOMINAL 1/2" TO 1" THICK AB/PVC PIPE INSULATION.
5. HILTI CP 648E FIRESTOP WRAP STRIP (NOMINAL 3/16" THICK x 1-3/4" WIDE) CONTINUOUSLY WRAPPED AROUND THE OUTER CIRCUMFERENCE OF THE INSULATION, COVERING ONE TIME, WITH ENDS BUTTED AND HELD IN PLACE WITH ALUMINUM FOIL TAPE. WRAP STRIP RECESSED FROM BOTTOM SURFACE OF FLOOR TO ACCOMMODATE FIRESTOP SEALANT.
6. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 5".
 2. ANNULAR SPACE = MINIMUM 3/16", MAXIMUM 3/4".
 3. HILTI CP 648E FIRESTOP WRAP STRIP AND FS-ONE INTUMESCENT FIRESTOP SEALANT ARE REQUIRED ON EACH SIDE OF A WALL ASSEMBLY.



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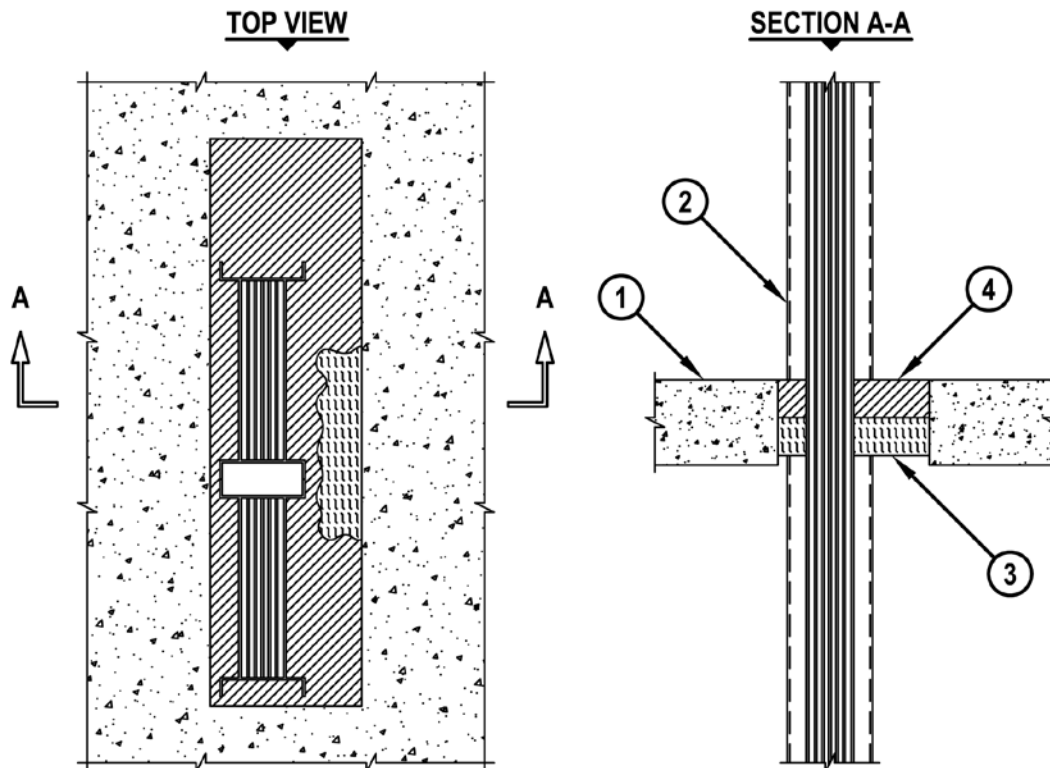
UL/cUL SYSTEM NO. C-AJ-6036

**ELECTRICAL BUSWAY THROUGH CONCRETE FLOOR/WALL OR
CONCRETE BLOCK WALL ASSEMBLY**

F-RATING = 2-HR.

T-RATING = 0-HR.

CAJ6036c.061407



1. CONCRETE FLOOR OR WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 4-1/2" THICK).
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 6" THICK).
 - C. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. ELECTRICAL BUSWAY (UL/cUL CLASSIFIED) (NOMINAL 23" WIDE x 4-1/2" DEEP, OR SMALLER) ("I" SHAPED ALUMINUM ENCLOSURE CONTAINING FACTORY MOUNTED ALUMINUM BARS RATED FOR 600V, 4000A, OR COPPER BARS RATED FOR 600V, 5000A) (SEE NOTE NO. 3 BELOW).
3. MINIMUM 2" THICKNESS MINERAL WOOL (MINIMUM 4 PCF DENSITY) TIGHTLY PACKED AND RECESSED TO ACCOMMODATE HILTI CP 620 FIRE FOAM.
4. MINIMUM 2" DEPTH HILTI CP 620 FIRE FOAM.

NOTES : 1. MAXIMUM AREA OF OPENING = 240 SQ. IN. WITH A MAXIMUM DIMENSION OF 30".
 2. ANNULAR SPACE = MINIMUM 1/4", MAXIMUM 5-3/4".
 3. AS AN ALTERNATE TO SINGLE BUSWAY, MAXIMUM TWO ELECTRICAL BUSWAYS (NOMINAL 11-1/4" WIDE x 4-1/2" DEEP, OR SMALLER) MAY BE INSTALLED.
 4. MINIMUM 2" DEPTH HILTI CP 620 FIRE FOAM IS REQUIRED ON BOTH SIDES OF A WALL ASSEMBLY.



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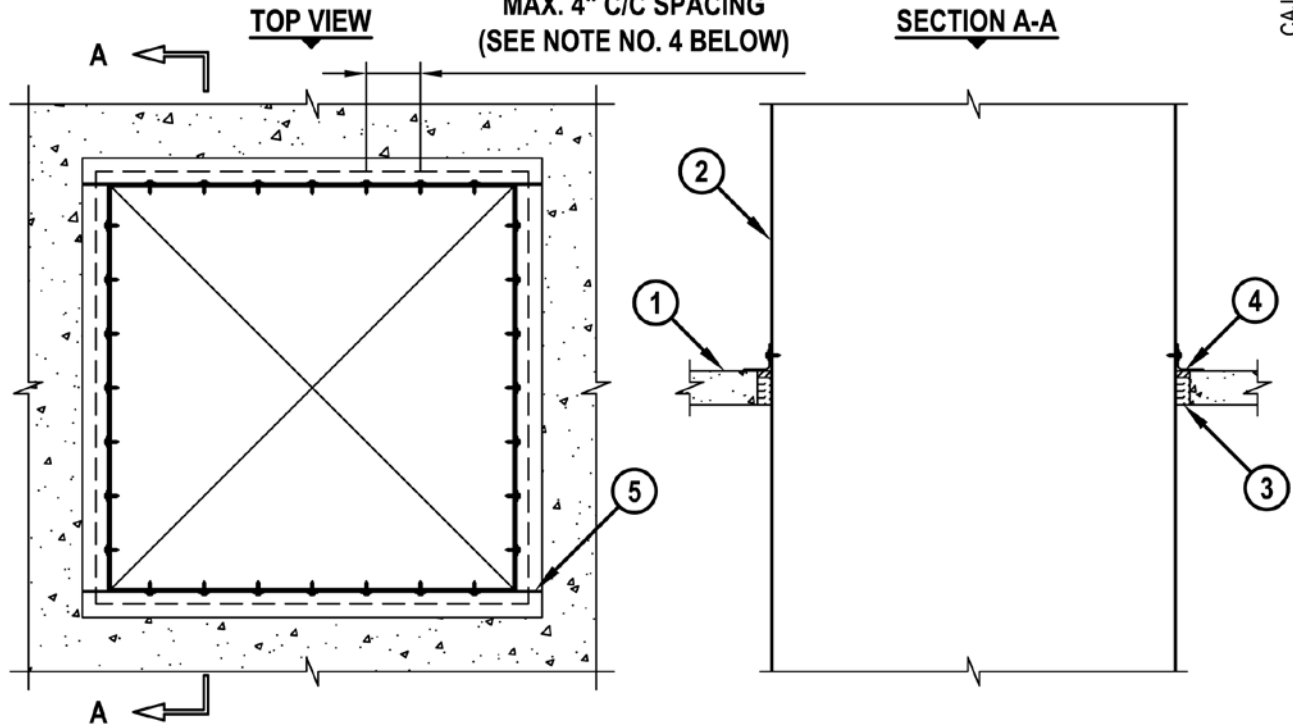
UL/cUL SYSTEM NO. C-AJ-7111

METAL DUCT (WITHOUT DAMPER) THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL

F-RATING = 2-HR.

T-RATING = 0-HR.

MAX. 4" C/C SPACING
(SEE NOTE NO. 4 BELOW)



1. CONCRETE FLOOR OR WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 2-1/2" THICK).
 - B. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 3" THICK).
 - C. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. MAXIMUM 30" X 30" RECTANGULAR STEEL DUCT (MINIMUM 24 GAUGE).
(NOTE: NOT FOR USE IN DUCT SYSTEMS CONTAINING A DAMPER).
3. MINIMUM 2" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED.
4. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
5. SEE NOTE NO. 4 BELOW.

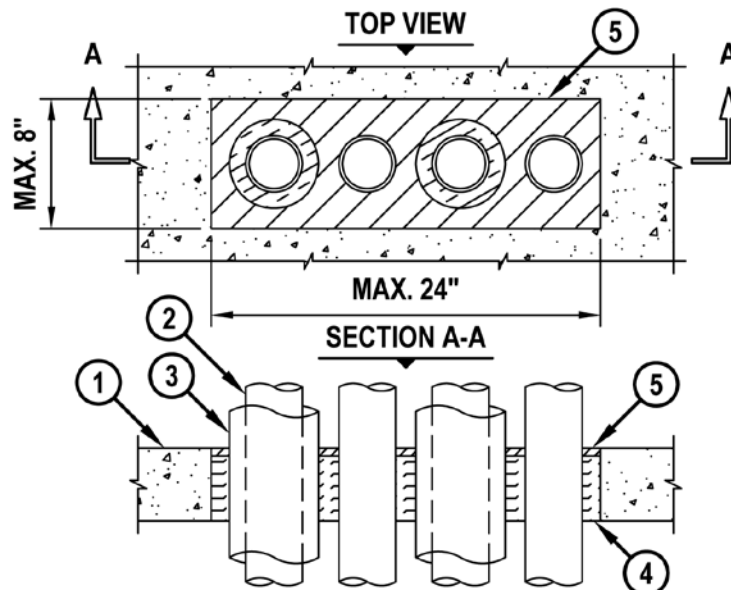
NOTES : 1. MAXIMUM SIZE OF OPENING = 32"x 32".
 2. ANNULAR SPACE = MINIMUM 1/4", MAXIMUM 1-3/4".
 3. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT AND STEEL ANGLES ARE REQUIRED ON BOTH SIDES OF A WALL ASSEMBLY.
 4. AFTER SEALING SPACE BETWEEN DUCT AND CONCRETE FLOOR/WALL ASSEMBLY WITH HILTI FS-ONE, FASTEN STEEL ANGLE (L2 X 2 X MIN. 16 GA.) TO DUCT WITH NO. 8 x 3/4" (OR LARGER) STEEL SHEET METAL SCREWS. ANGLE DOES NOT HAVE TO BE FASTENED TO CONCRETE FLOOR/WALL ASSEMBLY.

UL/cUL SYSTEM NO. C-AJ-8041

MULTIPLE INSULATED/NON-INSULATED METAL PIPES THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL

F RATING = 3-HR.
 T RATING = 0-HR. & 1-HR.
 L RATING AT AMBIENT = 10 CFM/SQ. FT.
 L RATING AT 400°F = 6 CFM/SQ. FT.

CAJ8041g.083199



1. CONCRETE FLOOR OR WALL ASSEMBLY (3-HR FIRE-RATING):
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MIN. 4-1/2" THICK).
 - B. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MIN. 5" THICK).
 - C. ANY UL/ULC CLASSIFIED CONCRETE BLOCK WALL.
2. PENETRATING ITEMS TO BE ANY COMBINATION OF THE FOLLOWING (MAX. QTY. = 4):
 - A. MAXIMUM 3" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 3" NOMINAL DIAMETER COPPER PIPE.
 - C. MAXIMUM 3" NOMINAL DIAMETER STEEL CONDUIT.
 - D. MAXIMUM 3" NOMINAL DIAMETER EMT.
3. OPTIONAL: MAXIMUM 1" THICK GLASS FIBER PIPE INSULATION ON ANY OR ALL PIPES.
4. MINIMUM 4" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED.
5. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.

NOTES : 1. MAXIMUM AREA OF OPENING IS 192 SQUARE INCHES, WITH A MAXIMUM DIMENSION OF 24 INCHES.
 2. ANNULAR SPACE BETWEEN PIPES = 1-1/2".
 3. ANNULAR SPACE BETWEEN PIPES AND PERIPHERY OF OPENING = MINIMUM 1-5/8", MAXIMUM 2-1/2".
 4. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT IS REQUIRED ON BOTH SIDES OF A WALL.



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UL/cUL SYSTEM NO. C-AJ-8095

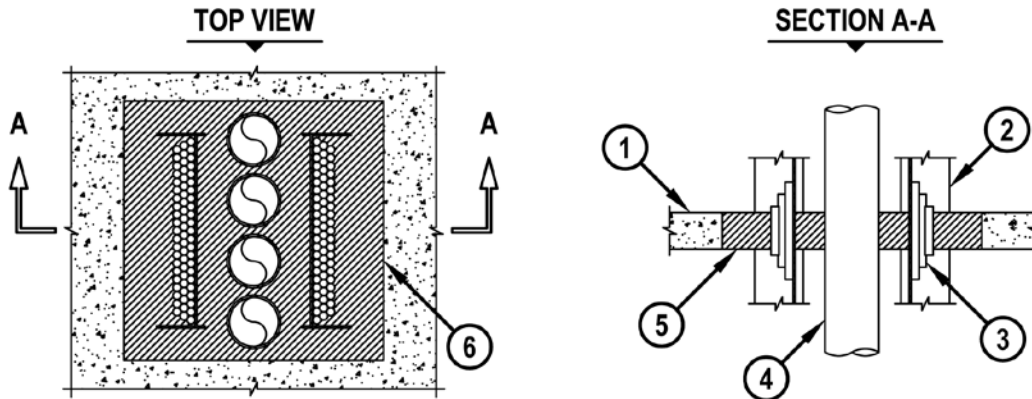
MULTIPLE PENETRATING ITEMS THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL

F-RATING = 4-HR.

T-RATING = 0-HR.

L-RATING AT AMBIENT = 14 CFM/SQ. FT.

L-RATING AT 400°F = 14 CFM/SQ. FT.



1. CONCRETE FLOOR OR WALL ASSEMBLY (4-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MIN. 4-1/2" THICK).
 - B. ANY UL/ULC CLASSIFIED CONCRETE BLOCK WALL.
2. MAXIMUM 24" x 6" ALUMINUM OR STEEL OPEN LADDER CABLE TRAY (MAXIMUM QUANTITY = 2).
3. ANY COMBINATION OF THE FOLLOWING CABLES MAY BE USED WITHIN THE CABLE TRAYS :
 - A. MAXIMUM 500 KCMIL SINGLE CONDUCTOR CABLE.
 - B. MAXIMUM 25 PAIR NO. 24 AWG TELEPHONE CABLE.
 - C. MAXIMUM 3/C (+ GROUND) NO. 12 AWG COPPER CABLE.
 - D. MULTIPLE TWO LEAD FIBER OPTIC CABLE (MAX. 0.12" x 0.24").
4. PENETRATING ITEMS TO BE ANY OF THE FOLLOWING (MAXIMUM QUANTITY = 4) :
 - A. MAXIMUM 26" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 15" NOMINAL DIAMETER CAST IRON PIPE.
 - C. MAXIMUM 6" NOMINAL DIAMETER COPPER PIPE.
 - D. MAXIMUM 6" NOMINAL DIAMETER STEEL CONDUIT.
 - E. MAXIMUM 4" NOMINAL DIAMETER EMT.
5. FORMING NOT SHOWN. USE A RIGID BOARD MATERIAL TO SUPPORT HILTI CP 637 FIRESTOP MORTAR DURING INITIAL CURE.
6. MINIMUM 4-1/2" DEPTH HILTI CP 637 FIRESTOP MORTAR.

NOTES : 1. MAXIMUM AREA OF OPENING = 1024 SQ. IN. WITH A MAX. DIM. OF 32 IN.
 2. CABLE TRAYS SPACED MINIMUM 5" APART AND A MINIMUM 2" FROM THE PERIPHERY OF THE OPENING.
 3. PIPES SPACE MINIMUM 2-1/2" APART AND FROM THE PERIPHERY OF THE OPENING.
 4. PIPES SPACE MINIMUM 5" FROM CABLE TRAYS.
 5. CABLES TO FILL MAXIMUM 27% OF CROSS-SECTIONAL AREA OF CABLE TRAY.



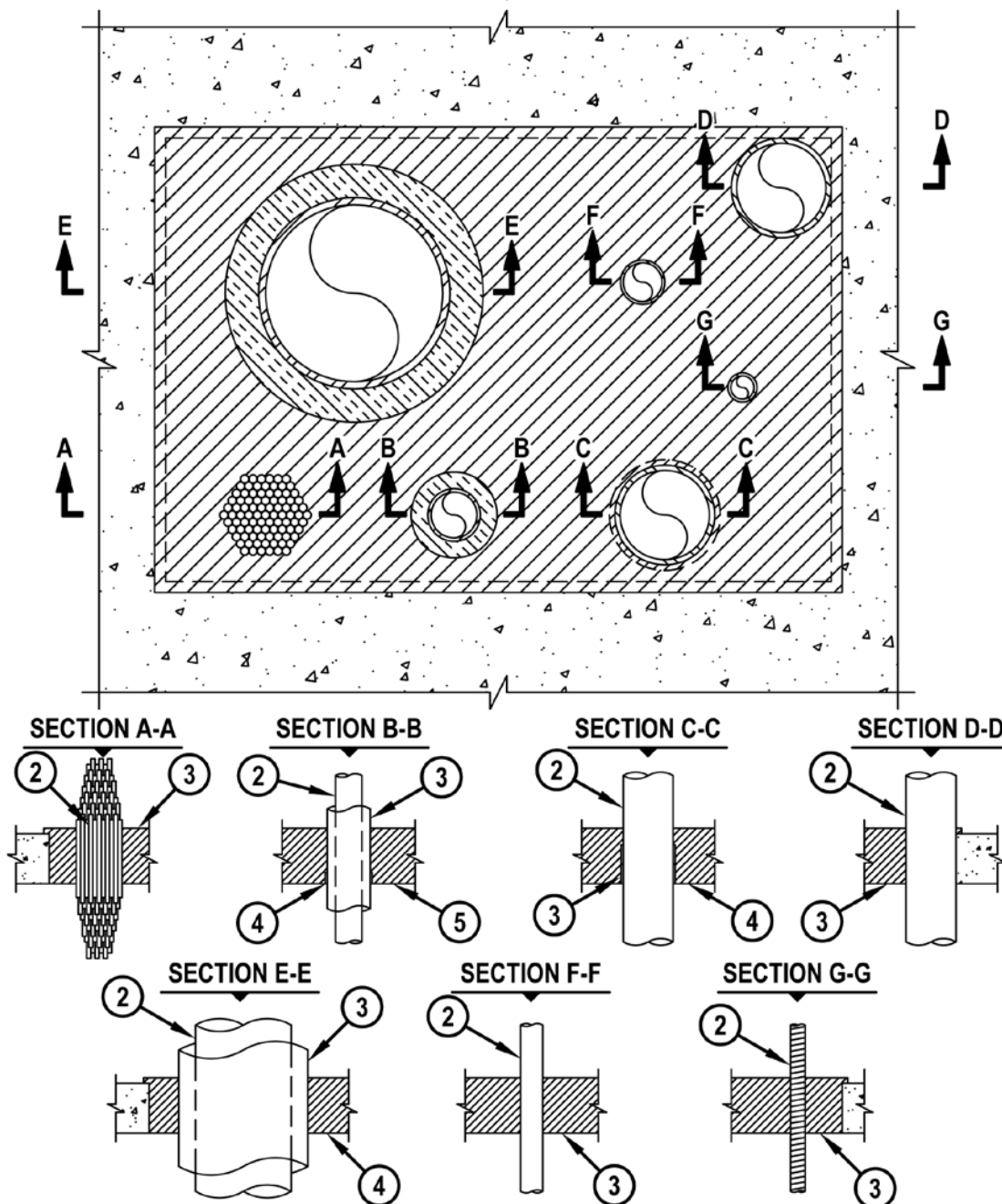
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UL/cUL SYSTEM NO. C-AJ-8096
**MULTIPLE PENETRATING ITEMS THROUGH CONCRETE FLOOR/WALL
 OR BLOCK WALL ASSEMBLY**

F-RATING = 2-HR.
 T-RATING = 0-HR., 1/2-HR. OR 2-HR. (SEE NOTE NO. 3 BELOW)

TOP VIEW



CAJ8096d.022610



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UL/cUL SYSTEM NO. C-AJ-8096

MULTIPLE PENETRATING ITEMS THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL ASSEMBLY

F-RATING = 2-HR.

T-RATING = 0-HR., 1/2-HR. OR 2-HR. (SEE NOTE NO. 3 BELOW)

CAJ8096d.022610

1. CONCRETE FLOOR OR WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MIN. 4-1/2" THICK).
 - B. ANY UL/ULC CLASSIFIED CONCRETE BLOCK WALL.

FIRESTOP CONFIGURATION A

2. MAXIMUM 4" DIAMETER CABLE BUNDLE CONSISTING OF ANY OF THE FOLLOWING :
 - A. MAXIMUM 300 PAIR NO. 24 AWG TELEPHONE CABLE.
 - B. MAXIMUM 500 KCMIL POWER CABLE.
 - C. MAXIMUM 7/C NO. 12 AWG POWER CABLE.
 - D. MAXIMUM 3/8" DIAMETER FIBER-OPTIC CABLE.
 - E. MAXIMUM 3/C NO. 12 AWG METAL-CLAD CABLE.
 - F. MAXIMUM 3/C NO. 10 (+ GROUND) ROMEX POWER CABLE.
3. MINIMUM 5" DEPTH HILTI CP 620 FIRE FOAM, EXTENDING 1/2" ABOVE THE TOP SURFACE OF THE FLOOR, OR BOTH SURFACES OF WALL, AND OVERLAPPING THE CONCRETE 1/2" ON ALL SIDES OF OPENING.

**NOTE : MINIMUM SPACING BETWEEN CABLE BUNDLE AND PERIPHERY OF
OPENING AND ADJACENT PENETRANTS = 1/2" AND 4" RESPECTIVELY.**

FIRESTOP CONFIGURATION B

2. MAXIMUM 2" NOMINAL DIAMETER COPPER PIPE.
3. NOMINAL 3/4" THICK AB/PVC PIPE INSULATION.
4. HILTI CP 648E WRAP STRIP (NOMINAL 3/16" THICK x 1" WIDE) CONTINUOUSLY WRAPPED AROUND THE OUTER CIRCUMFERENCE OF THE PIPE, COVERING ONCE, WITH ENDS HELD IN PLACE WITH TAPE. WRAP STRIP INSTALLED FLUSH WITH BOTTOM SURFACE OF FLOOR OR BOTH SURFACES OF CP 620 FIRE FOAM IN A WALL.
5. MINIMUM 5" DEPTH HILTI CP 620 FIRE FOAM, EXTENDING 1/2" ABOVE THE TOP SURFACE OF THE FLOOR, OR BOTH SURFACES OF WALL, AND OVERLAPPING THE CONCRETE 1/2" ON ALL SIDES OF OPENING.

**NOTE : MINIMUM SPACING BETWEEN INSULATED PIPE AND PERIPHERY OF
OPENING AND ADJACENT PENETRANTS = 1/2" AND 3" RESPECTIVELY.**

FIRESTOP CONFIGURATION C

2. MAXIMUM 4" NOMINAL DIAMETER PVC PLASTIC PIPE (SCHEDULE 40) (SOLID OR CELLULAR CORE) (CLOSED OR VENTED PIPING SYSTEMS).
3. HILTI CP 648E WRAP STRIP (NOMINAL 3/16" THICK x 1-3/4" WIDE) CONTINUOUSLY WRAPPED AROUND THE OUTER CIRCUMFERENCE OF THE PIPE, COVERING ONCE, WITH ENDS HELD IN PLACE WITH TAPE. WRAP STRIP TO BE DOUBLE-STACKED AND INSTALLED FLUSH WITH BOTTOM OF FLOOR OR BOTH SURFACES OF CP 620 IN A WALL.
4. MINIMUM 5" DEPTH HILTI CP 620 FIRE FOAM, EXTENDING 1/2" ABOVE THE TOP SURFACE OF THE FLOOR, OR BOTH SURFACES OF WALL, AND OVERLAPPING THE CONCRETE 1/2" ON ALL SIDES OF OPENING.



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UL/cUL SYSTEM NO. C-AJ-8096

MULTIPLE PENETRATING ITEMS THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL ASSEMBLY

F-RATING = 2-HR.

T-RATING = 0-HR., 1/2-HR. OR 2-HR. (SEE NOTE NO. 3 BELOW)

FIRESTOP CONFIGURATION C (continued...)

NOTE : MINIMUM SPACING BETWEEN PLASTIC PIPE AND PERIPHERY OF
OPENING AND ADJACENT PENETRANTS = 1/2" AND 4-1/2" RESPECTIVELY.

FIRESTOP CONFIGURATION D

2. MAX. 4" NOMINAL DIAMETER STEEL PIPE (SCH 10 OR HEAVIER), CAST IRON PIPE, COPPER PIPE, STEEL CONDUIT, OR EMT.
3. MINIMUM 5" DEPTH HILTI CP 620 FIRE FOAM, EXTENDING 1/2" ABOVE THE TOP SURFACE OF THE FLOOR, OR BOTH SURFACES OF WALL, AND OVERLAPPING THE CONCRETE 1/2" ON ALL SIDES OF OPENING.

NOTE : MINIMUM SPACING BETWEEN PIPE AND PERIPHERY OF OPENING AND
ADJACENT PENETRANTS = 0" AND 4" RESPECTIVELY.

FIRESTOP CONFIGURATION E

2. MAXIMUM 8" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 40 OR HEAVIER).
3. NOMINAL 1-1/2" THICK GLASS-FIBER PIPE INSULATION.
4. MINIMUM 5" DEPTH HILTI CP 620 FIRE FOAM, EXTENDING 1/2" ABOVE THE TOP SURFACE OF THE FLOOR, OR BOTH SURFACES OF WALL, AND OVERLAPPING THE CONCRETE 1/2" ON ALL SIDES OF OPENING.

NOTE : MINIMUM SPACING BETWEEN INSULATED PIPE AND PERIPHERY OF
OPENING AND ADJACENT PENETRANTS = 1/2" AND 3" RESPECTIVELY.

FIRESTOP CONFIGURATION F

2. MAXIMUM 2" DIAMETER TEK CABLE WITH CROSS-LINKED POLYETHYLENE INSULATION.
3. MINIMUM 5" DEPTH HILTI CP 620 FIRE FOAM, EXTENDING 1/2" ABOVE THE TOP SURFACE OF THE FLOOR, OR BOTH SURFACES OF WALL, AND OVERLAPPING THE CONCRETE 1/2" ON ALL SIDES OF OPENING.

NOTE : MINIMUM SPACING BETWEEN TEK CABLE AND PERIPHERY OF
OPENING AND ADJACENT PENETRANTS = 1/2" AND 3" RESPECTIVELY.

FIRESTOP CONFIGURATION G

2. MAXIMUM 1" DIAMETER FLEXIBLE ALUMINUM CONDUIT.
3. MINIMUM 5" DEPTH HILTI CP 620 FIRE FOAM, EXTENDING 1/2" ABOVE THE TOP SURFACE OF THE FLOOR, OR BOTH SURFACES OF WALL, AND OVERLAPPING THE CONCRETE 1/2" ON ALL SIDES OF OPENING.

NOTE : MINIMUM SPACING BETWEEN FLEXIBLE CONDUIT AND PERIPHERY OF
OPENING AND ADJACENT PENETRANTS = 1/2" AND 5" RESPECTIVELY.

NOTES : 1. MAXIMUM SIZE OF OPENING = 30" x 20".

2. MAXIMUM OF SEVEN FIRESTOP CONFIGURATIONS MAY BE INSTALLED WITHIN THE OPENING.

3. T-RATING IS 0-HR. FOR FIRESTOP CONFIGURATIONS C, D, AND G. T-RATING IS 1/2-HR. FOR CONFIGURATIONS A, B, AND F. T-RATING IS 2-HR. FOR CONFIGURATION E.

CAJ8096d.022610



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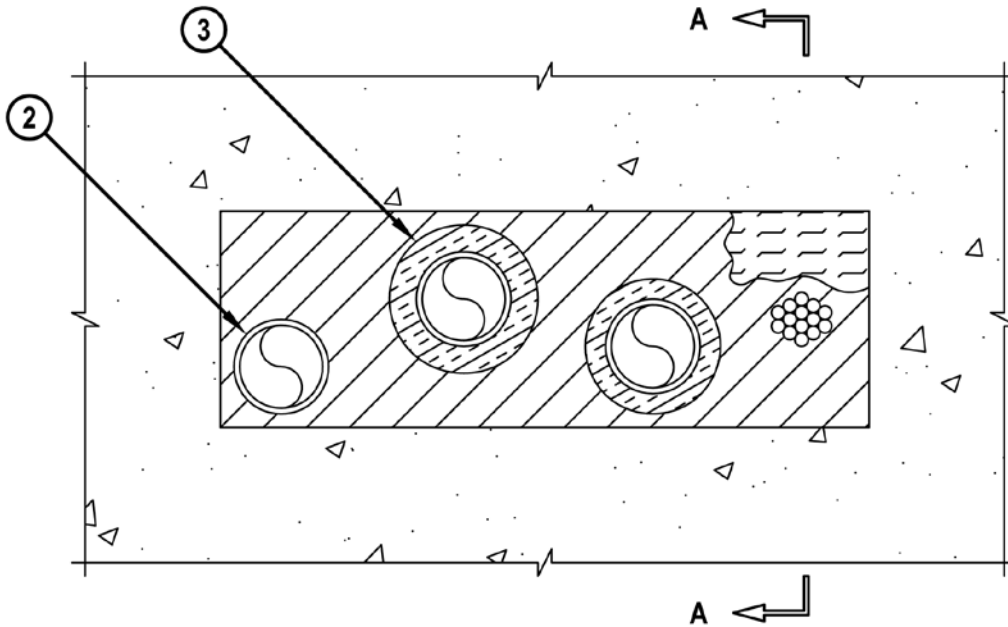
UL/cUL SYSTEM NO. C-AJ-8099

MULTIPLE PENETRATING ITEMS THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL

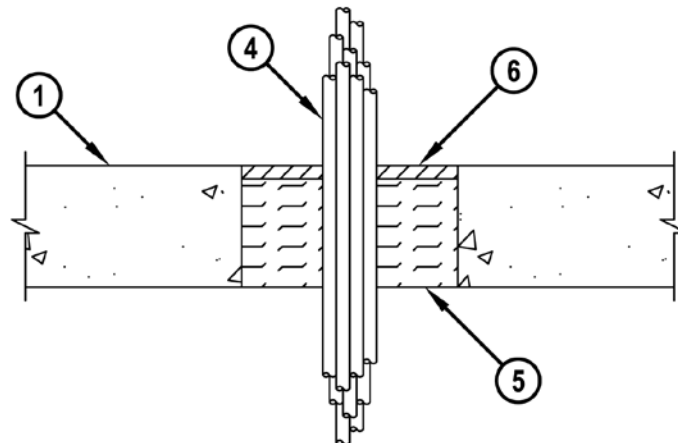
F-RATING = 3-HR.
T-RATING = 0-HR. OR 3/4-HR.

CAJ8099e.040808

TOP VIEW



SECTION A-A



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UL/cUL SYSTEM NO. C-AJ-8099

MULTIPLE PENETRATING ITEMS THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL

F-RATING = 3-HR.

T-RATING = 0-HR. OR 3/4-HR.

CAJ8099e.040808

1. CONCRETE FLOOR OR WALL ASSEMBLY (3-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 4-1/2" THICK).
 - B. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 5" THICK).
 - C. PRECAST (HOLLOW-CORE) CONCRETE FLOOR (MINIMUM 6" THICK).
 - D. ANY UL CLASSIFIED CONCRETE BLOCK WALL.
2. ONE OR MORE OF THE FOLLOWING PIPES, AND IN ANY COMBINATION MAY BE INSTALLED WITHIN THE OPENING :
 - A. MAXIMUM 3" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 3" NOMINAL DIAMETER CAST IRON PIPE.
 - C. MAXIMUM 3" NOMINAL DIAMETER COPPER PIPE.
 - D. MAXIMUM 3" NOMINAL DIAMETER STEEL CONDUIT OR EMT.
 - E. MAXIMUM 1" NOMINAL DIAMETER FLEXIBLE STEEL CONDUIT.
 - E. MAXIMUM 2" NOMINAL DIAMETER FLEXIBLE STEEL GAS PIPING (WITH OR WITHOUT PLASTIC COVERING) MANUFACTURED BY OMEGA FLEX, INC. OR WARD MFG., INC.
 - F. MAXIMUM 1" NOMINAL DIAMETER FLEXIBLE STEEL GAS PIPING (WITH OR WITHOUT PLASTIC COVERING) MANUFACTURED BY GASTITE, DIVISION OF TITEFLEX.
3. [OPTIONAL] ANY OR ALL PIPES MAY BE INSULATED WITH MAXIMUM 1" THICK GLASS-FIBER OR MAXIMUM 3/4" THICK AB/PVC PIPE INSULATION.
4. MAXIMUM 2" DIAMETER CABLE BUNDLE TO CONSIST OF ANY OF THE FOLLOWING :
 - A. MAXIMUM 300 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
 - B. MAXIMUM 500 KCMIL POWER CABLE WITH PVC JACKET.
 - C. MAXIMUM 7/C NO. 12 AWG POWER CABLE WITH PVC JACKET.
 - D. MAXIMUM 1/2" DIAMETER FIBER-OPTIC CABLE (24 FIBER).
 - E. MAXIMUM 3/C NO. 12 AWG METAL-CLAD CABLE.
5. MINIMUM 4" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED. WHEN INSTALLED IN PRECAST (HOLLOW-CORE) CONCRETE FLOOR, MINERAL WOOL TO FILL FLOOR, FLUSH WITH BOTTOM AND RECESSED TO ACCOMMODATE SEALANT ON TOP SIDE.
6. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.

NOTES : 1. MAXIMUM AREA OF SQUARE, RECTANGULAR, OR CIRCULAR OPENING IS 192 SQ. IN. WITH A MAXIMUM DIMENSION OF 24" IN NORMAL CONCRETE, 49 SQ. IN. WITH A MAXIMUM DIMENSION OF 7" IN PRECAST (HOLLOW-CORE) CONCRETE.

2. ANNULAR SPACE BETWEEN CABLE BUNDLE, PIPES, AND INSULATED PIPES = MINIMUM 1/2", MAXIMUM 3-1/8".

3. ANNULAR SPACE BETWEEN PIPES/INSULATED PIPES AND PERIPHERY OF OPENING = MINIMUM 1/2", MAXIMUM 5".

4. ANNULAR SPACE BETWEEN CABLE BUNDLE & PERIPHERY OF OPENING = MIN. 2", MAX. 4".

5. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT IS REQUIRED ON BOTH SIDES OF A WALL ASSEMBLY.



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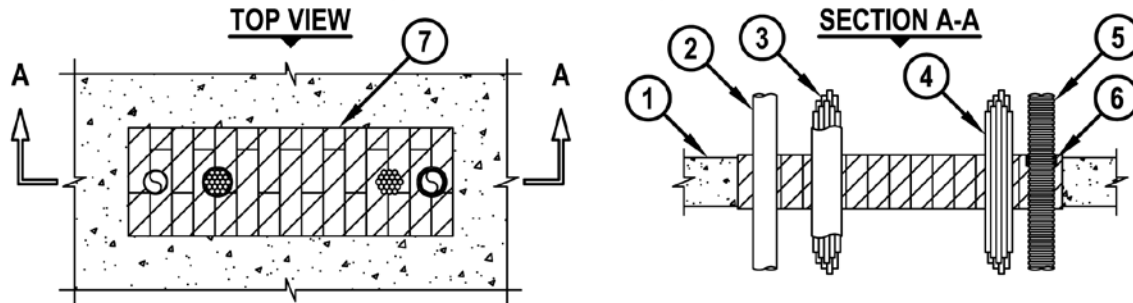
UL/cUL SYSTEM NO. C-AJ-8107

MULTIPLE PENETRATING ITEMS THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL

F-RATING = 3-HR.

T-RATING = 3/4-HR., 1-HR., 1 3/4-HR., OR 3-HR.

NOTE : TESTED TO A 2.5 Pa PRESSURE DIFFERENTIAL



CAJ8107c.010512

1. CONCRETE FLOOR OR WALL ASSEMBLY (3-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MINIMUM 4-1/2" THICK).
 - B. ANY UL/cUL CLASSIFIED SOLID OR FILLED CONCRETE BLOCK WALL.
2. MAXIMUM 2" NOMINAL DIAMETER EMT OR STEEL CONDUIT.
3. MAXIMUM 1800 PAIR NO. 24 AWG ARMM TELEPHONE CABLE WITH PVC JACKET.
4. MAXIMUM 3" DIAMETER CABLE BUNDLE CONSISTING OF ANY OF THE FOLLOWING :
 - A. MAXIMUM 300 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
 - B. MAXIMUM 7/C NO. 12 AWG POWER CABLE WITH PVC JACKET.
 - C. MAXIMUM (24 FIBER) 1/2" DIAMETER FIBER-OPTIC CABLE.
5. MAXIMUM 2" NOMINAL DIAMETER PVC OPTICAL FIBER RACEWAY.
6. [OPTIONAL] HILTI CP 648E WRAP STRIP (NOMINAL 3/16" THICK x 1" WIDE) CONTINUOUSLY WRAPPED AROUND THE OUTER CIRCUMFERENCE OF THE RACEWAY, COVERING ONE TIME, AND HELD IN PLACE WITH TAPE. WRAP STRIP INSTALLED FLUSH WITH TOP SURFACE OF FIRESTOP BLOCKS/FIRE BLOCKS.
7. HILTI CFS-BL FIRESTOP BLOCK OR HILTI FS 657 FIRE BLOCK (2" THICK x 8" WIDE x 5" DEEP, REFERENCE : TOP VIEW) FIRMLY PACKED AND CENTERED WITHIN OPENING. EITHER ONE OR A COMBINATION OF THE BLOCK TYPES MAY BE USED.

NOTES : 1. MAXIMUM SIZE OF OPENING = 30" x 10".

2. MINIMUM ANNULAR SPACE BETWEEN EMT, 1800 PAIR CABLE, FIBER OPTIC RACEWAYS, AND ADJACENT PENETRANTS = 3".

3. MIN. ANNULAR SPACE BETWEEN CABLE BUNDLE AND ADJACENT PENETRANTS = 1-1/2".

4. ANNULAR SPACE BETWEEN INDIVIDUAL PENETRANTS AND THE PERIPHERY OF THE OPENING = MINIMUM 1/2", MAXIMUM 11-1/4".

5. APPLY HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT, CP 618 FIRESTOP PUTTY STICK, OR CP 620 FIRE FOAM IN ANY VOID THAT MAY EXIST (AROUND PENETRANTS OR BETWEEN FIRESTOP BLOCKS/FIRE BLOCKS).

6. IF THE ANNULAR SPACE IS GREATER THAN 4", ATTACH A STEEL WIRE MESH (NOMINAL 2" SQUARES, NO. 16 SWG) ON TOP OF FLOOR OR BOTH SURFACES OF WALL, USING 1/4" DIAMETER x 1" LONG STEEL CONCRETE ANCHORS AND 1-1/2" DIAMETER FENDER WASHERS (SPACED MAX. 8" C/C). STEEL WIRE MESH CUT TO FIT THE CONTOUR OF THE PENETRATING ITEMS WITH A MINIMUM 3" OVERLAP BEYOND THE PERIPHERY OF THE OPENING.



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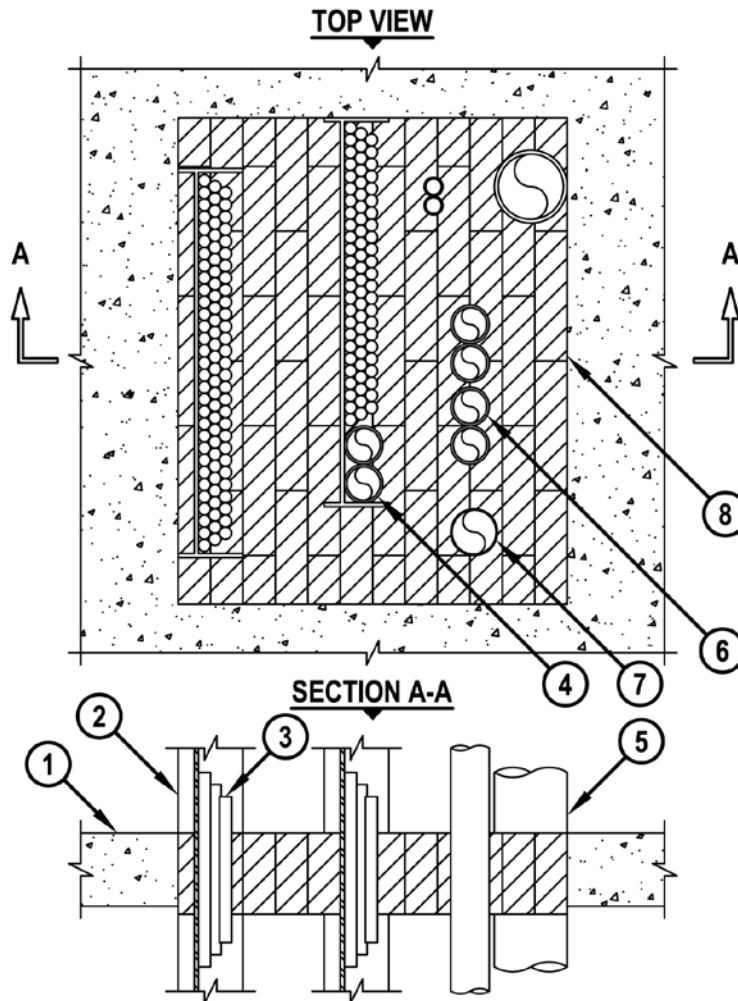
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UL/cUL SYSTEM NO. C-AJ-8110
**MULTIPLE PENETRATING ITEMS THROUGH CONCRETE FLOOR/WALL
 OR BLOCK WALL ASSEMBLY**

F-RATING = 3-HR.
 T-RATING = 0-HR.

CAJ8110c.010512



1. CONCRETE FLOOR OR WALL ASSEMBLY (3-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MINIMUM 4-1/2" THICK).
 - B. ANY UL/cUL CLASSIFIED SOLID OR FILLED CONCRETE BLOCK WALL.
2. MAXIMUM 24" x 4" ALUMINUM OR STEEL OPEN LADDER CABLE TRAY (MAXIMUM QUANTITY = 2).
3. ANY COMBINATION OF THE FOLLOWING CABLES MAY BE USED WITHIN THE CABLE TRAYS.
 - A. MAXIMUM 300 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
 - B. MAXIMUM 750 KCMIL SINGLE CONDUCTOR POWER CABLE WITH PVC JACKET.
 - C. MAXIMUM 1/2" DIAMETER FIBER-OPTIC CABLE (24 FIBER) WITH PVC JACKET.
 - D. MAXIMUM 3/C NO. 12 AWG METAL-CLAD CABLE.



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UL/cUL SYSTEM NO. C-AJ-8110

MULTIPLE PENETRATING ITEMS THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL ASSEMBLY

F-RATING = 3-HR.

T-RATING = 0-HR.

CAJ8110c.010512

4. MAX. 2" NOM. DIA. OPTICAL FIBER RACEWAY (MAX. QTY. = 2) INSTALLED WITHIN CABLE TRAY.
5. PENETRATING ITEM TO BE ANY OF THE FOLLOWING :
 - A. MAXIMUM 8" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 40 OR HEAVIER).
 - B. MAXIMUM 8" NOMINAL DIAMETER CAST IRON PIPE.
 - C. MAXIMUM 4" NOMINAL DIAMETER COPPER PIPE.
 - D. MAXIMUM 6" NOMINAL DIAMETER STEEL CONDUIT.
 - E. MAXIMUM 4" NOMINAL DIAMETER EMT.
6. MAXIMUM 2" NOMINAL DIAMETER EMT OR STEEL CONDUIT.
7. MAXIMUM 1800 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
8. HILTI CFS-BL FIRESTOP BLOCK OR HILTI FS 657 FIRE BLOCK (2" THICK x 8" WIDE x 5" DEEP, REFERENCE : TOP VIEW) FIRMLY PACKED AND FLUSH WITH TOP SURFACE OF FLOOR, OR CENTERED WITHIN WALL. EITHER ONE OR A COMBINATION OF THE BLOCK TYPES MAY BE USED.

ANNULAR SPACE	MINIMUM	MAXIMUM
BETWEEN CABLE TRAYS AND PERIPHERY OF OPENING	0"	3"
BETWEEN CABLE TRAYS	-	5"
BETWEEN METAL PIPE (ITEM 5) AND PERIPHERY OF OPENING	0"	-
BETWEEN METAL PIPE (ITEM 5) AND ADJACENT PENETRANTS	2"	-
BETWEEN EMT (ITEM 6) OR MAXIMUM 1800 PAIR TELEPHONE CABLE (ITEM 7) AND PERIPHERY OF OPENING	4"	-
BETWEEN EMT (ITEM 6) OR MAXIMUM 1800 PAIR TELEPHONE CABLE (ITEM 7) AND ADJACENT PENETRANTS	1-1/2"	-
BETWEEN EMT'S (MAXIMUM QUANTITY = 2)	0"	-

NOTES : 1. MAXIMUM SIZE OF OPENING = 30" x 24".

2. APPLY HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT, CP 618 FIRESTOP PUTTY STICK, OR CP 620 FIRE FOAM, IN ANY VOID THAT MAY EXIST (AROUND PENETRANTS, INTO INTERSTICES OF CABLES, BETWEEN CABLES AND CABLE TRAY, OR BETWEEN FIRESTOP BLOCKS/FIRE BLOCKS), TO MAXIMUM EXTENT POSSIBLE.

3. WHEN ANNULAR SPACE EXCEEDS 4", A NOM. 2" x 2" STEEL WIRE MESH (16 GA.) SHALL BE ATTACHED TO THE TOP SURFACE OF FLOOR OR BOTH SURFACES OF WALL WITH 1/4" DIA. x 1" LONG STEEL CONCRETE ANCHORS AND 1-1/2" DIAMETER FENDER WASHERS SPACED MAXIMUM 8" C/C. STEEL WIRE MESH SHALL BEGIN MAXIMUM 2-1/2" FROM THE PENETRANT AND OVERLAP MINIMUM 3" BEYOND THE PERIPHERY OF THE OPENING.

4. MAXIMUM AREA OF CABLES SHALL BE 45% OF CROSS-SECTIONAL AREA OF ONE CABLE TRAY AND 30% OF SECOND CABLE TRAY.



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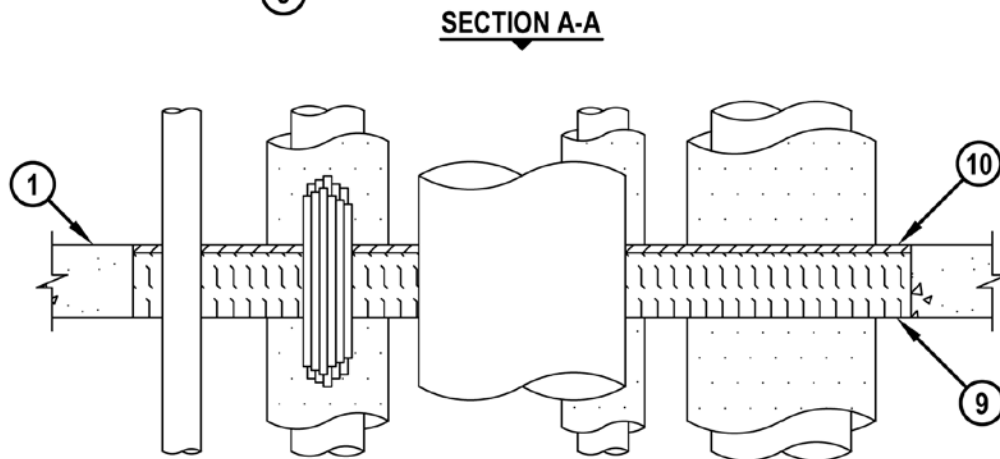
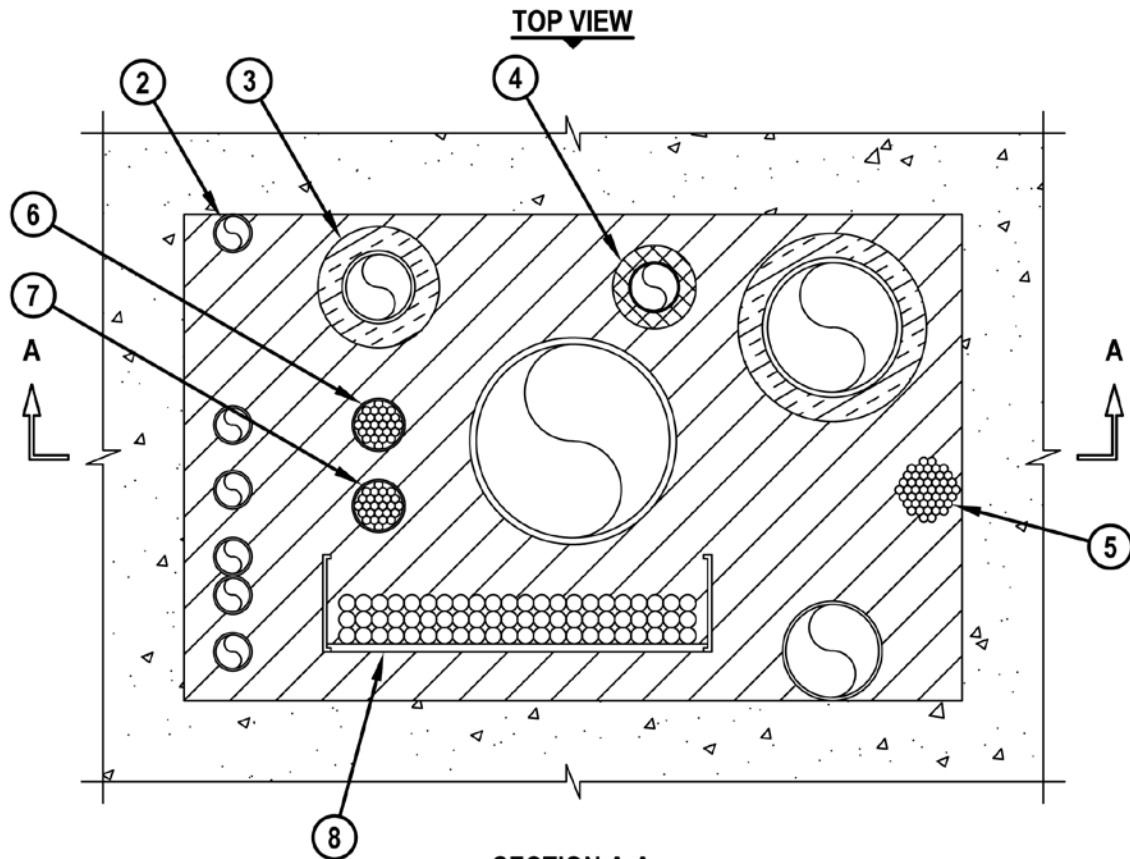
UL/cUL SYSTEM NO. C-AJ-8143

MULTIPLE PENETRATIONS THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL

F-RATING = 2-HR.

T-RATING = 0-HR.

CAJ8143b.082511



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UL/cUL SYSTEM NO. C-AJ-8143

MULTIPLE PENETRATIONS THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL

F-RATING = 2-HR.

T-RATING = 0-HR.

CAJ8143b.082511

1. CONCRETE FLOOR OR WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 4-1/2" THICK).
 - B. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 5" THICK).
 - C. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. ONE OR MORE OF THE FOLLOWING PENETRATING ITEMS (ITEMS 2-7) AND IN ANY COMBINATION MAY BE INSTALLED WITHIN THE OPENING :
 - A. MAXIMUM 24" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 40 OR HEAVIER).
 - B. MAXIMUM 24" NOMINAL DIAMETER CAST OR DUCTILE IRON PIPE.
 - C. MAXIMUM 6" NOMINAL DIAMETER COPPER PIPE.
 - D. MAXIMUM 6" NOMINAL DIAMETER STEEL CONDUIT.
 - E. MAXIMUM 4" NOMINAL DIAMETER EMT.
3. [OPTIONAL] ANY OR ALL PIPES (8" OR SMALLER) MAY BE INSULATED WITH MAXIMUM 1-1/2" THICK GLASS-FIBER PIPE INSULATION.
4. [OPTIONAL] ANY OR ALL PIPES (2" OR SMALLER) MAY BE INSULATED WITH MAXIMUM 2" THICK GLASS-FIBER PIPE INSULATION OR MAXIMUM 1" THICK AB/PVC PIPE INSULATION.
5. MAXIMUM 4" NOMINAL DIAMETER CABLE BUNDLE OR INDIVIDUAL CABLE TO CONSIST OF ANY OF THE FOLLOWING :
 - A. MAXIMUM 500 KCMIL SINGLE COPPER OR ALUMINUM CONDUCTOR POWER CABLE WITH PVC JACKET.
 - B. MAXIMUM 300 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
 - C. MAXIMUM 7/C NO. 12 AWG POWER CABLE WITH PVC JACKET.
 - D. MAXIMUM 1/2" DIAMETER FIBER OPTIC CABLE WITH PVC JACKET.
 - E. MAXIMUM 3/C NO. 12 AWG STEEL CLAD CABLE.
6. MAXIMUM 3/C NO. 2/0 AWG COPPER CONDUCTOR PVC JACKETED ALUMINUM OR STEEL CLAD, TECK 90 CABLE.
7. MAXIMUM 4/C NO. 750 KCMIL ALUMINUM OR COPPER CONDUCTOR WITH ALUMINUM OR STEEL CLAD, WITH OR WITHOUT PVC JACKET.
8. MAXIMUM 24" x 6" ALUMINUM OR STEEL OPEN LADDER CABLE TRAY (MAX. QTY. = 1). ANY COMBINATION OF THE TYPES AND SIZE OF CABLES DESCRIBED IN ITEM NO. 5 ABOVE MAY BE USED. CABLES TO FILL MAXIMUM 40% CROSS-SECTIONAL AREA OF TRAY AND HAVE A MAXIMUM 3" CABLE LOADING DEPTH.
9. MINIMUM 4" THICKNESS MINERAL WOOL (MINIMUM 4 PCF DENSITY) TIGHTLY PACKED.
10. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.



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UL/cUL SYSTEM NO. C-AJ-8143

MULTIPLE PENETRATIONS THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL

F-RATING = 2-HR.

T-RATING = 0-HR.

CAJ8143b.082511

ANNULAR SPACE	MINIMUM	MAXIMUM
BETWEEN INDIVIDUAL CABLES AND CABLE BUNDLES	1/2"	12"
BETWEEN INDIVIDUAL/BUNDLES CABLES AND OTHER PENETRANTS	1/2"	12"
-EXCEPTION : BETWEEN INDIVIDUAL/BUNDLED CABLES AND COPPER PIPES GREATER THAN 3", STEEL PIPE, IRON PIPE, AND CONDUITS GREATER THAN 4"	2"	12"
BETWEEN INSULATED PIPES	2"	12"
BETWEEN METALLIC PIPES	2"	12"
- EXCEPTION 1) BETWEEN 3" AND SMALLER COPPER PIPES	1/2"	12"
-EXCEPTION 2) BETWEEN 2" AND SMALLER STEEL PIPES AND CONDUITS	0"	12"
-EXCEPTION 3) BETWEEN 4" AND SMALLER STEEL PIPES AND CONDUITS	1/2"	12"
BETWEEN INSULATED PIPES OR CABLE TRAY AND PERIPHERY OF OPENING	1/2"	12"
BETWEEN ALL OTHER PENETRANTS AND PERIPHERY OF OPENING	0"	12"
BETWEEN CABLE TRAY AND ALL OTHER PENETRANTS	3"	12"

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 48" x 30".
 2. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT IS REQUIRED ON BOTH SIDES OF A WALL ASSEMBLY.



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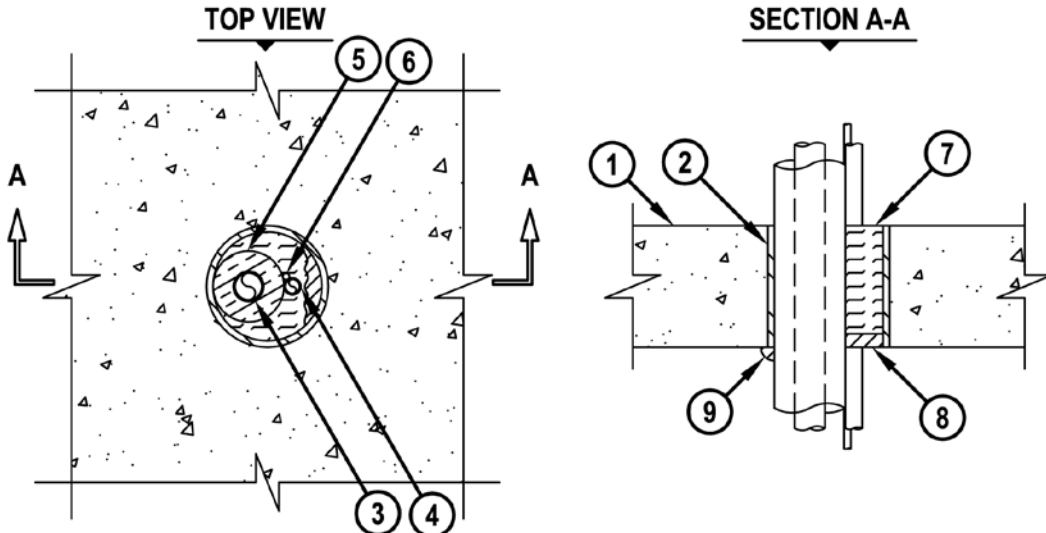
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UL/cUL SYSTEM NO. C-AJ-8166

HVAC LINE SET THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL

F-RATING = 3-HR.

T-RATING = 0-HR.



1. CONCRETE FLOOR OR WALL ASSEMBLY (3-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 4-1/2" THICK).
 - B. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 5" THICK).
 - C. PRECAST (HOLLOW-CORE) CONCRETE FLOOR (MINIMUM 6" THICK).
 - D. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. [OPTIONAL] MAXIMUM 4" NOMINAL DIAMETER STEEL PIPE SLEEVE (SCHEDULE 10 OR HEAVIER).
3. MAXIMUM 2" NOMINAL DIAMETER COPPER PIPE.
4. MAXIMUM 1/2" NOMINAL DIAMETER COPPER PIPE.
5. NOMINAL 1/2" TO 3/4" THICK AB/PVC PIPE INSULATION INSTALLED ON ONE COPPER PIPE.
6. MAXIMUM 4-PAIR NO. 18 AWG THERMOSTAT CABLE WITH PVC JACKET.
7. MINIMUM 4" THICKNESS MINERAL WOOL (MINIMUM 4 PCF DENSITY) TIGHTLY PACKED AND RECESSED TO ACCOMMODATE FIRESTOP SEALANT.
8. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
9. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT AT POINT OF CONTACT.

ANNULAR SPACE	MINIMUM	MAXIMUM
BETWEEN PIPES AND PERIPHERY OF OPENING	0"	1"
BETWEEN PENETRANTS	0"	1-1/2"
BETWEEN INSULATED PIPE AND PERIPHERY OF OPENING	0"	1"
BETWEEN CABLE AND PERIPHERY OF OPENING	1/2"	1"

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 4".
 2. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT IS REQUIRED ON EACH SIDE OF A WALL ASSEMBLY.

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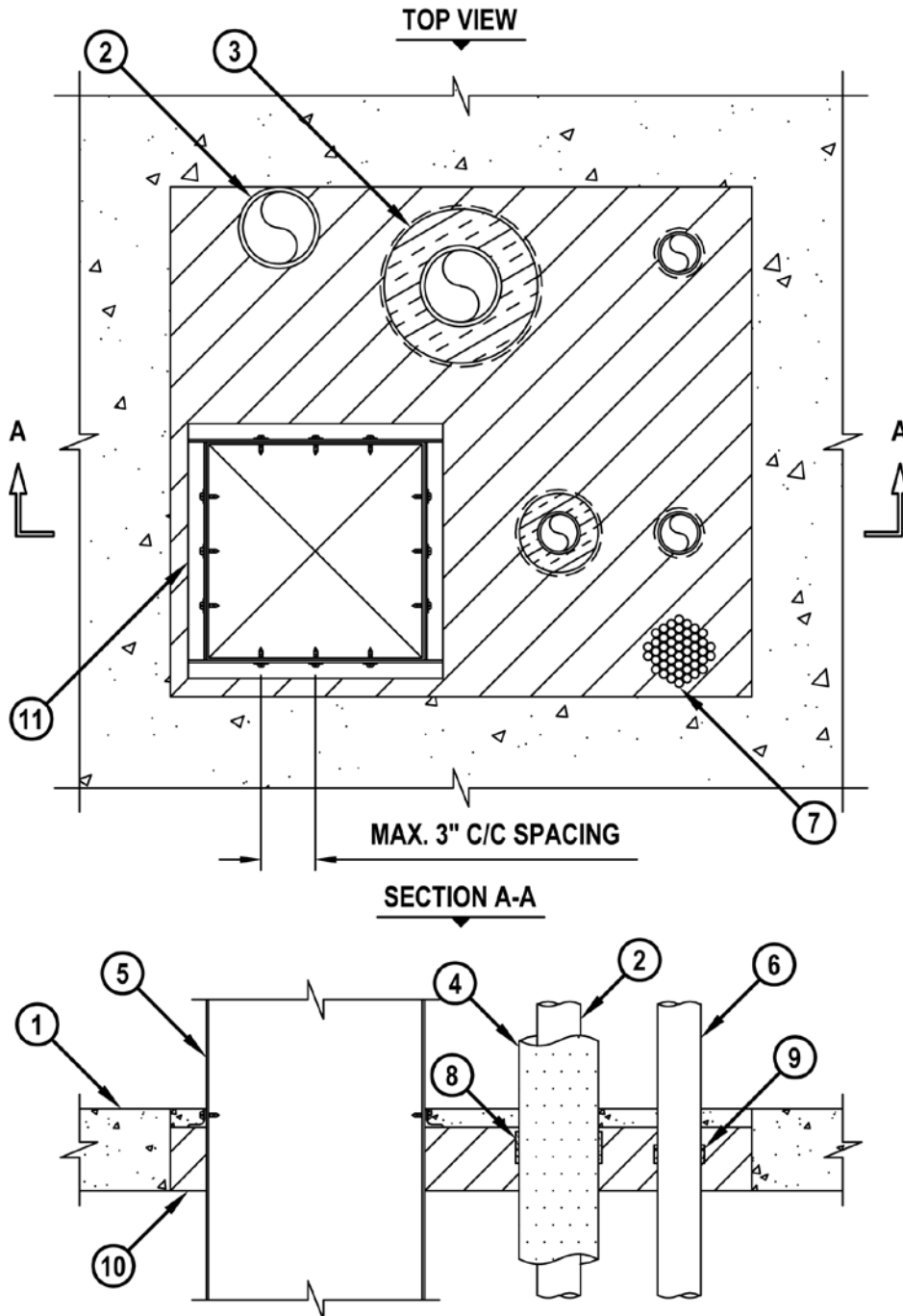
UL/cUL SYSTEM NO. C-AJ-8177

MULTIPLE PENETRANTS THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL

F-RATING = 2-HR.

T-RATING = 0-HR., 1/4-HR., 1-1/2-HR. OR 2-HR.

CAJ8177a.111005



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UL/cUL SYSTEM NO. C-AJ-8177

MULTIPLE PENETRANTS THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL

F-RATING = 2-HR.

T-RATING = 0-HR., 1/4-HR., 1-1/2-HR. OR 2-HR.

CAJ8177a.111005

1. CONCRETE FLOOR OR WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MINIMUM 4-1/2" THICK).
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. ONE OR MORE OF THE FOLLOWING METALLIC PIPES MAY BE USED :
 - A. MAXIMUM 8" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 8" NOMINAL DIAMETER CAST OR DUCTILE IRON PIPE.
 - C. MAXIMUM 4" NOMINAL DIAMETER COPPER PIPE OR TUBING.
 - D. MAXIMUM 4" NOMINAL DIAMETER STEEL CONDUIT OR EMT.
3. [OPTIONAL] ANY OR ALL PIPES (2A, 2B OR 2C) MAY BE INSULATED WITH NOMINAL 2" THICK GLASS-FIBER PIPE INSULATION.
4. [OPTIONAL] ANY OR ALL PIPES (2" OR SMALLER) (2A, 2B OR 2C) MAY BE INSULATED WITH NOMINAL 1" THICK AB/PVC PIPE INSULATION.
5. MAXIMUM 12" x 12" RECTANGULAR SHEET METAL DUCT (MIN. 26 GA.).
6. ONE OR MORE OF THE FOLLOWING NON-METALLIC PIPES MAY BE USED :
 - A. NOMINAL 1-1/2" AND 2" DIAMETER PVC PLASTIC PIPE (CELLULAR OR SOLID CORE).
 - B. NOMINAL 1-1/2" AND 2" DIAMETER CPVC PLASTIC PIPE (CLOSED PIPING SYSTEM ONLY).
 - C. NOMINAL 1-1/2" AND 2" DIAMETER PVC PLASTIC CONDUIT (RNC).
7. MAXIMUM 4" DIAMETER CABLE BUNDLE TO CONSIST OF ANY OF THE FOLLOWING :
 - A. MAXIMUM 300 PAIR NO. 24 AWG COPPER CONDUCTOR TELEPHONE CABLE WITH PVC JACKET.
 - B. MAXIMUM 500 KCMIL COPPER CONDUCTOR POWER CABLE WITH PVC JACKET.
 - C. MAXIMUM 3/C NO. 12 AWG STEEL CLAD CABLE WITH PVC JACKET.
 - D. MAXIMUM 3/C NO. 2/0 AWG ALUMINUM CONDUCTOR SER CABLE WITH PVC JACKET.
 - E. MAXIMUM RG/U COAXIAL CABLE WITH FLUORINATED ETHYLENE JACKET.
8. HILTI CP 648E WRAP STRIP (NOMINAL 3/16" THICK x 1-3/4" WIDE) CONTINUOUSLY WRAPPED ONE TIME AROUND EACH INSULATED PIPE WITH ENDS BUTTED AND HELD IN PLACE WITH TAPE. WRAP STRIP TO BE RECESSED 1-1/2" FROM BOTTOM SURFACE OF FLOOR OR BOTH SURFACES OF A WALL.
9. HILTI CP 648S WRAP STRIP (SIZE OF WRAP TO MATCH SIZE OF PIPE) CONTINUOUSLY WRAPPED AROUND THE OUTER CIRCUMFERENCE OF EACH NON-METALLIC PIPE AND HELD IN PLACE WITH INTEGRATED TAPE. WRAP STRIP TO BE RECESSED 1-1/2" FROM BOTTOM SURFACE OF FLOOR OR BOTH SIDES OF A WALL.
10. MINIMUM 3-1/2" DEPTH HILTI CP 637 FIRESTOP MORTAR, FLUSH WITH BOTTOM SURFACE OF FLOOR OR BOTH SIDES OF A WALL.
11. NOMINAL 1" x 1" (MIN. 18 GA.) STEEL ANGLES ATTACHED TO ALL FOUR SIDES OF DUCT, FLUSH WITH FIRESTOP MORTAR. FASTEN ANGLES TO DUCT WITH NO. 8 (OR LARGER) STEEL SHEET METAL SCREWS, SPACED MAXIMUM 2" FROM EACH END AND MAXIMUM 3" C/C.



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UL/cUL SYSTEM NO. C-AJ-8177

MULTIPLE PENETRANTS THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL

F-RATING = 2-HR.

T-RATING = 0-HR., 1/4-HR., 1-1/2-HR. OR 2-HR.

CAJ8177a.111005

ANNULAR SPACE	MINIMUM
BETWEEN METALLIC PIPES AND PERIPHERY OF OPENING	0"
BETWEEN METALLIC PIPES	0"
BETWEEN INSULATED METALLIC PIPES	4"
BETWEEN INSULATED METALLIC PIPES AND PERIPHERY OF OPENING	1/2"
BETWEEN DUCT AND METALLIC PIPES (INSULATED OR NON-INSULATED)	4-1/2"
BETWEEN DUCT AND NON-METALLIC PIPES AND CABLE BUNDLE	10"
BETWEEN DUCT AND PERIPHERY OF OPENING	2"
BETWEEN NON-METALLIC PIPES AND PERIPHERY OF OPENING	1"
BETWEEN NON-METALLIC PIPES AND METALLIC PIPES	8"
BETWEEN CABLE BUNDLE AND PERIPHERY OF OPENING	1/2"
BETWEEN CABLE BUNDLE AND METALLIC PIPES	8"
BETWEEN CABLE BUNDLE AND INSULATED PIPES AND NON-METALLIC PIPES	4"

NOTES : 1. MAXIMUM SIZE OF OPENING = 32" x 28".**2. [FORMING NOT SHOWN] USE A RIGID BOARD MATERIAL TO SUPPORT HILTI CP 637 FIRESTOP MORTAR DURING ITS INITIAL CURE (MINIMUM 24 HOURS.).****3. CLOSED OR VENTED PIPING SYSTEM (PVC, RNC = SCHEDULE 40; CPVC = SDR 13.5).**

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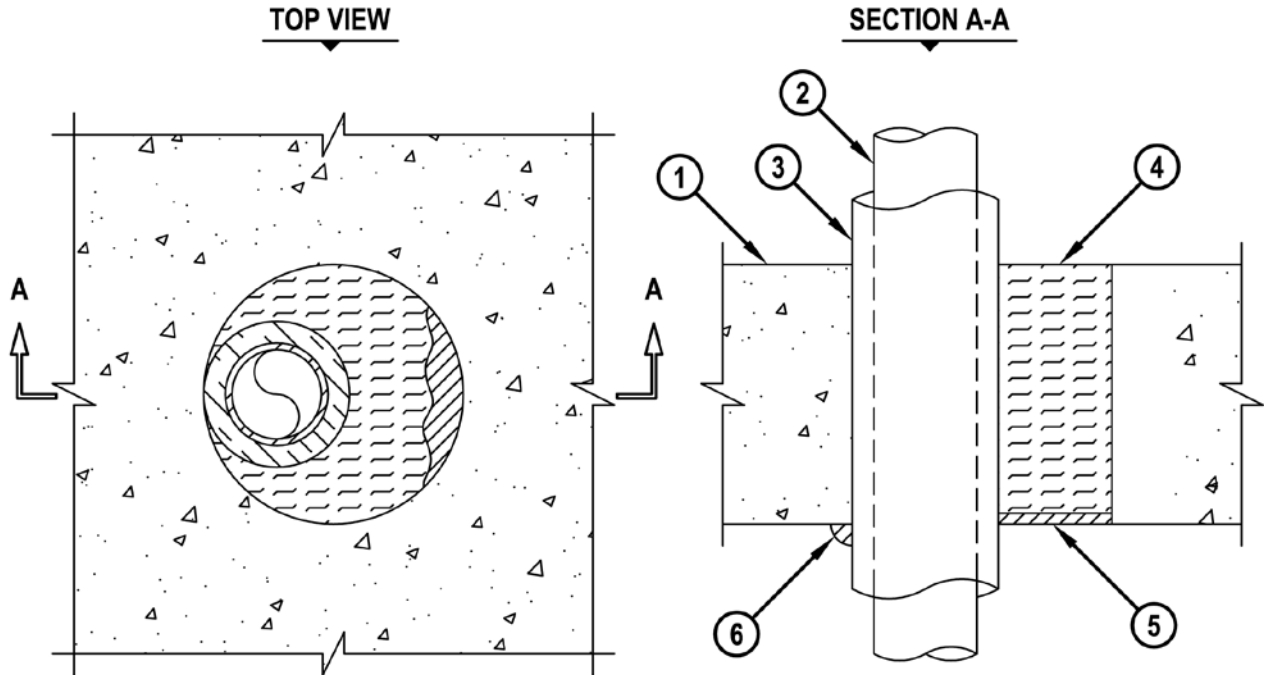
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UL/cUL SYSTEM NO. C-BJ-5015

INSULATED METAL PIPE THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL

F-RATING = 2-HR.
T-RATING = 1-1/2-HR.

CBJ5015a.111804



1. CONCRETE FLOOR OR WALL ASSEMBLY (2-HR. FIRE-RATING):
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MINIMUM 6" THICK).
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING:
 - A. MAXIMUM 2" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 40 OR HEAVIER).
 - B. MAXIMUM 2" NOMINAL DIAMETER CAST OR DUCTILE IRON PIPE.
 - C. MAXIMUM 2" NOMINAL DIAMETER COPPER PIPE OR TUBING.
3. NOMINAL 1" THICK GLASS-FIBER PIPE INSULATION.
4. MINIMUM 5-3/4" THICKNESS MINERAL WOOL (MINIMUM 4 PCF DENSITY) TIGHTLY PACKED AND RECESSED TO ACCOMMODATE FIRESTOP SEALANT.
5. MINIMUM 1/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT FLUSH WITH BOTTOM SURFACE OF FLOOR.
6. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT APPLIED AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 6".
2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1-7/8".
3. MINIMUM 1/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT MAY BE INSTALLED ON ONE OR BOTH SIDES OF A WALL.

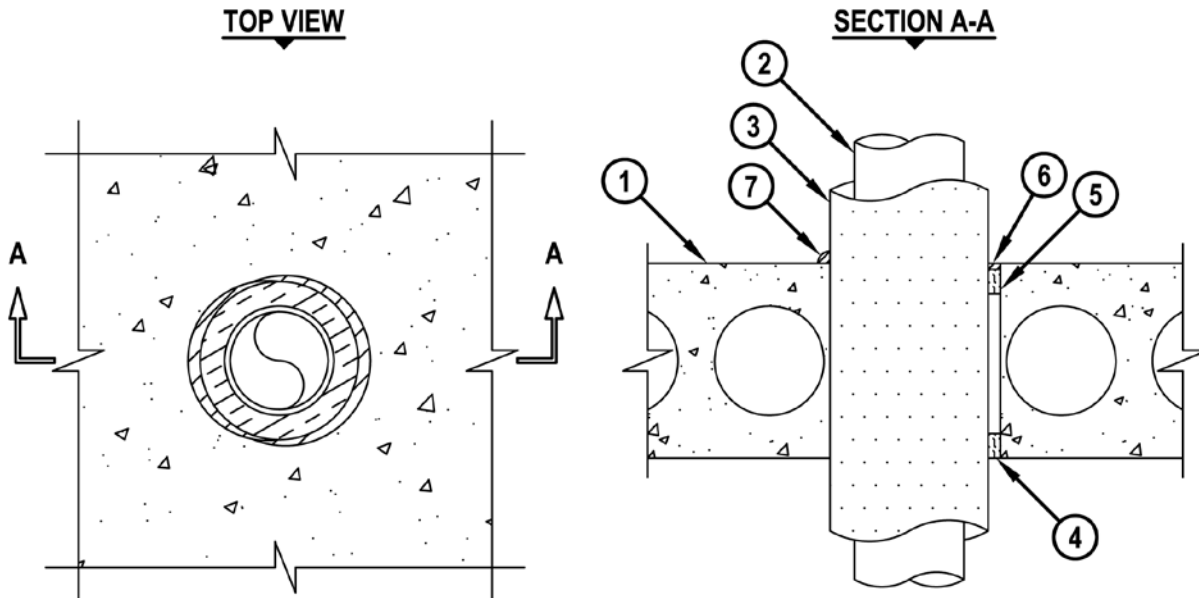


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UL/cUL SYSTEM NO. C-BJ-5018

INSULATED METAL PIPE THROUGH HOLLOW-CORE CONCRETE FLOOR ASSEMBLYF-RATING = 3-HR.
T-RATING = 1/2-HR.

CBU5018a.021507



1. ANY UL CLASSIFIED PRE-CAST HOLLOW-CORE CONCRETE FLOOR ASSEMBLY (MINIMUM 8" THICK) (3-HR. FIRE-RATING).
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 4" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 4" NOMINAL DIAMETER COPPER PIPE OR TUBING.
3. NOMINAL DIAMETER 1" THICK AB/PVC PIPE INSULATION.
4. MINIMUM 1" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED AND INSTALLED FLUSH WITH BOTTOM SURFACE OF FLOOR.
5. MINIMUM 1" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED AND RECESSED FROM THE TOP SURFACE OF THE ASSEMBLY TO ACCOMMODATE FIRESTOP SEALANT.
6. MINIMUM 1/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
7. MINIMUM 1/4" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT APPLIED AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 7".
2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 7/8".



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cUL SYSTEM NO. F-A-0001

BLANK OPENING THROUGH 2-HR. CONCRETE FLOOR ASSEMBLY

F-RATING = 2-HR.

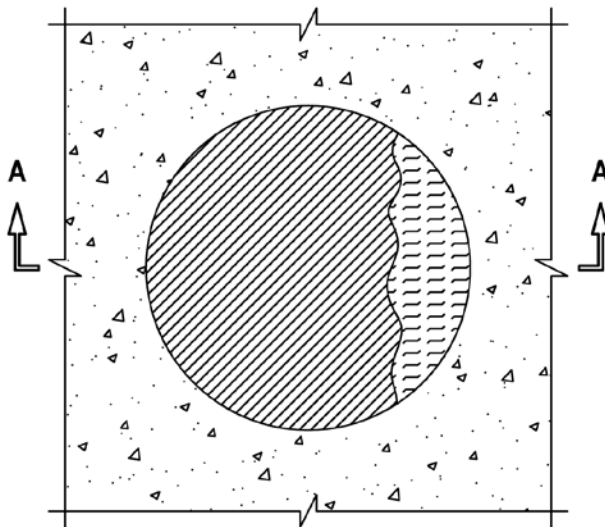
FT-RATING = 1-HR.

FH AND FTH-RATING = 0-HR.

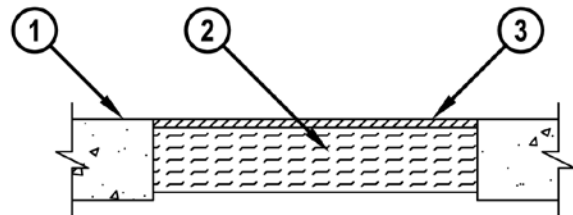


cUL FA0001a.092704

TOP VIEW



SECTION A-A



1. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR ASSEMBLY (MINIMUM 2-1/2" THICK) (2-HR. FIRE-RATING).
2. MINIMUM 2" THICKNESS MINERAL WOOL (MINIMUM 4 PCF DENSITY) TIGHTLY PACKED AND RECESSED TO ACCOMMODATE FIRESTOP SEALANT.
3. MINIMUM 1/4" DEPTH HILTI CP 604 SELF-LEVELING FIRESTOP SEALANT FLUSH WITH TOP SURFACE OF CONCRETE FLOOR ASSEMBLY.

NOTE : MAXIMUM DIAMETER OF OPENING = 10".



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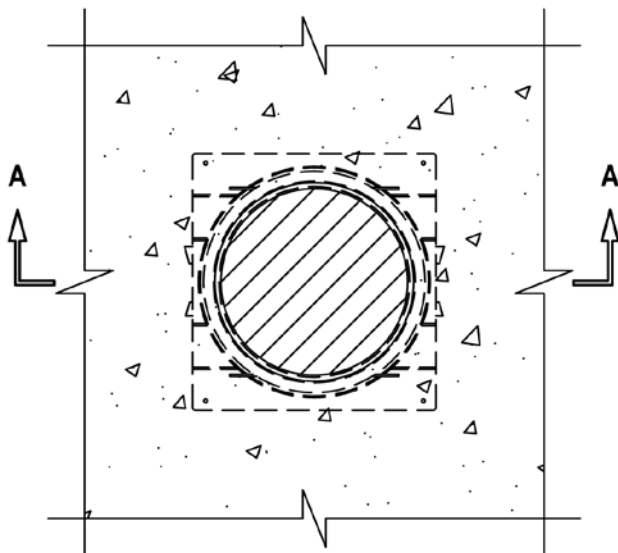
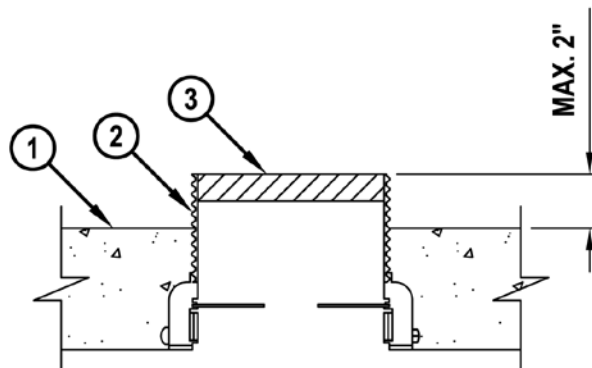
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UL/cUL SYSTEM NO. F-A-0006

BLANK OPENING THROUGH CONCRETE FLOOR OR CONCRETE FLOOR OVER METAL DECKING

F-RATING = 3-HR.
T-RATING = 0, 2-1/2 OR 3-HR.

FA0006e.120506

TOP VIEW**SECTION A-A**

1. CONCRETE FLOOR ASSEMBLY (3-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 4-1/2" THICK).
 - B. STEEL FLOOR UNIT/FLOOR ASSEMBLY - LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 4-1/2" THICK) OVER METAL DECKING.
2. HILTI CP 680-P [2", 3", 4" OR 6"] CAST-IN FIRESTOP DEVICE, CAST OR GROUTED INTO CONCRETE FLOOR.
3. MINIMUM 1" DEPTH HILTI CP 618 FIRESTOP PUTTY STICK (SEE NOTE NO. 1 BELOW).
4. [OPTIONAL - NOT SHOWN] HILTI FIRESTOP DEVICE CAP MAY BE THREADED ONTO TOP OF FIRESTOP DEVICE.

NOTES : 1. AS AN ALTERNATE TO HILTI CP 618 FIRESTOP PUTTY STICK, MINIMUM 4" THICKNESS MINERAL WOOL (MINIMUM 4 PCF DENSITY) MAY BE TIGHTLY PACKED INTO CP 680-P FLUSH WITH TOP SURFACE OF FIRESTOP DEVICE.

2. FOR CONCRETE FLOOR OVER METAL DECKING APPLICATIONS, A METAL DECK ADAPTER KIT IS REQUIRED.



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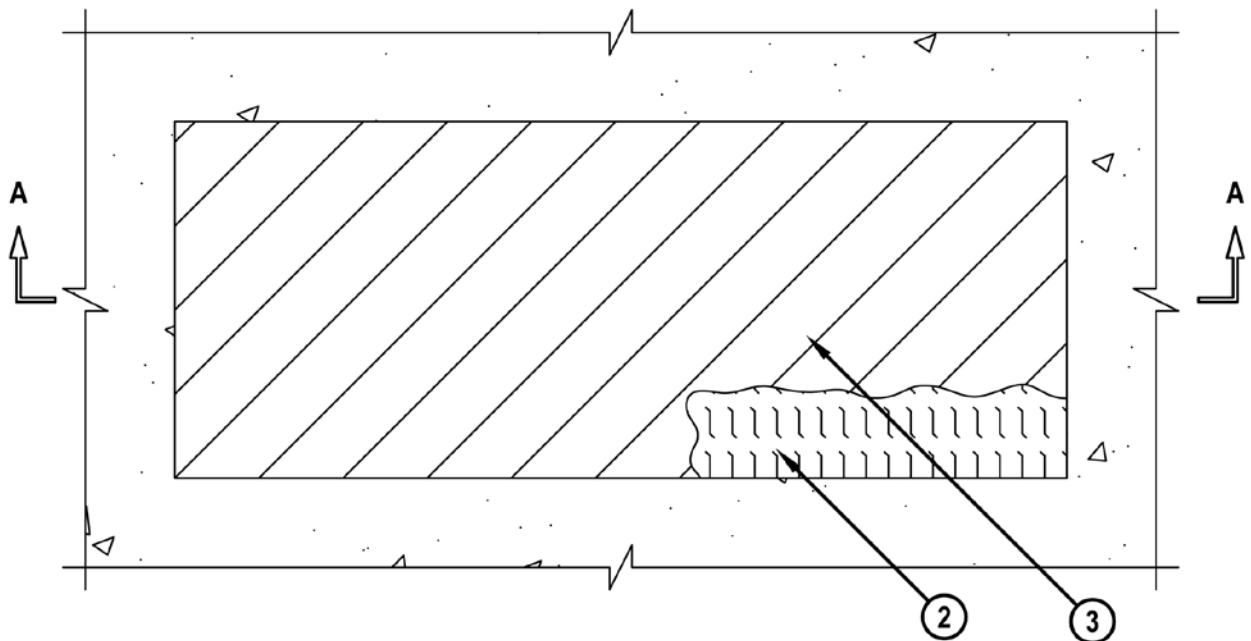
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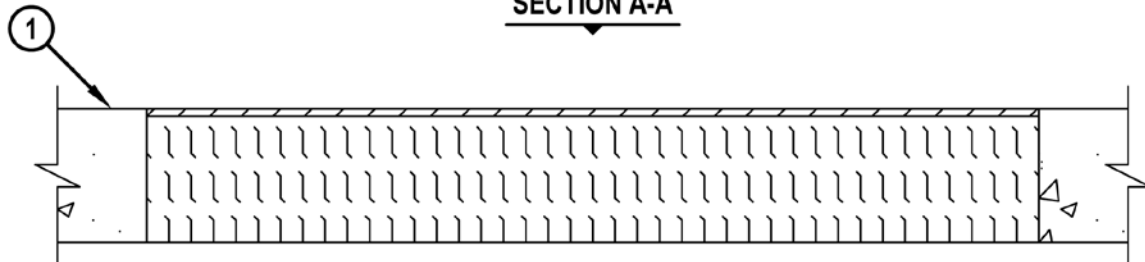
UL/cUL SYSTEM NO. F-A-0012
BLANK OPENING IN CONCRETE FLOOR ASSEMBLY

F-RATING = 3-HR.
 T-RATING = 2-HR.

TOP VIEW



SECTION A-A



1. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 4-1/2" THICK) (3-HR. FIRE-RATING).
2. MINIMUM 4-1/4" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED.
3. MINIMUM 1/4" DEPTH HILTI CP 604 SELF-LEVELING FIRESTOP SEALANT.

**NOTE : MAXIMUM SIZE OF OPENING = 30" x 12", OR
 MAXIMUM DIAMETER OF OPENING = 12".**



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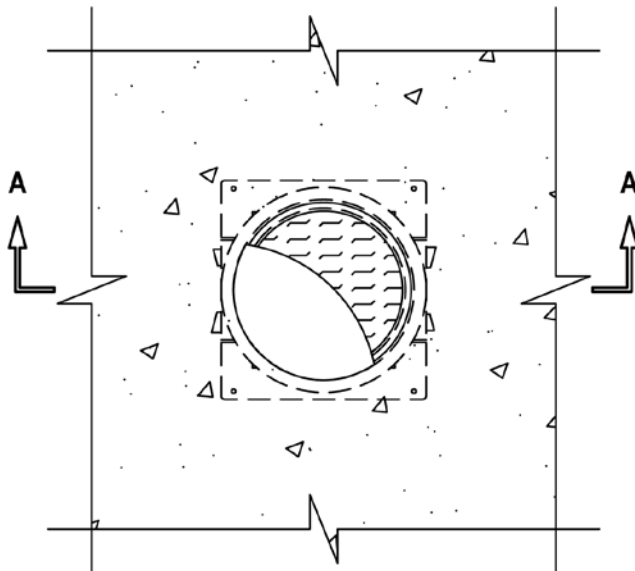
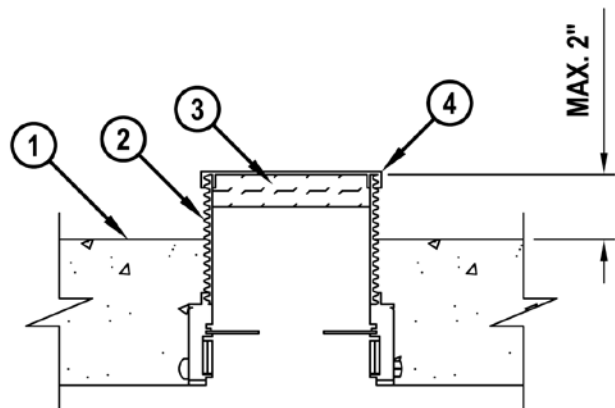
Hilti. Outperform. Outlast.

UL/cUL SYSTEM NO. F-A-0014

BLANK OPENING THROUGH CONCRETE FLOOR OR CONCRETE FLOOR OVER METAL DECKING

F-RATING = 3-HR.
T-RATING = 3-HR.

FA0014b.120706

TOP VIEW**SECTION A-A**

1. CONCRETE FLOOR ASSEMBLY (3-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 4-1/2" THICK).
 - B. STEEL FLOOR UNIT/FLOOR ASSEMBLY - LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 4-1/2" THICK) OVER METAL DECKING.
2. HILTI CP 680-M OR CP 680-P [2", 3" OR 4"] CAST-IN FIRESTOP DEVICE, CAST OR GROUTED INTO CONCRETE FLOOR.
3. MINIMUM 1" THICKNESS MINERAL WOOL (MINIMUM 4 PCF DENSITY) TIGHTLY PACKED AND FLUSH WITH TOP OF FIRESTOP DEVICE.
4. HILTI FIRESTOP DEVICE CAP THREADED ONTO TOP OF FIRESTOP DEVICE.

**NOTE : FOR CONCRETE FLOOR OVER METAL DECKING APPLICATIONS,
A METAL DECK ADAPTER KIT IS REQUIRED.**



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cUL SYSTEM NO. F-A-1004

METAL PIPE THROUGH 2-HR. CONCRETE FLOOR ASSEMBLY

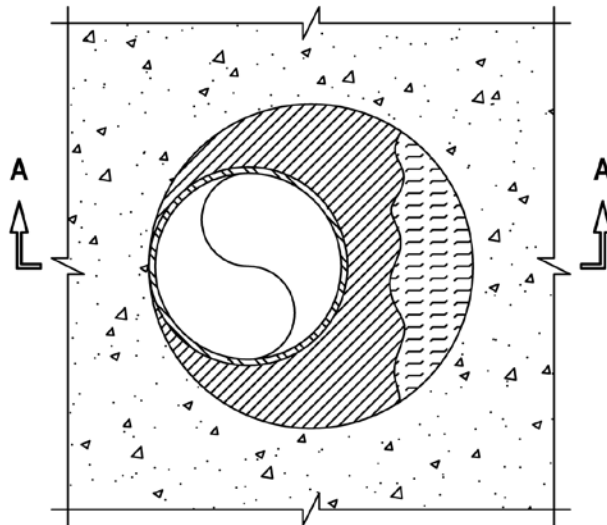
F-RATING = 2-HR.

FT, FH, AND FTH-RATING = 0-HR.

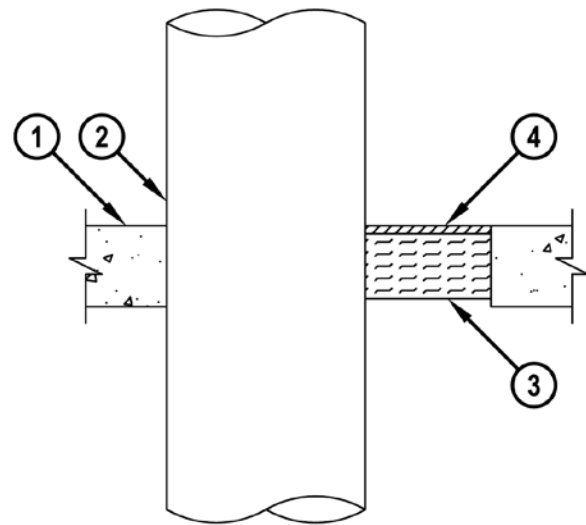


cUL FA1004a.092704

TOP VIEW



SECTION A-A



1. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR ASSEMBLY (MINIMUM 2-1/2" THICK) (2-HR. FIRE-RATING).
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING:
 - A. MAXIMUM 6" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 6" NOMINAL DIAMETER CAST IRON OR DUCTILE IRON PIPE.
 - C. MAXIMUM 6" NOMINAL DIAMETER COPPER PIPE OR TUBING.
 - D. MAXIMUM 6" NOMINAL DIAMETER STEEL CONDUIT.
 - E. MAXIMUM 4" NOMINAL DIAMETER EMT.
3. MINIMUM 2" THICKNESS MINERAL WOOL (MINIMUM 4 PCF DENSITY) TIGHTLY PACKED AND RECESSED TO ACCOMMODATE FIRESTOP SEALANT.
4. MINIMUM 1/4" DEPTH HILTI CP 604 SELF-LEVELING FIRESTOP SEALANT FLUSH WITH TOP SURFACE OF CONCRETE FLOOR ASSEMBLY.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 10".
2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 9-3/8".



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UL/cUL SYSTEM NO. F-A-1016

METAL PIPE THROUGH CONCRETE FLOOR OR CONCRETE OVER METAL DECKING

F-RATING = 2-HR.

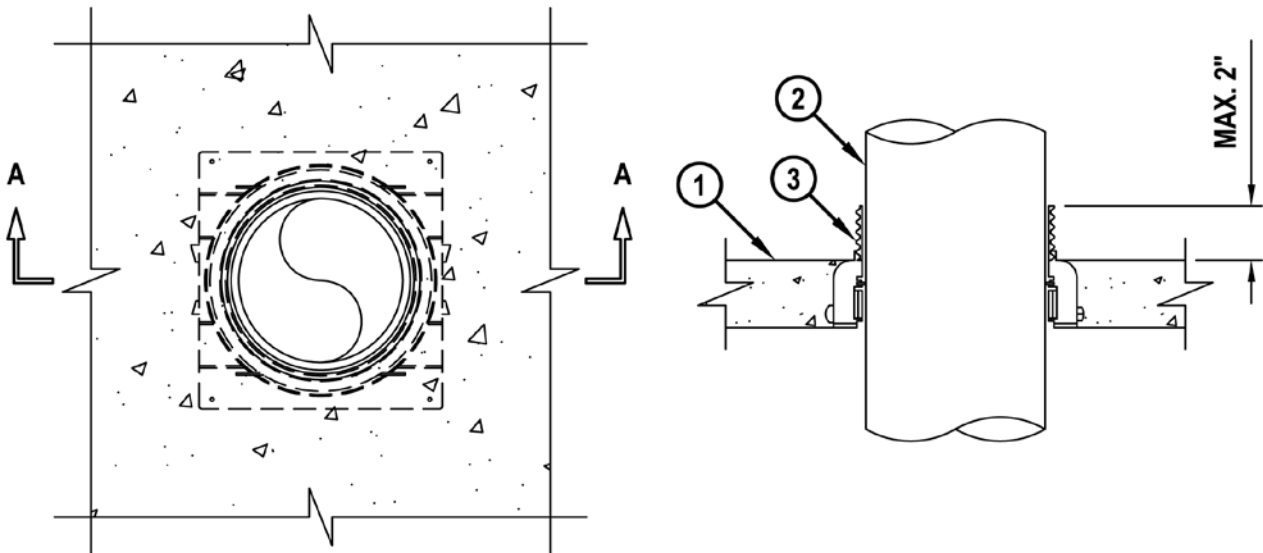
T-RATING = 0-HR.

L-RATING AT AMBIENT = 1 CFM/SQ. FT.

L-RATING AT 400°F = LESS THAN 1 CFM/SQ. FT.

W-RATING = CLASS I (SEE NOTES NO. 3 AND 4 BELOW)

FA1016n.122707

TOP VIEW**SECTION A-A**

1. CONCRETE FLOOR ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 2-1/2" THICK).
 - B. STEEL FLOOR UNIT/FLOOR ASSEMBLY - LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 2-1/2" THICK) OVER METAL DECKING.



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UL/cUL SYSTEM NO. F-A-1016

METAL PIPE THROUGH CONCRETE FLOOR OR CONCRETE OVER METAL DECKING

F-RATING = 2-HR.

T-RATING = 0-HR.

L-RATING AT AMBIENT = 1 CFM/SQ. FT.

L-RATING AT 400°F = LESS THAN 1 CFM/SQ. FT.

W-RATING = CLASS I (SEE NOTES NO. 3 AND 4 BELOW)

FA1016n.122707

2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
- A. MAXIMUM 6" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 6" NOMINAL DIAMETER CAST OR DUCTILE IRON PIPE.
 - C. MAXIMUM 6" NOMINAL DIAMETER COPPER PIPE OR TUBING.
 - D. MAXIMUM 6" NOMINAL DIAMETER STEEL CONDUIT.
 - E. MAXIMUM 4" NOMINAL DIAMETER EMT.
3. HILTI CP 680-M OR CP 680-P CAST-IN FIRESTOP DEVICE CAST OR GROUTED INTO CONCRETE FLOOR (SEE TABLE BELOW).

NOMINAL PIPE DIAMETER	PENETRANT TYPE	PRODUCT DESCRIPTION
1-1/2" TO 2"	STEEL, CAST IRON, CONDUIT, EMT	CP 680-M 2" OR CP 680-P 2"
2" TO 2-1/2"	COPPER	CP 680-M 2" OR CP 680-P 2"
2-1/2" TO 3"	ALL	CP 680-M 3" OR CP 680-P 3"
4"	ALL	CP 680-M 4" OR CP 680-P 4"
6"	ALL	CP 680-M 6" OR CP 680-P 6"

- NOTES :** 1. FOR CONCRETE FLOOR OVER METAL DECKING APPLICATIONS, A METAL DECK ADAPTER KIT IS REQUIRED.
2. WHEN PIPE DIAMETER IS SMALLER THAN INDICATED ABOVE, A MINIMUM 1" THICKNESS HILTI CP 618 FIRESTOP PUTTY STICK OR MINIMUM 4" THICKNESS TIGHTLY PACKED MINERAL WOOL (MIN. 4 PCF DENSITY) SHALL BE APPLIED WITHIN THE ANNULUS BETWEEN THE PIPE AND PERIPHERY OF CAST-IN FIRESTOP DEVICE, FLUSH WITH TOP SURFACE OF DEVICE.
3. AS AN ALTERNATE TO ITEMS ABOVE (NOTE 2) HILTI IPS OR CPS TOP SEAL MAY BE USED ON 1/2" TO 2" NOMINAL DIAMETER PIPES IN CONJUNCTION WITH HILTI 2" CAST-IN FIRESTOP DEVICES. W-RATING APPLIES ONLY TO 1", 1-1/4", 1-1/2", AND 2" COPPER PIPE/TUBES IN CONJUNCTION WITH CORRESPONDING CPS TOP SEAL PLUG.
4. WATER BARRIER MODULES MAY BE THREADED ON TOP OF CP 680-M OR CP 680-P DEVICES FOR NOMINAL 2", 3", 4", AND 6" METAL PIPES (LISTED ABOVE). IN ADDITION, A 3" WATER BARRIER MODULE MAY BE USED ON A NOMINAL 2-1/2" STEEL, CAST IRON, STEEL CONDUIT, OR EMT IN CONJUNCTION WITH A CP 680-M 3" OR CP 680-P 3". W-RATING WITH WATER BARRIER MODULE ONLY APPLIES WHEN DIAMETER OF PIPE EQUALS SIZE OF MODULE AND WHEN PIPE IS INSTALLED FROM BOTTOM OF DEVICE.
5. L-RATING APPLIES ONLY WHEN NOMINAL DIAMETER OF PIPE EQUALS SIZE OF DEVICE (2" PIPE IN 2" DEVICE, ETC.).

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UL/cUL SYSTEM NO. F-A-1018

FLEXIBLE STEEL CONDUIT THROUGH CONCRETE FLOOR OVER METAL DECK

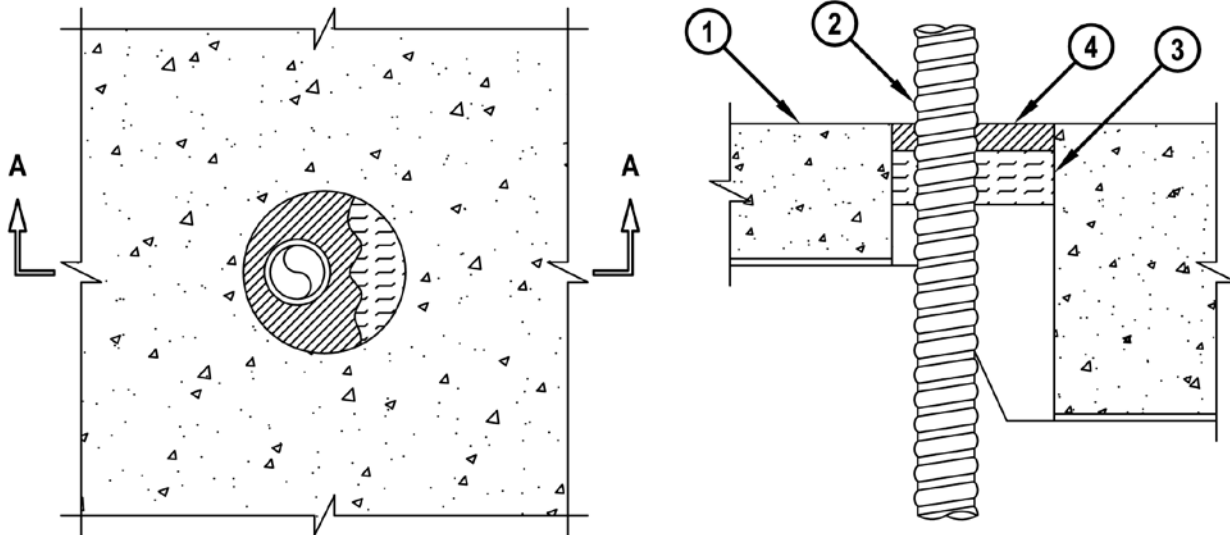
F-RATING = 2-HR.

T-RATING = 0-HR.

FA1018c.102704

TOP VIEW

SECTION A-A



1. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 2-1/2" THICK) OVER METAL DECK ASSEMBLY (2-HR. FIRE-RATING).
2. MAXIMUM 1" NOMINAL DIAMETER FLEXIBLE STEEL CONDUIT.
3. MINIMUM 1" THICKNESS MINERAL WOOL (MINIMUM 4 PCF DENSITY) TIGHTLY PACKED AND RECESSED TO ACCOMMODATE FIRESTOP SEALANT.
4. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 3".
 2. ANNULAR SPACE = MINIMUM 1/2", MAXIMUM 1-1/4".



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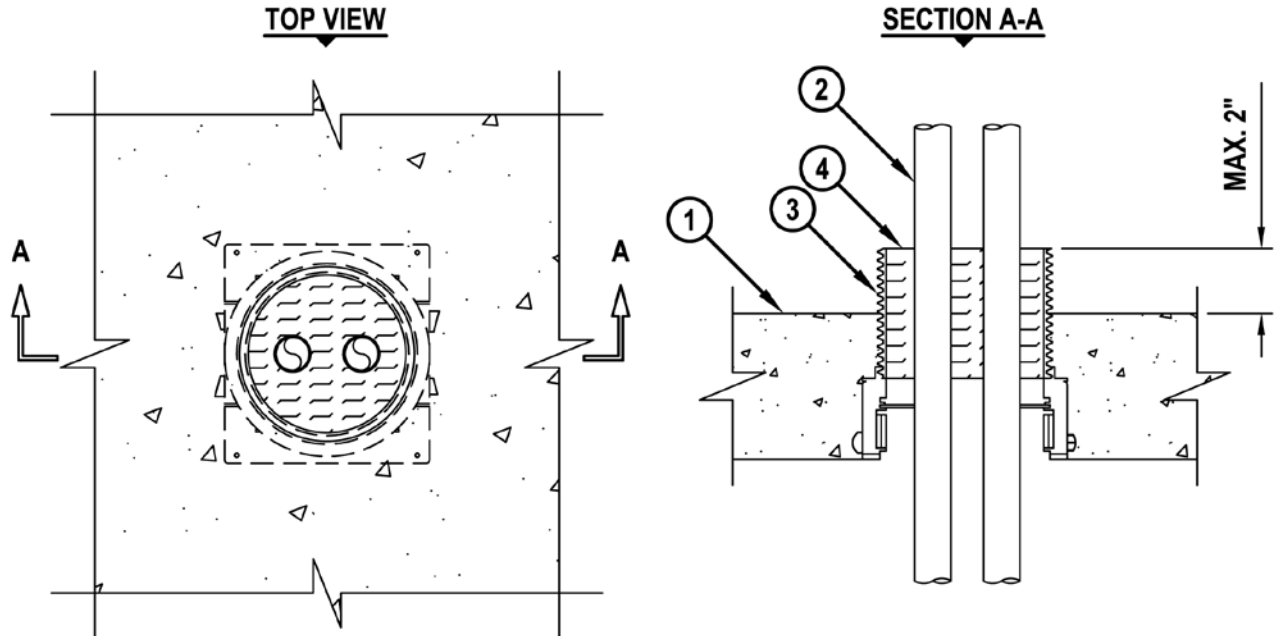
UL/cUL SYSTEM NO. F-A-1022

MULTIPLE METAL PENETRANTS THROUGH CONCRETE FLOOR OR CONCRETE OVER METAL DECKING

F-RATING = 3-HR.

T-RATING = 2-HR.

FA1022f.120606



1. CONCRETE FLOOR ASSEMBLY (3-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 4-1/2" THICK).
 - B. STEEL FLOOR UNIT/FLOOR ASSEMBLY - LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 4-1/2" THICK) OVER METAL DECKING.
2. PENETRATING ITEMS TO BE ANY COMBINATION OF THE FOLLOWING (MAX. QTY. = 5) :
 - A. MAXIMUM 1" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 5 OR HEAVIER).
 - B. MAXIMUM 1" NOMINAL DIAMETER CAST OR DUCTILE IRON PIPE.
 - C. MAXIMUM 1" NOMINAL DIAMETER COPPER PIPE OR TUBING.
 - D. MAXIMUM 1" NOMINAL DIAMETER STEEL CONDUIT.
 - E. MAXIMUM 1" NOMINAL DIAMETER EMT.
3. HILTI CP 680-M OR CP 680-P [2", 3", 4" OR 6"] CAST-IN FIRESTOP DEVICE, CAST OR GROUTED INTO CONCRETE FLOOR.
4. MINIMUM 4" THICKNESS MINERAL WOOL (MINIMUM 4 PCF DENSITY) TIGHTLY PACKED INTO DEVICE, COMPLETELY FILLING ANNULAR SPACE AROUND METAL PENETRANTS.

NOTES : 1. ANNULAR SPACE BETWEEN PENETRANTS = MINIMUM 1", MAXIMUM 2".
 2. ANNULAR SPACE BETWEEN PENETRANTS AND FIRESTOP DEVICE = MINIMUM 3/4", MAXIMUM 2".
 3. FOR CONCRETE FLOOR OVER METAL DECKING APPLICATIONS, A METAL DECK ADAPTER KIT IS REQUIRED.

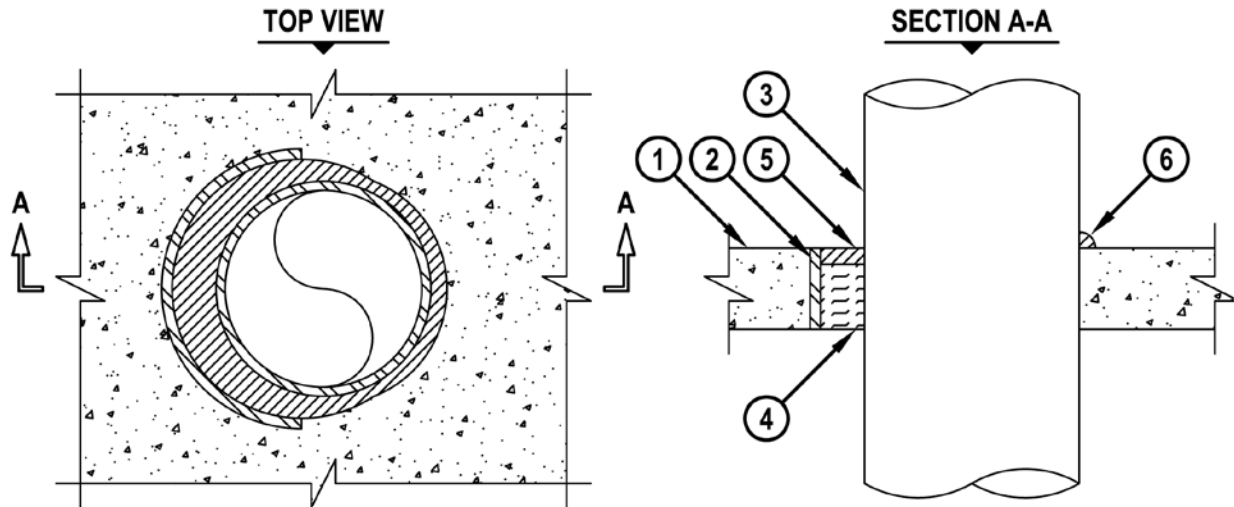
UL/cUL SYSTEM NO. F-A-1028

METAL PIPE THROUGH CONCRETE FLOOR OR CONCRETE FLOOR OVER METAL DECKING

F-RATING = 2-HR.

T-RATING = 0-HR.

FA1028c.091205



1. CONCRETE FLOOR ASSEMBLY (2-HR. FIRE-RATING):
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 2-1/2" THICK).
 - B. STEEL FLOOR UNIT/FLOOR ASSEMBLY - NORMAL WEIGHT CONCRETE FLOOR (MIN. 2-1/2" THICK) OVER METAL DECKING.
2. [OPTIONAL] ANY OF THE FOLLOWING STEEL SLEEVES MAY BE USED :
 - A. MAXIMUM 32" NOMINAL DIAMETER STEEL PIPE SLEEVE (SCHEDULE 40 OR HEAVIER).
 - B. MAXIMUM 6" (MIN. 26 GA.) OR 12" (MIN. 24 GA.) DIAMETER GALVANIZED STEEL SLEEVE WITH SQUARE FLANGE SPOT WELDED TO BOTTOM OF SLEEVE AND SIZED MINIMUM 2" LARGER THAN SLEEVE DIAMETER. SLEEVE MAY EXTEND MAXIMUM 1" ABOVE TOP SURFACE OF FLOOR. WHEN USED ON METAL DECKS, STEEL FLANGE SPOT WELDED TO THE SLEEVE AT APPROXIMATE MID-HEIGHT AND MAY EXTEND A MAXIMUM OF 4" BELOW THE BOTTOM OF THE DECK.
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING:
 - A. MAXIMUM 30" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 30" NOMINAL DIAMETER CAST IRON PIPE.
 - C. MAXIMUM 6" NOMINAL DIAMETER COPPER PIPE.
 - D. MAXIMUM 6" NOMINAL DIAMETER STEEL CONDUIT.
 - E. MAXIMUM 4" NOMINAL DIAMETER EMT.
4. MINIMUM 2" THICKNESS MINERAL WOOL (MINIMUM 4 PCF DENSITY) TIGHTLY PACKED.
5. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
6. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 31-7/8".
 2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1-7/8".



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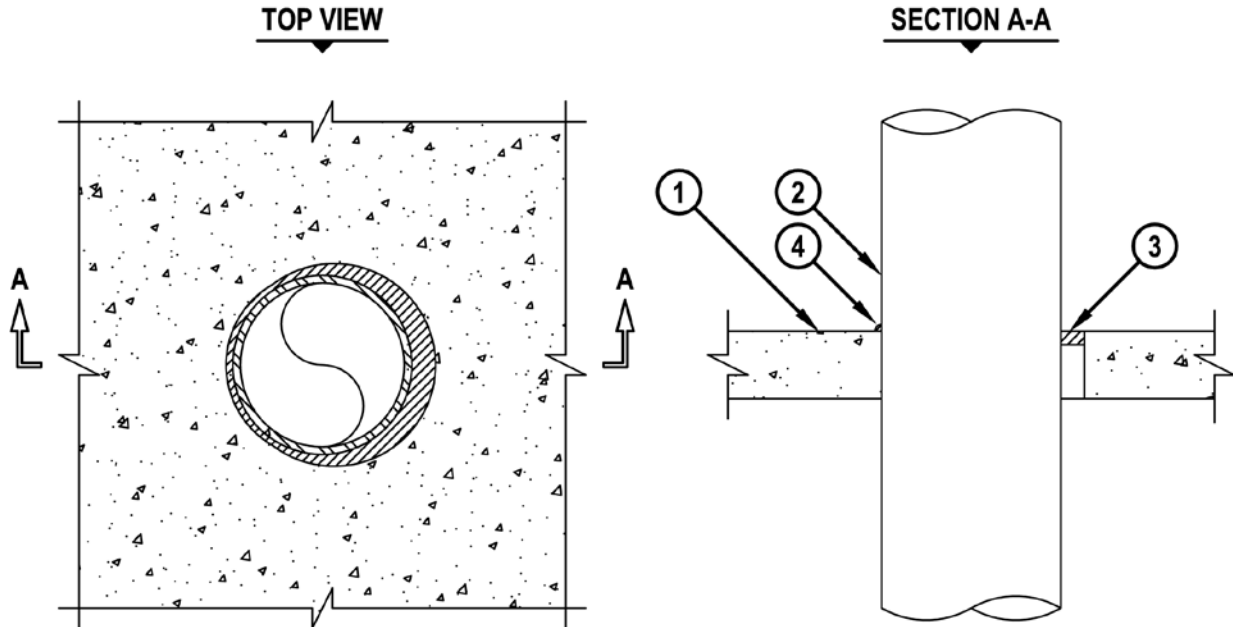
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UL/cUL SYSTEM NO. F-A-1029
**METAL PIPE THROUGH CONCRETE FLOOR OR CONCRETE
FLOOR OVER METAL DECKING**

F-RATING = 2-HR.
T-RATING = 0-HR.

FA1029b.012102



1. CONCRETE FLOOR ASSEMBLY (2-HR. FIRE-RATING):
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 2-1/2" THICK).
 - B. STEEL FLOOR UNIT/FLOOR ASSEMBLY - NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 2-1/2" THICK) OVER METAL DECKING.
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING:
 - A. MAXIMUM 30" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 30" NOMINAL DIAMETER CAST IRON PIPE.
 - C. MAXIMUM 6" NOMINAL DIAMETER COPPER PIPE.
 - D. MAXIMUM 6" NOMINAL DIAMETER STEEL CONDUIT.
 - E. MAXIMUM 4" NOMINAL DIAMETER EMT.
3. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
4. MINIMUM 1/4" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT AT POINT ON CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 30-7/8".
2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 7/8".



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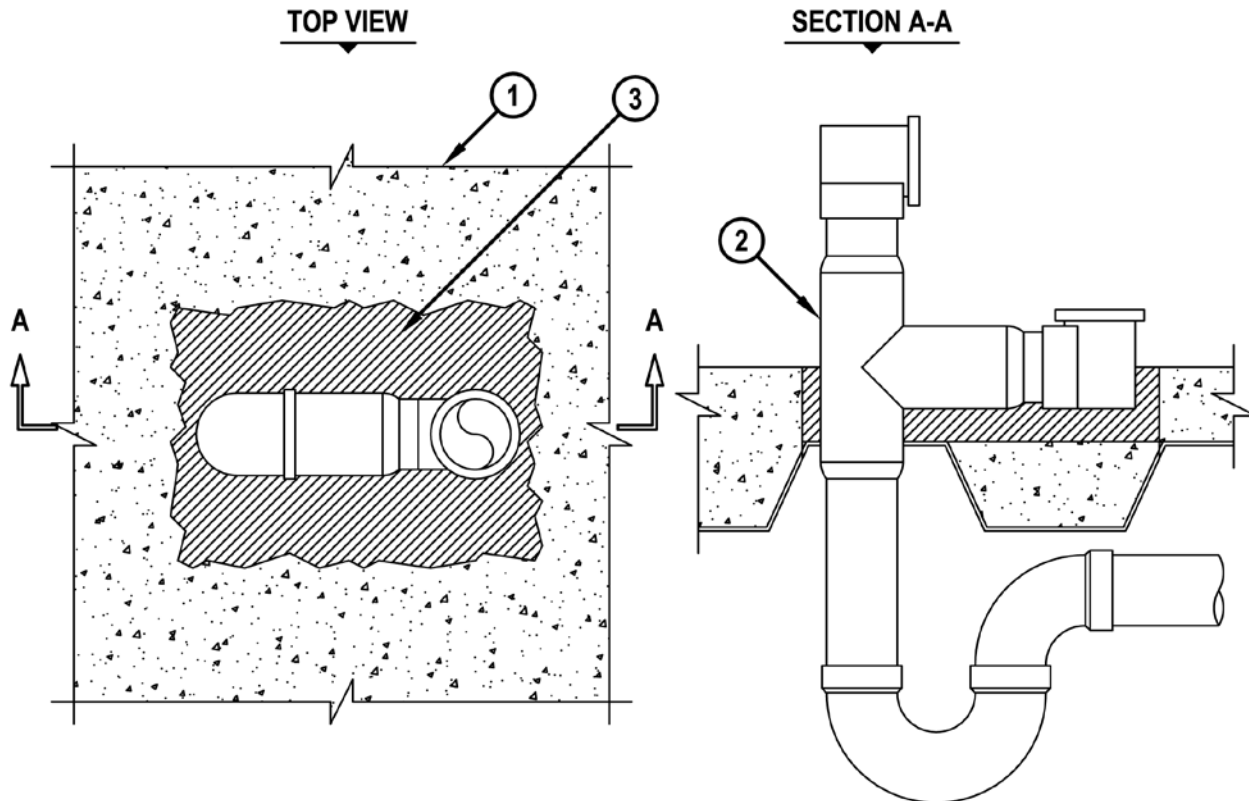
UL/cUL SYSTEM NO. F-A-1051

METAL PIPE AND TUB FITTINGS THROUGH CONCRETE FLOOR ASSEMBLY

F-RATING = 2-HR.

T-RATING = 0-HR.

FA1051b.040203



1. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE (MIN. 2-1/2" THICK) OVER METAL DECK ASSEMBLY (2-HR. FIRE-RATING).
2. MAXIMUM 2" NOMINAL DIAMETER COPPER, BRASS, OR CAST IRON PIPE WASTE/OVERFLOW FITTINGS.
3. MINIMUM 2-1/2" DEPTH HILTI CP 637 FIRESTOP MORTAR.

NOTES : 1. MAXIMUM SIZE OF RECESSED OPENING = 12" x 8-1/2".
 2. MAXIMUM DIAMETER OF CORED OPENING FOR DRAIN PIPE = 4".
 3. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1-7/8".



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UL/cUL SYSTEM NO. F-A-1105
METAL PIPE THROUGH CONCRETE FLOOR ASSEMBLY

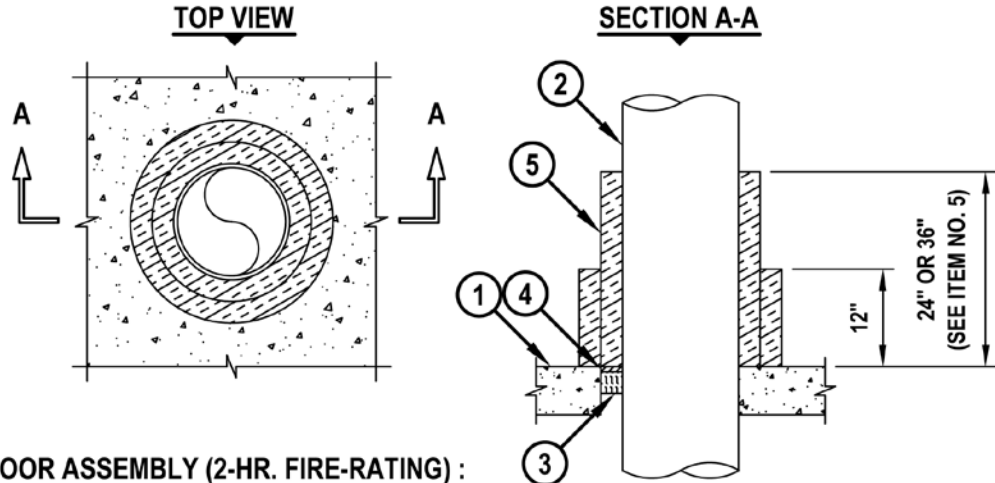
F-RATING = 2-HR.

T-RATING = 2-HR.

L-RATING AT AMBIENT = LESS THAN 1 CFM/SQ. FT.

L-RATING AT 400°F = 4 CFM/SQ. FT.

W-RATING = CLASS I (SEE NOTE NO. 4 BELOW)



1. CONCRETE FLOOR ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 4-1/2" THICK).
 - B. STEEL FLOOR UNIT/FLOOR ASSEMBLY (UL/cUL D700, D800, OR D900 SERIES) - LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 2-1/2" THICK) OVER METAL DECKING.
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 10" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 40 OR HEAVIER).
 - B. MAXIMUM 10" NOMINAL DIAMETER CAST OR DUCTILE IRON PIPE.
 - C. MAXIMUM 6" NOMINAL DIAMETER STEEL CONDUIT.
 - D. MAXIMUM 4" NOMINAL DIAMETER EMT.
3. MINIMUM 2" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED.
4. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT OR HILTI CP 604 SELF LEVELING FIRESTOP SEALANT (SEE NOTE NO. 3 BELOW).
5. DUCT WRAP (NOMINAL 1-1/2" OR 2" THICK FYREWRAPE DUCT INSULATION OR FIREWRAP DUCT 1.5 INSULATION [MANUFACTURED BY UNIFRAX] OR NOMINAL 1-1/2" THICK FIREMASTER FASTWRAP XL DUCT INSULATION [MANUFACTURED BY THERMAL CERAMICS]) WRAPPED AROUND PENETRANT, EXTENDING 24" ABOVE THE FLOOR (FOR PENETRANTS OF NOMINAL 4" DIAMETER OR SMALLER) OR 36" ABOVE THE FLOOR (FOR PENETRANTS GREATER THAN A NOMINAL 4" DIAMETER). AN ADDITIONAL LAYER OF DUCT WRAP TIGHTLY WRAPPED AROUND THE FIRST LAYER OF DUCT WRAP, EXTENDING 12" ABOVE FLOOR. SEAMS TO OVERLAP MINIMUM 1" AND SEALED WITH FOIL TAPE.

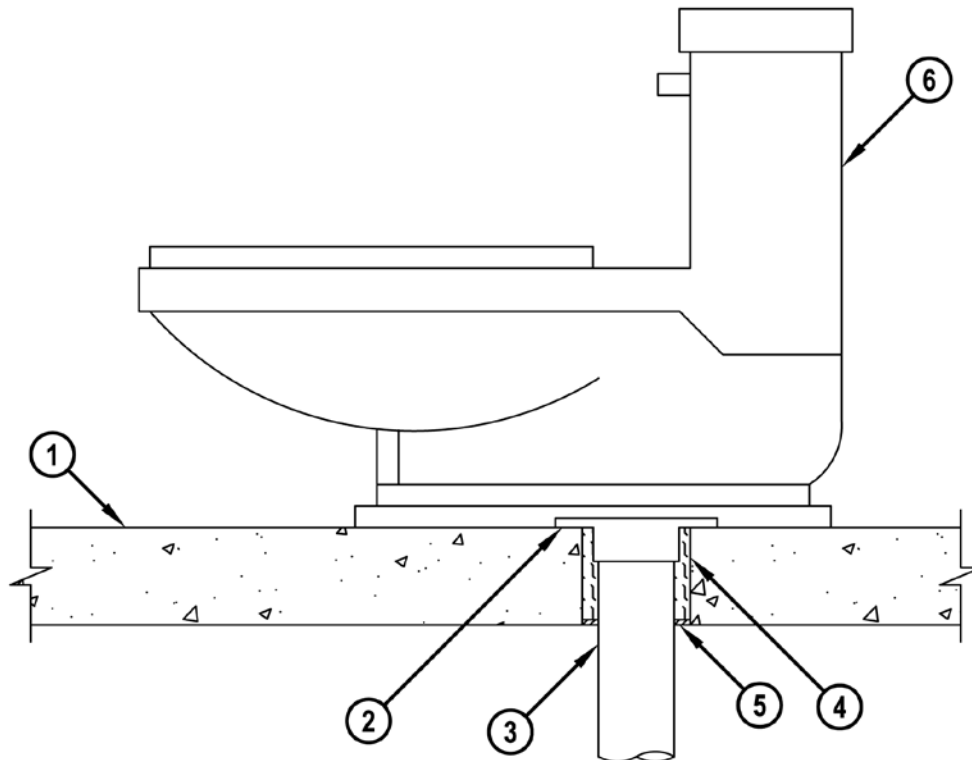
NOTES : 1. MAXIMUM DIAMETER OF OPENING = 12-3/4".
 2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 2".
 3. WHEN CP 604 IS USED, MINIMUM THICKNESS OF MINERAL WOOL IS 4" AND MINIMUM THICKNESS OF FLOOR IS 4-1/2".
 4. W-RATING ONLY APPLIES WHEN CP 604 IS USED.

UL/cUL SYSTEM NO. F-A-1108

CLOSET FLANGE AND DRAIN PIPING THROUGH CONCRETE FLOOR ASSEMBLY

F-RATING = 2-HR.

T-RATING = 2-HR.

CROSS-SECTIONAL VIEW

FA1108a.102008

1. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR ASSEMBLY (MINIMUM 4-1/2" THICK) (2-HR. FIRE-RATING).
2. CAST IRON CLOSET FLANGE SIZED TO ACCOMMODATE DRAIN PIPE AND SECURED TO CONCRETE FLOOR WITH CONCRETE ANCHORS.
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. NOMINAL 3" DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. NOMINAL 3" DIAMETER CAST OR DUCTILE IRON PIPE.
4. MINIMUM 4" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED AND RECESSED FROM BOTTOM OF CONCRETE FLOOR TO ACCOMMODATE SEALANT.
5. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
6. FLOOR MOUNTED VITREOUS CHINA WATER CLOSET.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 5".
 2. ANNULAR SPACE = MINIMUM 3/8".



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UL/cUL SYSTEM NO. F-A-1128

METAL PIPE THROUGH CONCRETE FLOOR ASSEMBLY

F-RATING = 2-HR. OR 3-HR.

T-RATING = 0-HR. OR 1/4-HR.

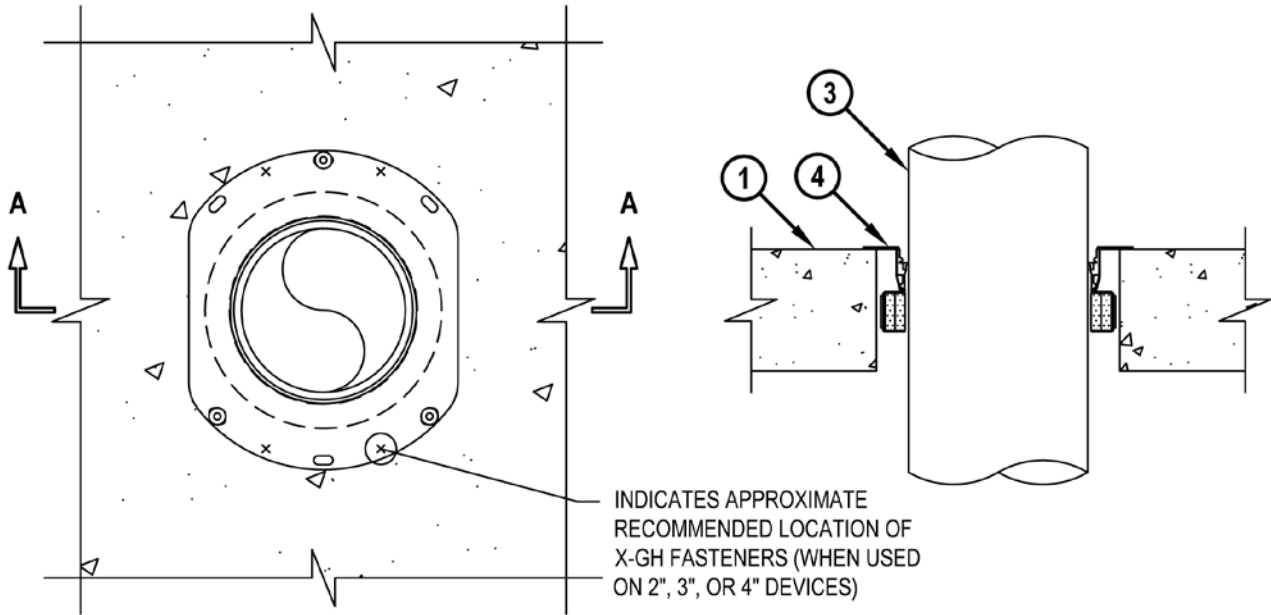
L-RATING AT AMBIENT = LESS THAN 1 CFM/SQ. FT. (SEE NOTE BELOW)

L-RATING AT 400°F = LESS THAN 1 CFM/SQ. FT. (SEE NOTE BELOW)

W-RATING = CLASS I (SEE NOTE BELOW)

TOP VIEW

SECTION A-A



1. CONCRETE FLOOR ASSEMBLY (2-HR. OR 3-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 2-1/2" TO 8" THICK).
 - B. STEEL FLOOR UNIT/FLOOR ASSEMBLY - LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 2-1/2" TO 8" THICK) OVER METAL DECKING (UL CLASSIFIED D700, D800, OR D900 SERIES).
2. [OPTIONAL - NOT SHOWN] ANY OF THE FOLLOWING SLEEVES MAY BE USED :
 - A. NOMINAL 4", 5", OR 6" DIAMETER STEEL PIPE SLEEVE (SCHEDULE 10 OR HEAVIER) CAST OR GROUTED INTO FLOOR ASSEMBLY, FLUSH WITH FLOOR SURFACES.
 - B. NOMINAL 4", 5", 6", OR 9" DIAMETER GALVANIZED STEEL SLEEVE (MIN. 26 GA.) WITH SQUARE FLANGE SPOT WELDED TO BOTTOM OR MID-HEIGHT OF SLEEVE AND SIZED MINIMUM 2" LARGER THAN SLEEVE DIAMETER. SLEEVE IS TO BE CAST IN PLACE, AND MAY EXTEND A MAXIMUM 4" BELOW BOTTOM SURFACE OF FLOOR AND SIT FLUSH WITH TOP SURFACE OF FLOOR.



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UL/cUL SYSTEM NO. F-A-1128

METAL PIPE THROUGH CONCRETE FLOOR ASSEMBLY

F-RATING = 2-HR. OR 3-HR.

T-RATING = 0-HR. OR 1/4-HR.

L-RATING AT AMBIENT = LESS THAN 1 CFM/SQ. FT. (SEE NOTE BELOW)

L-RATING AT 400°F = LESS THAN 1 CFM/SQ. FT. (SEE NOTE BELOW)

W-RATING = CLASS I (SEE NOTE BELOW)

FA1128b.051311

3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
- A. MAXIMUM 6" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 6" NOMINAL DIAMETER CAST OR DUCTILE IRON PIPE.
 - C. MAXIMUM 6" NOMINAL DIAMETER COPPER PIPE OR TUBING.
 - D. MAXIMUM 6" NOMINAL DIAMETER STEEL CONDUIT.
 - E. MAXIMUM 4" NOMINAL DIAMETER EMT.
4. HILTI CFS-DID FIRESTOP DROP-IN DEVICE INSERTED INTO OPENING (SEE TABLE BELOW) AND SECURED TO TOP OF FLOOR WITH THREE HILTI 1/4" (6mm) DIAMETER BY 1-1/4" (32mm) LONG KWIK-CON II+ CONCRETE SCREW ANCHORS, HILTI 1/4" (6mm) DIAMETER BY 1-3/4" (45mm) LONG KWIK BOLT 3 STEEL EXPANSION ANCHORS, OR HILTI 1/4" (6mm) BY 3/4" (19mm) LONG METAL HIT ANCHORS (INSTALLED IN A TRIANGULAR FASHION THROUGH HOLES PROVIDED). IN ADDITION, FOR NOMINAL 2", 3", AND 4" DEVICES, FOUR 11/16" (18mm) LONG HILTI X-GH P18 MX STEEL FASTENERS MAY BE INSTALLED THROUGH THE STEEL FLANGE, TWO ON EACH SIDE.

MINIMUM CONCRETE THICKNESS	CORE HOLE OR SLEEVE DIAMETER	PRODUCT DESCRIPTION	NOMINAL PIPE DIAMETER	F-RATING
2-1/2"	4"	CFS-DID 2" MD	2" (OR SMALLER)+	2-HR.
2-1/2"	5"	CFS-DID 3" MD	3"	2-HR.
2-1/2"	6"	CFS-DID 4" MD	4"	2-HR.
2-1/2"	9"	CFS-DID 6" MD	6"	2-HR.
4-1/2"	4"	CFS-DID 2" MD	2" (OR SMALLER)+	3-HR.
4-1/2"	5"	CFS-DID 3" MD	3"	3-HR.
4-1/2"	6"	CFS-DID 4" MD	4"	3-HR.
4-1/2"	9"	CFS-DID 6" MD	6"	3-HR.

+ FOR PIPE SMALLER THAN NOMINAL 2" DIAMETER, AN ADAPTER AND HILTI IPS OR CPS TOP SEAL PLUG MUST BE USED IN CONJUNCTION WITH THE CFS-DID 2" MD DEVICE.

NOTE : [OPTIONAL] TO ACHIEVE W-RATING AND/OR L-RATING, WATER BARRIER MODULES MAY BE THREADED ON TOP OF CFS-DID DEVICES FOR NOMINAL 2", 3", 4", AND 6" PIPES (LISTED ABOVE).



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cUL SYSTEM NO. F-A-2006

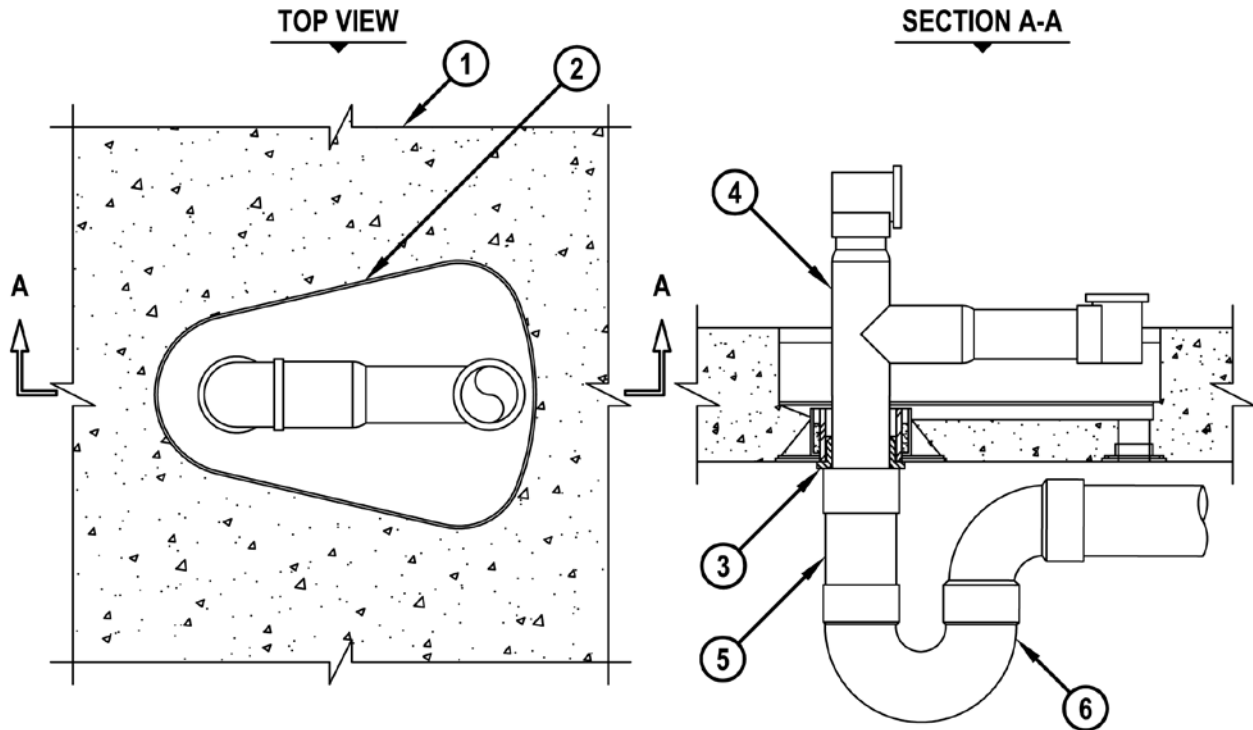


PLASTIC PIPE AND TUB FITTINGS THROUGH CONCRETE FLOOR ASSEMBLY

F-RATING = 2-HR.

FT, FH AND FTH-RATINGS = 0-HR.

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL



cUL FA2006c.111302

1. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR ASSEMBLY (MIN. 4-1/2" THICK) (2-HR. FIRE-RATING).
2. HILTI CP 681 TUB BOX KIT, CONSISTING OF 8-1/2" x 12" x 2" DEEP ABS TUB BOX WITH ADJUSTABLE LEGS AND INTUMESCENT COUPLING, FASTENED TO FORM WORK AND PERMANENTLY EMBEDDED DURING CONCRETE PLACEMENT. MINIMUM 2" OF CONCRETE SHALL BE MAINTAINED BELOW TUB BOX.
3. ELASTOMERIC RUBBER BUSHING (PROVIDED BY HILTI, INC.) INSERTED INTO BOTTOM OF DEVICE. ELASTOMERIC BUSHING SIZED TO PROVIDE TIGHT FIT AROUND DRAIN PIPE (ITEM NO. 4).
4. MAXIMUM 1-1/2" NOMINAL DIAMETER PVC PLASTIC PIPE (THIN WALL OR SCHEDULE 40) WASTE/OVERFLOW FITTINGS.
5. MAXIMUM 2" NOMINAL DIAMETER PVC PLASTIC PIPE (SCHEDULE 40) SECURED TO PVC PIPE (ITEM NO. 4).
6. PVC OR CAST IRON P-TRAP PROPERLY SECURED TO DRAIN PIPING (ITEM NO. 5).

NOTE : DRAIN PIPING AND P-TRAPS (ITEMS NO. 4 AND NO. 5) SHOULD BE PROPERLY SUPPORTED AWAY FROM THE TUB BOX WITH SUITABLE HANGERS.



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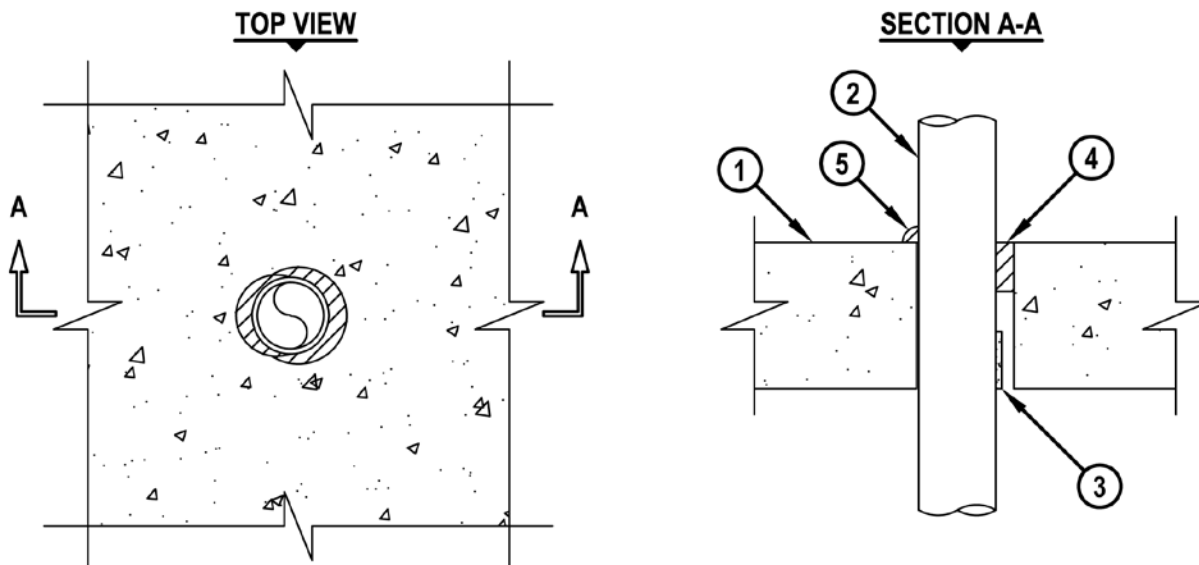
cUL SYSTEM NO. F-A-2009

**PLASTIC PIPE THROUGH CONCRETE FLOOR ASSEMBLY**

F, FT, FH AND FTH-RATINGS = 2-HR.

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL

cUL FA2009e.092806



1. CONCRETE FLOOR ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 4-1/2" THICK).
 - B. PRECAST (HOLLOW-CORE) CONCRETE FLOOR (MINIMUM 6" THICK).
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING (ALSO SEE NOTE NO. 4 BELOW) :
 - A. MAXIMUM 2" NOMINAL DIAMETER PVC PLASTIC PIPE (CELLULAR OR SOLID CORE).
 - B. MAXIMUM 2" NOMINAL DIAMETER CPVC PLASTIC PIPE (SDR 13.5) (CLOSED PIPING SYSTEM ONLY).
 - C. MAXIMUM 2" NOMINAL DIAMETER CROSS LINKED POLYETHYLENE (PEX) SDR 9 TUBING (CLOSED OR VENTED PIPING SYSTEM).
 - D. MAXIMUM 2" NOMINAL DIAMETER AQUARISE CPVC PLASTIC PIPE (SDR 11) MANUFACTURED BY IPEX, INC. (CLOSED PIPING SYSTEM ONLY).
3. HILTI CP 648E WRAP STRIP (NOMINAL 3/16" THICK X 1-3/4" WIDE) WRAPPED AROUND PIPE TO MAXIMUM EXTENT POSSIBLE AND HELD IN PLACE WITH STEEL TIE WIRE. WRAP STRIP INSTALLED FLUSH WITH BOTTOM SURFACE OF FLOOR.
4. MINIMUM 1-1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT INSTALLED FLUSH WITH TOP SURFACE OF FLOOR (SEE NOTE NO. 3 BELOW).
5. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT INSTALLED ON TOP SURFACE OF FLOOR WHEN ANNULAR SPACE EQUALS 1/16".

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 3".
 2. ANNULAR SPACE = MINIMUM 1/16", MAXIMUM 9/16".
 3. IN HOLLOW-CORE FLOORS, APPLY ADDITIONAL MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT FLUSH WITH BOTTOM SURFACE OF FLOOR.
 4. CLOSED OR VENTED PIPING SYSTEM (PVC = SCHEDULE 40; CPVC = SDR 11 OR 13.5).



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cUL SYSTEM NO. F-A-2012



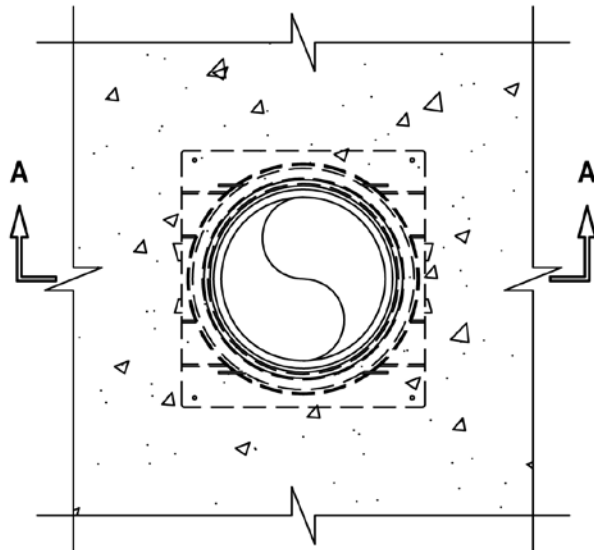
PLASTIC PIPE THROUGH CONCRETE FLOOR/CONCRETE OVER METAL DECKING

F-RATING = 1-HR., 2-HR., OR 3-HR.
FT-RATING = 0-HR., 1/4-HR., 3/4-HR., OR 2-HR.

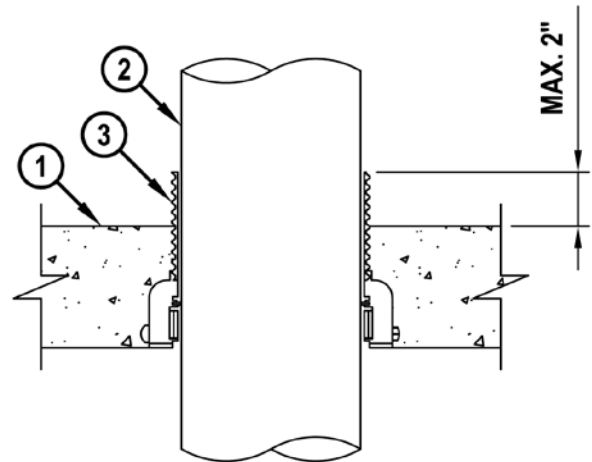
FH-RATING = 0-HR. OR 3-HR.
FTH-RATING = 0-HR. OR 2-HR.

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL

TOP VIEW



SECTION A-A



cUL FA2012h.022212

1. CONCRETE FLOOR ASSEMBLY (1-HR., 2-HR. OR 3-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MIN. 2-1/2", 4-1/2", OR 6" THICK).
 - B. STEEL FLOOR UNIT/FLOOR ASSEMBLY - LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MIN. 2-1/2", 4-1/2", OR 6" THICK) OVER METAL DECKING.



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cUL FA2012h.022212

PLASTIC PIPE THROUGH CONCRETE FLOOR/CONCRETE OVER METAL DECKING

F-RATING = 1-HR., 2-HR., OR 3-HR.

FH-RATING = 0-HR. OR 3-HR.

FT-RATING = 0-HR., 1/4-HR., 3/4-HR., OR 2-HR.

FTH-RATING = 0-HR. OR 2-HR.

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL

2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING (SEE TABLE BELOW):

- A. MAXIMUM 6" NOMINAL DIAMETER PVC PLASTIC PIPE (CELLULAR AND SOLID CORE).
- B. MAXIMUM 4" NOMINAL DIAMETER ABS PLASTIC PIPE (CELLULAR AND SOLID CORE)
(SEE NOTE NO. 3 BELOW).
- C. MAXIMUM 6" NOMINAL DIAMETER FRPP PLASTIC PIPE (SEE NOTE NO. 3 BELOW).
- D. MAXIMUM 6" NOMINAL DIAMETER CPVC PLASTIC PIPE (SDR 11, SDR 13.5, OR SDR 17).
- E. MAXIMUM 6" NOMINAL DIAMETER AQUARISE CPVC PLASTIC PIPE (SDR 11) MANUFACTURED BY IPEX, INC. (CLOSED PIPING SYSTEM ONLY).
- F. MAXIMUM 4" NOMINAL DIAMETER RIGID NONMETALLIC CONDUIT (SCH 40 PVC).
- G. MAXIMUM 6" NOMINAL DIAMETER SYSTEM 15 PVC PLASTIC PIPE (CELLULAR OR SOLID CORE) MANUFACTURED BY IPEX, INC.

3. HILTI CP 680-P CAST-IN FIRESTOP DEVICE, CAST OR GROUTED INTO CONCRETE FLOOR (SEE TABLE BELOW).

MINIMUM CONCRETE THICKNESS	NOMINAL PIPE DIAMETER	PRODUCT DESCRIPTION	RATINGS, HR.			
			F	FH	FT	FTH
2-1/2"	2" (PVC OR CPVC ONLY)	CP 680-P 2"	2	0	3/4	0
2-1/2"	3" (PVC OR CPVC ONLY)	CP 680-P 3"	2	0	0	0
2-1/2"	4" (PVC OR CPVC ONLY)	CP 680-P 4"	2	0	0	0
2-1/2"	6" (PVC OR CPVC ONLY)	CP 680-P 6"	2	0	0	0
4-1/2"	1-1/2"	CP 680-P 2"	2	0	2	0
4-1/2"	2"	CP 680-P 2"	2	0	2	0
4-1/2"	3"	CP 680-P 3"	3	0	0	0
6"	3" (PVC OR CPVC ONLY)	CP 680-P 3"	2	2	2	2
4-1/2"	3"	CP 680-P 4"	3	3	2	2
4-1/2"	4"	CP 680-P 4"	3	3	2	2
4-1/2"	4"	CP 680-P 6"	1	0	0	0
4-1/2"	6"	CP 680-P 6"	2	0	0	0

NOTES : 1. CLOSED OR VENTED PIPING SYSTEM (PVC, ABS, FRPP = SCH 40; CPVC = SDR 11, 13.5, OR 17).
 2. FOR CONCRETE FLOOR OVER METAL DECKING APPLICATIONS, A METAL DECK ADAPTER KIT IS REQUIRED.
 3. ABS AND FRPP PLASTIC PIPE MAY ONLY BE INSTALLED IN MINIMUM 4-1/2" THICK CONCRETE FLOORS. FT AND FTH RATINGS ARE 0-HR. WHEN ABS AND FRPP PIPES ARE USED.



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cUL SYSTEM NO. F-A-2013

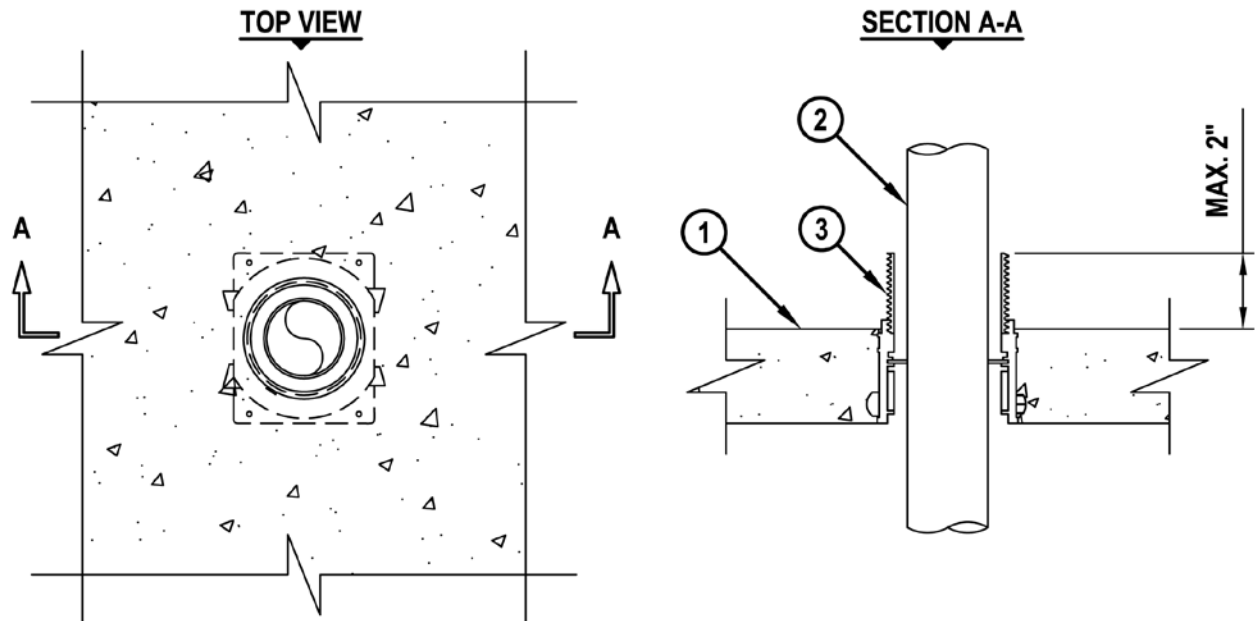


PLASTIC PIPE THROUGH CONCRETE FLOOR/CONCRETE OVER METAL DECKING

F-RATING = 2-HR. OR 3-HR.
 FT-RATING = 0-HR, 1-HR., OR 2-HR.
 FH-RATING = 0-HR. OR 2-HR.
 FTH-RATING = 0-HR. OR 1-HR.

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL

cUL FA2013c.012408



1. CONCRETE FLOOR ASSEMBLY (2-HR. OR 3-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 2-1/2" THICK).
 - B. STEEL FLOOR UNIT/FLOOR ASSEMBLY - LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 2-1/2" THICK) OVER METAL DECKING.
2. MAXIMUM 2" NOMINAL DIAMETER PEX TUBING (SDR 9) (CLOSED OR VENTED PIPING SYSTEM).
3. HILTI CP 680-P CAST-IN FIRESTOP DEVICE, CAST OR GROUTED INTO CONCRETE FLOOR (SEE TABLE BELOW).

MINIMUM CONCRETE THICKNESS	PEX DIAMETER	PRODUCT DESCRIPTION	RATINGS, HR.			
			F	FH	FT	FTH
2-1/2"	2"	CP 680-P 2"	2	3	0 AND 1	1
4-1/2"	2"	CP 680-P 2"	3	0	0 AND 2	0
4-1/2"	LESS THAN 2"	CP 680-P 2"	3	0	0	0

NOTES : 1. FOR PEX TUBING LESS THAN 2" DIAMETER, MINIMUM 4" THICKNESS MINERAL WOOL SHALL BE TIGHTLY PACKED INTO HILTI CP 680-P, FLUSH WITH TOP SURFACE OF DEVICE.
 2. FOR CONCRETE FLOOR OVER METAL DECKING APPLICATIONS, A METAL DECK ADAPTER KIT IS REQUIRED.



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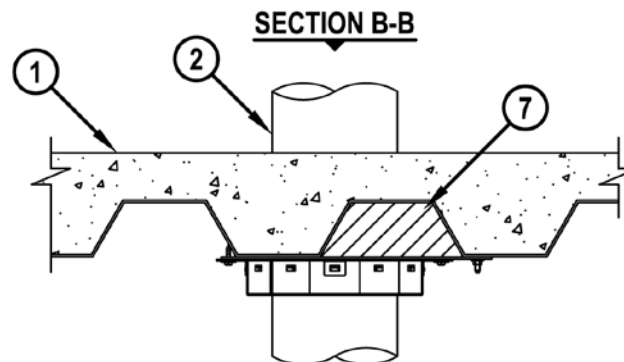
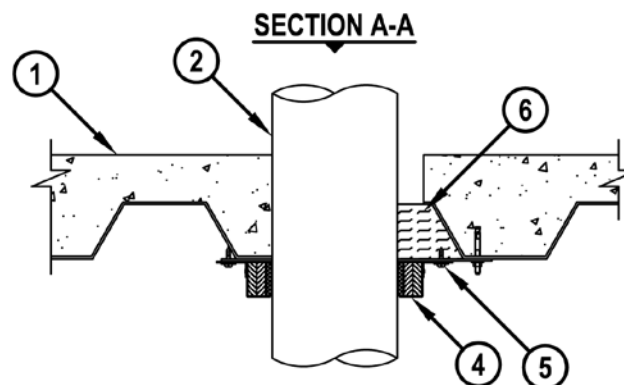
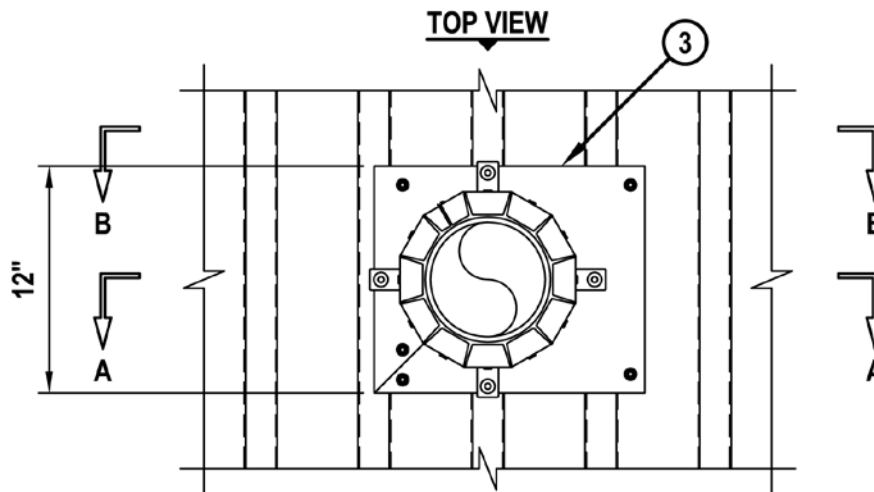
cUL SYSTEM NO. F-A-2025

PLASTIC PIPE THROUGH CONCRETE FLOOR OVER METAL DECKINGF AND FT-RATINGS = 2-HR.
FH AND FTH-RATINGS = 0-HR.

NOTE: TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL



cUL FA2025e.022212

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PLASTIC PIPE THROUGH CONCRETE FLOOR OVER METAL DECKING

F AND FT-RATINGS = 2-HR.

FH AND FTH-RATINGS = 0-HR.

NOTE: TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL



cUL FA2025e.022212

1. NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 2-1/2" THICK) OVER METAL DECKING (2-HR. FIRE-RATING).
2. PENETRATING ITEM TO BE ANY OF THE FOLLOWING (ALSO SEE NOTE NO. 3 BELOW) :
 - A. MAXIMUM 6" NOMINAL DIAMETER PVC PLASTIC PIPE (CELLULAR OR SOLID CORE).
 - B. MAXIMUM 6" NOMINAL DIAMETER ABS PLASTIC PIPE (CELLULAR OR SOLID CORE).
 - C. MAXIMUM 6" NOMINAL DIAMETER FRPP PLASTIC PIPE.
 - D. MAXIMUM 6" NOMINAL DIAMETER CPVC PLASTIC PIPE (SDR 11 OR SDR 13.5) (CLOSED PIPING SYSTEM ONLY).
 - E. MAXIMUM 6" NOMINAL DIAMETER AQUARISE CPVC PLASTIC PIPE (SDR 11) MANUFACTURED BY IPEX, INC. (CLOSED PIPING SYSTEM ONLY).
 - F. MAXIMUM 4" NOMINAL DIAMETER RIGID NONMETALLIC CONDUIT (SCH 40 PVC).
3. SHEET METAL PLATE (MIN. 18 GA.) FASTENED TO VALLEYS OF DECKING WITH 1/4" x 1-1/4" LONG STEEL EXPANSION BOLTS WITH STEEL NUTS AND MINIMUM 3/4" STEEL WASHERS OR 0.145 x 1-1/4" LONG POWDER ACTUATED FASTENERS WITH 1-7/16" DIAMETER STEEL WASHER, HILTI 1/4" x 1-1/4" LONG KWIK-CON II CONCRETE SCREW ANCHOR, 1/4" x 1-3/4" KWIK-BOLT 3 STEEL EXPANSION ANCHOR, OR HILTI X-DNI 27 P8 S15 POWDER ACTUATED FASTENER WITH INTEGRATED WASHER AT EACH CORNER, AT EACH PLATE/VALLEY INTERSECTION AND AT BOTH SIDES OF SLIT MADE TO PERMIT INSTALLATION AROUND PIPE. FASTENERS NOT TO EXCEED 10" SPACING.
4. HILTI CP 643N FIRESTOP COLLAR WITH FASTENING HOOKS.
5. EACH FASTENING HOOK SECURED TO VALLEY OF DECKING WITH 1/4" x 1-1/4" LONG STEEL EXPANSION BOLTS WITH STEEL NUTS AND MINIMUM 3/4" STEEL WASHERS. WHERE ANCHOR HOOKS ARE BENEATH THE CREST OF DECKING, SECURE FASTENING HOOKS WITH NO. 10 x 1/2" LONG SELF-DRILLING SELF TAPPING STEEL SCREWS AND WASHERS.
6. MINERAL WOOL (MINIMUM 4 PCF DENSITY) TIGHTLY PACKED TO FILL METAL DECK FLUTES ABOVE METAL PLATE AND RECESSED TO ACCOMMODATE SEALANT.
7. MINIMUM 1/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT TO COMPLETELY COVER MINERAL WOOL WITHIN FLUTES.
8. [NOT SHOWN] MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT APPLIED AROUND PERIMETER OF METAL PLATE.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 8".
 2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1-1/2".
 3. CLOSED OR VENTED PIPING SYSTEM (PVC, ABS, FRPP = SCH 40; CPVC = SDR 11 OR 13.5).
 4. SHEET METAL PLATE TO EXTEND MINIMUM 1-1/2" ON THE FLOOR UNIT VALLEY ON EACH END.



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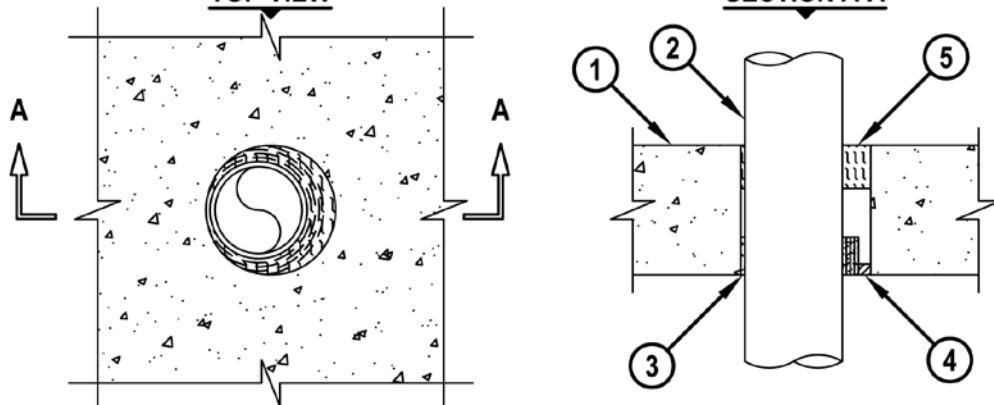
cUL SYSTEM NO. F-A-2026

**PLASTIC PIPE THROUGH CONCRETE FLOOR ASSEMBLY**

F-RATING = 2-HR.

FT-RATING = 1/4-HR., 1-3/4-HR., OR 2-HR.

FH AND FTH-RATINGS = 0-HR.

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL
TOP VIEW SECTION A-A

1. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR ASSEMBLY (MINIMUM 4-1/2" THICK) (2-HR. FIRE-RATING).
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 4" NOMINAL DIAMETER PVC PLASTIC PIPE (CELLULAR OR SOLID CORE).
 - B. MAXIMUM 4" NOMINAL DIAMETER ABS PLASTIC PIPE (CELLULAR OR SOLID CORE).
 - C. MAXIMUM 4" NOMINAL DIAMETER CPVC PLASTIC PIPE (SDR 11 OR SDR 13.5) (CLOSED PIPING SYSTEM ONLY).
 - D. MAXIMUM 4" NOMINAL DIAMETER FRPP PLASTIC PIPE.
 - E. MAXIMUM 4" NOMINAL DIAMETER RIGID NONMETALLIC CONDUIT (SCH 40 PVC).
 - F. MAXIMUM 2" NOMINAL DIAMETER PP PLASTIC PIPE.
 - G. MAXIMUM 4" NOMINAL DIAMETER AQUARISE CPVC PLASTIC PIPE (SDR 11) MANUFACTURED BY IPEX, INC. (CLOSED PIPING SYSTEM ONLY).
3. HILTI CP 648E WRAP STRIP (NOMINAL 3/16" THICK X 1-3/4" WIDE) WRAPPED AROUND THE OUTER CIRCUMFERENCE OF PIPE, COVERING ONE TIME, AND HELD IN PLACE WITH TAPE. AN ADDITIONAL THREE LAYERS WRAPPED AROUND PIPE TO THE MAXIMUM EXTENT POSSIBLE AND HELD IN PLACE WITH TAPE. WRAP STRIP INSTALLED FLUSH WITH BOTTOM SURFACE OF FLOOR.
4. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT FLUSH WITH BOTTOM SURFACE OF FLOOR.
5. MINIMUM 2" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED, FLUSH WITH TOP SURFACE OF FLOOR.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 6".
 2. ANNULAR SPACE = MINIMUM 3/16", MAXIMUM 1-1/4".
 3. CLOSED OR VENTED PIPING SYSTEM (PVC, ABS, FRPP = SCH 40; CPVC = SDR 11 OR 13.5; PP = SCH 80).
 4. T-RATING = 2-HR. WHEN PP PIPE IS USED, 1-3/4-HR. WHEN PVC, RNC OR CPVC PIPE IS USED AND 1/4-HR. WHEN ABS OR FRPP PIPE IS USED.



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cUL FA2026c.022212

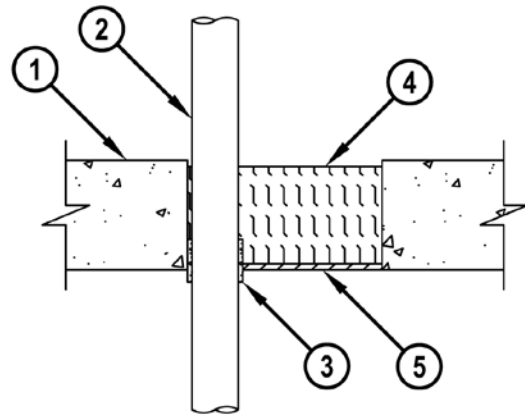
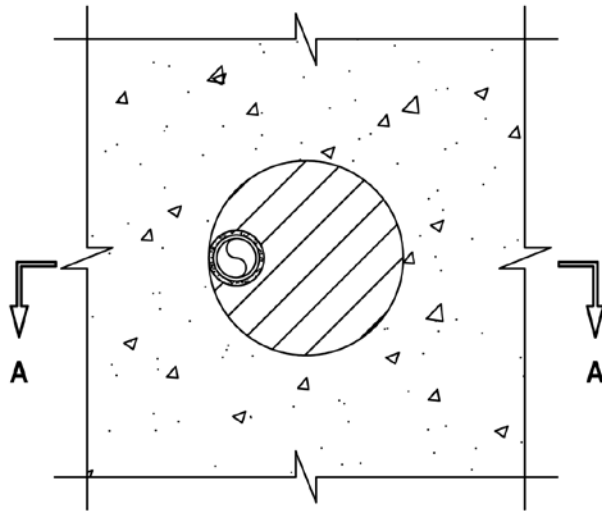
cUL SYSTEM NO. F-A-2034

PLASTIC PIPE THROUGH CONCRETE FLOOR ASSEMBLY

F-RATING = 2-HR.

FT, FH, AND FTH-RATINGS = 0-HR.

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL

BOTTOM VIEW
SECTION A-A


1. CONCRETE FLOOR ASSEMBLY (MINIMUM 4-1/2" THICK) (2-HR. FIRE-RATING).
2. MAXIMUM 1-1/2" NOMINAL DIAMETER XFR PVC PLASTIC PIPE (SCHEDULE 40) (CLOSED OR VENTED PIPING SYSTEM).
3. HILTI CP 648E WRAP STRIP (NOMINAL 3/16" THICK x 1-3/4" WIDE) CONTINUOUSLY WRAPPED AROUND THE OUTER CIRCUMFERENCE OF THE PIPE, COVERING ONE TIME, WITH ENDS BUTTED AND HELD IN PLACE WITH TAPE. BOTTOM EDGE OF WRAP STRIP TO BE POSITIONED 1/2" BELOW THE BOTTOM SURFACE OF CONCRETE FLOOR.
4. MINIMUM 4" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED AND RECESSED TO ACCOMMODATE SEALANT.
5. MINIMUM 1/4" DEPTH HILTI CP 601S ELASTOMERIC FIRESTOP SEALANT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 8".
2. ANNULAR SPACE = MINIMUM 3/16", MAXIMUM 5-7/8".



cUL FA2034a.082208



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cUL SYSTEM NO. F-A-2156

**PVC PLASTIC SHOWER DRAIN THROUGH CONCRETE FLOOR ASSEMBLY**

F-RATING = 3-HR.

T-RATING = 0-HR. OR 2-HR. (SEE NOTE BELOW)

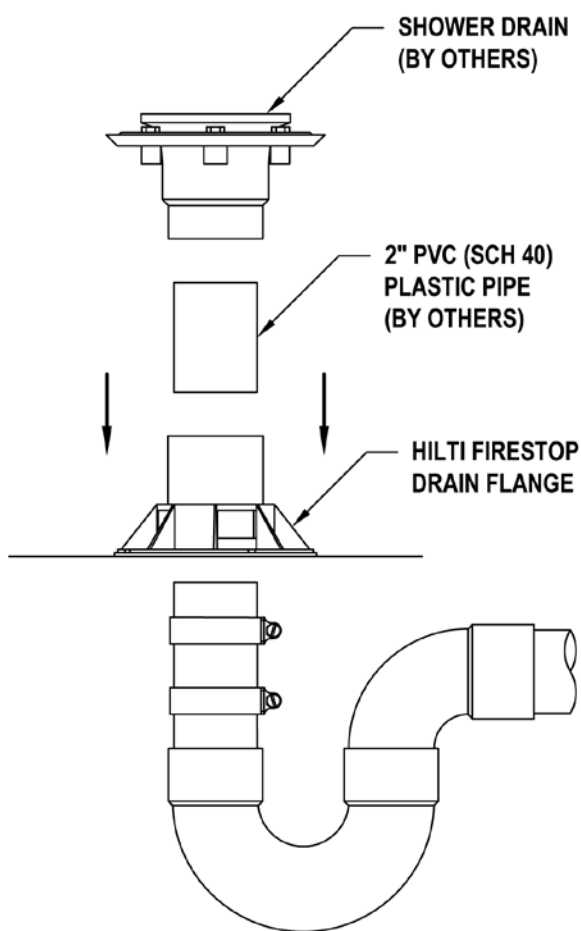
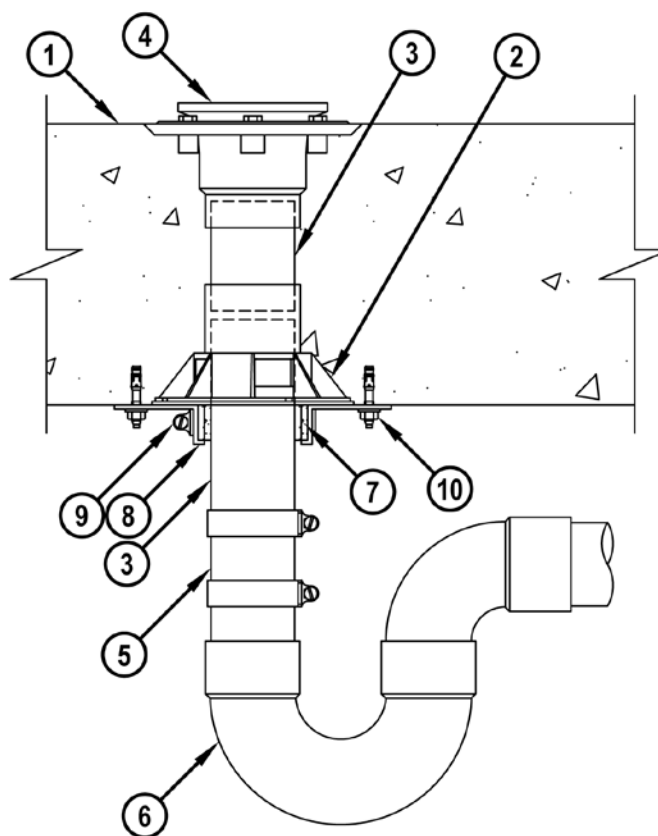
L-RATING AT AMBIENT = LESS THAN 1 CFM/SQ FT

L-RATING AT 400° F = LESS THAN 1 CFM/SQ FT

W-RATING = CLASS I

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL

cUL FA2156a.082412

INSTALLATION PROCEDURE**CROSS-SECTIONAL VIEW**

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cUL SYSTEM NO. F-A-2156

**PVC PLASTIC SHOWER DRAIN THROUGH CONCRETE FLOOR ASSEMBLY**

F-RATING = 3-HR.

T-RATING = 0-HR. OR 2-HR. (SEE NOTE BELOW)

L-RATING AT AMBIENT = LESS THAN 1 CFM/SQ FT

L-RATING AT 400° F = LESS THAN 1 CFM/SQ FT

W-RATING = CLASS I

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL

cUL FA2156a.082412

1. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR ASSEMBLY (MINIMUM 4-1/2" THICK) (3-HR. FIRE-RATING).
2. HILTI FIRESTOP DRAIN FLANGE.
3. NOMINAL 2" DIAMETER PVC PLASTIC DRAIN PIPE (SCHEDULE 40) (CELLULAR OR SOLID CORE) CEMENTED INTO HILTI FIRESTOP DRAIN FLANGE WITH PVC GLUE (PROVIDED BY OTHERS).
4. PVC PLASTIC SHOWER FITTING WITH CHROMED STEEL STRAINER (SIZED TO ACCOMMODATE PIPE) CEMENTED IN PVC DRAIN PIPE (PROVIDED BY OTHERS).
5. [OPTIONAL] NOMINAL 2" DIAMETER (MIN. 32 GA.) CORRUGATED STAINLESS STEEL SHIELDED RUBBER NO-HUB CONNECTOR.
6. [OPTIONAL] NOMINAL 2" DIAMETER CAST IRON PIPE AND P-TRAP SECURED TO PVC PIPE WITH NO-HUB COUPLER.
7. [OPTIONAL] HILTI CP 648E WRAP STRIP (NOMINAL 3/16" THICK x 1" WIDE) CONTINUOUSLY WRAPPED AROUND THE OUTER CIRCUMFERENCE OF THE PIPE, COVERING TWO TIMES, WITH ENDS BUTTED AND HELD IN PLACE WITH TAPE.
8. [OPTIONAL] HILTI 1" RETAINING COLLAR WRAPPED OVER WRAP STRIPS, OVERLAPPING MINIMUM 1".
9. HILTI RETAINING COLLAR CLAMP FASTENED AT MID-HEIGHT OF RETAINING COLLAR, WHEN INSTALLED.
10. SECURE EVERY OTHER TAB OF RETAINING COLLAR, WHEN INSTALLED, TO CONCRETE FLOOR WITH 1/4" DIAMETER BY 1-1/4" LONG STEEL EXPANSION BOLTS, 1-1/4" LONG CONCRETE SCREW ANCHORS, 0.145" DIAMETER BY 1-1/4" LONG POWDER ACTUATED FASTENERS UTILIZING A 9/16" DIAMETER STEEL WASHER, HILTI 1/4" DIAMETER BY 1-1/4" LONG KWIK-CON II+ CONCRETE SCREW ANCHORS, HILTI 1/4" DIAMETER BY 1-3/4" LONG KWIK-BOLT 3 STEEL EXPANSION ANCHORS, OR HILTI X-DNI 27 P8 215 POWDER ACTUATED FASTENERS WITH INTEGRATED 9/16" DIAMETER STEEL WASHERS.

NOTE : T-RATING IS 2-HR. WHEN HILTI CP 648E AND RETAINING COLLAR (ITEMS NO. 7 THROUGH 10) ARE INSTALLED.



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**PLASTIC PIPE THROUGH CONCRETE FLOOR ASSEMBLY**

F-RATING = 2-HR. OR 3-HR.

FT-RATING = 0-HR., 1/4-HR., OR 1/2-HR.

FH-RATING = 2-HR. OR 3-HR.

FTH-RATING = 0-HR., 1/4-HR., OR 1/2-HR.

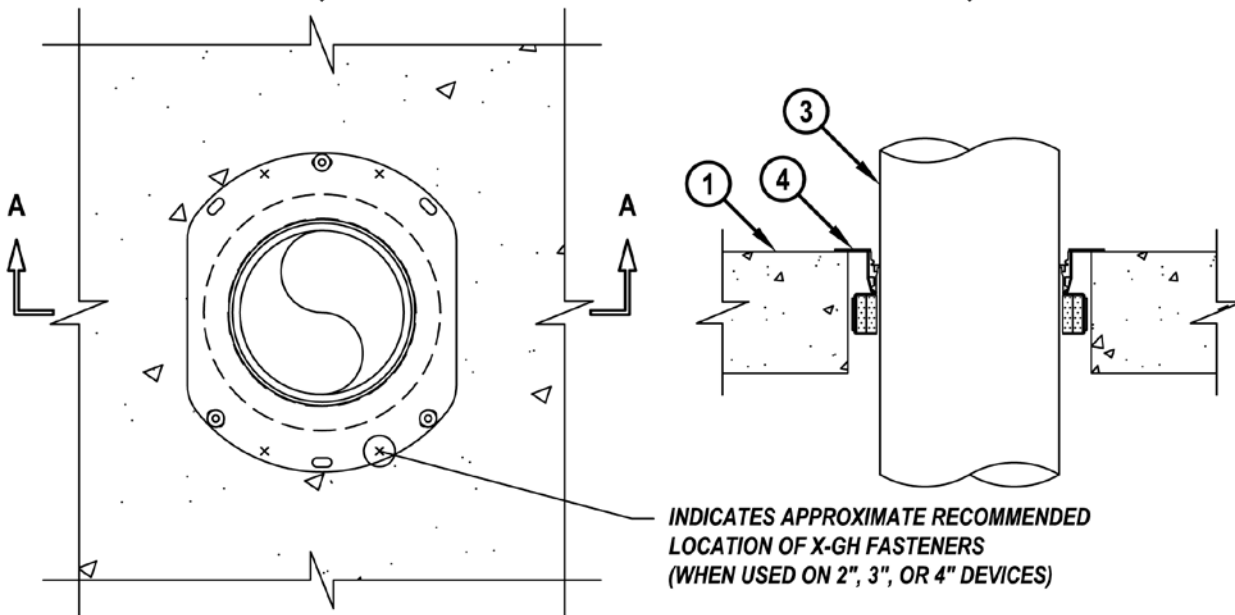
L-RATING AT AMBIENT = LESS THAN 1 CFM/SQ. FT. (SEE NOTE NO. 2 BELOW)

L-RATING AT 400°F = LESS THAN 1 CFM/SQ. FT. (SEE NOTE NO. 2 BELOW)

W-RATING = CLASS I (SEE NOTE NO. 2 BELOW)

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL

cUL FA2214a.051311

TOP VIEW**SECTION A-A****1. CONCRETE FLOOR ASSEMBLY (2-HR. OR 3-HR. FIRE-RATING) :**

A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 2-1/2" TO 8" THICK).

B. STEEL FLOOR UNIT/FLOOR ASSEMBLY - LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 2-1/2" TO 8" THICK) OVER METAL DECKING (UL CLASSIFIED D700, D800, OR D900 SERIES).

2. [OPTIONAL - NOT SHOWN] ANY OF THE FOLLOWING SLEEVES MAY BE USED :

A. NOMINAL 4", 5", OR 6" DIAMETER STEEL PIPE SLEEVE (SCHEDULE 10 OR HEAVIER) CAST OR GROUTED INTO FLOOR ASSEMBLY, FLUSH WITH FLOOR SURFACES.

B. NOMINAL 4", 5", 6", OR 9" DIAMETER GALVANIZED STEEL SLEEVE (MIN. 26 GA.) WITH SQUARE FLANGE SPOT WELDED TO BOTTOM OR MID-HEIGHT OF SLEEVE AND SIZED MINIMUM 2" LARGER THAN SLEEVE DIAMETER. SLEEVE IS TO BE CAST IN PLACE, AND MAY EXTEND A MAXIMUM 4" BELOW BOTTOM SURFACE OF FLOOR AND SIT FLUSH WITH TOP SURFACE OF FLOOR.



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**PLASTIC PIPE THROUGH CONCRETE FLOOR ASSEMBLY**

F-RATING = 2-HR. OR 3-HR.

FT-RATING = 0-HR., 1/4-HR., OR 1/2-HR.

FH-RATING = 2-HR. OR 3-HR.

FTH-RATING = 0-HR., 1/4-HR., OR 1/2-HR.

L-RATING AT AMBIENT = LESS THAN 1 CFM/SQ. FT. (SEE NOTE NO. 2 BELOW)

L-RATING AT 400°F = LESS THAN 1 CFM/SQ. FT. (SEE NOTE NO. 2 BELOW)

W-RATING = CLASS I (SEE NOTE NO. 2 BELOW)

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL

cUL FA2214a.051311

3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :

- A. MAXIMUM 6" NOMINAL DIAMETER PVC PLASTIC PIPE (CELLULAR OR SOLID CORE).
- B. MAXIMUM 6" NOMINAL DIAMETER ABS PLASTIC PIPE (CELLULAR OR SOLID CORE).
- C. MAXIMUM 6" NOMINAL DIAMETER CPVC PLASTIC PIPE.
- D. MAXIMUM 4" NOMINAL DIAMETER FRPP PLASTIC PIPE.

4. HILTI CFS-DID FIRESTOP DROP-IN DEVICE INSERTED INTO OPENING (SEE TABLE BELOW) AND SECURED TO TOP OF FLOOR WITH THREE HILTI 1/4" (6mm) DIAMETER BY 1-1/4" (32mm) LONG KWIK-CON II+ CONCRETE SCREW ANCHORS, HILTI 1/4" (6mm) DIAMETER BY 1-3/4" (45mm) LONG KWIK BOLT 3 STEEL EXPANSION ANCHORS, OR HILTI 1/4" (6mm) BY 3/4" (19mm) LONG METAL HIT ANCHORS (INSTALLED IN A TRIANGULAR FASHION THROUGH HOLES PROVIDED). IN ADDITION, FOR NOMINAL 2", 3", AND 4" DEVICES, FOUR 11/16" (18mm) LONG HILTI X-GH P18 MX STEEL FASTENERS MAY BE INSTALLED THROUGH THE STEEL FLANGE, TWO ON EACH SIDE.

MINIMUM CONCRETE THICKNESS	CORE HOLE OR SLEEVE DIAMETER	PRODUCT DESCRIPTION	NOMINAL PIPE DIAMETER	FH-RATING
2-1/2"	4"	CFS-DID 2" MD	2" (OR SMALLER)+	2-HR.
2-1/2"	5"	CFS-DID 3" MD	3"	2-HR.
2-1/2"	6"	CFS-DID 4" MD	4"	2-HR.
2-1/2"	9"	CFS-DID 6" MD	6"	2-HR.
4-1/2"	4"	CFS-DID 2" MD	2" (OR SMALLER)+	3-HR.
4-1/2"	5"	CFS-DID 3" MD	3"	3-HR.
4-1/2"	6"	CFS-DID 4" MD	4"	3-HR.
4-1/2"	9"	CFS-DID 6" MD	6"	3-HR.

+ FOR PIPE SMALLER THAN NOMINAL 2" DIAMETER, AN ADAPTER AND HILTI IPS OR CPS TOP SEAL PLUG MUST BE USED IN CONJUNCTION WITH THE CFS-DID 2" MD DEVICE.

**NOTES : 1. CLOSED OR VENTED PIPING SYSTEM (PVC, ABS, FRPP = SCH 40; CPVC = SDR 13.5).
2. [OPTIONAL] TO ACHIEVE W-RATING AND/OR L-RATING, WATER BARRIER MODULES MAY BE THREADED ON TOP OF CFS-DID DEVICES FOR NOMINAL 2", 3", 4", AND 6" PIPES (LISTED ABOVE).**



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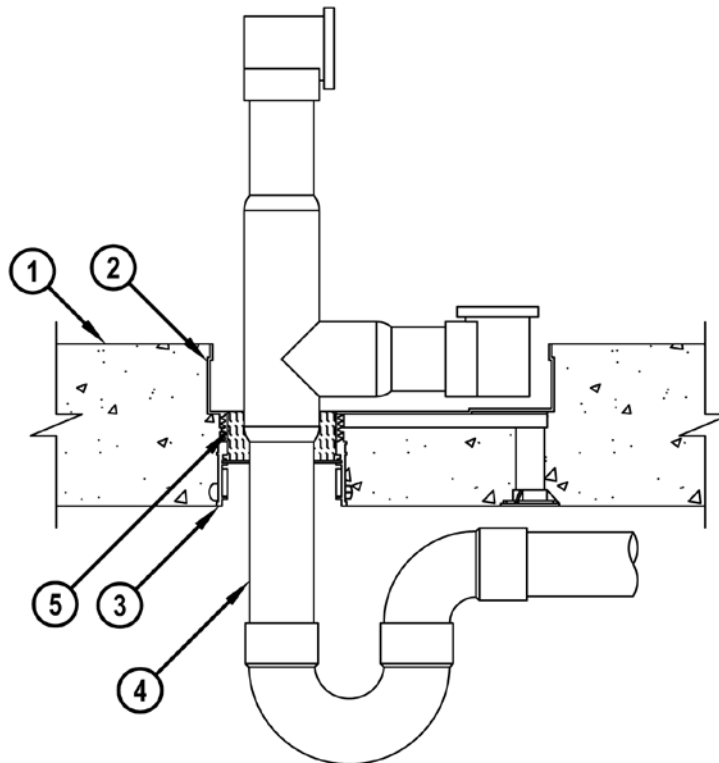
**PLASTIC PIPE AND TUB FITTINGS THROUGH CONCRETE FLOOR ASSEMBLY**

F-RATING = 2-HR.

FT-RATING = 3/4-HR. OR 2-HR.

FH AND FTH-RATINGS = 0-HR.

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL

CROSS-SECTIONAL VIEW

cUL FA2219a.061412

1. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 6" THICK) (2-HR. FIRE-RATING).
2. HILTI CP 681 TUB BOX KIT, CONSISTING OF 8-1/2" x 12" x 2" DEEP ABS TUB BOX WITH ADJUSTABLE LEGS, FASTENED TO FORM WORK AND PERMANENTLY EMBEDDED DURING CONCRETE PLACEMENT.
3. HILTI CP 680-P 3" CAST-IN FIRESTOP DEVICE SECURED TO BOTTOM OF TUB BOX.
4. NOMINAL 1-1/2" OR 2" DIAMETER PVC PLASTIC PIPE (SCH 40) CEMENTED TOGETHER AND SECURED TO WASTE OVERFLOW FITTINGS WITH A COMPRESSION COUPLING.
5. MINIMUM 2" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED AROUND PIPE, FLUSH WITH TOP OF FIRESTOP DEVICE.

NOTES : 1. DRAIN PIPING AND P-TRAPS (ITEM NO. 4) SHOULD BE PROPERLY SUPPORTED AWAY FROM THE TUB BOX WITH SUITABLE HANGERS.
 2. WHEN NOMINAL 1-1/2" DIAMETER PVC IS USED, THE FT-RATING = 2-HR.
 WHEN NOMINAL 2" DIAMETER PVC IS USED, THE FT-RATING = 3/4-HR.



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cUL SYSTEM NO. F-A-3002

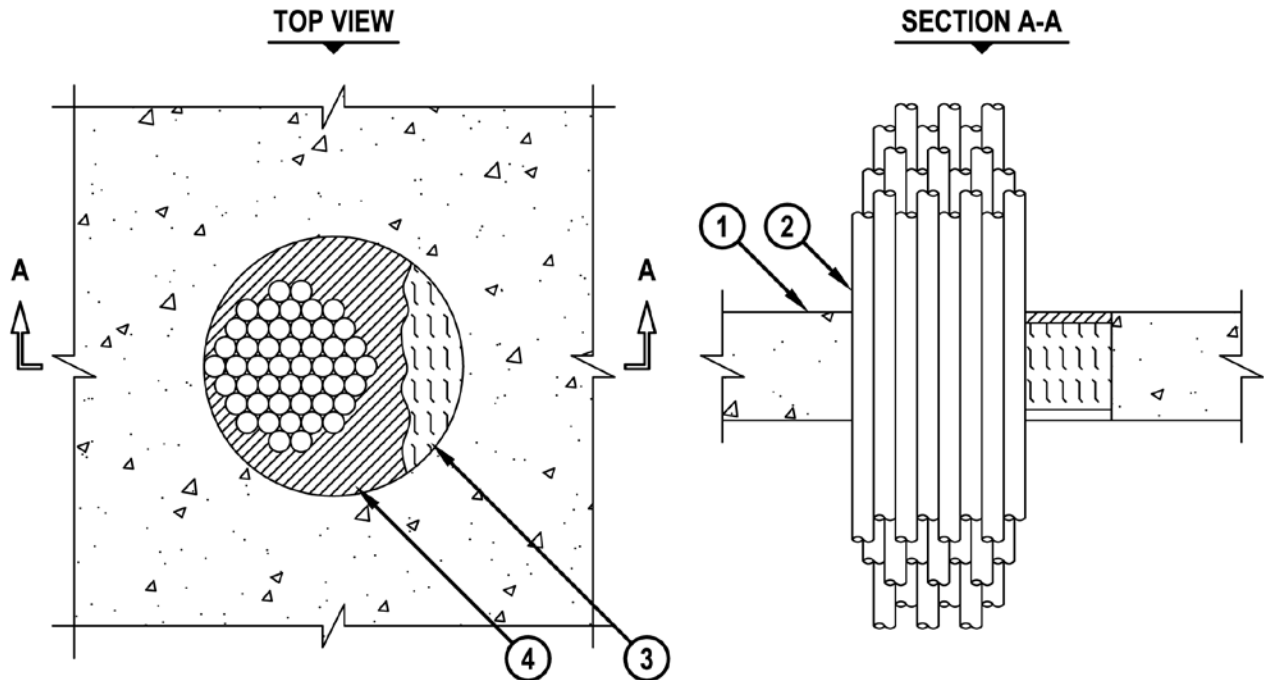
CABLE BUNDLE THROUGH 2-HR. CONCRETE FLOOR ASSEMBLY

F-RATING = 2-HR.

FT, FH, FTH-RATING = 0-HR.



cUL FA3002a.102804



1. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR ASSEMBLY (MINIMUM 2-1/2" THICK) (2-HR. FIRE-RATING).
2. SINGLE CABLE OR BUNDLED CABLE CONSISTING OF ANY OF THE FOLLOWING:
 - A. MAXIMUM 300 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
 - B. MAXIMUM 500 KCMIL POWER CABLE WITH PVC JACKET.
 - C. MAXIMUM 7/C NO. 12 AWG POWER CABLE WITH PVC JACKET.
 - D. MAXIMUM 1/2" DIAMETER FIBER-OPTIC CABLE WITH PVC JACKET.
 - E. MAXIMUM 3/C NO. 12 AWG WITH BARE ALUMINUM GROUND STEEL METAL-CLAD CABLE.
 - F. MAXIMUM 1" DIAMETER METAL CLAD TEK CABLE WITH PVC JACKET.
 - G. MAXIMUM 3/C (+GROUND) 2/0 AWG ALUMINUM CONDUCTOR SER CABLE WITH PVC JACKET.
 - H. MAXIMUM 1/2" NOMINAL DIAMETER RG/U COAXIAL CABLE WITH PVC JACKET.
3. MINIMUM 2" THICKNESS MINERAL WOOL (MINIMUM 4 PCF DENSITY) TIGHTLY PACKED AND RECESSED TO ACCOMMODATE FIRESTOP SEALANT.
4. MINIMUM 1/4" DEPTH HILTI CP 604 SELF-LEVELING FIRESTOP SEALANT FLUSH WITH TOP SURFACE OF CONCRETE FLOOR ASSEMBLY.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 6".
 2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 5-3/4".
 3. CABLES TO FILL MAXIMUM 54% OF CROSS-SECTIONAL AREA OF OPENING.



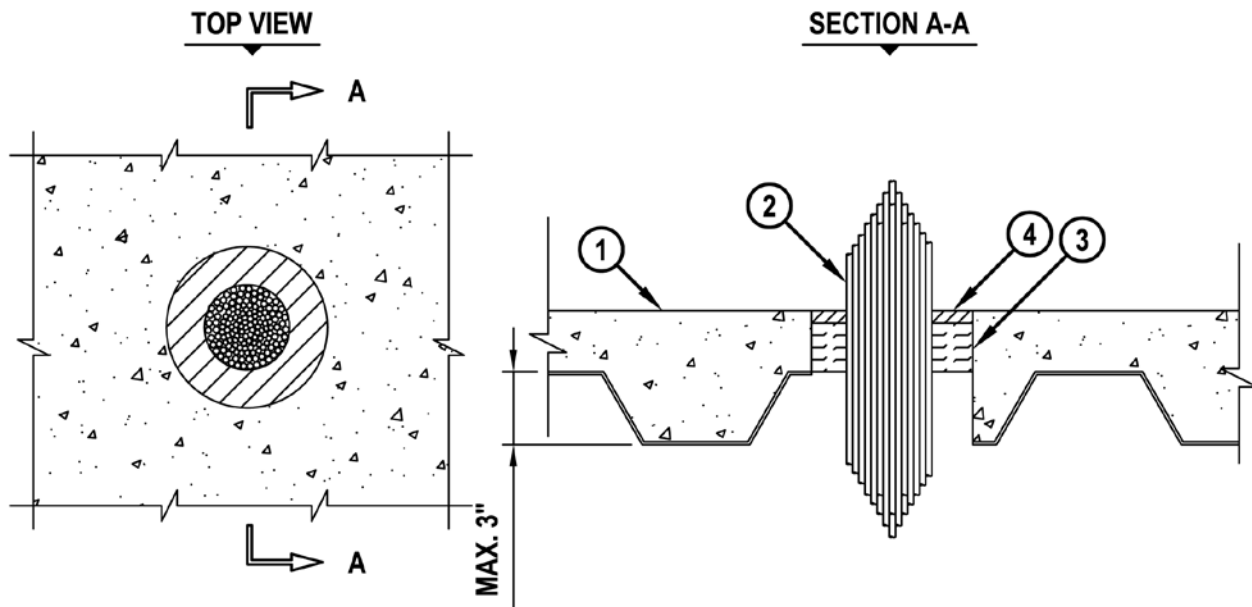
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UL/cUL SYSTEM NO. F-A-3005

CABLE BUNDLE THROUGH CONCRETE FLOOR OVER METAL DECKINGF-RATING = 2-HR.
T-RATING = 1/2-HR.

FA3005c.060909



1. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MIN. 2-1/2" THICK) OVER METAL DECKING (UL/cUL CLASSIFIED D900 SERIES) (2-HR FIRE-RATING).
2. CABLE BUNDLE TO BE A COMBINATION OF ANY OF THE FOLLOWING :
 - A. MAXIMUM 300 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
 - B. MAXIMUM 500 KCMIL POWER CABLE WITH XLPE JACKET.
 - C. MAXIMUM 7/C NO. 12 AWG POWER CABLE WITH PVC JACKET.
 - D. MAXIMUM 24 FIBER-OPTIC CABLE WITH PVC JACKET.
 - E. MAXIMUM 3/C NO. 12 AWG METAL-CLAD CABLE.
3. MINIMUM 2" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED.
4. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.

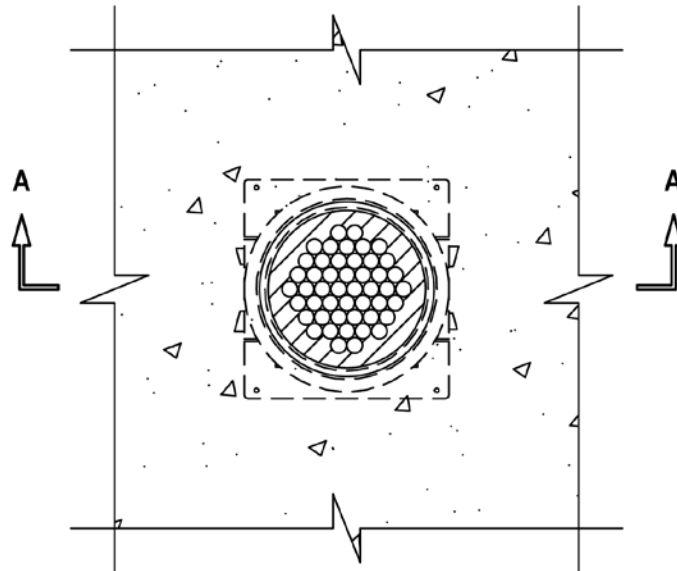
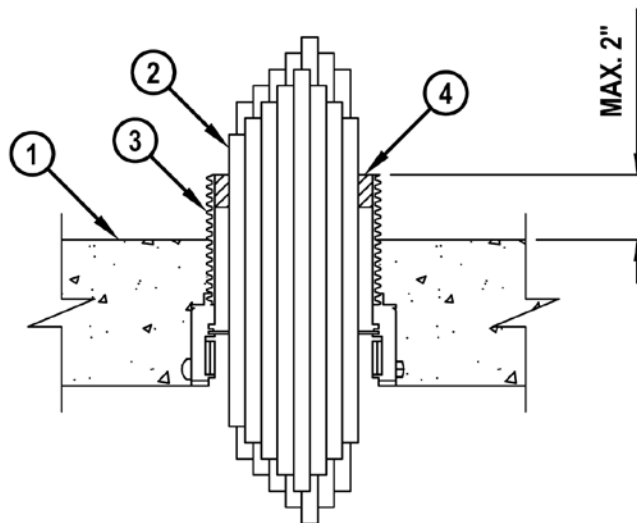
NOTES : 1. MAXIMUM DIAMETER OF OPENING = 6-3/4".
 2. CABLES TO FILL MAXIMUM 33% OF CROSS-SECTIONAL AREA OF OPENING.
 3. ANNULAR SPACE = NOMINAL 1-3/8".

UL/cUL SYSTEM NO. F-A-3007

CABLE BUNDLE THROUGH CONCRETE FLOOR OR CONCRETE OVER METAL DECKING

F-RATING = 3-HR.

T-RATING = 0-HR., 1/4-HR. OR 1/2-HR.

TOP VIEWSECTION A-A

FA3007h.011707

UL/cUL SYSTEM NO. F-A-3007

CABLE BUNDLE THROUGH CONCRETE FLOOR OR CONCRETE OVER METAL DECKING

F-RATING = 3-HR.

T-RATING = 0-HR., 1/4-HR. OR 1/2-HR.

FA3007h.011707

1. CONCRETE FLOOR ASSEMBLY (3-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 4-1/2" THICK).
 - B. STEEL FLOOR UNIT/FLOOR ASSEMBLY - LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 4-1/2" THICK) OVER METAL DECKING.
2. CABLE BUNDLE CONSISTING OF ANY OF THE FOLLOWING :
 - A. MAXIMUM 300 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
 - B. MAXIMUM 750 KCMIL POWER CABLE WITH PVC JACKET.
 - C. MAXIMUM 7/C NO. 12 AWG POWER CABLE WITH PVC JACKET.
 - D. MAXIMUM (24 FIBER) 1/2" DIAMETER FIBER-OPTIC CABLE.
 - E. MAXIMUM 3/C NO. 12 AWG METAL-CLAD CABLE.
3. HILTI CP 680-M OR CP 680-P CAST-IN FIRESTOP DEVICE, CAST OR GROUTED INTO CONCRETE FLOOR (SEE TABLE BELOW).
4. MINIMUM 1" DEPTH HILTI CP 618 FIRESTOP PUTTY STICK APPLIED AROUND CABLES (SEE NOTES BELOW).

MAXIMUM DIAMETER OF CABLE BUNDLE	PRODUCT DESCRIPTION
2"	CP 680-M 2" OR CP 680-P 2"
3"	CP 680-M 3" OR CP 680-P 3"
4-1/2"	CP 680-M 4" OR CP 680-P 4"
6-1/2"	CP 680-P 6"

NOTES : 1. AS AN ALTERNATE TO HILTI CP 618 FIRESTOP PUTTY STICK, MINIMUM 2" THICKNESS MINERAL WOOL (MINIMUM 4 PCF DENSITY) MAY BE TIGHTLY PACKED INTO FIRESTOP DEVICE, FLUSH WITH TOP SURFACE OF DEVICE.

2. FILL MATERIAL IS OPTIONAL FOR MINIMUM 2" DIAMETER CABLE BUNDLES INSTALLED IN 2" DEVICES, MINIMUM 2-1/2" DIAMETER CABLE BUNDLES INSTALLED IN 3" DEVICES AND MINIMUM 3" DIAMETER CABLE BUNDLES INSTALLED IN 4" DEVICES.

3. FOR CONCRETE FLOOR OVER METAL DECKING APPLICATIONS, A METAL DECK ADAPTER KIT IS REQUIRED.



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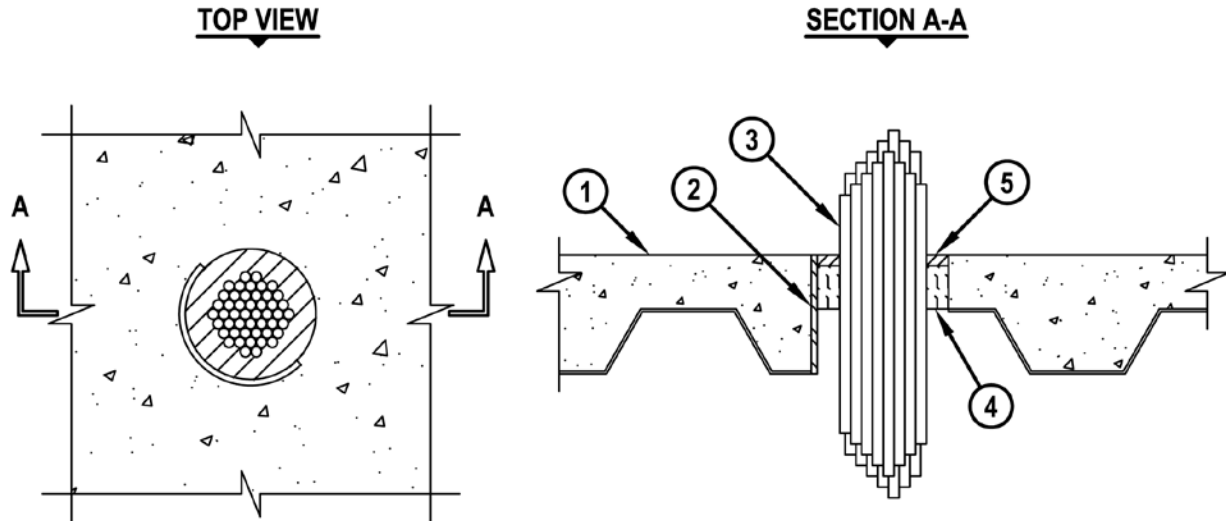
UL/cUL SYSTEM NO. F-A-3012

CABLE BUNDLE THROUGH CONCRETE FLOOR OVER METAL DECKING

F-RATING = 3-HR.

T-RATING = 0-HR., 1/2-HR. OR 3/4-HR.

FA3012b.011107



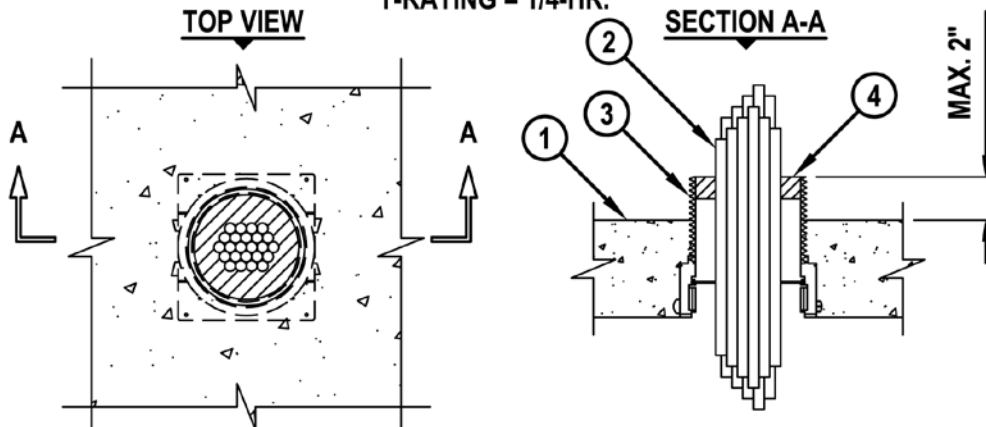
1. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OVER METAL DECKING ASSEMBLY (MINIMUM 2-1/2" THICK) (3-HR. FIRE-RATING).
2. [OPTIONAL] MAXIMUM 6" NOMINAL DIAMETER STEEL PIPE SLEEVE (SCHEDULE 10 OR HEAVIER).
3. MAXIMUM 4" DIAMETER CABLE BUNDLE TO BE A COMBINATION OF ANY OF THE FOLLOWING :
 - A. MAXIMUM 300 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
 - B. MAXIMUM 500 KCMIL POWER CABLE WITH PVC JACKET.
 - C. MAXIMUM 7/C NO. 12 AWG POWER CABLE WITH PVC JACKET.
 - D. MAXIMUM 1/2" DIAMETER FIBER-OPTIC CABLE (24 FIBER).
 - E. MAXIMUM 3/C NO. 12 AWG METAL-CLAD CABLE.
4. MINIMUM 2" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED.
5. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 6".
 2. CABLES TO FILL MINIMUM 25%, TO MAXIMUM 45% OF CROSS-SECTIONAL AREA OF OPENING.



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UL/cUL SYSTEM NO. F-A-3033

CABLE BUNDLE THROUGH CONCRETE FLOOR OR CONCRETE OVER METAL DECKINGF-RATING = 3-HR.
T-RATING = 1/4-HR.

FA3033c.120806

1. CONCRETE FLOOR ASSEMBLY (3-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 2-1/2" THICK).
 - B. STEEL FLOOR UNIT/FLOOR ASSEMBLY - LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 2-1/2" THICK) OVER METAL DECKING.
2. CABLE BUNDLE CONSISTING OF ANY OF THE FOLLOWING :
 - A. MAXIMUM 300 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
 - B. MAXIMUM 750 KCMIL POWER CABLE WITH PVC JACKET.
 - C. MAXIMUM 7/C NO. 12 AWG POWER CABLE WITH PVC JACKET.
 - D. MAXIMUM (24 FIBER) 1/2" DIAMETER FIBER-OPTIC CABLE.
 - E. MAXIMUM 3/C NO. 12 AWG METAL-CLAD CABLE.
3. HILTI CP 680-M OR CP 680-P CAST-IN FIRESTOP DEVICE, CAST OR GROUTED INTO CONCRETE FLOOR (SEE TABLE BELOW).
4. WHEN DIAMETER OF CABLE BUNDLE IS LESS THAN WHAT IS LISTED IN TABLE BELOW, APPLY MINIMUM 1" DEPTH HILTI CP 618 FIRESTOP PUTTY STICK APPLIED AROUND CABLE BUNDLE (SEE NOTE BELOW).

MAXIMUM DIAMETER OF CABLE BUNDLE	PRODUCT DESCRIPTION
2"	CP 680-M 2" OR CP 680-P 2"
3"	CP 680-M 3" OR CP 680-P 3"
3"	CP 680-M 4" OR CP 680-P 4"

- NOTES :**
1. AS AN ALTERNATE TO HILTI CP 618 FIRESTOP PUTTY STICK, MINIMUM 4" THICKNESS MINERAL WOOL (MINIMUM 4 PCF DENSITY) MAY BE TIGHTLY PACKED INTO FIRESTOP DEVICE, FLUSH WITH TOP SURFACE OF DEVICE.
 2. FILL MATERIAL IS OPTIONAL FOR MINIMUM 2" DIAMETER CABLE BUNDLES INSTALLED IN 2" DEVICES, MINIMUM 2-1/2" DIAMETER CABLE BUNDLES INSTALLED IN 3" DEVICES AND MINIMUM 3" DIAMETER CABLE BUNDLES INSTALLED IN 3" OR 4" DEVICES.
 3. FOR CONCRETE FLOOR OVER METAL DECKING APPLICATIONS, A METAL DECK ADAPTER KIT IS REQUIRED.



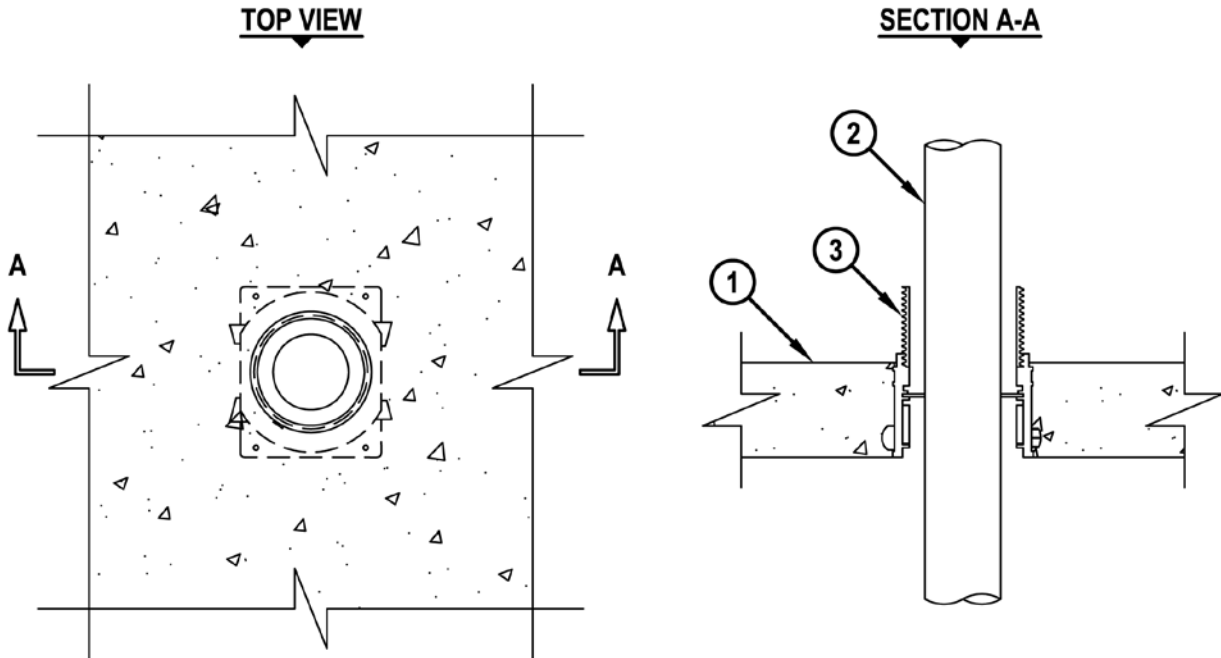
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UL/cUL SYSTEM NO. F-A-3034
**SINGLE TEK CABLE THROUGH CONCRETE FLOOR OR CONCRETE OVER
 METAL DECKING**

F-RATING = 3-HR.
 T-RATING = 1/2-HR.

FA3034b.122206



1. CONCRETE FLOOR ASSEMBLY (3-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 2-1/2" THICK).
 - B. STEEL FLOOR UNIT/FLOOR ASSEMBLY - LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 2-1/2" THICK) OVER METAL DECKING.
2. NOMINAL 4/C 500 KCMIL COPPER CONDUCTOR PVC JACKETED ALUMINUM OR STEEL CLAD TEK CABLE.
3. HILTI CP 680-M 2" OR CP 680-P 2" CAST-IN FIRESTOP DEVICE, CAST OR GROUTED INTO CONCRETE FLOOR.

**NOTE : FOR CONCRETE FLOOR OVER METAL DECKING APPLICATIONS,
 A METAL DECK ADAPTER KIT IS REQUIRED.**



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cUL SYSTEM NO. F-A-5004

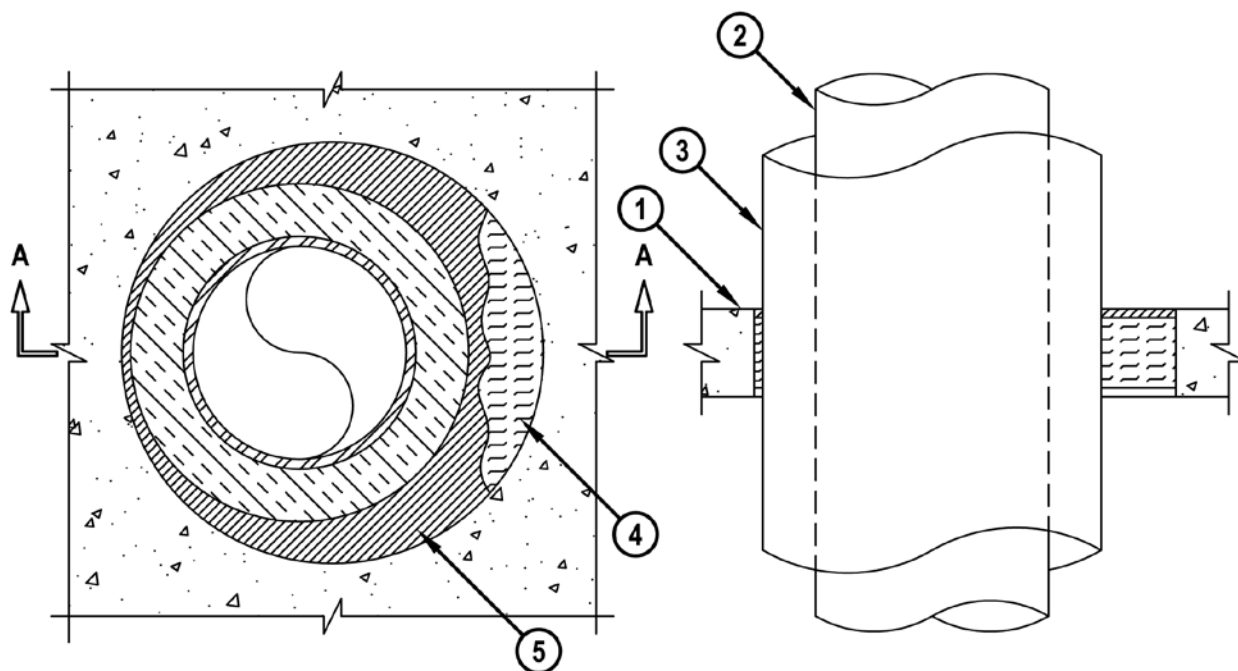
**INSULATED METAL PIPE THROUGH CONCRETE FLOOR ASSEMBLY**

F-RATING = 2-HR.

T-RATING = 3/4-HR.

FH AND FTH-RATINGS = 0-HR.

cUL FA5004a.102804

TOP VIEW**SECTION A-A**

1. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR ASSEMBLY (MINIMUM 2-1/2" THICK) (2-HR. FIRE-RATING).
2. PENETRATING ITEM TO BE ANY ONE OF THE FOLLOWING:
 - A. MAXIMUM 6" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 6" NOMINAL DIAMETER CAST OR DUCTILE IRON PIPE.
3. NOMINAL 1-1/2" THICKNESS GLASS-FIBER PIPE INSULATION.
4. MINIMUM 2" THICKNESS MINERAL WOOL (MINIMUM 4 PCF DENSITY) TIGHTLY PACKED AND RECESSED TO ACCOMMODATE FIRESTOP SEALANT.
5. MINIMUM 1/4" DEPTH HILTI CP 604 SELF-LEVELING FIRESTOP SEALANT FLUSH WITH TOP SURFACE OF CONCRETE FLOOR ASSEMBLY.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 10".
 2. ANNULAR SPACE = MINIMUM 1/4", MAXIMUM 8-1/8".



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cUL SYSTEM NO. F-A-5005

INSULATED METAL PIPE THROUGH CONCRETE FLOOR ASSEMBLY

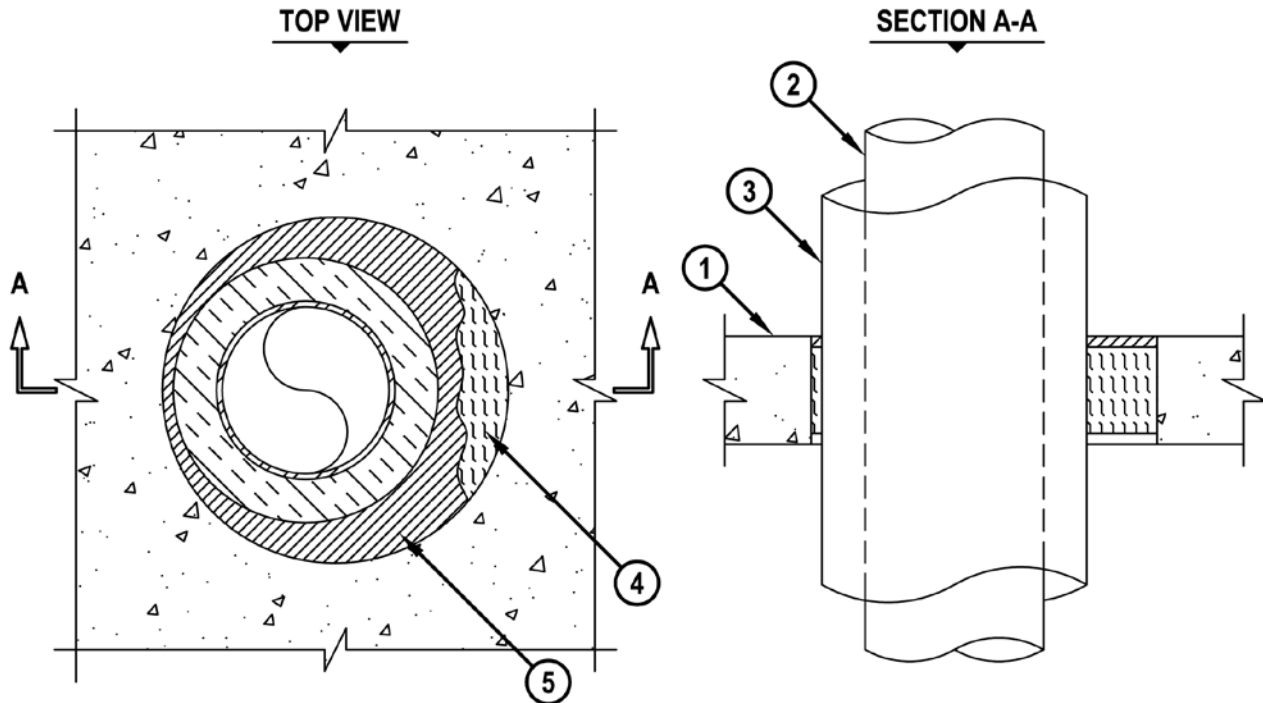
F-RATING = 2-HR.

T-RATING = 1/2 AND 3/4-HR.

FH AND FTH-RATINGS = 0-HR.



cUL FA5005a.102804



1. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR ASSEMBLY (MINIMUM 2-1/2" THICK) (2-HR. FIRE-RATING).
2. PENETRATING ITEM TO BE ANY ONE OF THE FOLLOWING:
 - A. MAXIMUM 4" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 4" NOMINAL DIAMETER CAST OR DUCTILE IRON PIPE.
 - C. MAXIMUM 4" NOMINAL DIMAETER COPPER PIPE OR TUBING.
3. NOMINAL 1" OR 1-1/2" THICKNESS GLASS-FIBER PIPE INSULATION.
4. MINIMUM 2" THICKNESS MINERAL WOOL (MINIMUM 4 PCF DENSITY) TIGHTLY PACKED AND RECESSED TO ACCOMMODATE FIRESTOP SEALANT.
5. MINIMUM 1/4" DEPTH HILTI CP 604 SELF-LEVELING FIRESTOP SEALANT FLUSH WITH TOP SURFACE OF CONCRETE FLOOR ASSEMBLY.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 8".
2. ANNULAR SPACE = MINIMUM 1/4", MAXIMUM 5-1/8".



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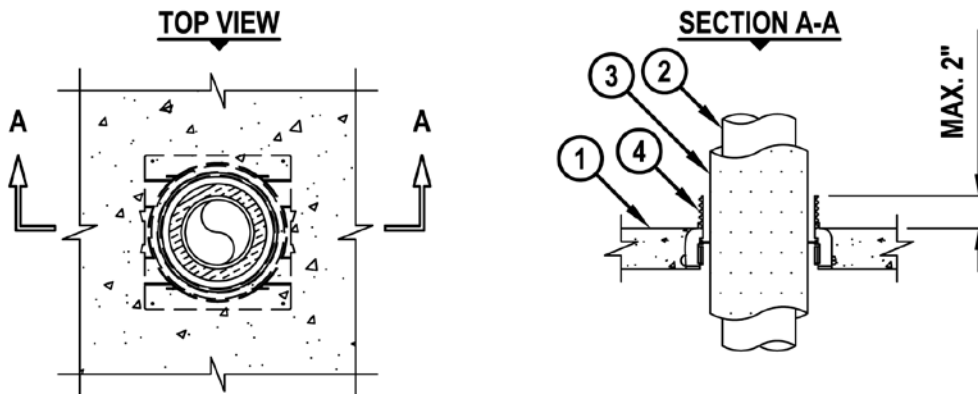
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UL/cUL SYSTEM NO. F-A-5015

INSULATED METAL PIPE THROUGH CONCRETE FLOOR OR CONCRETE OVER METAL DECKING

F-RATING = 2-HR.

T-RATING = 1/2-HR. OR 3/4-HR.



FA5015f.122706

1. CONCRETE FLOOR ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 2-1/2" THICK).
 - B. STEEL FLOOR UNIT/FLOOR ASSEMBLY - LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 2-1/2" THICK) OVER METAL DECKING.
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING (SEE TABLE BELOW) :
 - A. MAXIMUM 4" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 4" NOMINAL DIAMETER COPPER PIPE OR TUBING.
3. NOMINAL 3/4" OR 1" THICK AB/PVC FLEXIBLE FOAM PIPE INSULATION.
4. HILTI CP 680-M OR CP 680-P CAST-IN FIRESTOP CAST OR GROUTED INTO CONCRETE FLOOR (SEE TABLE BELOW).

NOMINAL PIPE DIAMETER	AB/PVC THICKNESS	PRODUCT DESCRIPTION
1/2"	1"	CP 680-M 2" OR CP 680-P 2"
1"	3/4"	CP 680-P 2" OR CP 680-P 3"
1"	1"	CP 680-M 3" OR CP 680-P 3"
1" (SEE NOTE NO. 2)	1"	CP 680-M 4"
2"	1"	CP 680-M 4" OR CP 680-P 4"
2"	3/4"	CP 680-P 4"
4"	3/4"	CP 680-P 6"

NOTES : 1. FOR CONCRETE FLOOR OVER METAL DECKING APPLICATIONS, A METAL DECK ADAPTER KIT IS REQUIRED.

2. WHEN USING A NOMINAL 1" DIAMETER PIPE WITH 1" THICK INSULATION IN A 4" DEVICE, TIGHTLY PACK 2" THICKNESS OF MINERAL WOOL (MINIMUM 4 PCF DENSITY) FLUSH WITH THE TOP OF DEVICE.



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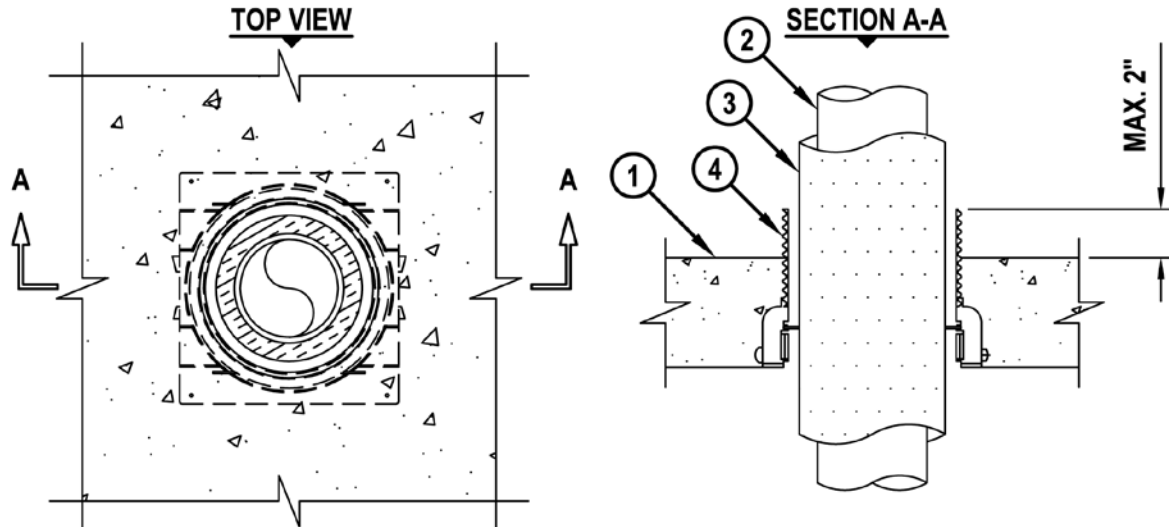
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UL/cUL SYSTEM NO. F-A-5016
**INSULATED METAL PIPE THROUGH CONCRETE FLOOR OR
 CONCRETE OVER METAL DECKING**

F-RATING = 3-HR.

T-RATING = 0-HR., 3/4-HR., 1-HR. OR 3-HR.



1. CONCRETE FLOOR ASSEMBLY (3-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 4-1/2" THICK).
 - B. STEEL FLOOR UNIT/FLOOR ASSEMBLY - LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 4-1/2" THICK) OVER METAL DECKING.
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING (SEE TABLE BELOW) :
 - A. MAXIMUM 4" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 4" NOMINAL DIAMETER COPPER PIPE OR TUBING.
3. NOMINAL 3/4" OR 1" THICK AB/PVC FLEXIBLE FOAM PIPE INSULATION.
4. HILTI CP 680-M OR CP 680-P CAST-IN FIRESTOP DEVICE, CAST OR GROUTED INTO CONCRETE FLOOR (SEE TABLE BELOW).

NOMINAL PIPE DIAMETER	AB/PVC THICKNESS	PRODUCT DESCRIPTION
1/2"	1"	CP 680-M 2" OR CP 680-P 2"
1"	1"	CP 680-M 3", CP 680-P 3", CP 680-M 4" OR CP 680-P 4"
2"	3/4"	CP 680-P 4"
4"	3/4"	CP 680-P 6"

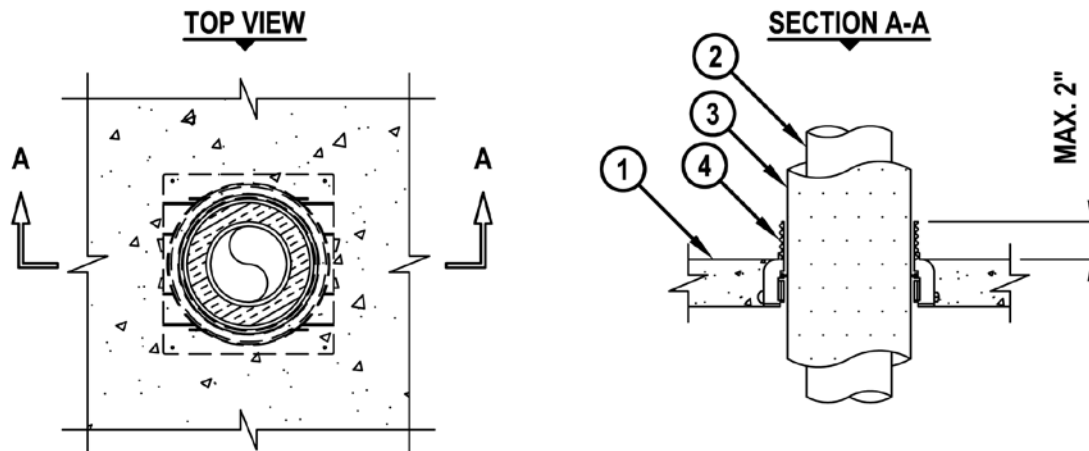
NOTES : 1. FOR CONCRETE FLOOR OVER METAL DECKING APPLICATIONS, A METAL DECK ADAPTER KIT IS REQUIRED.
 2. WHEN PIPE SIZES ARE LESS THAN INDICATED ABOVE, MINIMUM 4" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) MAY BE TIGHTLY PACKED BETWEEN THE PIPE AND PERIPHERY OF CAST-IN DEVICE, FLUSH WITH THE TOP SURFACE OF DEVICE.

UL/cUL SYSTEM NO. F-A-5017

INSULATED METAL PIPE THROUGH CONCRETE FLOOR OR CONCRETE OVER METAL DECKING

F-RATING = 2-HR.

T-RATING = 3/4-HR. OR 1-HR.



FA5017f.122706

1. CONCRETE FLOOR ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 2-1/2" THICK).
 - B. STEEL FLOOR UNIT/FLOOR ASSEMBLY - LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 2-1/2" THICK) OVER METAL DECKING.
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 4" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 4" NOMINAL DIAMETER COPPER PIPE OR TUBING.
3. NOMINAL 1", 1-1/2" OR 2" THICK GLASS-FIBER PIPE INSULATION.
4. HILTI CP 680-M OR CP 680-P CAST-IN FIRESTOP DEVICE, CAST OR GROUTED INTO CONCRETE FLOOR (SEE TABLE BELOW).

NOMINAL PIPE DIAMETER	GLASS-FIBER THICKNESS	PRODUCT DESCRIPTION
1/2"	1"	CP 680-M 2" OR CP 680-P 2"
1"	1"	CP 680-M 3" OR CP 680-P 3"
1" (SEE NOTE 2)	1-1/2" (SEE NOTE 2)	CP 680-M 4" OR CP 680-P 4"
2"	1"	CP 680-M 4" OR CP 680-P 4"
2"	2"	CP 680-P 6"
4"	1"	CP 680-P 6"

NOTES : 1. FOR CONCRETE FLOOR OVER METAL DECKING APPLICATIONS, A METAL DECK ADAPTER KIT IS REQUIRED.

2. WHEN USING A NOMINAL 1" DIAMETER PIPE WITH 1-1/2" THICK INSULATION IN A 4" DEVICE, TIGHTLY PACK A MINIMUM 2" THICKNESS OF MINERAL WOOL (MINIMUM 4 PCF DENSITY) FLUSH WITH THE TOP OF FIRESTOP DEVICE.



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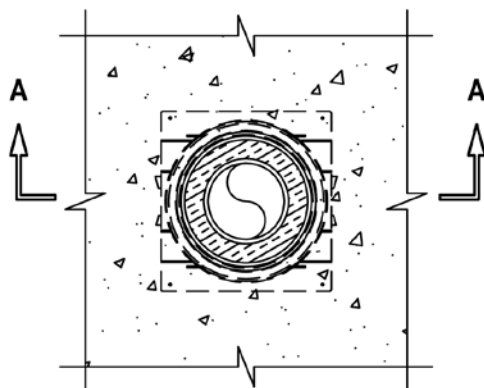
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UL/cUL SYSTEM NO. F-A-5018
**INSULATED METAL PIPE THROUGH CONCRETE FLOOR OR
CONCRETE OVER METAL DECKING**

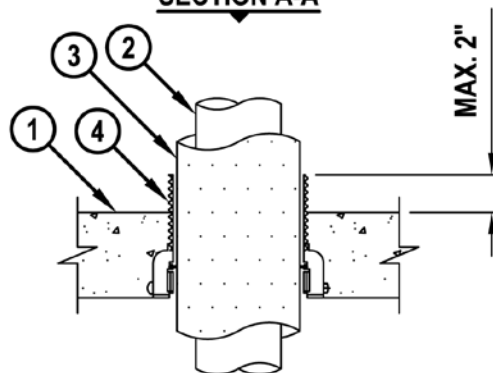
F-RATING = 3-HR.

T-RATING = 1-3/4-HR., 2-HR., 2-1/2-HR., 2-3/4-HR. OR 3-HR.

TOP VIEW



SECTION A-A



1. CONCRETE FLOOR ASSEMBLY (3-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 4-1/2" THICK).
 - B. STEEL FLOOR UNIT/FLOOR ASSEMBLY - LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 4-1/2" THICK) OVER METAL DECKING.
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 4" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 4" NOMINAL DIAMETER COPPER PIPE OR TUBING.
3. NOMINAL 1", 1-1/2" OR 2" THICK GLASS-FIBER PIPE INSULATION.
4. HILTI CP 680-M OR CP 680-P CAST-IN FIRESTOP DEVICE, CAST OR GROUTED INTO CONCRETE FLOOR (SEE TABLE BELOW).

NOMINAL PIPE DIAMETER	GLASS-FIBER THICKNESS	PRODUCT DESCRIPTION
1/2"	1"	CP 680-M 2" OR CP 680-P 2"
1"	1"	CP 680-M 3" OR CP 680-P 3"
1" (SEE NOTE 2)	1-1/2" (SEE NOTE 2)	CP 680-M 4"
2"	1"	CP 680-M 4" OR CP 680-P 4"
2"	2"	CP 680-P 6"
4"	1"	CP 680-P 6"

NOTES : 1. FOR CONCRETE FLOOR OVER METAL DECKING APPLICATIONS, A METAL DECK ADAPTER KIT IS REQUIRED.

2. WHEN USING A NOMINAL 1" DIAMETER PIPE WITH 1-1/2" THICK INSULATION IN A 4" DEVICE, TIGHTLY PACK A MINIMUM 2" THICKNESS OF MINERAL WOOL (MINIMUM 4 PCF DENSITY) AROUND PIPE FLUSH WITH THE TOP OF FIRESTOP DEVICE.



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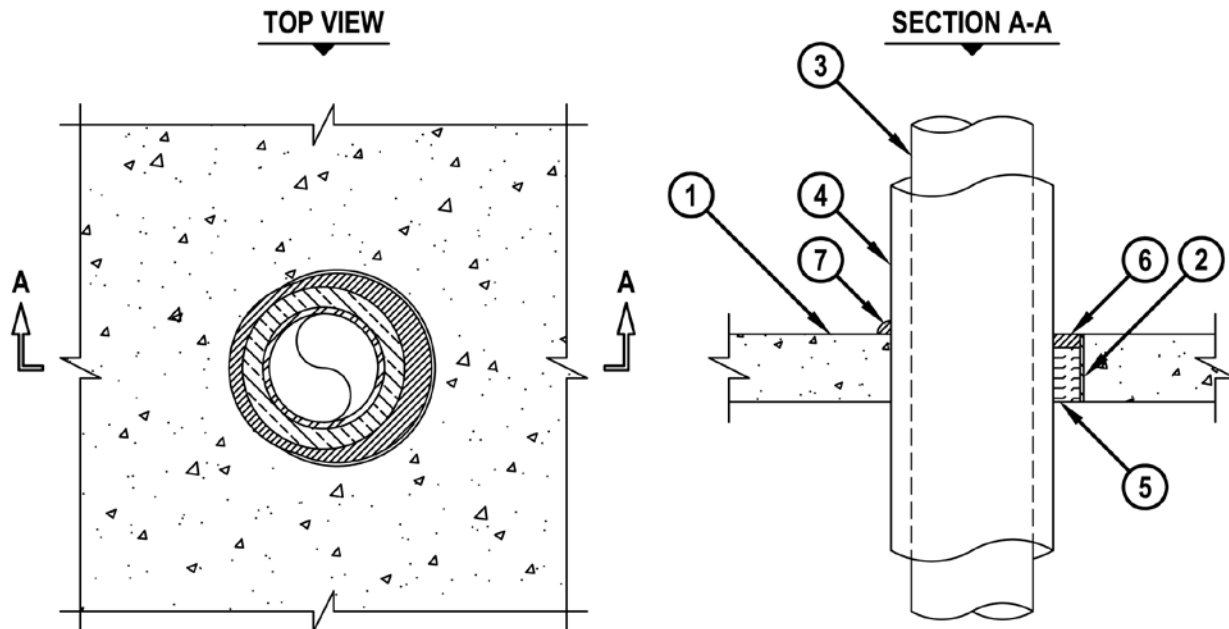
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UL/cUL SYSTEM NO. F-A-5019

INSULATED METAL PIPE THROUGH CONCRETE FLOOR OR CONCRETE OVER METAL DECKING

F-RATING = 2-HR.
T-RATING = 1/2-HR.

FA5019b.091205



1. CONCRETE FLOOR ASSEMBLY (2-HR. FIRE-RATING):
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 2-1/2" THICK).
 - B. STEEL FLOOR UNIT/FLOOR ASSEMBLY - NORMAL WEIGHT CONCRETE FLOOR (MIN. 2-1/2" THICK) OVER METAL DECKING.
2. [OPTIONAL] MAXIMUM 6" (MIN. 26 GA.) OR 12" (MIN. 24 GA.) DIAMETER GALVANIZED STEEL SLEEVE WITH SQUARE FLANGE SPOT WELDED TO BOTTOM OF SLEEVE AND SIZED MINIMUM 2" LARGER THAN SLEEVE DIAMETER. SLEEVE MAY EXTEND MAXIMUM 1" ABOVE TOP SURFACE OF FLOOR. WHEN USED ON METAL DECKS, STEEL FLANGE SPOT WELDED TO THE SLEEVE AT APPROXIMATE MID-HEIGHT AND MAY EXTEND A MAXIMUM OF 4" BELOW THE BOTTOM OF THE DECK.
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING:
 - A. MAXIMUM 4" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 4" NOMINAL DIAMETER COPPER PIPE.
4. NOMINAL 3/4" THICK AB/PVC FLEXIBLE FOAM PIPE INSULATION.
5. MINIMUM 2" THICKNESS MINERAL WOOL (MINIMUM 4 PCF DENSITY) TIGHTLY PACKED.
- 6 MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
- 7 MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 7".
2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1-3/8".



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UL/cUL SYSTEM NO. F-A-5021

INSULATED METAL PIPE THROUGH CONCRETE FLOOR OR CONCRETE FLOOR OVER METAL DECKING

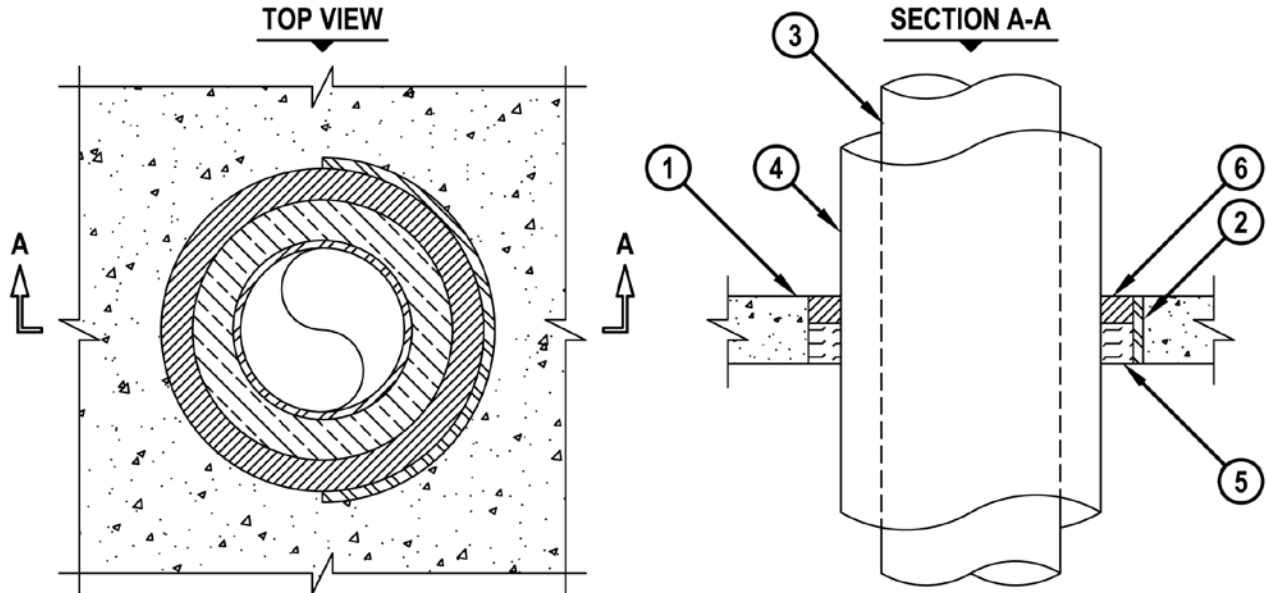
F-RATING = 2-HR.

T-RATING = 0-HR.

L-RATING AT AMBIENT = 4 CFM/SQ. FT.

L-RATING AT 400° = LESS THAN 1 CFM/SQ. FT.

FA5021c.031306



1. CONCRETE FLOOR ASSEMBLY (2-HR. FIRE-RATING):
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 2-1/2" THICK).
 - B. STEEL FLOOR UNIT/FLOOR ASSEMBLY - LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 2-1/2" THICK) OVER METAL DECKING.
2. [OPTIONAL] ANY OF THE FOLLOWING SLEEVES MAY BE USED :
 - A. MAXIMUM 18" NOMINAL DIAMETER STEEL PIPE SLEEVE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 6" (MIN. 26 GA.) OR 12" (MIN. 24 GA.) DIAMETER GALVANIZED STEEL SLEEVE WITH SQUARE FLANGE SPOT WELDED TO BOTTOM OF SLEEVE AND SIZED MINIMUM 2" LARGER THAN SLEEVE DIAMETER. SLEEVE MAY EXTEND MAXIMUM 1" ABOVE TOP SURFACE OF FLOOR. WHEN USED ON METAL DECKS, STEEL FLANGE SPOT WELDED TO THE SLEEVE AT APPROXIMATE MID-HEIGHT AND MAY EXTEND A MAXIMUM OF 4" BELOW THE BOTTOM OF THE DECK.
3. PENETRATING ITEM TO BE ANY ONE OF THE FOLLOWING:
 - A. MAXIMUM 12" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 6" NOMINAL DIAMETER COPPER PIPE.
4. NOMINAL 1-1/2" THICK GLASS-FIBER PIPE INSULATION.
5. MINIMUM 1-1/2" THICKNESS MINERAL WOOL (MINIMUM 4 PCF DENSITY) TIGHTLY PACKED.
6. MINIMUM 1" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 18".
2. ANNULAR SPACE = MINIMUM 1/2", MAXIMUM 1-7/8".



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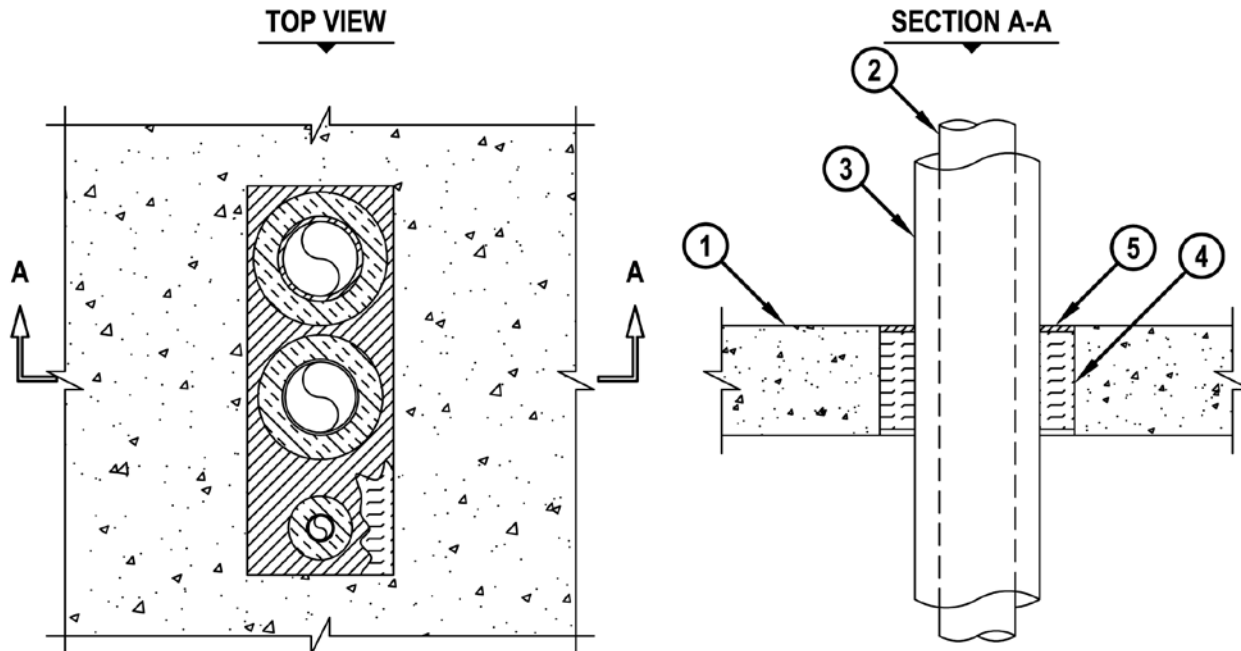
UL/cUL SYSTEM NO. F-A-5032

INSULATED METAL PENETRANTS THROUGH CONCRETE FLOOR ASSEMBLY

F-RATING = 2-HR.

T-RATING = 1-HR.

FA5032a.021304



1. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR ASSEMBLY (MINIMUM 4-1/2" THICK) (2-HR. FIRE-RATING).
2. PENETRANTS TO CONSIST OF ANY OF THE FOLLOWING (MAXIMUM QUANTITY = 3) :
 - A. MAXIMUM 3" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 5 OR HEAVIER).
 - B. MAXIMUM 3" NOMINAL DIAMETER CAST OR DUCTILE IRON.
 - C. MAXIMUM 3" NOMINAL DIAMETER COPPER PIPE.
3. ONE OF THE FOLLOWING TYPES OF PIPE INSULATION SHALL BE USED ON EACH PENETRANT :
 - A. NOMINAL 1" THICK GLASS-FIBER PIPE INSULATION WITH AN ALL SERVICE JACKET.
 - B. NOMINAL 1" THICK AB/PVC PIPE INSULATION.
4. MINIMUM 4" THICKNESS MINERAL WOOL (MINIMUM 4 PCF DENSITY) TIGHTLY PACKED AND RECESSED TO ACCOMMODATE FIRESTOP SEALANT.
5. MINIMUM 1/4" DEPTH HILTI CP 604 SELF-LEVELING FIRESTOP SEALANT FLUSH WITH TOP SURFACE OF FLOOR.

NOTES : 1. MAXIMUM SIZE OF OPENING = 6" x 16".
 2. ANNULAR SPACE = MINIMUM 1/4", MAXIMUM 2".



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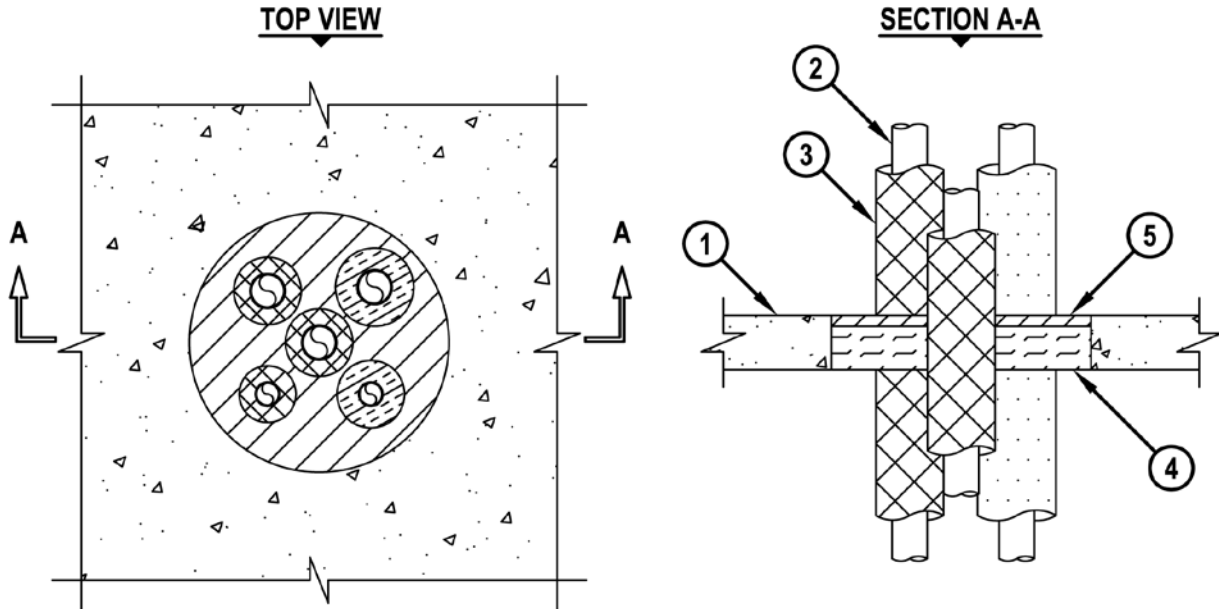
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UL/cUL SYSTEM NO. F-A-5036

MULTIPLE INSULATED PIPE THROUGH CONCRETE FLOOR ASSEMBLY

F-RATING = 2-HR.

T-RATING = 1/2-HR. OR 1-HR.



FA5036a.081706

1. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR ASSEMBLY (MINIMUM 2-1/2" THICK) (2-HR. FIRE-RATING).
2. ANY COMBINATION OF THE FOLLOWING PIPES MAY BE INSTALLED WITH THE OPENING (MAX. QTY. = 5) :
 - A. MAXIMUM 1-1/2" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 1-1/2" NOMINAL DIAMETER CAST OR DUCTILE IRON PIPE.
 - C. MAXIMUM 1-1/2" NOMINAL DIAMETER COPPER PIPE OR TUBING.
3. ONE OF THE FOLLOWING PIPE COVERINGS TO BE USED ON EACH PIPE :
 - A. NOMINAL 1" THICK GLASS-FIBER PIPE INSULATION.
 - B. NOMINAL 3/4" THICK AB/PVC PIPE INSULATION ON PIPES NOMINAL 1" DIAMETER OR SMALLER ONLY.
4. MINIMUM 2" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED.
5. MINIMUM 1/2" DEPTH HILTI CP 604 SELF LEVELING FIRESTOP SEALANT FLUSH WITH TOP SURFACE OF FLOOR.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 12".
 2. ANNULAR SPACE BETWEEN INSULATED PIPES = MINIMUM 1/4", MAXIMUM 2".
 3. ANNULAR SPACE BETWEEN GLASS-FIBER INSULATED PIPE AND PERIPHERY OF OPENING = MINIMUM 1/4", MAXIMUM 2".
 4. ANNULAR SPACE BETWEEN AB/PVC INSULATED PIPE AND PERIPHERY OF OPENING = MINIMUM 1/2", MAXIMUM 2".



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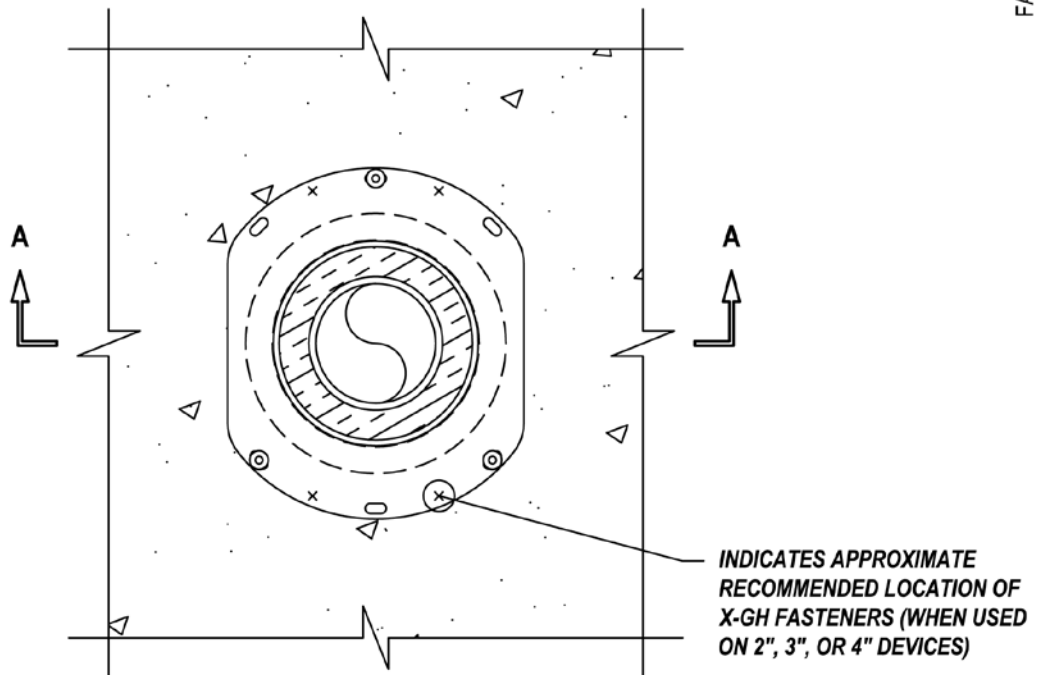
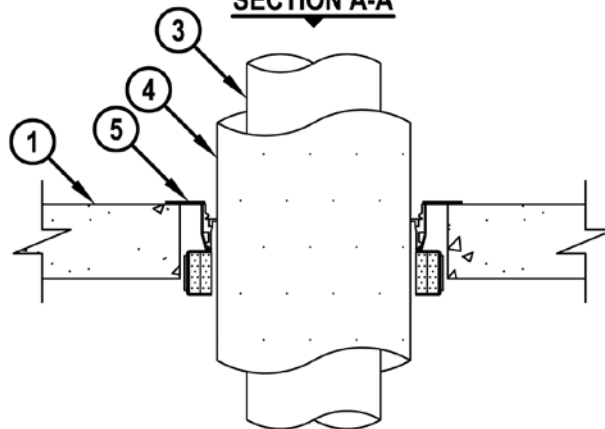
UL/cUL SYSTEM NO. F-A-5046

INSULATED METAL PIPE THROUGH CONCRETE FLOOR ASSEMBLY

F-RATING = 2-HR. OR 3-HR.

T-RATING = 0-HR. OR 1/2-HR.

FA5046b.051311

TOP VIEW**SECTION A-A****1. CONCRETE FLOOR ASSEMBLY (2-HR. OR 3-HR. FIRE-RATING) :****A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 2-1/2" TO 8" THICK).****B. STEEL FLOOR UNIT/FLOOR ASSEMBLY - LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 2-1/2" TO 8" THICK) OVER METAL DECKING (UL CLASSIFIED D700, D800, OR D900 SERIES).**

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UL/cUL SYSTEM NO. F-A-5046

INSULATED METAL PIPE THROUGH CONCRETE FLOOR ASSEMBLY

F-RATING = 2-HR. OR 3-HR.

T-RATING = 0-HR. OR 1/2-HR.

FA5046b.051311

2. [OPTIONAL - NOT SHOWN] ANY OF THE FOLLOWING SLEEVES MAY BE USED :
- A. NOMINAL 4", 5", OR 6" DIAMETER STEEL PIPE SLEEVE (SCHEDULE 10 OR HEAVIER) CAST OR GROUTED INTO FLOOR ASSEMBLY, FLUSH WITH FLOOR SURFACES.
 - B. NOMINAL 4", 5", 6", OR 9" DIAMETER GALVANIZED STEEL SLEEVE (MIN. 26 GA.) WITH SQUARE FLANGE SPOT WELDED TO BOTTOM OR MID-HEIGHT OF SLEEVE AND SIZED MINIMUM 2" LARGER THAN SLEEVE DIAMETER. SLEEVE IS TO BE CAST IN PLACE, AND MAY EXTEND A MAXIMUM 4" BELOW BOTTOM SURFACE OF FLOOR AND SIT FLUSH WITH TOP SURFACE OF FLOOR.
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
- A. MAXIMUM 4" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 4" NOMINAL DIAMETER CAST OR DUCTILE IRON PIPE.
 - C. MAXIMUM 4" NOMINAL DIAMETER COPPER PIPE OR TUBING.
4. ONE OF THE FOLLOWING PIPE COVERS TO BE USED :
- A. NOMINAL 3/4" OR 1" THICK AB/PVC PIPE INSULATION (SEE NOTE NOTES BELOW).
 - B. NOMINAL 1", 1-1/2", OR 2" THICK GLASS-FIBER PIPE INSULATION.
5. HILTI CFS-DID FIRESTOP DROP-IN DEVICE INSERTED INTO OPENING (SEE TABLE BELOW) AND SECURED TO TOP OF FLOOR WITH THREE HILTI 1/4" (6mm) DIAMETER BY 1-1/4" (32mm) LONG KWIK-CON II+ CONCRETE SCREW ANCHORS, HILTI 1/4" (6mm) DIAMETER BY 1-3/4" (45mm) LONG KWIK BOLT 3 STEEL EXPANSION ANCHORS, OR HILTI 1/4" (6mm) BY 3/4" (19mm) LONG METAL HIT ANCHORS (INSTALLED IN A TRIANGULAR FASHION THROUGH HOLES PROVIDED). IN ADDITION, FOR NOMINAL 2", 3", AND 4" DEVICES, FOUR 11/16" (18mm) LONG HILTI X-GH P18 MX STEEL FASTENERS MAY BE INSTALLED THROUGH THE STEEL FLANGE, TWO ON EACH SIDE.

NOMINAL PIPE DIAMETER	INSULATION TYPE AND THICKNESS	FIRESTOP DEVICE	CORE HOLE OR SLEEVE DIAMETER
1/2"	3/4" OR 1" AB/PVC	CFS-DID 2" MD	4"
1"	3/4" OR 1" AB/PVC	CFS-DID 3" MD	5"
2"	3/4" OR 1" AB/PVC	CFS-DID 4" MD	6"
4"	3/4" OR 1" AB/PVC	CFS-DID 6" MD	9"
1/2"	1" GLASS-FIBER	CFS-DID 2" MD	4"
1"	1" GLASS-FIBER	CFS-DID 3" MD	5"
1"	1-1/2" GLASS-FIBER	CFS-DID 4" MD	6"
2"	1" GLASS-FIBER	CFS-DID 4" MD	6"
2"	2" GLASS-FIBER	CFS-DID 6" MD	9"
4"	1" GLASS-FIBER	CFS-DID 6" MD	9"

NOTE : T-RATING = 0-HR. WHEN SLEEVE IS USED.



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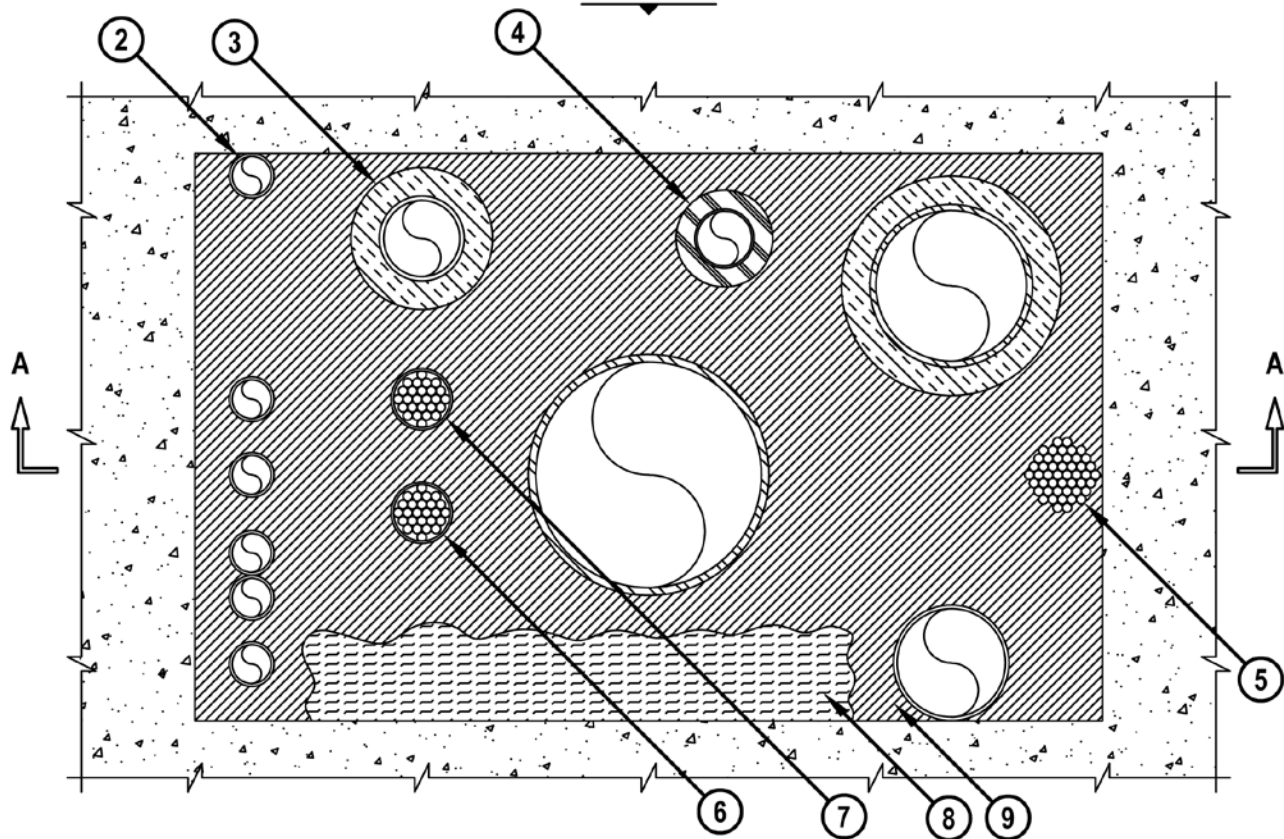
cUL SYSTEM NO. F-A-8002

**MULTIPLE PENETRATIONS THROUGH CONCRETE FLOOR ASSEMBLY**

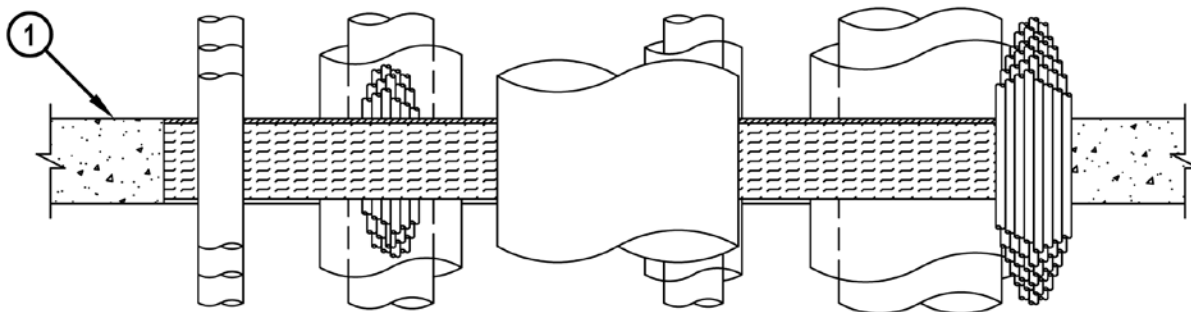
F-RATING = 2-HR.
 FT, FH AND FTH-RATINGS = 0-HR.

cULFA8002a.032504

TOP VIEW



SECTION A-A



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cUL SYSTEM NO. F-A-8002

MULTIPE PENETRATIONS THROUGH CONCRETE FLOOR ASSEMBLY

F-RATING = 2-HR.

FT, FH AND FTH-RATINGS = 0-HR.



cULFA8002a.032504

1. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 4-1/2" THICK) (2-HR. FIRE-RATING).
2. ONE OR MORE OF THE FOLLOWING PENETRATING ITEMS (ITEMS 2-7) AND IN ANY COMBINATION MAY BE INSTALLED WITHIN THE OPENING :
 - A. MAXIMUM 24" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 40 OR HEAVIER).
 - B. MAXIMUM 24" NOMINAL DIAMETER CAST OR DUCTILE IRON PIPE.
 - C. MAXIMUM 6" NOMINAL DIAMETER COPPER PIPE.
 - D. MAXIMUM 6" NOMINAL DIAMETER STEEL CONDUIT.
 - E. MAXIMUM 4" NOMINAL DIAMETER EMT.
3. OPTIONAL : ANY OR ALL PIPES (4" OR SMALLER) MAY BE INSULATED WITH MAXIMUM 1-1/2" THICK GLASS-FIBER PIPE INSULATION.
4. OPTIONAL : ANY OR ALL PIPES (2" OR SMALLER) MAY BE INSULATED WITH MAXIMUM 1" AB/PVC PIPE INSULATION.
5. MAXIMUM 4" NOMINAL DIAMETER CABLE BUNDLE OR INDIVIDUAL CABLE TO CONSIST OF ANY OF THE FOLLOWING :
 - A. MAXIMUM 500 KCMIL SINGLE COPPER OR ALUMINUM CONDUCTOR POWER CABLE WITH PVC JACKET.
 - B. MAXIMUM 300 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
 - C. MAXIMUM 7/C NO. 12 AWG POWER CABLE WITH PVC JACKET.
 - D. MAXIMUM 1/2" DIAMETER FIBER OPTIC CABLE WITH PVC JACKET.
 - E. MAXIMUM 3/C NO. 12 AWG STEEL CLAD CABLE.
6. MAXIMUM 3/C NO. 2/0 AWG COPPER CONDUCTOR PVC JACKETED ALUMINUM OR STEEL CLAD TECK 90 CABLE.
7. MAXIMUM 4/C NO. 750 KCMIL ALUMINUM OR COPPER CONDUCTOR WITH ALUMINUM OR STEEL CLAD WITH OR WITHOUT PVC JACKET.
8. MINIMUM 4" THICKNESS MINERAL WOOL (MINIMUM 4 PCF DENSITY) TIGHTLY PACKED.
9. MINIMUM 1/4" DEPTH HILTI CP 604 SELF-LEVELING FIRESTOP SEALANT.

ANNULAR SPACE	MINIMUM	MAXIMUM
BETWEEN CABLE BUNDLES AND OTHER PENETRANTS	6"	12"
BETWEEN METAL PIPES LARGER THAN 2"	2"	12"
BETWEEN 2" AND SMALLER PIPES	0"	12"
BETWEEN INSULATED PIPES AND THE PERIPHERY OF OPENING	1/2"	12"
BETWEEN ALL OTHER PENETRANTS AND THE PERIPHERY OF THE OPENING	0"	12"

NOTE : MAXIMUM DIAMETER OF OPENING = 48" x 30".



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UL/cUL SYSTEM NO. F-A-8004

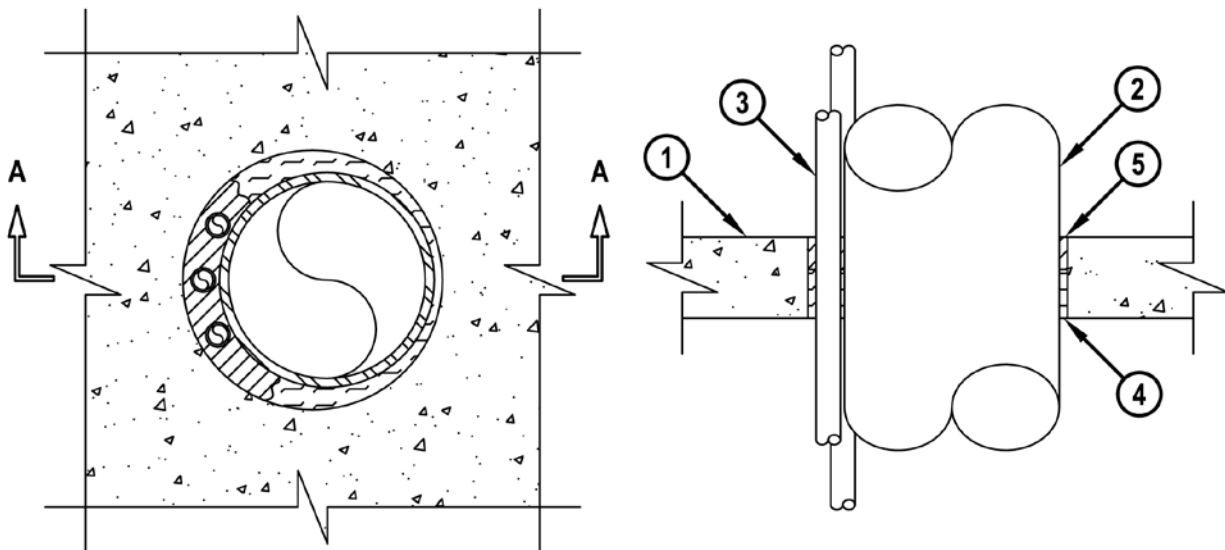
STEEL TUBE AND CABLES THROUGH CONCRETE FLOOR OR CONCRETE FLOOR OVER METAL DECKING

F-RATING = 2-HR.
T-RATING = 0-HR.

FA8004a.111500

TOP VIEW

SECTION A-A



1. CONCRETE FLOOR OR WALL ASSEMBLY (2-HR. FIRE-RATING):
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 2-1/2" THICK).
 - B. STEEL FLOOR UNIT/FLOOR ASSEMBLY - NORMAL WEIGHT CONCRETE FLOOR (MIN. 2-1/2" THICK) OVER METAL DECKING.
2. MAXIMUM 6" NOMINAL DIAMETER STEEL TUBE (16 GA.).
3. TWO PAIR NO. 22 AWG FOIL SHIELDED COMMUNICATION CABLES (MAX. QTY. = 3).
4. MINIMUM 1-1/2" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED.
5. MINIMUM 1" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 8".
 2. ANNULAR SPACE BETWEEN TUBE AND PERIPHERY OF OPENING = MIN. 1/4", MAX. 1-3/4".
 3. ANNULAR SPACE BETWEEN CABLES AND PERIPHERY OF OPENING = MINIMUM 1/4".
 4. ANNULAR SPACE BETWEEN CABLES AND STEEL TUBE = MINIMUM 0", MAXIMUM 1".



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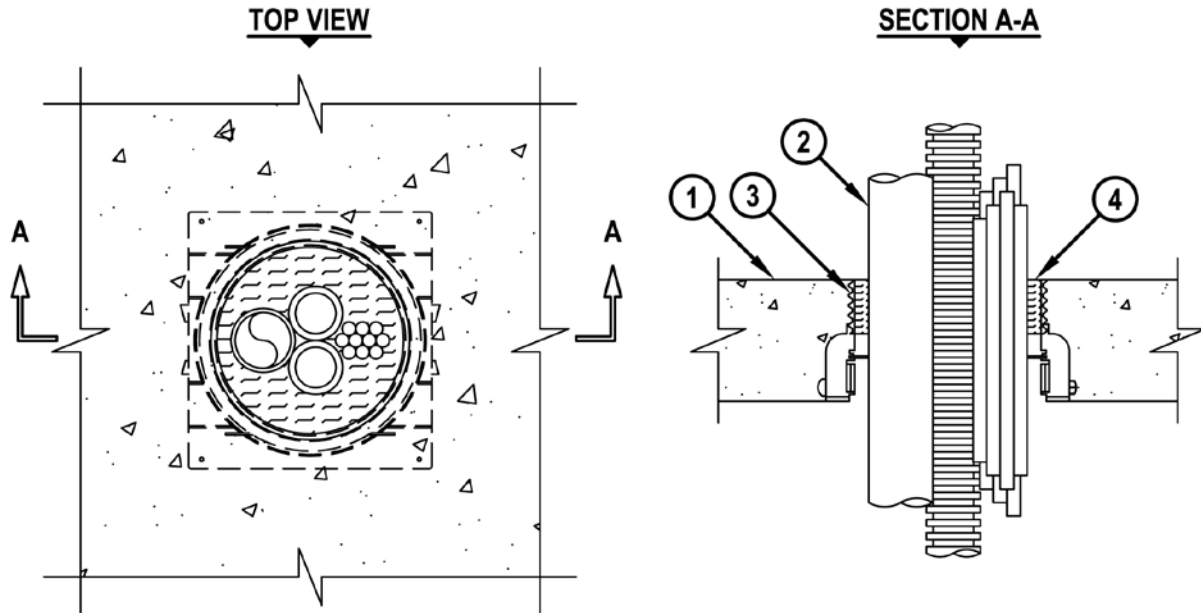
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UL/cUL SYSTEM NO. F-A-8023
**MULTIPLE PENETRANTS THROUGH CONCRETE FLOOR OR
CONCRETE OVER METAL DECKING**

F-RATING = 3-HR.
T-RATING = 0-HR.

FA8023b.122206



1. CONCRETE FLOOR OR WALL ASSEMBLY (3-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MINIMUM 4-1/2" THICK).
 - B. STEEL FLOOR UNIT/FLOOR ASSEMBLY - LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 4-1/2" THICK) OVER METAL DECKING.
2. PENETRATING ITEMS TO BE ANY BUNDLED COMBINATION OF THE FOLLOWING :
 - A. MAXIMUM 2" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER) (MAX. QTY. = 1).
 - B. MAXIMUM 2" NOMINAL DIAMETER ENT (MAX. QTY. = 2).
 - C. MAXIMUM 2" DIAMETER CABLE BUNDLE CONSISTING OF MAXIMUM 7/C NO. 12 AWG CABLE AND/OR MAXIMUM 25 PAIR NO. 24 AWG TELEPHONE CABLE.
3. HILTI CP 680-P [2", 3", 4" OR 6"] CAST-IN FIRESTOP DEVICE CAST OR GROUTED INTO CONCRETE FLOOR.
4. MINIMUM 2" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED AND FLUSH WITH TOP OF FIRESTOP DEVICE.

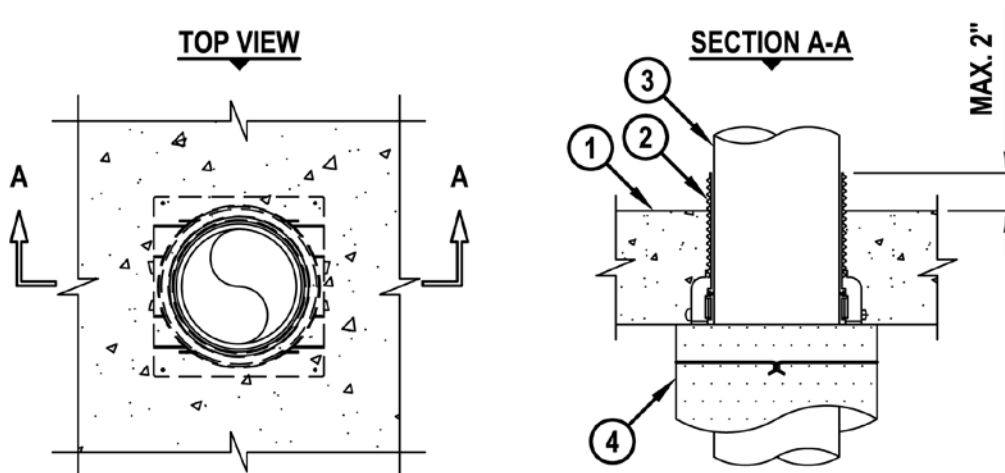
NOTES : 1. FOR CONCRETE FLOOR OVER METAL DECKING APPLICATIONS, A METAL DECK ADAPTER KIT IS REQUIRED.
2. ANNULAR SPACE BETWEEN BUNDLE AND DEVICE = MINIMUM 1/2", MAXIMUM 2".

UL/cUL SYSTEM NO. F-B-1010

METAL PENETRANT THROUGH CONCRETE FLOOR ASSEMBLY

F-RATING = 2-HR.

T-RATING = 2-HR.



FB1010f.122706

1. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR ASSEMBLY (MINIMUM 6" THICK) (2-HR. FIRE-RATING).
2. HILTI CP 680-M OR CP 680-P CAST-IN FIRESTOP DEVICE, CAST OR GROUTED INTO CONCRETE FLOOR (SEE TABLE BELOW).
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING (ALSO SEE NOTE NO. 1 BELOW) :
 - A. MAXIMUM 6" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 6" NOMINAL DIAMETER CAST OR DUCTILE IRON PIPE.
 - C. MAXIMUM 6" NOMINAL DIAMETER STEEL CONDUIT.
 - D. MAXIMUM 4" NOMINAL DIAMETER EMT.
4. NOMINAL 2" THICK MINERAL FIBER PIPE INSULATION TO EXTEND MINIMUM 30" BELOW FLOOR ASSEMBLY. PIPE INSULATION TO BE TIGHTLY BUTTED TO BOTTOM OF FLOOR ASSEMBLY AND SECURED WITH 16 GA. STEEL TIE WIRE SPACED MAXIMUM 6" O.C. (SEE NOTE NO. 2 BELOW).

NOMINAL PIPE DIAMETER	PRODUCT DESCRIPTION	T-RATING
1-1/2" TO 2"	CP 680-M 2" OR CP 680-P 2"	2-HR.
3"	CP 680-M 3" OR CP 680-P 3"	2-HR.
3" TO 4"	CP 680-M 4" OR CP 680-P 4"	2-HR.
4" TO 6"	CP 680-M 6" OR CP 680-P 6"	2-HR.

NOTES : 1. PENETRANT MAY RUN VERTICALLY OR TURN 90° HORIZONTALLY BELOW FLOOR.
 2. IN ADDITION TO STEEL TIE WIRE, INSULATION SHALL BE WRAPPED WITH A UL APPROVED ALL SERVICE JACKET OR FOIL-SCRIM-KRAFT.
 3. WHEN PIPE DIAMETER IS SMALLER THAN INDICATED ABOVE, A MINIMUM 1" THICKNESS HILTI CP 618 FIRESTOP PUTTY STICK OR MINIMUM 4" THICKNESS TIGHTLY PACKED MINERAL WOOL (MIN. 4 PCF DENSITY) SHALL BE APPLIED BETWEEN THE PIPE AND PERIPHERY OF HILTI CAST-IN FIRESTOP DEVICE, FLUSH WITH TOP SURFACE OF DEVICE.



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UL/cUL SYSTEM NO. F-B-1026

METAL PIPE THROUGH CONCRETE FLOOR ASSEMBLY

F-RATING = 3-HR.

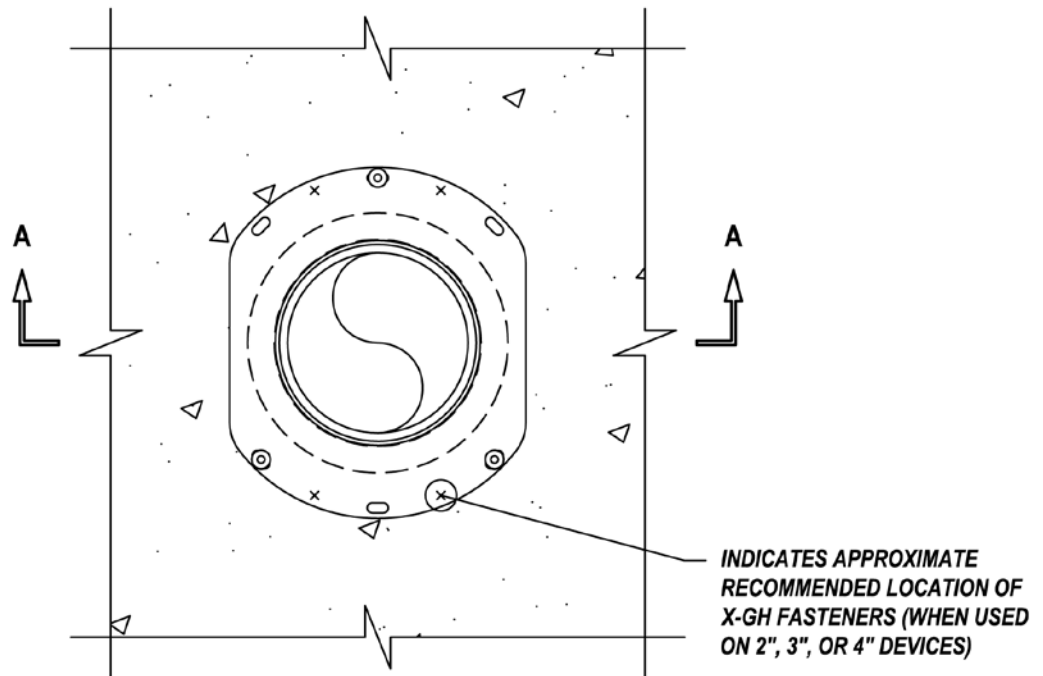
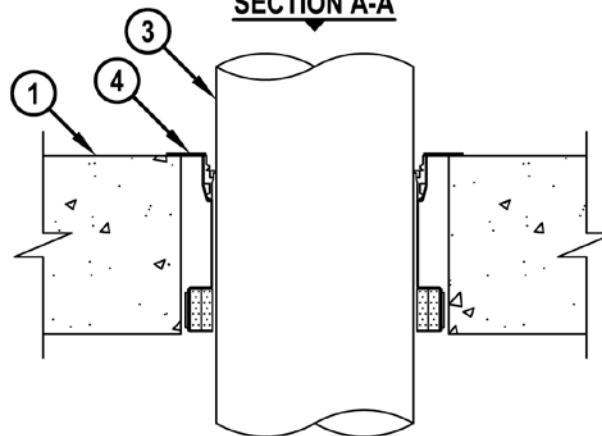
T-RATING = 0-HR. OR 1/4-HR.

L-RATING AT AMBIENT = LESS THAN 1 CFM/SQ. FT. (SEE NOTE BELOW)

L-RATING AT 400°F = LESS THAN 1 CFM/SQ. FT. (SEE NOTE BELOW)

W-RATING = CLASS I (SEE NOTE BELOW)

FB1026b.051311

TOP VIEW**SECTION A-A**

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UL/cUL SYSTEM NO. F-B-1026

METAL PIPE THROUGH CONCRETE FLOOR ASSEMBLY

F-RATING = 3-HR.

T-RATING = 0-HR. OR 1/4-HR.

L-RATING AT AMBIENT = LESS THAN 1 CFM/SQ. FT. (SEE NOTE BELOW)

L-RATING AT 400°F = LESS THAN 1 CFM/SQ. FT. (SEE NOTE BELOW)

W-RATING = CLASS I (SEE NOTE BELOW)

FB1026b.051311

1. CONCRETE FLOOR ASSEMBLY (3-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 6" TO 12" THICK).
 - B. STEEL FLOOR UNIT/FLOOR ASSEMBLY - LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 6 TO 12" THICK) OVER METAL DECKING (UL CLASSIFIED D700, D800, OR D900 SERIES).
2. [OPTIONAL - NOT SHOWN] ANY OF THE FOLLOWING SLEEVES MAY BE USED :
 - A. NOMINAL 4", 5", OR 6" DIAMETER STEEL PIPE SLEEVE (SCHEDULE 10 OR HEAVIER) CAST OR GROUTED INTO FLOOR ASSEMBLY, FLUSH WITH FLOOR SURFACES.
 - B. NOMINAL 4", 5", 6", OR 9" DIAMETER GALVANIZED STEEL SLEEVE (MIN. 26 GA.) WITH SQUARE FLANGE SPOT WELDED TO BOTTOM OR MID-HEIGHT OF SLEEVE AND SIZED MINIMUM 2" LARGER THAN SLEEVE DIAMETER. SLEEVE IS TO BE CAST IN PLACE, AND MAY EXTEND A MAXIMUM 4" BELOW BOTTOM SURFACE OF FLOOR AND SIT FLUSH WITH TOP SURFACE OF FLOOR.
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 6" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 6" NOMINAL DIAMETER CAST OR DUCTILE IRON PIPE.
 - C. MAXIMUM 6" NOMINAL DIAMETER COPPER PIPE OR TUBING.
 - D. MAXIMUM 6" NOMINAL DIAMETER STEEL CONDUIT.
 - E. MAXIMUM 4" NOMINAL DIAMETER EMT.
4. HILTI CFS-DID FIRESTOP DROP-IN DEVICE INSERTED INTO OPENING (SEE TABLE BELOW) AND SECURED TO TOP OF FLOOR WITH THREE HILTI 1/4" (6mm) DIAMETER BY 1-1/4" (32mm) LONG KWIK-CON II+ CONCRETE SCREW ANCHORS, HILTI 1/4" (6mm) DIAMETER BY 1-3/4" (45mm) LONG KWIK BOLT 3 STEEL EXPANSION ANCHORS, OR HILTI 1/4" (6mm) BY 3/4" (19mm) LONG METAL HIT ANCHORS (INSTALLED IN A TRIANGULAR FASHION THROUGH HOLES PROVIDED). IN ADDITION, FOR NOMINAL 2", 3", AND 4" DEVICES, FOUR 11/16" (18mm) LONG HILTI X-GH P18 MX STEEL FASTENERS MAY BE INSTALLED THROUGH THE STEEL FLANGE, TWO ON EACH SIDE.

CORE HOLE OR SLEEVE DIAMETER	PRODUCT DESCRIPTION	NOMINAL PIPE DIAMETER
4"	CFS-DID 2" C	2" (OR SMALLER)+
5"	CFS-DID 3" C	3"
6"	CFS-DID 4" C	4"
9"	CFS-DID 6" C	6"

+ FOR PIPE SMALLER THAN NOMINAL 2" DIAMETER, AN ADAPTER AND HILTI IPS OR CPS TOP SEAL PLUG MUST BE USED IN CONJUNCTION WITH THE CFS-DID 2" C DEVICE.

NOTE : [OPTIONAL] TO ACHIEVE W-RATING AND/OR L-RATING, WATER BARRIER MODULES MAY BE THREADED ON TOP OF CFS-DID DEVICES FOR NOMINAL 2", 3", 4", AND 6" PIPES (LISTED ABOVE).



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UL/cUL SYSTEM NO. F-B-1029

METAL PIPE THROUGH HOLLOW-CORE CONCRETE FLOOR ASSEMBLY

F-RATING = 3-HR.

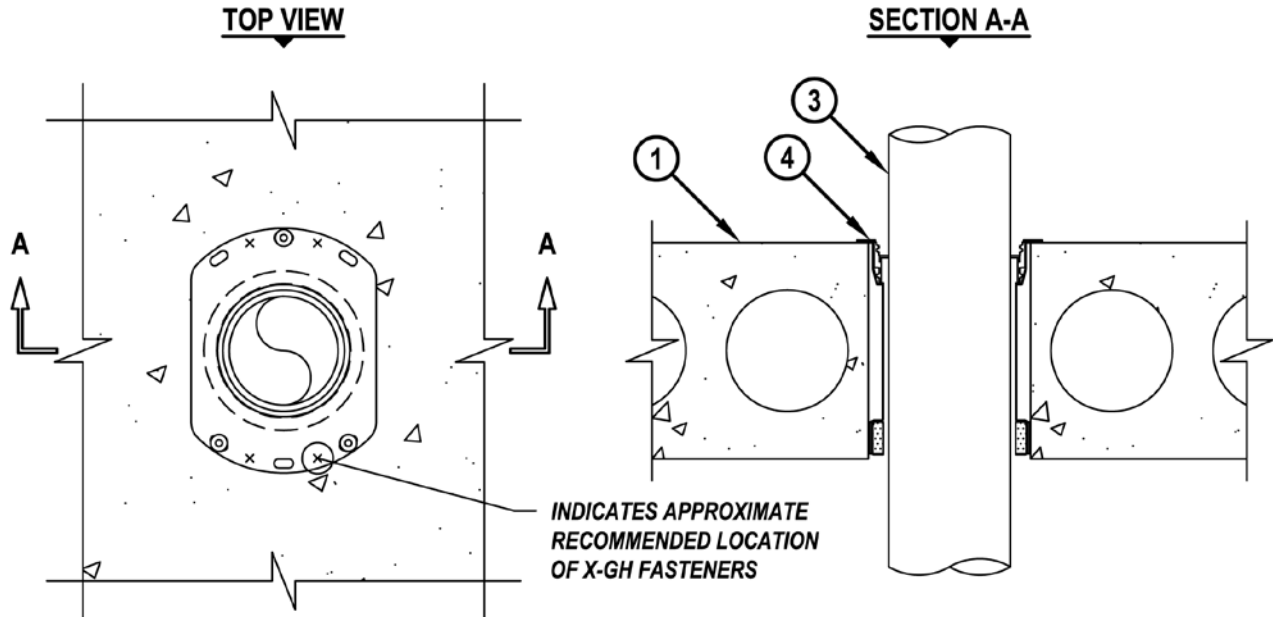
T-RATING = 0-HR. OR 1/4-HR.

L-RATING AT AMBIENT = LESS THAN 1 CFM/SQ. FT. (SEE NOTE BELOW)

L-RATING AT 400°F = LESS THAN 1 CFM/SQ. FT. (SEE NOTE BELOW)

W-RATING = CLASS I (SEE NOTE BELOW)

FB1029a.051311



1. ANY UL CLASSIFIED PRECAST HOLLOW-CORE FLOOR ASSEMBLY (MINIMUM 6" TO MAXIMUM 12-1/2" THICK) (3-HR. FIRE-RATING).
2. [OPTIONAL - NOT SHOWN] NOMINAL 4", 5", OR 6" DIAMETER GALVANIZED STEEL SLEEVE (MIN. 26 GA.), HAVING A MINIMUM 2" LAP ALONG THE LONGITUDINAL SEAM, INSERTED INTO THE OPENING. SLEEVE MAY EXTEND A MAXIMUM 4" BELOW BOTTOM SURFACE OF FLOOR AND SIT FLUSH WITH TOP SURFACE OF FLOOR.



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UL/cUL SYSTEM NO. F-B-1029

METAL PIPE THROUGH HOLLOW-CORE CONCRETE FLOOR ASSEMBLY

F-RATING = 3-HR.

T-RATING = 0-HR. OR 1/4-HR.

L-RATING AT AMBIENT = LESS THAN 1 CFM/SQ. FT. (SEE NOTE BELOW)

L-RATING AT 400°F = LESS THAN 1 CFM/SQ. FT. (SEE NOTE BELOW)

W-RATING = CLASS I (SEE NOTE BELOW)

FB1029a.051311

3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
- A. MAXIMUM 4" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 4" NOMINAL DIAMETER CAST OR DUCTILE IRON PIPE.
 - C. MAXIMUM 4" NOMINAL DIAMETER COPPER PIPE OR TUBING.
 - D. MAXIMUM 4" NOMINAL DIAMETER STEEL CONDUIT OR EMT.
4. HILTI CFS-DID FIRESTOP DROP-IN DEVICE INSERTED INTO OPENING (SEE TABLE BELOW) AND SECURED TO TOP OF FLOOR WITH THREE HILTI 1/4" (6mm) DIAMETER BY 1-1/4" (32mm) LONG KWIK-CON II+ CONCRETE SCREW ANCHORS, HILTI 1/4" (6mm) DIAMETER BY 1-3/4" (45mm) LONG KWIK BOLT 3 STEEL EXPANSION ANCHORS, OR HILTI 1/4" (6mm) BY 3/4" (19mm) LONG METAL HIT ANCHORS (INSTALLED IN A TRIANGULAR FASHION THROUGH HOLES PROVIDED). IN ADDITION, FOR NOMINAL 2", 3", AND 4" DEVICES, FOUR 11/16" (18mm) LONG HILTI X-GH P18 MX STEEL FASTENERS MAY BE INSTALLED THROUGH THE STEEL FLANGE, TWO ON EACH SIDE.

CORE HOLE OR SLEEVE DIAM	FIRESTOP DEVICE	NOM DIAM OF THROUGH PENETRANT	FLOOR THICKNESS (MIN. MAX.)
4"	CFS-DID 2" C	2" OR SMALLER+	6" to 6-1/2"
5"	CFS-DID 3" C	3"	6" to 6-1/2"
6"	CFS-DID 4" C	4"	6" to 6-1/2"
4"	CFS-DID 2" HC8	2" OR SMALLER+	7-1/2" to 8-1/2"
5"	CFS-DID 3" HC8	3"	7-1/2" to 8-1/2"
6"	CFS-DID 4" HC8	4"	7-1/2" to 8-1/2"
4"	CFS-DID 2" HC10	2" OR SMALLER+	9-1/2" to 10-1/2"
5"	CFS-DID 3" HC10	3"	9-1/2" to 10-1/2"
6"	CFS-DID 4" HC10	4"	9-1/2" to 10-1/2"
4"	CFS-DID 2" HC12	2" OR SMALLER+	11-1/2" to 12-1/2"
5"	CFS-DID 3" HC12	3"	11-1/2" to 12-1/2"
6"	CFS-DID 4" HC12	4"	11-1/2" to 12-1/2"

+ FOR PIPE SMALLER THAN NOMINAL 2" DIAMETER, AN ADAPTER AND HILTI IPS OR CPS TOP SEAL PLUG MUST BE USED IN CONJUNCTION WITH THE CFS-DID 2" C, HC8, HC10, AND HC12 DEVICES.

NOTE : [OPTIONAL] TO ACHIEVE W-RATING AND/OR L-RATING, WATER BARRIER MODULES MAY BE THREADED ON TOP OF CFS-DID DEVICES FOR NOMINAL 2", 3", AND 4" PIPES (LISTED ABOVE).



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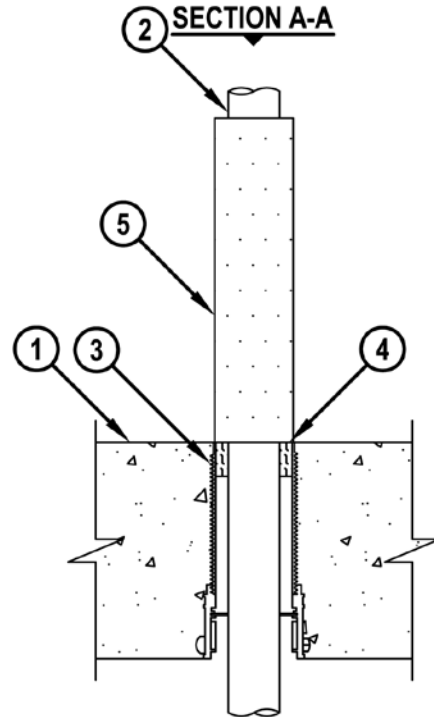
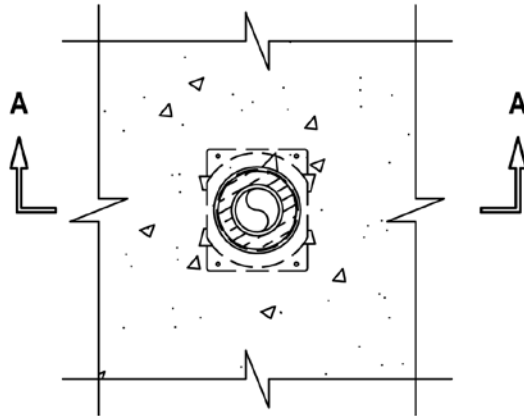
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cUL SYSTEM NO. F-B-2006

PLASTIC PIPE THROUGH CONCRETE FLOOR OR CONCRETE FLOOR OVER METAL DECKING

F, FT, FH AND FTH-RATINGS = 2-HR.

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL

TOP VIEW


1. CONCRETE FLOOR ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 8" THICK).
 - B. STEEL FLOOR UNIT/FLOOR ASSEMBLY - LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 8" THICK) OVER METAL DECKING.
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 1-1/2" NOMINAL DIAMETER POLYPROPYLENE (PP) PLASTIC PIPE (SDR 11 OR 7.4) (CLOSED OR VENTED PIPING SYSTEM).
 - B. MAXIMUM 40mm NOMINAL DIAMETER FUSIOTHERM® PLASTIC PIPE (SDR 11 OR 7.4) MANUFACTURED BY AQUATHERM, INC. (CLOSED OR VENTED PIPING SYSTEM).
3. HILTI CP 680-P 2" CAST-IN FIRESTOP DEVICE, CAST OR GROUTED INTO CONCRETE FLOOR.
4. MINIMUM 1-1/4" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED, FLUSH WITH TOP OF DEVICE.
5. [OPTIONAL] MINIMUM 1/2" THICK GLASS FIBER PIPE INSULATION (EXTENDING MINIMUM 12" ABOVE FLOOR) INSTALLED AROUND PIPE, RESTING FLUSH WITH TOP SURFACE OF FLOOR.

NOTE : FOR CONCRETE FLOOR OVER METAL DECKING APPLICATIONS, A METAL DECK ADAPTER KIT IS REQUIRED.



cUL FB2006c.091807



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cUL SYSTEM NO. F-B-2008



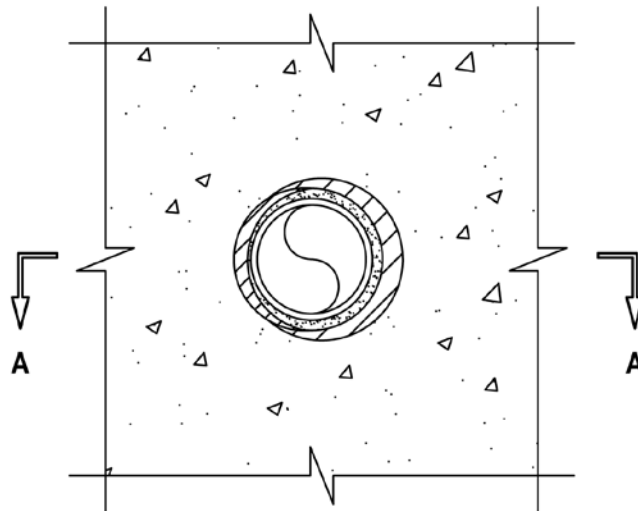
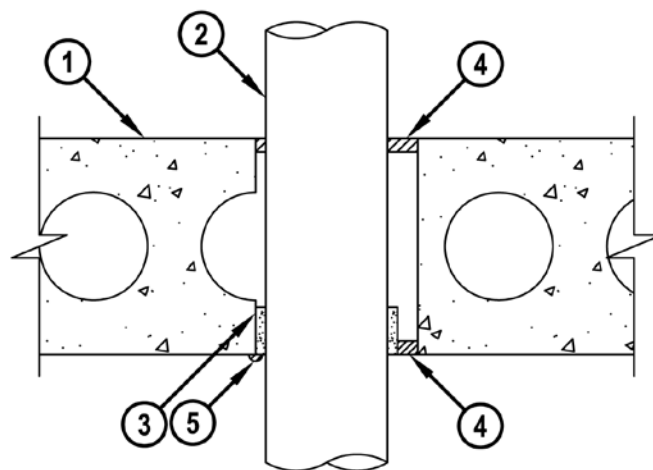
**PLASTIC PIPE THROUGH CONCRETE FLOOR/WALL OR HOLLOW-CORE
CONCRETE FLOOR ASSEMBLY**

F-RATING = 2-HR.

FT, FH, AND FTH-RATINGS = 0-HR.

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL

cUL FB2008.032807

BOTTOM VIEW**SECTION A-A**

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cUL SYSTEM NO. F-B-2008

PLASTIC PIPE THROUGH CONCRETE FLOOR/WALL OR HOLLOW-CORE CONCRETE FLOOR ASSEMBLY

F-RATING = 2-HR.

FT, FH, AND FTH-RATINGS = 0-HR.

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL



cUL FB2008.032807

1. CONCRETE FLOOR ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MINIMUM 8" THICK).
 - B. ANY UL CLASSIFIED PRECAST (HOLLOW-CORE) CONCRETE FLOOR (MINIMUM 8" THICK).
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 4" NOMINAL DIAMETER PVC PLASTIC PIPE (CELLULAR OR SOLID CORE).
 - B. MAXIMUM 4" NOMINAL DIAMETER ABS PLASTIC PIPE (CELLULAR OR SOLID CORE).
 - C. MAXIMUM 4" NOMINAL DIAMETER CPVC PLASTIC PIPE (CLOSED PIPING SYSTEM ONLY).
 - D. MAXIMUM 4" NOMINAL DIAMETER RIGID NON-METALLIC CONDUIT (RNC).
3. HILTI CP 648S WRAP STRIP WRAPPED CONTINUOUSLY AROUND THE OUTER CIRCUMFERENCE OF PIPE, AND HELD IN PLACE WITH INTEGRATED FASTENING TAPE. WRAP STRIP INSTALLED FLUSH WITH BOTTOM OF FLOOR (SEE TABLE BELOW).
4. HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT OR HILTI CP 601S ELASTOMERIC FIRESTOP SEALANT INSTALLED FLUSH WITH TOP AND BOTTOM SURFACES OF FLOOR (SEE NOTE NO. 2 BELOW) :
 - A. MINIMUM 1/4" DEPTH FOR NOMINAL 3" PIPES OR SMALLER.
 - B. MINIMUM 1/2" DEPTH FOR 4" PIPES.
5. MINIMUM 1/4" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT OR HILTI CP 601S ELASTOMERIC FIRESTOP SEALANT APPLIED AT WRAP STRIP/CONCRETE INTERFACE AT BOTTOM OF FLOOR.

NOMINAL PIPE DIAMETER	PRODUCT DESCRIPTION	MAXIMUM DIAMETER OF OPENING	ANNULAR SPACE	
			MINIMUM	MAXIMUM
1-1/2"	CP 648S-1.5" US	2-1/2"	3/16"	7/16"
2"	CP 648S-2" US	3"	3/16"	7/16"
3"	CP 648S-3" US	4"	3/16"	5/16"
4"	CP 648S-4" US	6"	1/2"	1"

NOTES : 1. CLOSED OR VENTED PIPING SYSTEM (PVC, ABS, RNC = SCHEDULE 40; CPVC = SDR 13.5).
 2. AS AN ALTERNATE TO HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT OR HILTI CP 601S ELASTOMERIC FIRESTOP SEALANT INSTALLED ON THE TOP SURFACE OF THE FLOOR, HILTI CP 604 SELF LEVELING FIRESTOP SEALANT MAY BE USED.
 3. [NOT SHOWN] MINIMUM 1/2" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED RECESSED FROM TOP SURFACE OF FLOOR WHEN HILTI CP 604 SELF LEVELING FIRESTOP SEALANT IS USED.



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cUL SYSTEM NO. F-B-2009

**PLASTIC/METAL PIPE TRANSITION THROUGH CONCRETE FLOOR ASSEMBLY**

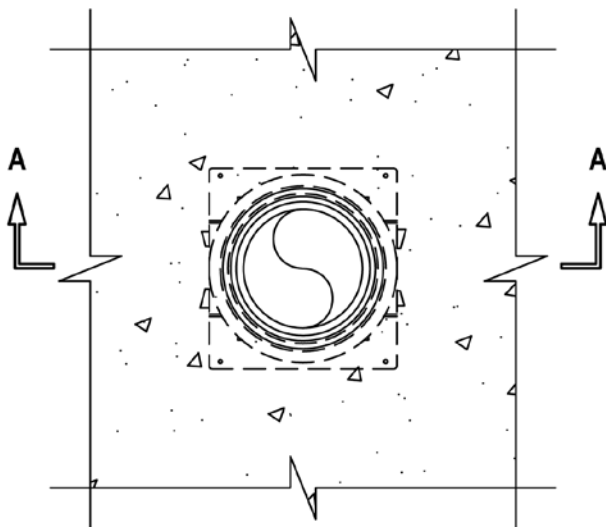
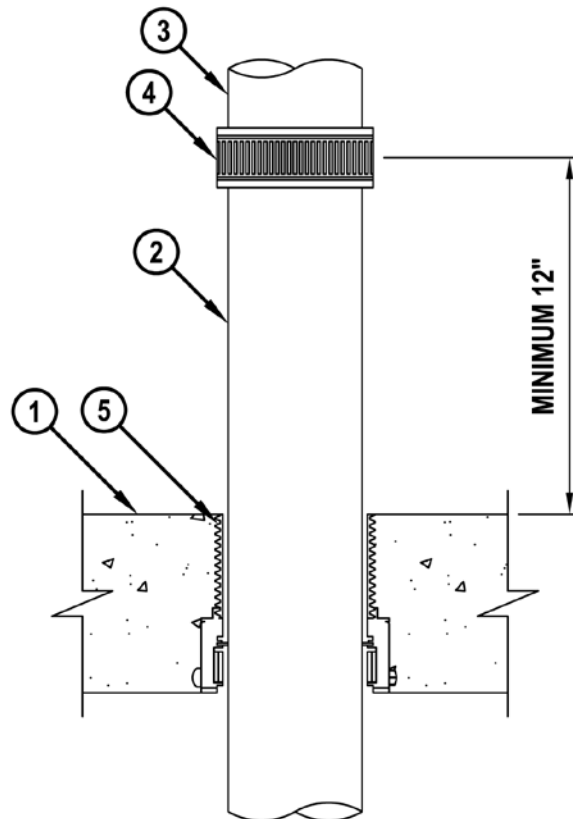
F, FT, FH, AND FTH-RATINGS = 2-HR.

L-RATING AT AMBIENT = LESS THAN 5 L/S/SQ METER

L-RATING AT 400°F = LESS THAN 5 L/S/SQ METER

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL

cUL FB2009a.091807

TOP VIEW**SECTION A-A**

1. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 6" THICK) (2-HR. FIRE-RATING).
2. NON-METALLIC PIPE TO BE ANY OF THE FOLLOWING AND TO EXTEND MINIMUM 12" ABOVE TOP SURFACE OF FLOOR :
 - A. MAXIMUM 4" NOMINAL DIAMETER PVC PLASTIC PIPE (SCH 40) (CELLULAR OR SOLID CORE) (CLOSED OR VENTED PIPING SYSTEM).
 - B. MAXIMUM 4" NOMINAL DIAMETER CPVC (SDR 13.5) PLASTIC PIPE (CLOSED PIPING SYSTEM ONLY).
3. MAXIMUM 4" NOMINAL DIAMETER STEEL PIPE (SCH 10 OR HEAVIER) OR CAST/DUCTILE IRON PIPE.
4. COMPRESSION TYPE COUPLING WITH ELASTOMERIC GASKET AND A STAINLESS STEEL JACKET WITH STAINLESS STEEL BAND CLAMPS USED TO SECURE METALLIC PIPE WITH NON-METALLIC PIPE.
5. HILTI CP 680-P [2", 3", OR 4"] CAST-IN FIRESTOP DEVICE, CAST OR GROUTED INTO CONCRETE FLOOR. SIZE OF DEVICE TO MATCH NOMINAL DIAMETER OF PIPE.



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cUL SYSTEM NO. F-B-2051



PLASTIC PIPE THROUGH HOLLOW-CORE CONCRETE FLOOR ASSEMBLY

F-RATING = 3-HR.

FT-RATING = 0-HR. OR 1/2-HR.

FH-RATING = 3-HR.

FTH-RATING = 0-HR. OR 1/2-HR.

L-RATING AT AMBIENT = LESS THAN 1 CFM/SQ. FT. (SEE NOTE NO. 2 BELOW)

L-RATING AT 400°F = LESS THAN 1 CFM/SQ. FT. (SEE NOTE NO. 2 BELOW)

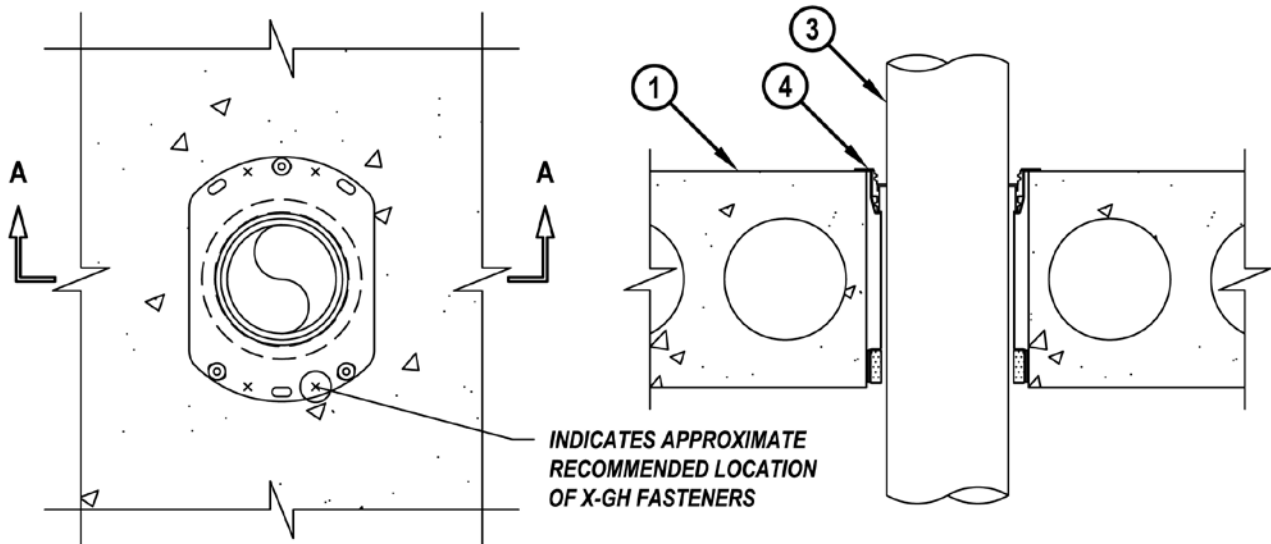
W-RATING = CLASS I (SEE NOTE NO. 2 BELOW)

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL

cUL FB2051a.051311

TOP VIEW

SECTION A-A



1. ANY UL CLASSIFIED PRECAST HOLLOW-CORE FLOOR ASSEMBLY (MINIMUM 6" TO MAXIMUM 12-1/2" THICK) (3-HR. FIRE-RATING).
2. [OPTIONAL - NOT SHOWN] NOMINAL 4", 5", OR 6" DIAMETER GALVANIZED STEEL SLEEVE (MIN. 26 GA.), HAVING A MINIMUM 2" LAP ALONG THE LONGITUDINAL SEAM, INSERTED INTO THE OPENING. SLEEVE MAY EXTEND A MAXIMUM 4" BELOW BOTTOM SURFACE OF FLOOR AND SIT FLUSH WITH TOP SURFACE OF FLOOR.
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 4" NOMINAL DIAMETER PVC PLASTIC PIPE (CELLULAR OR SOLID CORE).
 - B. MAXIMUM 4" NOMINAL DIAMETER ABS PLASTIC PIPE (CELLULAR OR SOLID CORE).
 - C. MAXIMUM 4" NOMINAL DIAMETER CPVC PLASTIC PIPE.
 - D. MAXIMUM 4" NOMINAL DIAMETER FRPP PLASTIC PIPE.



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cUL SYSTEM NO. F-B-2051

**PLASTIC PIPE THROUGH HOLLOW-CORE CONCRETE FLOOR ASSEMBLY**

F-RATING = 3-HR.

FT-RATING = 0-HR. OR 1/2-HR.

FH-RATING = 3-HR.

FTH-RATING = 0-HR. OR 1/2-HR.

L-RATING AT AMBIENT = LESS THAN 1 CFM/SQ. FT. (SEE NOTE NO. 2 BELOW)

L-RATING AT 400°F = LESS THAN 1 CFM/SQ. FT. (SEE NOTE NO. 2 BELOW)

W-RATING = CLASS I (SEE NOTE NO. 2 BELOW)

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL

cUL FB2051a.051311

4. HILTI CFS-DID FIRESTOP DROP-IN DEVICE INSERTED INTO OPENING (SEE TABLE BELOW) AND SECURED TO TOP OF FLOOR WITH THREE HILTI 1/4" (6mm) DIAMETER BY 1-1/4" (32mm) LONG KWIK-CON II+ CONCRETE SCREW ANCHORS, HILTI 1/4" (6mm) DIAMETER BY 1-3/4" (45mm) LONG KWIK BOLT 3 STEEL EXPANSION ANCHORS, OR HILTI 1/4" (6mm) BY 3/4" (19mm) LONG METAL HIT ANCHORS (INSTALLED IN A TRIANGULAR FASHION THROUGH HOLES PROVIDED). IN ADDITION, FOR NOMINAL 2", 3", AND 4" DEVICES, FOUR 11/16" (18mm) LONG HILTI X-GH P18 MX STEEL FASTENERS MAY BE INSTALLED THROUGH THE STEEL FLANGE, TWO ON EACH SIDE.

CORE HOLE OR SLEEVE DIAM	FIRESTOP DEVICE	NOM DIAM OF THROUGH PENETRANT	FLOOR THICKNESS (MIN. MAX.)
4"	CFS-DID 2" C	2" OR SMALLER+	6" to 6-1/2"
5"	CFS-DID 3" C	3"	6" to 6-1/2"
6"	CFS-DID 4" C	4"	6" to 6-1/2"
4"	CFS-DID 2" HC8	2" OR SMALLER+	7-1/2" to 8-1/2"
5"	CFS-DID 3" HC8	3"	7-1/2" to 8-1/2"
6"	CFS-DID 4" HC8	4"	7-1/2" to 8-1/2"
4"	CFS-DID 2" HC10	2" OR SMALLER+	9-1/2" to 10-1/2"
5"	CFS-DID 3" HC10	3"	9-1/2" to 10-1/2"
6"	CFS-DID 4" HC10	4"	9-1/2" to 10-1/2"
4"	CFS-DID 2" HC12	2" OR SMALLER+	11-1/2" to 12-1/2"
5"	CFS-DID 3" HC12	3"	11-1/2" to 12-1/2"
6"	CFS-DID 4" HC12	4"	11-1/2" to 12-1/2"

+ FOR PIPE SMALLER THAN NOMINAL 2" DIAMETER, AN ADAPTER AND HILTI IPS OR CPS TOP SEAL PLUG MUST BE USED IN CONJUNCTION WITH THE CFS-DID 2" C, HC8, HC10, AND HC12 DEVICES.

NOTES : 1. CLOSED OR VENTED PIPING SYSTEM (PVC, ABS, FRPP = SCH 40; CPVC = SDR 13.5).
2. [OPTIONAL] TO ACHIEVE W-RATING AND/OR L-RATING, WATER BARRIER MODULES MAY BE THREADED ON TOP OF CFS-DID DEVICES FOR NOMINAL 2", 3", AND 4" PIPES (LISTED ABOVE).



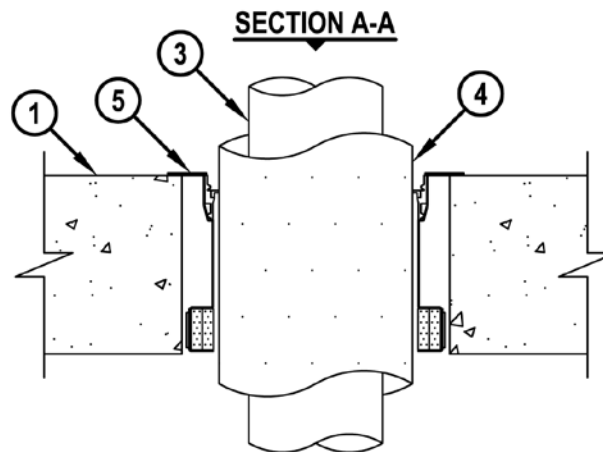
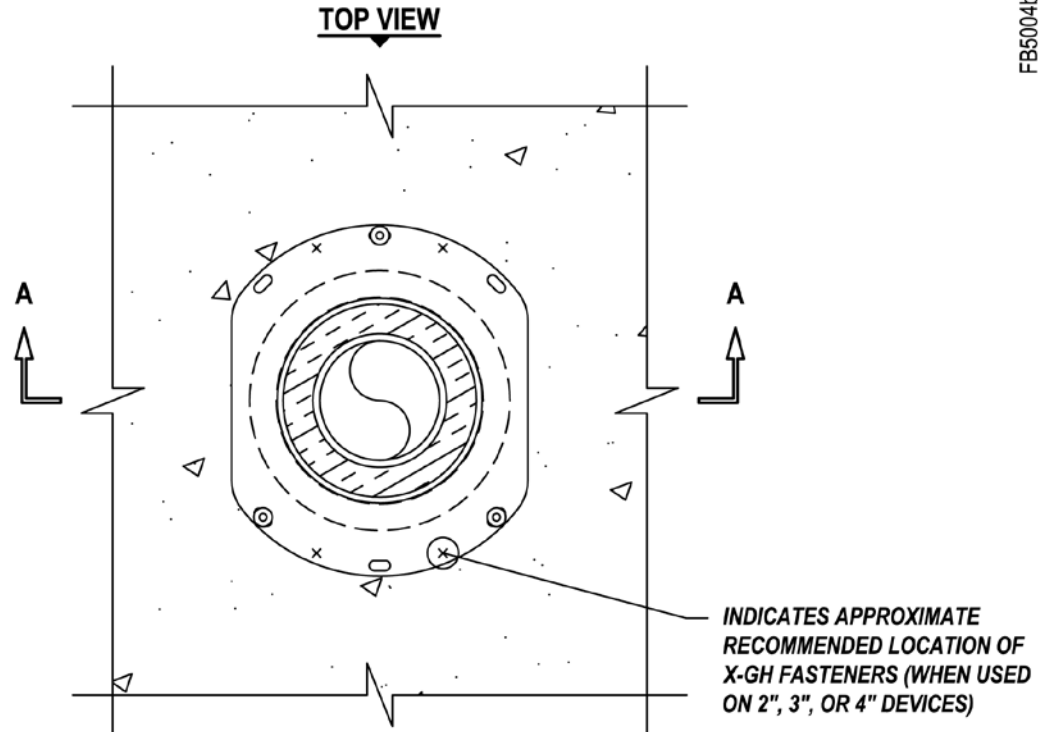
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UL/cUL SYSTEM NO. F-B-5004
INSULATED METAL PIPE THROUGH CONCRETE FLOOR ASSEMBLY

F-RATING = 3-HR.
 T-RATING = 0-HR. OR 2-HR.

FB5004b.051311



- 1. CONCRETE FLOOR ASSEMBLY (3-HR. FIRE-RATING) :**
 A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 6" TO 12" THICK).
 B. STEEL FLOOR UNIT/FLOOR ASSEMBLY - LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR
 (MINIMUM 6" TO 12" THICK) OVER METAL DECKING (UL CLASSIFIED D700, D800, OR D900 SERIES).



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UL/cUL SYSTEM NO. F-B-5004

INSULATED METAL PIPE THROUGH CONCRETE FLOOR ASSEMBLY

F-RATING = 3-HR.

T-RATING = 0-HR. OR 2-HR.

FB5004b.051311

2. [OPTIONAL - NOT SHOWN] ANY OF THE FOLLOWING SLEEVES MAY BE USED :
- A. NOMINAL 4", 5", OR 6" DIAMETER STEEL PIPE SLEEVE (SCHEDULE 10 OR HEAVIER) CAST OR GROUTED INTO FLOOR ASSEMBLY, FLUSH WITH FLOOR SURFACES.
 - B. NOMINAL 4", 5", 6", OR 9" DIAMETER GALVANIZED STEEL SLEEVE (MIN. 26 GA.) WITH SQUARE FLANGE SPOT WELDED TO BOTTOM OR MID-HEIGHT OF SLEEVE AND SIZED MINIMUM 2" LARGER THAN SLEEVE DIAMETER. SLEEVE IS TO BE CAST IN PLACE, AND MAY EXTEND A MAXIMUM 4" BELOW BOTTOM SURFACE OF FLOOR AND SIT FLUSH WITH TOP SURFACE OF FLOOR.
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
- A. MAXIMUM 4" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 4" NOMINAL DIAMETER CAST OR DUCTILE IRON PIPE.
 - C. MAXIMUM 4" NOMINAL DIAMETER COPPER PIPE OR TUBING.
4. ONE OF THE FOLLOWING PIPE COVERS TO BE USED :
- A. NOMINAL 3/4" OR 1" THICK AB/PVC PIPE INSULATION (SEE NOTE NOTES BELOW).
 - B. NOMINAL 1", 1-1/2", OR 2" THICK GLASS-FIBER PIPE INSULATION.
5. HILTI CFS-DID FIRESTOP DROP-IN DEVICE INSERTED INTO OPENING (SEE TABLE BELOW) AND SECURED TO TOP OF FLOOR WITH THREE HILTI 1/4" (6mm) DIAMETER BY 1-1/4" (32mm) LONG KWIK-CON II+ CONCRETE SCREW ANCHORS, HILTI 1/4" (6mm) DIAMETER BY 1-3/4" (45mm) LONG KWIK BOLT 3 STEEL EXPANSION ANCHORS, OR HILTI 1/4" (6mm) BY 3/4" (19mm) LONG METAL HIT ANCHORS (INSTALLED IN A TRIANGULAR FASHION THROUGH HOLES PROVIDED). IN ADDITION, FOR NOMINAL 2", 3", AND 4" DEVICES, FOUR 11/16" (18mm) LONG HILTI X-GH P18 MX STEEL FASTENERS MAY BE INSTALLED THROUGH THE STEEL FLANGE, TWO ON EACH SIDE.

NOMINAL PIPE DIAMETER	INSULATION TYPE AND THICKNESS	FIRESTOP DEVICE	CORE HOLE OR SLEEVE DIAMETER
1/2"	3/4" OR 1" AB/PVC	CFS-DID 2" C	4"
1"	3/4" OR 1" AB/PVC	CFS-DID 3" C	5"
2"	3/4" OR 1" AB/PVC	CFS-DID 4" C	6"
4"	3/4" OR 1" AB/PVC	CFS-DID 6" C	9"
1/2"	1" GLASS-FIBER	CFS-DID 2" C	4"
1"	1" GLASS-FIBER	CFS-DID 3" C	5"
1"	1-1/2" GLASS-FIBER	CFS-DID 4" C	6"
2"	1" GLASS-FIBER	CFS-DID 4" C	6"
2"	2" GLASS-FIBER	CFS-DID 6" C	9"
4"	1" GLASS-FIBER	CFS-DID 6" C	9"

NOTE : T-RATING = 0-HR. WHEN SLEEVE IS USED.



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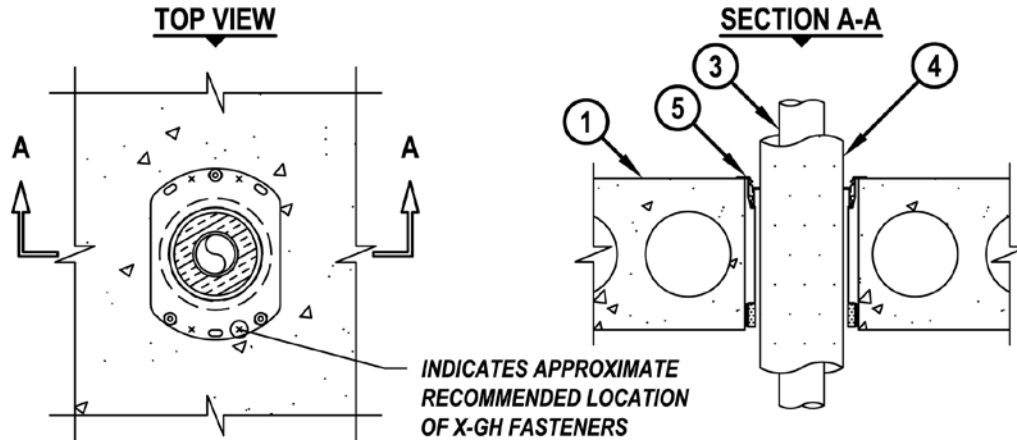
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UL/cUL SYSTEM NO. F-B-5005

INSULATED METAL PIPE THROUGH HOLLOW-CORE CONCRETE FLOOR ASSEMBLY

F-RATING = 3-HR.

T-RATING = 0-HR. OR 2-HR.



FB5005a.051311

1. ANY UL CLASSIFIED PRECAST HOLLOW-CORE FLOOR ASSEMBLY (MINIMUM 6" TO MAXIMUM 12-1/2" THICK) (3-HR. FIRE-RATING).
2. [OPTIONAL - NOT SHOWN] NOMINAL 4", 5", OR 6" DIAMETER GALVANIZED STEEL SLEEVE (MIN. 26 GA.), HAVING A MINIMUM 2" LAP ALONG THE LONGITUDINAL SEAM, INSERTED INTO THE OPENING. SLEEVE MAY EXTEND A MAXIMUM 4" BELOW BOTTOM SURFACE OF FLOOR AND SIT FLUSH WITH TOP SURFACE OF FLOOR.
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 2" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 2" NOMINAL DIAMETER COPPER PIPE OR TUBING.
4. ONE OF THE FOLLOWING PIPE COVERS TO BE USED :
 - A. NOMINAL 3/4" OR 1" THICK AB/PVC PIPE INSULATION (SEE TABLE BELOW).
 - B. NOMINAL 1" OR 1-1/2" THICK GLASS-FIBER PIPE INSULATION.
5. HILTI CFS-DID FIRESTOP DROP-IN DEVICE INSERTED INTO OPENING (SEE TABLE BELOW) AND SECURED TO TOP OF FLOOR WITH THREE HILTI 1/4" (6mm) DIAMETER BY 1-1/4" (32mm) LONG KWIK-CON II+ CONCRETE SCREW ANCHORS, HILTI 1/4" (6mm) DIAMETER BY 1-3/4" (45mm) LONG KWIK BOLT 3 STEEL EXPANSION ANCHORS, OR HILTI 1/4" (6mm) BY 3/4" (19mm) LONG METAL HIT ANCHORS (INSTALLED IN A TRIANGULAR FASHION THROUGH HOLES PROVIDED). IN ADDITION, FOR NOMINAL 2", 3", AND 4" DEVICES, FOUR 11/16" (18mm) LONG HILTI X-GH P18 MX STEEL FASTENERS MAY BE INSTALLED THROUGH THE STEEL FLANGE, TWO ON EACH SIDE.

NOM PIPE OR TUBE (ITEM 3) DIAM	INSULATION TYPE (ITEM 4A OR 4B) AND THICKNESS	FIRESTOP DEVICE	CORE HOLE OR SLEEVE DIAM	FLOOR THICKNESS (MIN. MAX.)
1/2"	3/4" OR 1" AB/PVC	CFS-DID 2" C	4"	6" to 6-1/2"
1"	3/4" OR 1" AB/PVC	CFS-DID 3" C	5"	6" to 6-1/2"
2"	3/4" OR 1" AB/PVC	CFS-DID 4" C	6"	6" to 6-1/2"



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UL/cUL SYSTEM NO. F-B-5005

INSULATED METAL PIPE THROUGH HOLLOW-CORE CONCRETE FLOOR ASSEMBLY

F-RATING = 3-HR.
T-RATING = 0-HR. OR 2-HR.

FB5005a.051311

NOM PIPE OR TUBE (ITEM 3) DIAM	INSULATION TYPE (ITEM 4A OR 4B) AND THICKNESS	FIRESTOP DEVICE	CORE HOLE OR SLEEVE DIAM	FLOOR THICKNESS (MIN. MAX.)
1/2"	1" GLASS FIBER	CFS-DID 2" C	4"	6" to 6-1/2"
1"	1" GLASS FIBER	CFS-DID 3" C	5"	6" to 6-1/2"
1"	1-1/2" GLASS FIBER	CFS-DID 4" C	6"	6" to 6-1/2"
2"	1" GLASS FIBER	CFS-DID 4" C	6"	6" to 6-1/2"
1/2"	3/4" OR 1" AB/PVC	CFS-DID 2" HC8	4"	7-1/2" to 8-1/2"
1"	3/4" OR 1" AB/PVC	CFS-DID 3" HC8	5"	7-1/2" to 8-1/2"
2"	3/4" OR 1" AB/PVC	CFS-DID 4" HC8	6"	7-1/2" to 8-1/2"
1/2"	1" GLASS FIBER	CFS-DID 2" HC8	4"	7-1/2" to 8-1/2"
1"	1" GLASS FIBER	CFS-DID 3" HC8	5"	7-1/2" to 8-1/2"
1"	1-1/2" GLASS FIBER	CFS-DID 4" HC8	6"	7-1/2" to 8-1/2"
2"	1" GLASS FIBER	CFS-DID 4" HC8	6"	7-1/2" to 8-1/2"
1/2"	3/4" OR 1" AB/PVC	CFS-DID 2" HC10	4"	9-1/2" to 10-1/2"
1"	3/4" OR 1" AB/PVC	CFS-DID 3" HC10	5"	9-1/2" to 10-1/2"
2"	3/4" OR 1" AB/PVC	CFS-DID 4" HC10	6"	9-1/2" to 10-1/2"
1/2"	1" GLASS FIBER	CFS-DID 2" HC10	4"	9-1/2" to 10-1/2"
1"	1" GLASS FIBER	CFS-DID 3" HC10	5"	9-1/2" to 10-1/2"
1"	1-1/2" GLASS FIBER	CFS-DID 4" HC10	6"	9-1/2" to 10-1/2"
2"	1" GLASS FIBER	CFS-DID 4" HC10	6"	9-1/2" to 10-1/2"
1/2"	3/4" OR 1" AB/PVC	CFS-DID 2" HC12	4"	11-1/2" to 12-1/2"
1"	3/4" OR 1" AB/PVC	CFS-DID 3" HC12	5"	11-1/2" to 12-1/2"
2"	3/4" OR 1" AB/PVC	CFS-DID 4" HC12	6"	11-1/2" to 12-1/2"
1/2"	1" GLASS FIBER	CFS-DID 2" HC12	4"	11-1/2" to 12-1/2"
1"	1" GLASS FIBER	CFS-DID 3" HC12	5"	11-1/2" to 12-1/2"
1"	1-1/2" GLASS FIBER	CFS-DID 4" HC12	6"	11-1/2" to 12-1/2"
2"	1" GLASS FIBER	CFS-DID 4" HC12	6"	11-1/2" to 12-1/2"



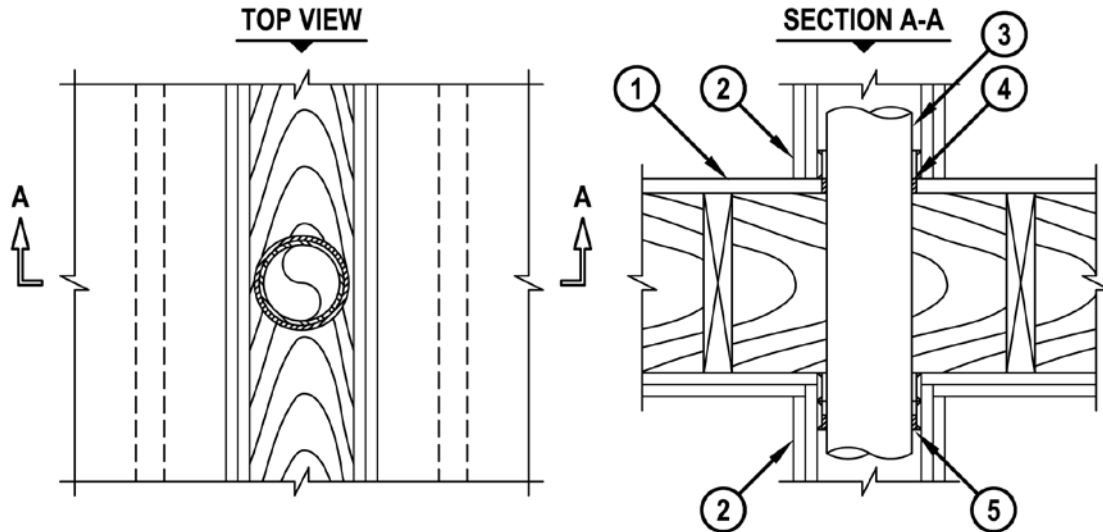
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UL/cUL SYSTEM NO. F-C-1009
METAL PIPE THROUGH WOOD FLOOR/CEILING ASSEMBLY

F-RATING = 1-HR. OR 2-HR.
T-RATING = 1/4-HR.
L-RATING AT AMBIENT = LESS THAN 1 CFM/SQ. FT.
L-RATING AT 400° F = 4 CFM/SQ. FT.



1. WOOD FLOOR/CEILING ASSEMBLY (UL/cUL CLASSIFIED L500 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. [OPTIONAL] GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U300 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN) CONSISTING OF NOMINAL 2" x 4", 2" x 6", OR PARALLEL 2" x 4" LUMBER PLATES AND STUDS.
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 4" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 4" NOMINAL DIAMETER CAST OR DUCTILE IRON PIPE.
 - C. MAXIMUM 4" NOMINAL DIAMETER COPPER PIPE OR TUBING.
 - D. MAXIMUM 4" NOMINAL DIAMETER STEEL CONDUIT OR EMT.
4. MINIMUM 3/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT, CP 601S ELASTOMERIC FIRESTOP SEALANT, OR CP 606 FLEXIBLE FIRESTOP SEALANT, FLUSH WITH TOP SURFACE OF FLOOR OR SOLE PLATE.
5. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT, CP 601S ELASTOMERIC FIRESTOP SEALANT, OR CP 606 FLEXIBLE FIRESTOP SEALANT, FLUSH WITH BOTTOM SURFACE OF CEILING OR LOWER TOP PLATE.

NOTES : 1. DIAMETER OF OPENING TO BE MAXIMUM 1" LARGER THAN DIAMETER OF PIPE OR SQUARE-CUT WITH A MAXIMUM DIMENSION 1" GREATER THAN THE DIAMETER OF PIPE.
2. WHEN LUMBER PLATES ARE DISCONTINUOUS, ATTACH A NOMINAL 1-1/2" WIDE 20 GA. (OR HEAVIER) GALVANIZED STEEL PLATE TO EACH END OF LUMBER PLATE. STEEL PLATES SHOULD OVERLAP 2" ONTO LUMBER, AND SECURED WITH STEEL SCREWS OR NAILS.
3. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1".
4. L-RATINGS APPLY ONLY WHEN HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT IS USED.

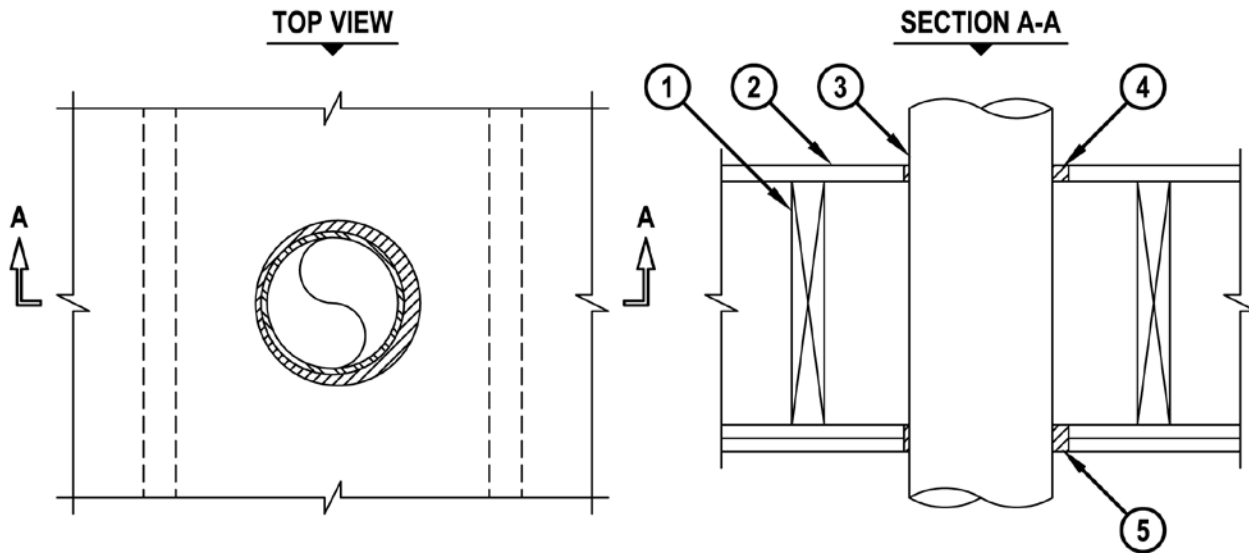
UL/cUL SYSTEM NO. F-C-1059

METAL PIPE THROUGH WOOD FLOOR/CEILING ASSEMBLY

F-RATING = 1-HR. OR 2-HR.

T-RATING = 0-HR. OR 1/2-HR.

FC-1059g.081108



1. WOOD FLOOR/CEILING ASSEMBLY (UL/cUL CLASSIFIED L500 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. LUMBER OR PLYWOOD SUBFLOOR WITH FINISH FLOOR OF LUMBER, PLYWOOD, OR FLOOR TOPPING MIXTURE.
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING:
 - A. MAXIMUM 6" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 40 OR HEAVIER).
 - B. MAXIMUM 6" NOMINAL DIAMETER CAST IRON PIPE.
 - C. MAXIMUM 6" NOMINAL DIAMETER STEEL CONDUIT.
 - D. MAXIMUM 4" NOMINAL DIAMETER EMT.
 - E. MAXIMUM 2" NOMINAL DIAMETER FLEXIBLE STEEL CONDUIT.
4. MINIMUM 3/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT FLUSH WITH TOP SURFACE OF SUBFLOOR OR SOLE PLATE.
5. HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT FLUSH WITH BOTTOM SURFACE OF CEILING OR LOWER TOP PLATE :
 - A. MINIMUM 5/8" DEPTH OF SEALANT FOR A 1-HR. FIRE-RATING.
 - B. MINIMUM 1-1/4" DEPTH OF SEALANT FOR A 2-HR. FIRE-RATING.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 7-5/8".
 2. ANNULAR SPACE = MINIMUM 1/4", MAXIMUM 3/4".
 3. CHASE WALL (NOT SHOWN, OPTIONAL) - THE THROUGH PENETRANT MAY BE ROUTED THROUGH A 1-HR. OR 2-HR. FIRE-RATED GYPSUM CHASE WALL ASSEMBLY.



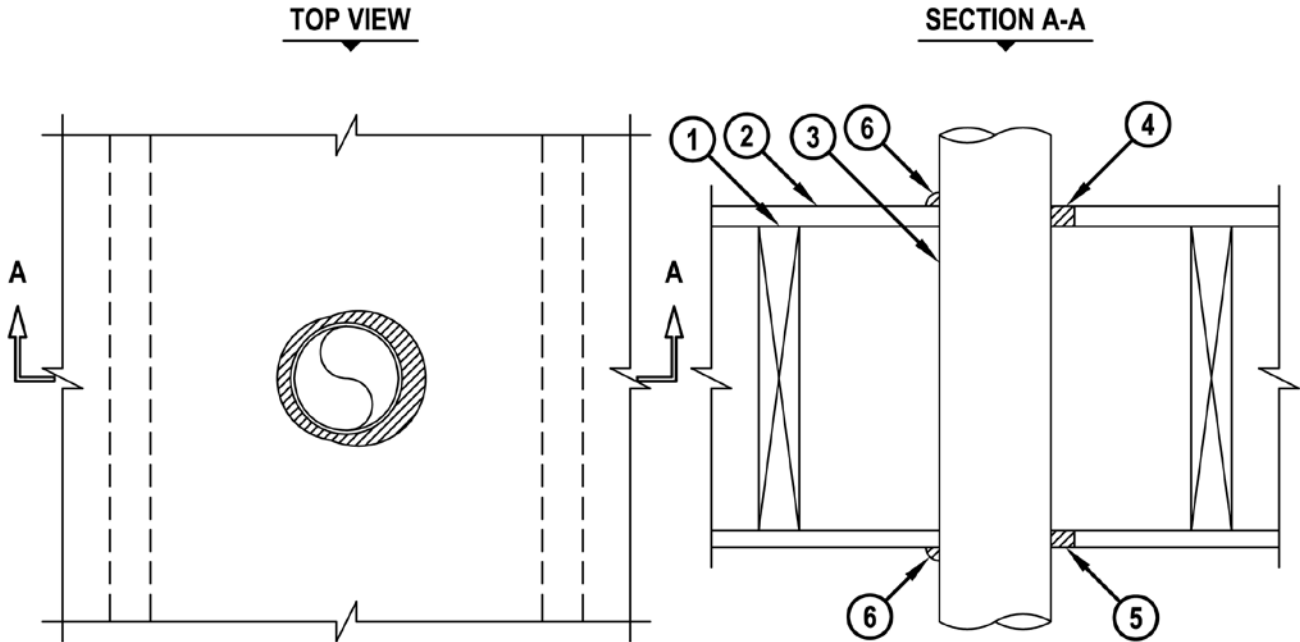
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UL/cUL SYSTEM NO. F-C-1106
METAL PIPE THROUGH WOOD FLOOR ASSEMBLY

F-RATING = 1-HR.
T-RATING = 1/4-HR.

FC1106c.031306



1. WOOD FLOOR/CEILING ASSEMBLY (UL/cUL CLASSIFIED L500 SERIES) (1-HR. FIRE-RATING).
2. LUMBER OR PLYWOOD SUBFLOOR WITH FINISH FLOOR OF LUMBER, PLYWOOD, OR FLOOR TOPPING MIXTURE.
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 4" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 4" NOMINAL DIAMETER CAST IRON OR DUCTILE IRON PIPE.
 - C. MAXIMUM 4" NOMINAL DIAMETER COPPER PIPE OR COPPER TUBING.
 - D. MAXIMUM 4" NOMINAL DIAMETER STEEL CONDUIT.
 - E. MAXIMUM 4" NOMINAL DIAMETER EMT.
4. MINIMUM 3/4" DEPTH HILTI CP 606 FLEXIBLE FIRESTOP SEALANT OR HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
5. MINIMUM 5/8" DEPTH HILTI CP 606 FLEXIBLE FIRESTOP SEALANT OR HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
6. MINIMUM 1/2" BEAD HILTI CP 606 FLEXIBLE FIRESTOP SEALANT OR HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 5".
2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 7/8".
3. CHASE WALL (NOT SHOWN, OPTIONAL) - THE THROUGH PENETRANT MAY ROUTED THROUGH A 1-HR. FIRE-RATED GYPSUM CHASE WALL.



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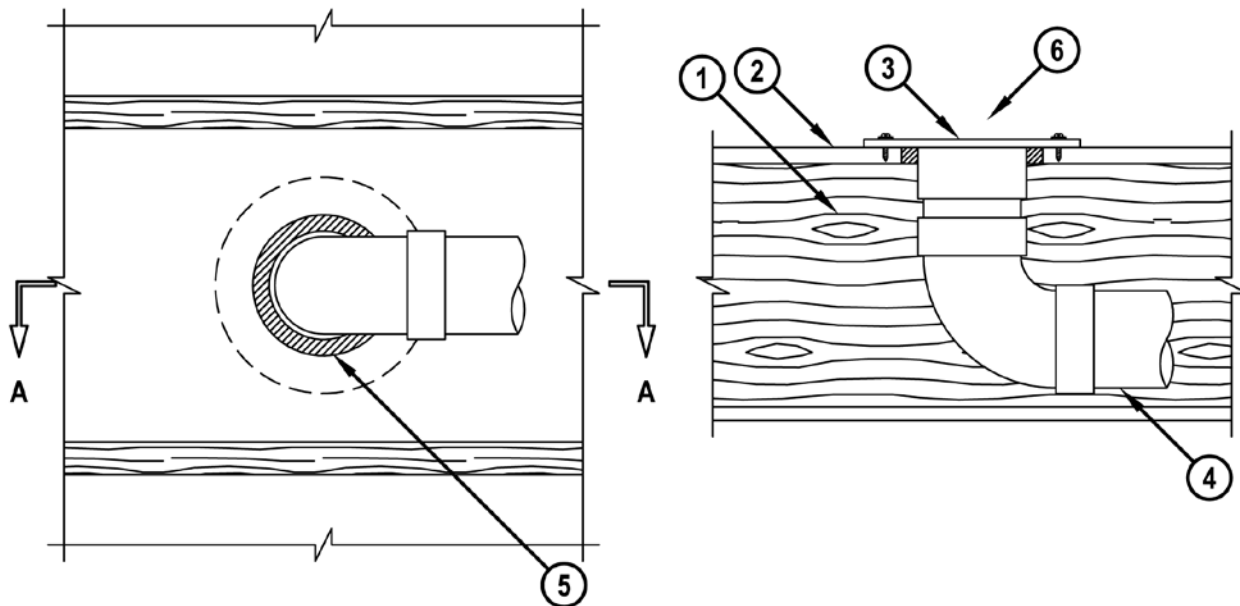
UL/cUL SYSTEM NO. F-C-1134

CLOSET FLANGE IN WOOD FLOOR/CEILING ASSEMBLY

F-RATING = 1-HR.

T-RATING = 0-HR.

FC-1134a.010505

BOTTOM VIEW**SECTION A-A**

1. WOOD FLOOR/CEILING ASSEMBLY (UL/cUL CLASSIFIED L500 SERIES) (1-HR. FIRE-RATING).
2. LUMBER OR PLYWOOD SUBFLOOR WITH FINISH FLOOR OF LUMBER, PLYWOOD, OR FLOOR TOPPING MIXTURE.
3. CAST IRON CLOSET FLANGE SIZED TO ACCOMMODATE DRAIN PIPE. CLOSET FLANGE SECURED TO PLYWOOD SUBFLOOR WITH STEEL SCREWS.
4. MAXIMUM 4" NOMINAL DIAMETER CAST IRON PIPE DRAIN PIPING AND 90° ELBOW.
5. MINIMUM 3/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT OR CP 606 FLEXIBLE FIRESTOP SEALANT.
6. (NOT SHOWN). FLOOR MOUNTED VITREOUS CHINA WATER CLOSET.

NOTES: 1. MAXIMUM DIAMETER OF OPENING = 5".
2. ANNULAR SPACE = NOMINAL 1/4".



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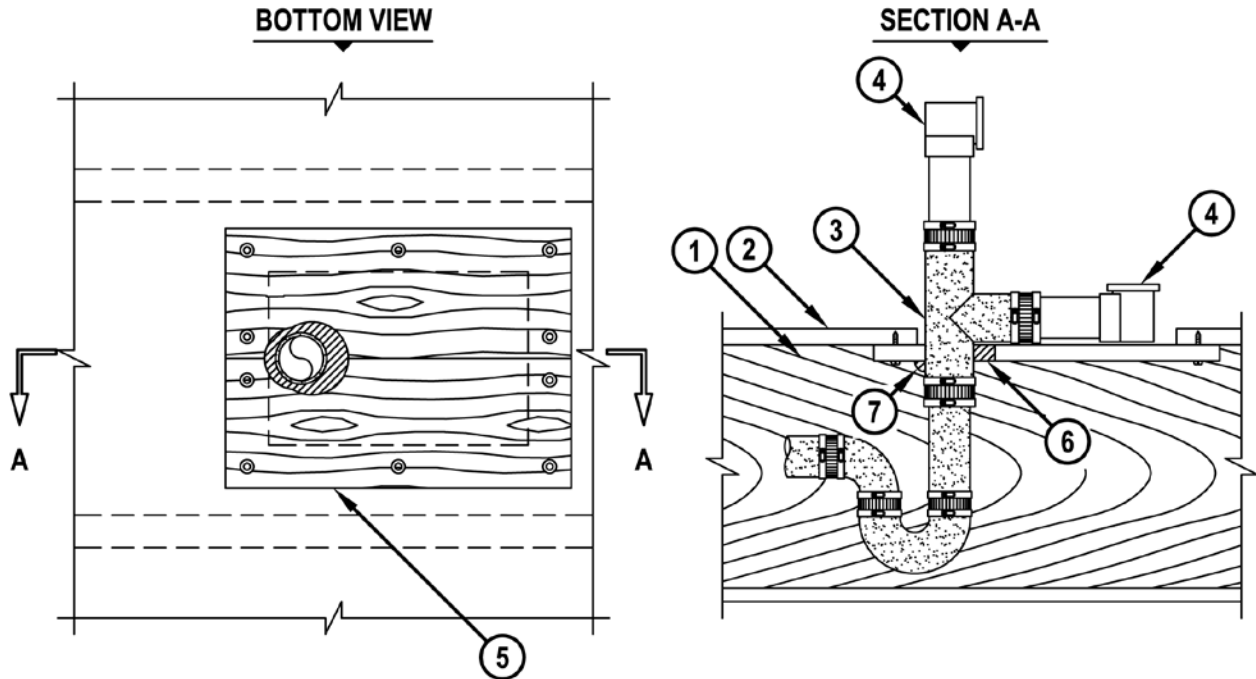
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UL/cUL SYSTEM NO. F-C-1135
CAST IRON THROUGH 1-HR. WOOD FLOOR/CEILING ASSEMBLY

F-RATING = 1-HR.

T-RATING = 0-HR.



FC1135a.012405

1. WOOD FLOOR/CEILING ASSEMBLY (UL/cUL CLASSIFIED L500 SERIES) (1-HR. FIRE-RATING).
2. LUMBER OR PLYWOOD SUBFLOOR WITH FINISH FLOOR OF LUMBER, PLYWOOD, OR FLOOR TOPPING MIXTURE.
3. MAXIMUM 1-1/2" NOMINAL DIAMETER CAST IRON PIPE, P-TRAP, DRAIN AND TEE CONNECTED WITH STAINLESS STEEL "NO-HUB" CONNECTORS.
4. MAXIMUM 1-1/2" NOMINAL DIAMETER ABS, PVC OR BRASS BATHTUB WASTE/OVERFLOW FITTINGS.
5. 3/4" THICK PLYWOOD PATCH SIZED TO OVERLAP MINIMUM 2" BEYOND EACH EDGE OF RECTANGULAR OPENING. TWO PIECES POSITIONED AROUND DRAIN PIPING WITH CUT EDGES TIGHTLY BUTTED, AND SCREW ATTACHED TO UNDERSIDE OF SUBFLOOR WITH 1-1/4" LONG STEEL SCREWS (SPACED MAXIMUM 6" C/C). (SEE NOTE NO. 3 BELOW).
6. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
7. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT APPLIED AT POINT OF CONTACT.

NOTES : 1. MAXIMUM SIZE OF OPENING = 12" x 8".
 2. ANNULAR SPACE BETWEEN DRAIN PIPING AND PATCH = MINIMUM 0", MAXIMUM 1".
 3. AS AN ALTERNATE TO PLYWOOD, 5/8" THICK GYPSUM WALLBOARD MAY BE USED.



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cUL SYSTEM NO. F-C-2005

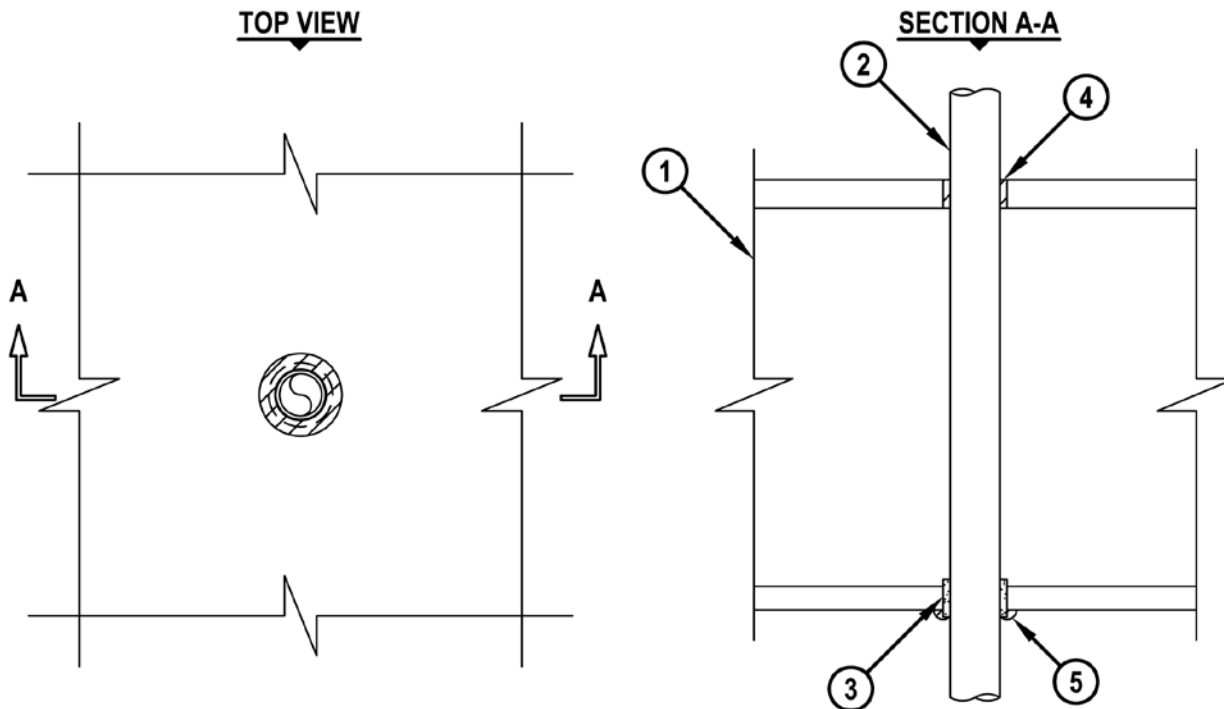
**PLASTIC PEX PIPE THROUGH WOOD FLOOR/CEILING ASSEMBLY**

F AND FH-RATINGS = 1-HR.

FT AND FTH-RATINGS = 1/4-HR.

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL

cUL FC2005e.021307



1. WOOD FLOOR/CEILING ASSEMBLY (UL/cUL CLASSIFIED L500 SERIES) (1-HR. FIRE-RATING).
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 1" NOMINAL DIAMETER CROSS LINKED POLYETHYLENE (PEX) SDR 9 TUBING (CLOSED OR VENTED PIPING SYSTEM).
 - B. MAXIMUM 1" NOMINAL DIAMETER AQUARISE CPVC PLASTIC PIPE (SDR 11) MANUFACTURED BY IPEX, INC. (CLOSED PIPING SYSTEM ONLY).
3. HILTI CP 648E WRAP STRIP (NOMINAL 3/16" THICK x 1" WIDE) CONTINUOUSLY WRAPPED AROUND THE OUTER CIRCUMFERENCE OF THE TUBE, CENTERED WITHIN GYPSUM CEILING, COVERING ONCE, WITH ENDS HELD IN PLACE WITH TAPE.
4. MINIMUM 3/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
5. MINIMUM 1/4" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT AT WRAP STRIP/ GYPSUM INTERFACE.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 1-1/2".
 2. ANNULAR SPACE = NOMINAL 1/4".



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cUL SYSTEM NO. F-C-2007

PLASTIC PIPE THROUGH WOOD FLOOR/CEILING ASSEMBLY

F AND FH-RATINGS = 1-HR.

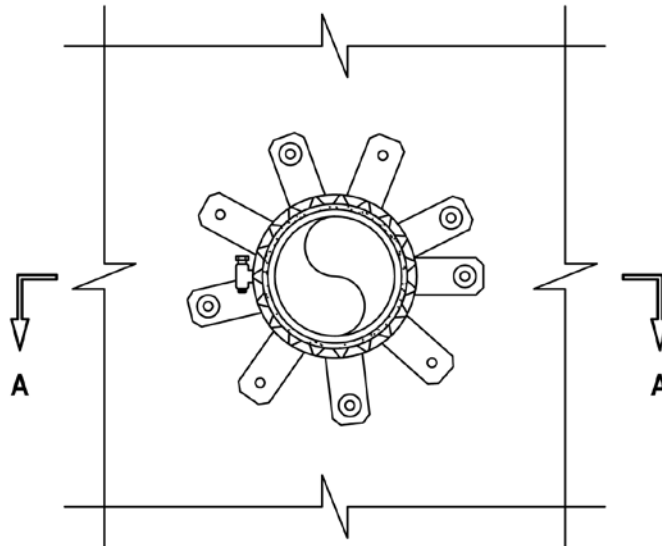
FT AND FTH-RATINGS = 3/4-HR. OR 1-HR.

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL

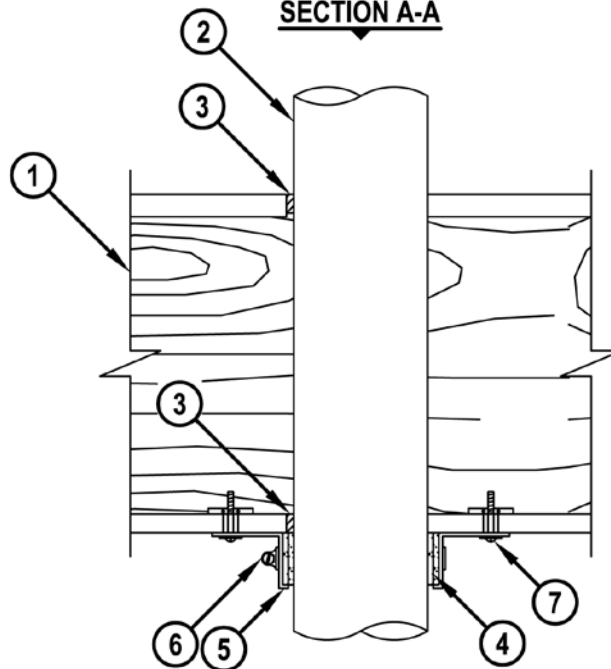


cUL FC2007f.022212

BOTTOM VIEW



SECTION A-A



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cUL SYSTEM NO. F-C-2007

PLASTIC PIPE THROUGH WOOD FLOOR/CEILING ASSEMBLY

F AND FH-RATINGS = 1-HR.

FT AND FTH-RATINGS = 3/4-HR. OR 1-HR.

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL



cUL FC2007f.022212

1. WOOD FLOOR/CEILING ASSEMBLY (UL/cUL CLASSIFIED L500 SERIES) (1-HR. FIRE-RATING).
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING (ALSO SEE NOTE NO. 2 BELOW) :
 - A. MAXIMUM 4" NOMINAL DIAMETER PVC PLASTIC PIPE (CELLULAR AND SOLID CORE).
 - B. MAXIMUM 4" NOMINAL DIAMETER CPVC PLASTIC PIPE (SDR 11 OR SDR 13.5) (CLOSED PIPING SYSTEM ONLY).
 - C. MAXIMUM 4" NOMINAL DIAMETER AQUARISE CPVC PLASTIC PIPE (SDR 11) MANUFACTURED BY IPEX, INC. (CLOSED PIPING SYSTEM ONLY).
3. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
4. HILTI CP 648E WRAP STRIP CONTINUOUSLY WRAPPED AROUND THE OUTER CIRCUMFERENCE OF THE PIPE (SIZE OF WRAP STRIP AND NUMBER OF LAYERS ARE SHOWN IN THE TABLE BELOW) WITH ENDS BUTTED AND HELD IN PLACE WITH TAPE. WRAP STRIP TO BE BUTTED TIGHTLY AGAINST BOTTOM SURFACE OF GYPSUM CEILING.
5. HILTI RETAINING COLLAR (SIZED TO MATCH WRAP STRIP) WRAPPED OVER THE WRAP STRIPS, OVERLAPPING MINIMUM 1".
6. NOMINAL 1/2" WIDE STAINLESS STEEL HOSE CLAMP(S) SECURED AT MID-HEIGHT OF HILTI RETAINING COLLAR.
7. EVERY OTHER TAB OF RETAINING COLLAR SECURED TO GYPSUM CEILING WITH HILTI 1/4" x 1-1/2" LONG STEEL TOGGLER BOLTS IN CONJUNCTION WITH 3/4" DIAMETER STEEL WASHERS.

MAXIMUM PIPE DIAMETER	ANNULAR SPACE		FT AND FTH RATINGS
	MINIMUM	MAXIMUM	
2"	0"	1/4"	1-HR.
4"	0"	1/4"	3/4-HR.

MAXIMUM PIPE DIAMETER	FIRESTOP PRODUCT	NUMBER OF LAYERS
3"	CP 648E W25/1"	2
3"	CP 648E W45/1-3/4"	1
4"	CP 648E W25/1"	3
4"	CP 648E W45/1-3/4"	2

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 5".
 2. CLOSED OR VENTED PIPING SYSTEMS (PVC = SCHEDULE 40; CPVC = SDR 11 OR 13.5).



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cUL SYSTEM NO. F-C-2009

PLASTIC PIPE THROUGH WOOD FLOOR/CEILING ASSEMBLY

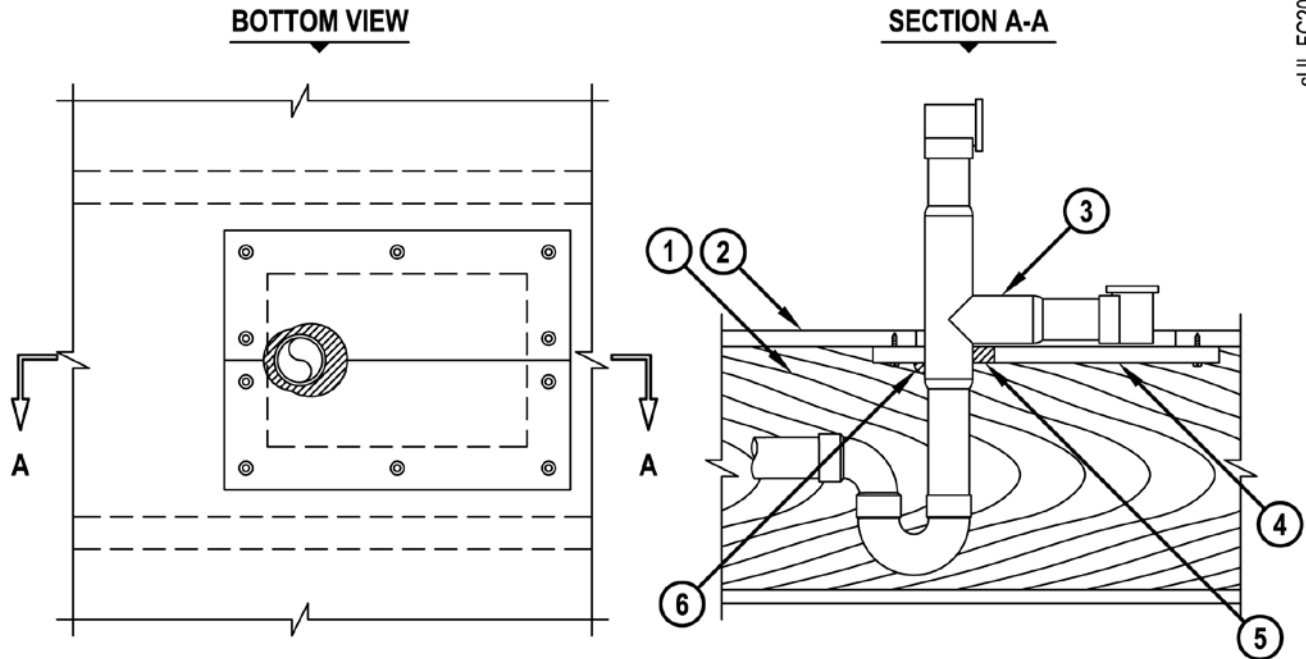
F AND FT-RATINGS = 1-HR.

FH AND FTH-RATINGS = 0-HR.

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL



cUL FC2009b.060804



1. WOOD FLOOR/CEILING ASSEMBLY (UL/cUL CLASSIFIED L500 SERIES) (1-HR. FIRE-RATING).
2. LUMBER OR PLYWOOD SUBFLOOR WITH FINISH FLOOR OF LUMBER, PLYWOOD, OR FLOOR TOPPING MIXTURE.
3. MAXIMUM 1-1/2" NOMINAL DIAMETER PVC OR ABS PLASTIC PIPE (SCHEDULE 40) AND DRAIN FITTINGS CEMENTED TOGETHER WITH PVC OR ABS BATHTUB WASTE/OVERFLOW FITTINGS.
4. 3/4" THICK PLYWOOD PATCH SIZED TO OVERLAP MINIMUM 2" BEYOND EACH EDGE OF RECTANGULAR OPENING. TWO PIECES POSITIONED AROUND DRAIN PIPING WITH CUT EDGES TIGHTLY BUTTED, AND SCREW ATTACHED TO UNDERSIDE OF SUBFLOOR WITH 1-1/4" LONG STEEL SCREWS (SPACED MAXIMUM 6" C/C). (SEE NOTE NO. 3 BELOW).
5. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT OR CP 606 FLEXIBLE FIRESTOP SEALANT.
6. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT OR CP 606 FLEXIBLE FIRESTOP SEALANT APPLIED AT POINT OF CONTACT.

NOTES : 1. MAXIMUM SIZE OF OPENING = 12" x 8".

2. ANNULAR SPACE BETWEEN DRAIN PIPING AND PATCH = MINIMUM 0", MAXIMUM 1".

3. AS AN ALTERNATE TO PLYWOOD, 5/8" THICK GYPSUM WALL BOARD MAY BE USED.



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cUL SYSTEM NO. F-C-2010

**CLOSET FLANGE IN WOOD FLOOR/CEILING ASSEMBLY**

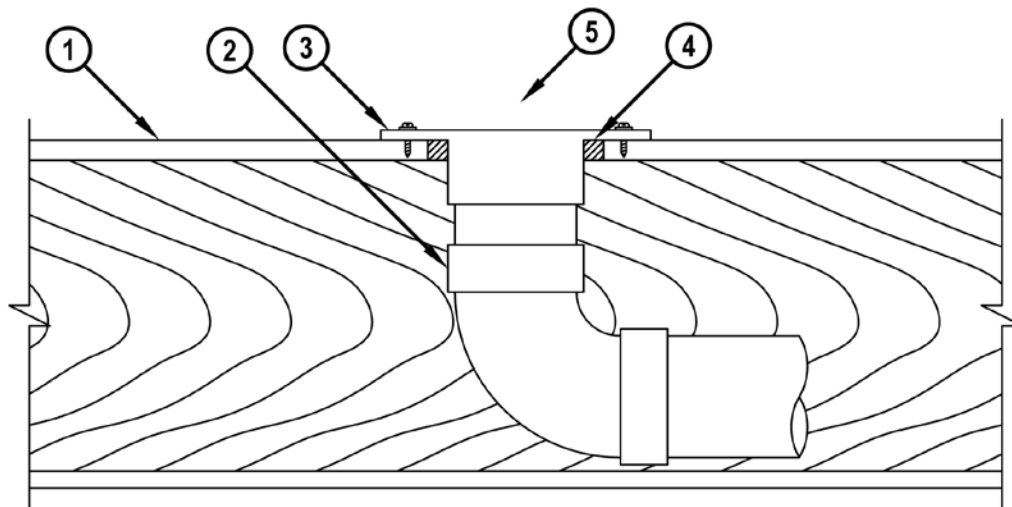
F-RATING = 1-HR.

FT-RATING = 3/4-HR.

FH-RATING = 1-HR.

T-RATING = 1/2-HR.

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL

CROSS-SECTIONAL VIEW

1. WOOD FLOOR/CEILING ASSEMBLY (UL/cUL CLASSIFIED L500 SERIES) (1-HR. FIRE-RATING).
2. DRAIN PIPING AND 90° ELBOW TO BE ONE OF THE FOLLOWING :
 - A. NOMINAL 4" DIAMETER PVC PLASTIC PIPE (SCHEDULE 40).
 - B. NOMINAL 4" DIAMETER ABS PLASTIC PIPE (SCHEDULE 40).
3. PVC OR ABS CLOSET FLANGE SIZED TO ACCOMMODATE DRAIN PIPE. CLOSET FLANGE SECURED TO PLYWOOD SUBFLOOR WITH STEEL SCREWS.
4. MINIMUM 3/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT OR CP 606 FLEXIBLE FIRESTOP SEALANT.
5. (NOT SHOWN). FLOOR MOUNTED VITREOUS CHINA WATER CLOSET.

NOTE : DIAMETER OF OPENING TO BE MAXIMUM 1/2" LARGER
THAN OUTSIDE DIAMETER OF CLOSET FLANGE.



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cUL FC2010b.060904

cUL SYSTEM NO. F-C-2011

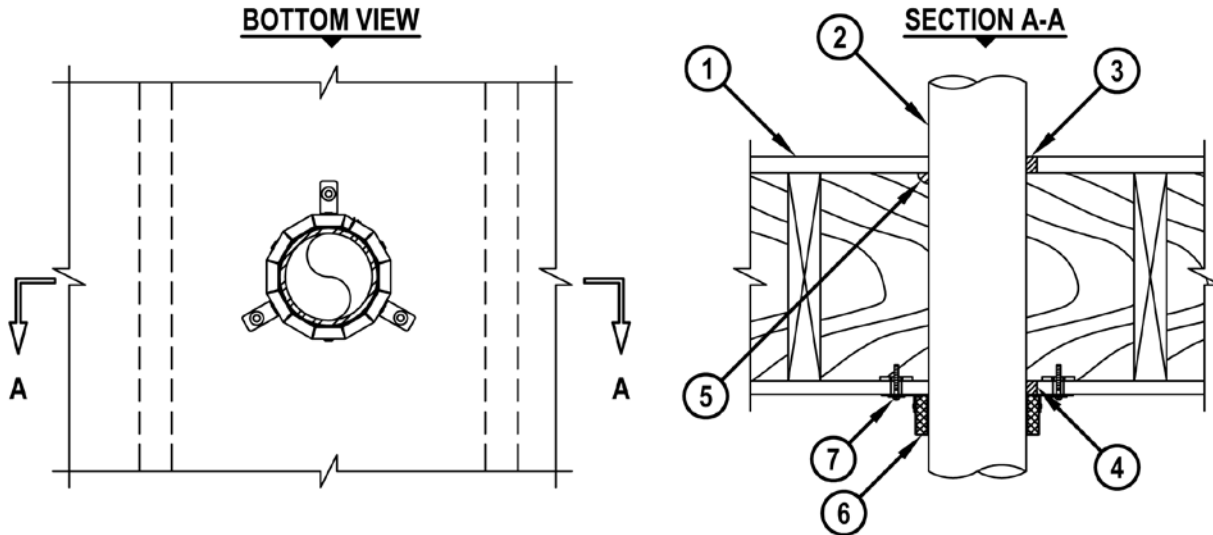
PLASTIC PIPE THROUGH WOOD FLOOR/CEILING ASSEMBLY

F AND FT-RATINGS = 1-HR.
FT AND FTH-RATINGS = 0-HR.

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL



cUL FC2011d.071212



1. WOOD FLOOR/CEILING ASSEMBLY (UL/cUL CLASSIFIED L500 SERIES) (1-HR. FIRE-RATING).
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING (SEE NOTE NO. 3 BELOW) :
 - A. MAXIMUM 4" NOMINAL DIAMETER PVC PLASTIC PIPE (CELLULAR AND SOLID CORE).
 - B. MAXIMUM 4" NOMINAL DIAMETER ABS PLASTIC PIPE (CELLULAR AND SOLID CORE).
 - C. MAXIMUM 4" NOMINAL DIAMETER CPVC PLASTIC PIPE (SDR 13.5).
 - D. MAXIMUM 4" NOMINAL DIAMETER AQUARISE CPVC PLASTIC PIPE (SDR 11) MANUFACTURED BY IPEX, INC. (CLOSED PIPING SYSTEM ONLY).
3. MINIMUM 3/4" DEPTH OF HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT OR HILTI CP 606 FLEXIBLE FIRESTOP SEALANT.
4. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT OR HILTI CP 606 FLEXIBLE FIRESTOP SEALANT.
5. MINIMUM 1/2" BEAD OF HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT OR HILTI CP 606 FLEXIBLE FIRESTOP SEALANT AT POINT OF CONTACT.
6. HILTI CP 643N FIRESTOP COLLAR WITH FASTENING HOOKS.
7. ATTACH MOUNTING HOOKS TO CEILING ASSEMBLY WITH HILTI 3/16" TOGGLER BOLT AND WASHER, OR TO LOWER TOP PLATE WITH 1-1/2" LONG WOOD SCREWS AND WASHERS WHEN ROUTED WITHIN CHASE WALL.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 5".
2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1/2".
3. CLOSED OR VENTED PIPING SYSTEM (PVC & ABS = SCHEDULE 40; CPVC = SDR 11 OR 13.5).
4. CHASE WALL [NOT SHOWN, OPTIONAL] - THE THROUGH PENETRANT MAY BE ROUTED THROUGH A 1-HR. FIRE-RATED GYPSUM CHASE WALL.



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cUL SYSTEM NO. F-C-2044

PLASTIC PIPE THROUGH WOOD/FLOOR CEILING ASSEMBLY

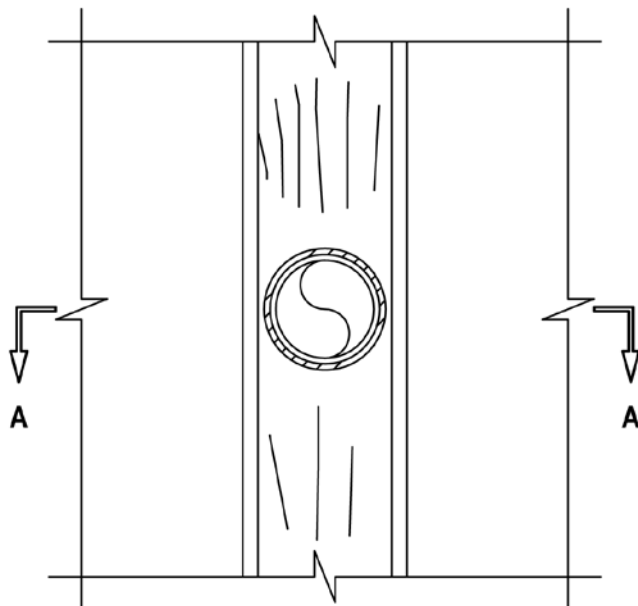
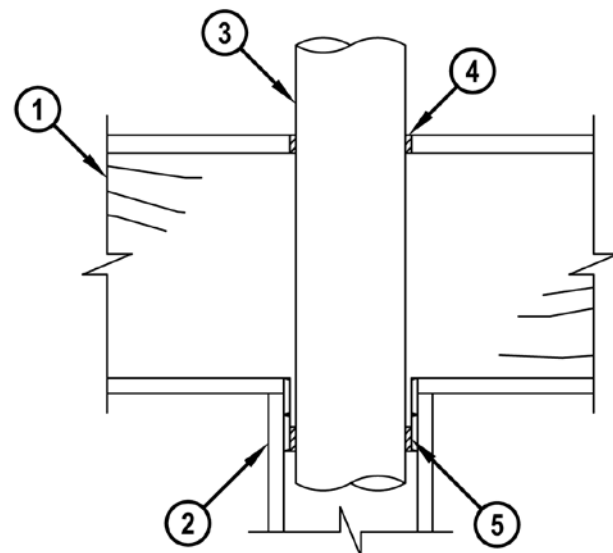
F AND FH-RATINGS = 1-HR.

FT AND FTH-RATINGS = 3/4-HR.

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL



cUL FC2044a.062910

BOTTOM VIEW**SECTION A-A**

1. WOOD FLOOR/CEILING ASSEMBLY (UL/cUL CLASSIFIED L500 SERIES) (1-HR. FIRE-RATING).
2. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U300 SERIES) (1-HR. FIRE-RATING) CONSISTING OF 2" x 4" OR 2" x 6" LUMBER PLATES AND STUDS.
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 4" NOMINAL DIAMETER PVC PLASTIC PIPE (SCH 40) (CLOSED OR VENTED PIPING SYSTEM).
 - B. MAXIMUM 4" NOMINAL DIAMETER CPVC PLASTIC PIPE (SDR 13.5) (CLOSED OR VENTED PIPING SYSTEM).
 - C. MAXIMUM 4" NOMINAL DIAMETER ABS PLASTIC PIPE (SCH 40) (CLOSED OR VENTED PIPING SYSTEM).
4. MINIMUM 3/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
5. MINIMUM 1" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.

NOTES : 1. MAXIMUM SIZE OF OPENING = 5-1/2" x 6" [OR A MAXIMUM DIAMETER OF 6"].

2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1".

3. [NOT SHOWN] WHEN ANNULAR SPACE IS 0", APPLY MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT AT POINT OF CONTACT.

4. WHEN LUMBER PLATES ARE DISCONTINUOUS, ATTACH A MINIMUM 3" WIDE 20 GA. (OR HEAVIER) GALVANIZED STEEL PLATE TO EACH END OF LUMBER PLATE. STEEL PLATES SHOULD OVERLAP 1/2" ONTO LUMBER, AND SECURED WITH TWO STEEL SCREWS OR NAILS ON EACH SIDE OF OPENING.



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cUL SYSTEM NO. F-C-2045

PLASTIC PIPE THROUGH WOOD/FLOOR CEILING ASSEMBLY

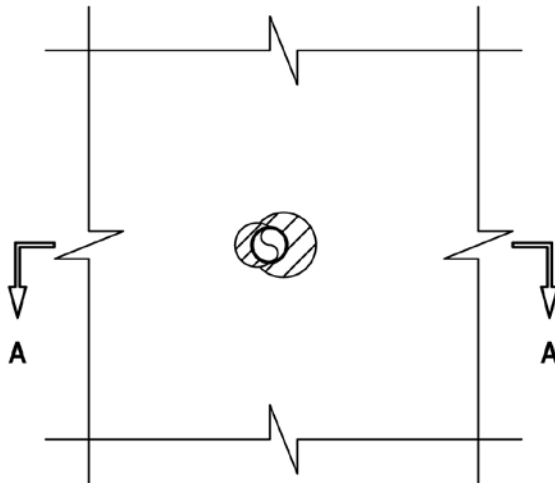
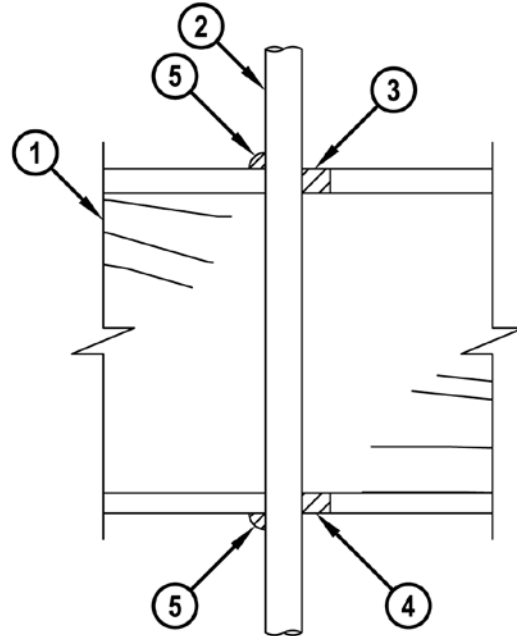
F AND FH-RATINGS = 1-HR.

FT AND FTH-RATINGS = 0-HR.

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL



cUL FC2045a.050310

BOTTOM VIEW**SECTION A-A**

1. WOOD FLOOR/CEILING ASSEMBLY (UL/cUL CLASSIFIED L500 SERIES) (1-HR. FIRE-RATING).
2. MAXIMUM 1" NOMINAL DIAMETER SDR 9 CROSS-LINKED POLYETHYLENE (PEX) TUBING.
3. MINIMUM 3/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
4. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
5. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT APPLIED AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 2".
2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 7/8".



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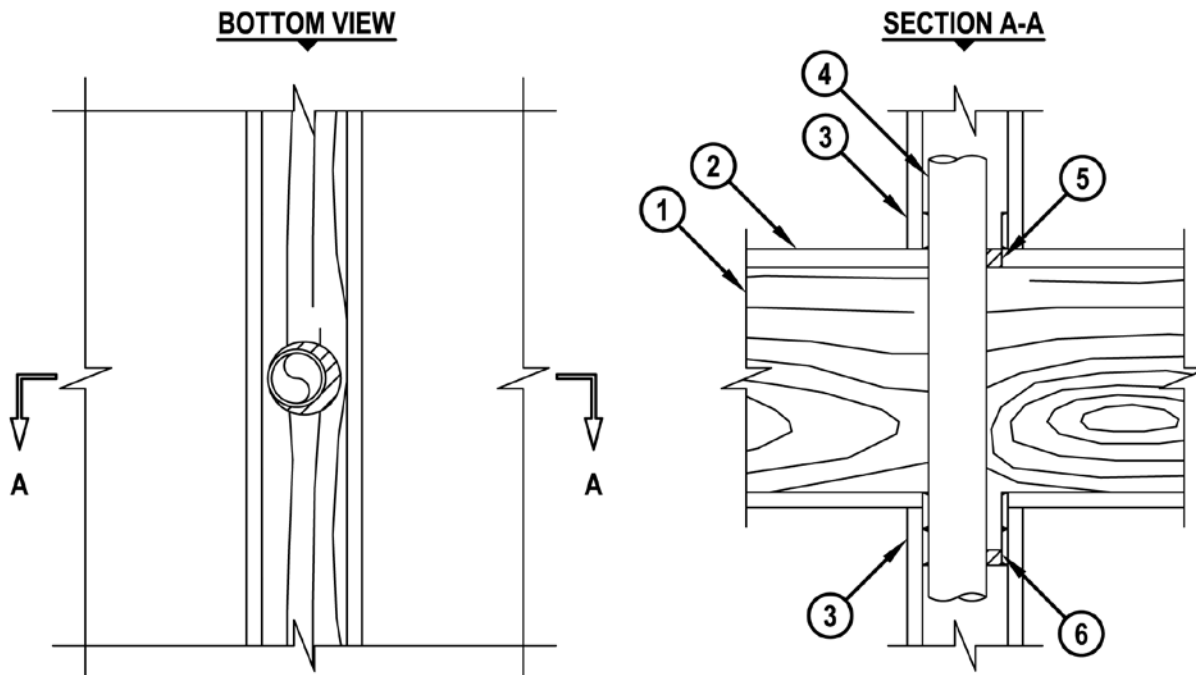
cUL SYSTEM NO. F-C-2378

PLASTIC PIPE THROUGH WOOD FLOOR/CEILING ASSEMBLY

F AND FH-RATINGS = 1-HR.
FT AND FTH-RATINGS = 0-HR.



cUL FC2378a.070108



1. WOOD FLOOR/CEILING ASSEMBLY (UL/cUL CLASSIFIED L500 SERIES) (1-HR. FIRE-RATING).
2. LUMBER OR PLYWOOD SUBFLOOR WITH FINISH FLOOR OF LUMBER, PLYWOOD, OR FLOOR TOPPING MIXTURE.
3. [OPTIONAL] GYPSUM CHASE WALL (UL/cUL CLASSIFIED U300 SERIES) (1-HR. FIRE-RATING) CONSISTING OF NOMINAL 2" x 4" LUMBER PLATES AND STUDS.
4. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 2" NOMINAL DIAMETER PVC PLASTIC PIPE (CELLULAR OR SOLID CORE).
 - B. MAXIMUM 2" NOMINAL DIAMETER CPVC PLASTIC PIPE.
 - C. MAXIMUM 2" NOMINAL DIAMETER ABS PLASTIC PIPE (CELLULAR OR SOLID CORE).
 - D. MAXIMUM 2" NOMINAL DIAMETER AQUARISE CPVC PLASTIC PIPE (SDR 11) MANUFACTURED BY IPEX, INC.
 - E. MAXIMUM 1" NOMINAL DIAMETER CROSS-LINKED POLYETHYLENE (PEX) TUBING.
5. MINIMUM 3/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT FLUSH WITH TOP SURFACE OF FLOOR OR SOLE PLATE.
6. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT FLUSH WITH BOTTOM SURFACE OF CEILING OR LOWER TOP PLATE.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 3".
 2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 5/8".
 3. CLOSED PIPING SYSTEM ONLY (PVC, ABS = SCH 40; CPVC = SDR 17; PEX = SDR 9).

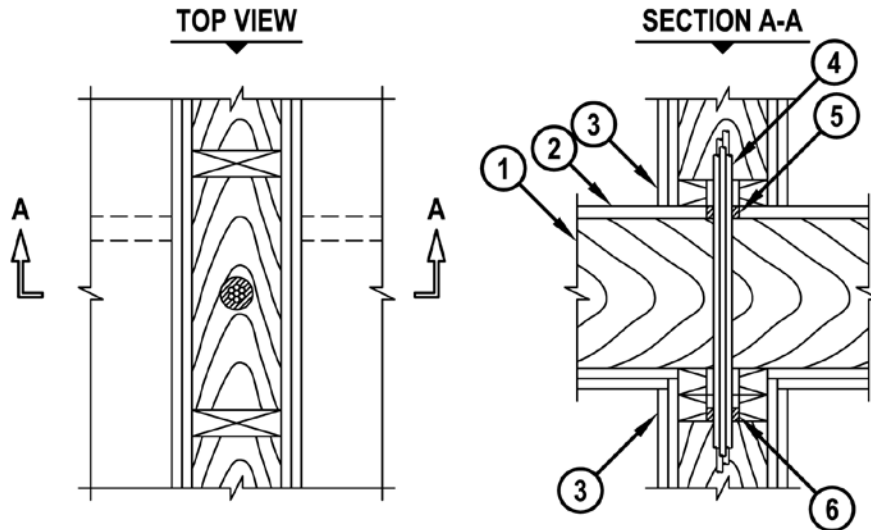


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UL/cUL SYSTEM NO. F-C-3012
CABLE/CABLE BUNDLE THROUGH WOOD FLOOR/CEILING ASSEMBLY

F-RATING = 1-HR. OR 2-HR.
T-RATING = 0-HR., 1-HR., OR 1-3/4-HR.



1. WOOD FLOOR/CEILING ASSEMBLY (UL/cUL CLASSIFIED L500 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. LUMBER OR PLYWOOD SUBFLOOR WITH FINISH FLOOR OF LUMBER, PLYWOOD, OR FLOOR TOPPING MIXTURE.
3. [OPTIONAL] GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U300 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN) CONSISTING OF NOMINAL 2" x 6" OR PARALLEL 2" x 4" LUMBER PLATES AND STUDS.
4. CABLE BUNDLE MAY CONSIST OF ANY OF THE FOLLOWING:
 - A. RG 59 COAXIAL CABLE WITH PVC JACKET.
 - B. MAXIMUM 8/C NO. 22 AWG TELEPHONE CABLE WITH PVC JACKET.
 - C. MAXIMUM 2/C NO. 12 AWG CABLE WITH PVC JACKET.
 - D. MAXIMUM 3/C (+GROUND) 2/0 AWG SER CABLE (ALUMINUM OR COPPER) WITH PVC JACKET.
 - E. MAXIMUM 3/C (+GROUND) NO. 2/0 AWG TYPE NM CABLE WITH PVC JACKET.
 - F. MAXIMUM 3/C NO. 12 METAL-CLAD (BX) CABLE.
 - G. MAXIMUM 1" DIAMETER METAL-CLAD TEK CABLE WITH PVC JACKET.
 - H. ANY CABLES, METAL-CLAD CABLES, OR ARMORED CABLES CURRENTLY LISTED UNDER THE THROUGH PENETRATING PRODUCTS CATEGORY.
 - I. MAXIMUM 4/C (+GRND) NO. 300 KCMIL ALUMINUM SER CABLE.
5. MINIMUM 3/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT FLUSH WITH TOP SURFACE OF FLOOR OR SOLE PLATE OF CHASE WALL.
6. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT FLUSH WITH BOTTOM SURFACE OF CEILING OR LOWER TOP PLATE.

NOTES : 1. MAXIMUM DIAMETER OF OPENING FOR 1-HR. OR 2-HR. FIRE-RATED ASSEMBLY IS 2" OR 2-1/2", RESPECTIVELY.
2. CABLES TO FILL MAXIMUM 45% OF CROSS-SECTIONAL AREA OF OPENING.



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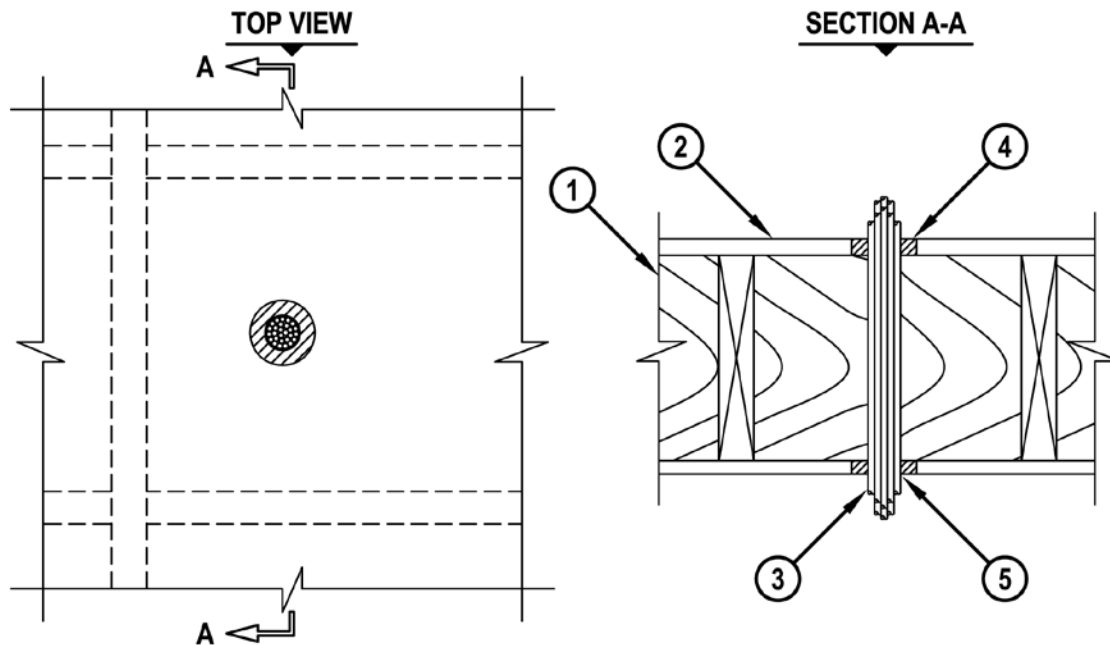
UL/cUL SYSTEM NO. F-C-3044

CABLE BUNDLE THROUGH WOOD FLOOR/CEILING ASSEMBLY

F-RATING = 1-HR.

T-RATING = 1-HR.

FC3044d.091608



1. WOOD FLOOR/CEILING ASSEMBLY (UL/cUL CLASSIFIED L500 SERIES) (1-HR. FIRE-RATING).
2. LUMBER OR PLYWOOD SUBFLOOR WITH FINISH FLOOR OF LUMBER, PLYWOOD, OR FLOOR TOPPING MIXTURE.
3. CABLE BUNDLE TO CONSIST OF ANY OF THE FOLLOWING :
 - A. RG 59 COAXIAL CABLE.
 - B. MAXIMUM 25 PAIR NO. 24 AWG TELEPHONE CABLE.
 - C. MAXIMUM 3/C NO. 10 AWG CABLE (ROMEX).
 - D. MAXIMUM 3/C (+ GRND) 2/0 AWG SER CABLE (ALUMINUM OR COPPER).
 - E. MAXIMUM 3/C NO. 10 AWG METAL-CLAD CABLE.
 - F. MAXIMUM 24 FIBER-OPTIC CABLE.
4. MINIMUM 3/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT FLUSH WITH TOP SURFACE OF FLOOR OR SOLE PLATE.
5. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT FLUSH WITH BOTTOM SURFACE OF CEILING OR LOWER TOP PLATE.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 3".
 2. ANNULAR SPACE = 3/4".
 3. CABLES TO FILL A MAXIMUM 25% OF CROSS-SECTIONAL AREA OF OPENING.
 4. CHASE WALL (NOT SHOWN, OPTIONAL) THE THROUGH PENETRANT MAY BE ROUTED THROUGH A 1-HR. FIRE-RATED GYPSUM CHASE WALL.



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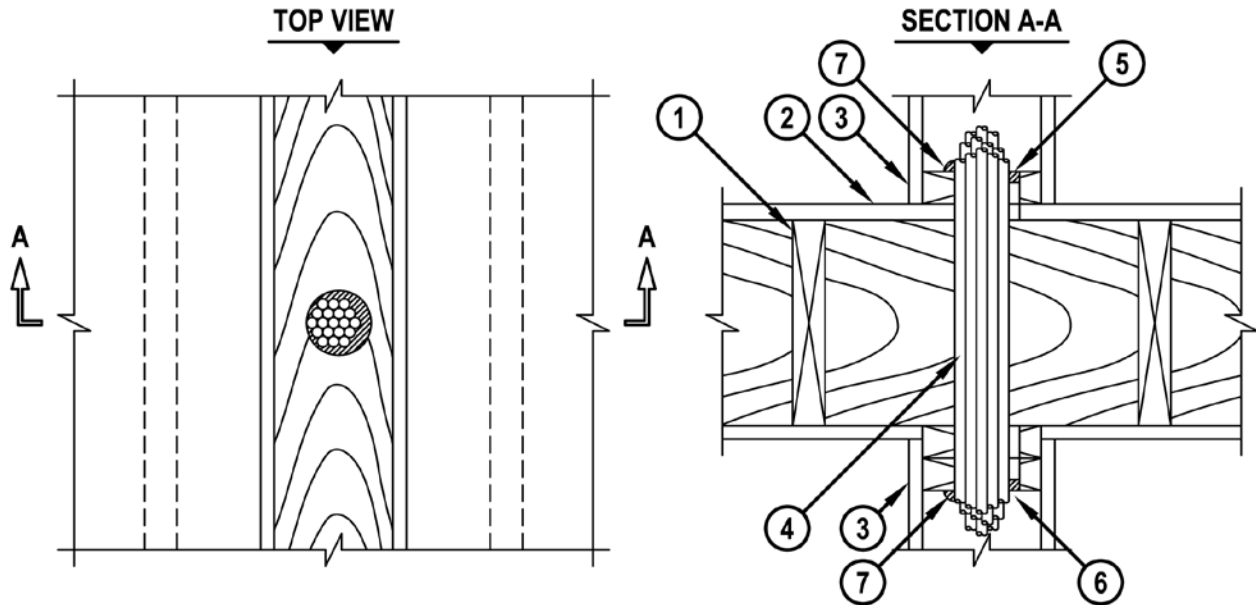
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UL/cUL SYSTEM NO. F-C-3071

CABLE BUNDLE THROUGH WOOD FLOOR/CEILING ASSEMBLY

F-RATING = 1-HR.

T-RATING = 1-HR.



FC3071d.092707

1. WOOD FLOOR/CEILING ASSEMBLY (UL/cUL CLASSIFIED L500 SERIES) (1-HR. FIRE-RATING).
2. LUMBER OR PLYWOOD SUBFLOOR WITH FINISH FLOOR OF LUMBER, PLYWOOD OR FLOOR TOPPING MIXTURE.
3. [OPTIONAL] GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U300 SERIES) (1-HR. FIRE-RATING) CONSISTING OF NOMINAL 2" x 6" LUMBER PLATES AND STUDS..
4. MAXIMUM 2" DIAMETER CABLE BUNDLE TO CONSIST OF ANY COMBINATION OF THE FOLLOWING:
 - A. MAXIMUM 25 PAIR NO. 24 AWG TELEPHONE WITH PVC JACKET.
 - B. MAXIMUM 3/C (+GROUND) 2/0 ALUMINUM SER CABLE WITH PVC JACKET.
 - C. MAXIMUM 3/C NO. 8 AWG STEEL CLAD CABLE.
 - D. MAXIMUM 3/C (+GROUND) NO. 10 AWG (ROMEX) CABLE WITH PVC JACKET.
 - E. TYPE RG 59/4 COAXIAL CABLE WITH PVC JACKET.
 - F. MAXIMUM 1" DIAMETER METAL CLAD TEK CABLE WITH PVC JACKET.
5. MINIMUM 1/2" DEPTH HILTI CP 606 FLEXIBLE FIRESTOP SEALANT INSTALLED FLUSH WITH TOP SURFACE OF SOLE PLATE OR SUBFLOOR.
6. MINIMUM 5/8" DEPTH HILTI CP 606 FLEXIBLE FIRESTOP SEALANT INSTALLED FLUSH WITH BOTTOM SURFACE OF CEILING OR LOWER TOP PLATE.
7. MINIMUM 1/2" BEAD HILTI CP 606 FLEXIBLE FIRESTOP SEALANT APPLIED AT POINT OF CONTACT ON BOTTOM SURFACE OF SUBFLOOR OR TOP SURFACE OF SOLE PLATE AND BOTTOM SURFACE OF CEILING OR LOWER TOP PLATE.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 3".
 2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1".
 3. CABLES TO FILL A MAXIMUM 45% OF CROSS-SECTIONAL AREA OF OPENING.



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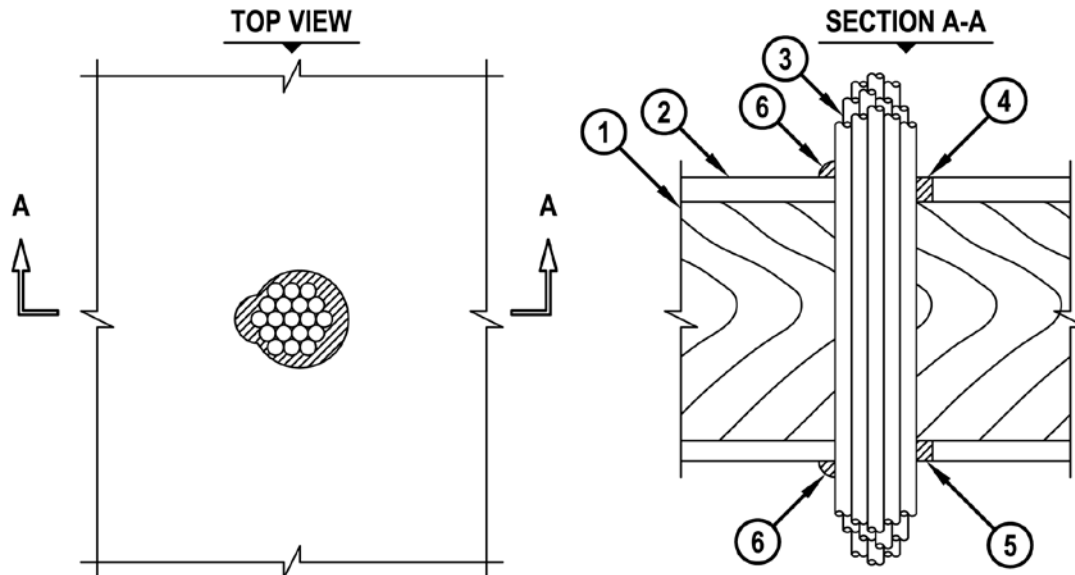
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UL/cUL SYSTEM NO. F-C-3074

CABLE BUNDLE THROUGH WOOD FLOOR ASSEMBLY

F-RATING = 1-HR.

T-RATING = 0-HR. OR 1-HR.



FC3074e.021109

1. WOOD FLOOR ASSEMBLY (UL/cUL CLASSIFIED L500 SERIES) (1-HR. FIRE-RATING).
2. LUMBER OR PLYWOOD SUBFLOOR WITH FINISH FLOOR OF LUMBER, PLYWOOD, OR FLOOR TOPPING MIXTURE.
3. CABLE BUNDLE TO CONSIST OF ANY OF THE FOLLOWING :
 - A. MAXIMUM 150 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
 - B. MAXIMUM 2/C NO. 10 AWG (+GROUND) WITH PVC JACKET (ROMEX).
 - C. MAXIMUM 3/C (+GROUND) 2/0 AWG ALUMINUM SER CABLE WITH PVC JACKET.
 - D. MAXIMUM 3/C NO. 10 AWG STEEL-CLAD CABLE WITH PVC JACKET.
 - E. FIBER OPTIC CABLE (MAXIMUM 24 FIBER) WITH PVC JACKET.
 - F. RG 59U COAXIAL CABLE WITH PVC JACKET.
 - G. CATEGORY 5 DATA CABLE WITH PVC JACKET.
 - H. ANY CABLES, METAL-CLAD CABLES, OR ARMORED CABLES CURRENTLY LISTED UNDER THE THROUGH PENETRATING PRODUCTS CATEGORY.
 - I. MAXIMUM 4/C (+GRND) NO. 300 KCMIL ALUMINUM SER CABLE.
4. MINIMUM 3/4" DEPTH HILTI CP 606 FLEXIBLE FIRESTOP SEALANT.
5. MINIMUM 5/8" DEPTH HILTI CP 606 FLEXIBLE FIRESTOP SEALANT.
6. MINIMUM 1/2" BEAD HILTI CP 606 FLEXIBLE FIRESTOP SEALANT AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 3".
 2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1".
 3. CABLES TO FILL MAXIMUM 50% OF CROSS-SECTIONAL AREA OF OPENING.
 4. CHASE WALL (NOT SHOWN, OPTIONAL) - THE THROUGH PENETRANT MAY BE ROUTED THROUGH A 1-HR. GYPSUM CHASE WALL ASSEMBLY.



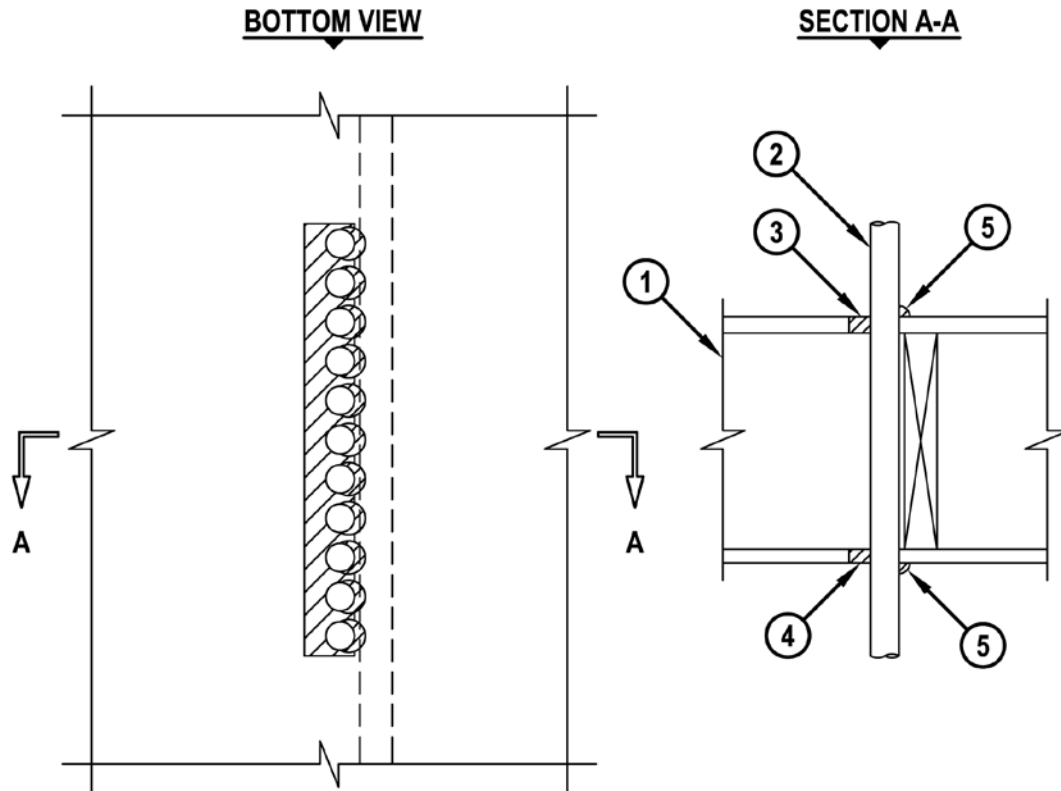
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UL/cUL SYSTEM NO. F-C-3094
CABLES THROUGH WOOD FLOOR/CEILING ASSEMBLY

F-RATING = 1-HR.
 T-RATING = 1-HR.

FC3094a.020306



1. WOOD FLOOR/CEILING ASSEMBLY (UL/cUL CLASSIFIED L500 SERIES) (1-HR. FIRE-RATING).
2. MAXIMUM 3/C (+GRND) NO 2/0 AWG ALUMINUM CONDUCTOR SER CABLE WITH PVC JACKET (ONE OR MORE).
3. MINIMUM 3/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
4. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
5. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT APPLIED AT POINT OF CONTACT.

NOTES : 1. MAXIMUM SIZE OF OPENING = 20" x 2".
 2. ANNULAR SPACE BETWEEN CABLES AND PERIPHERY OF OPENING = MINIMUM 0", MAXIMUM 1".
 3. ANNULAR SPACE BETWEEN CABLES = MINIMUM 1/4", MAXIMUM 1/2".



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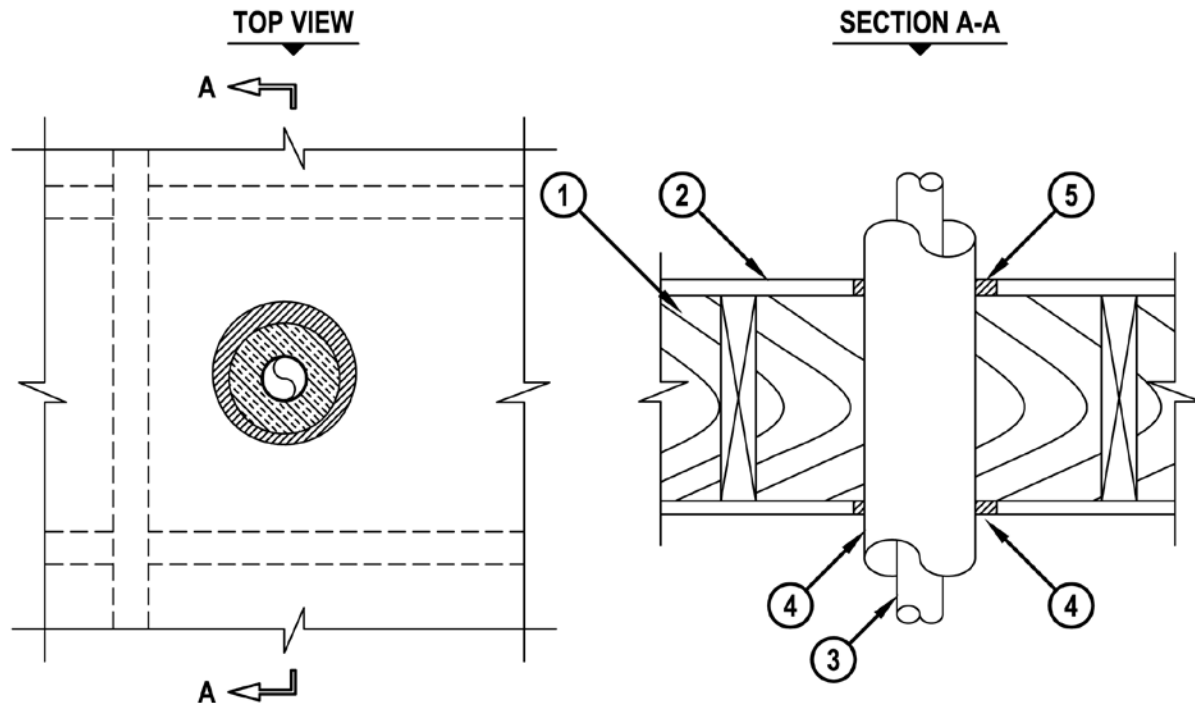
UL/cUL SYSTEM NO. F-C-5036

INSULATED METAL PIPE THROUGH WOOD FLOOR/CEILING ASSEMBLY

F-RATING = 1-HR.

T-RATING = 1-HR.

FC5036d.091608



1. WOOD FLOOR/CEILING ASSEMBLY (UL/cUL CLASSIFIED L500 SERIES) (1-HR. FIRE-RATING).
2. LUMBER OR PLYWOOD SUBFLOOR WITH FINISH FLOOR OF LUMBER, PLYWOOD, OR FLOOR TOPPING MIXTURE.
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 2" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 2" NOMINAL DIAMETER COPPER PIPE.
4. NOMINAL 1-1/2" THICK GLASS-FIBER PIPE INSULATION.
5. MINIMUM 3/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT FLUSH WITH TOP SURFACE OF FLOOR OR SOLE PLATE.
6. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT FLUSH WITH BOTTOM SURFACE OF CEILING OR LOWER TOP PLATE.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 6-7/8".
 2. ANNULAR SPACE = MINIMUM 1/2", MAXIMUM 1".
 3. CHASE WALL (NOT SHOWN, OPTIONAL) THE THROUGH PENETRANT MAY BE ROUTED THROUGH A 1-HR. FIRE-RATED GYPSUM CHASE WALL.



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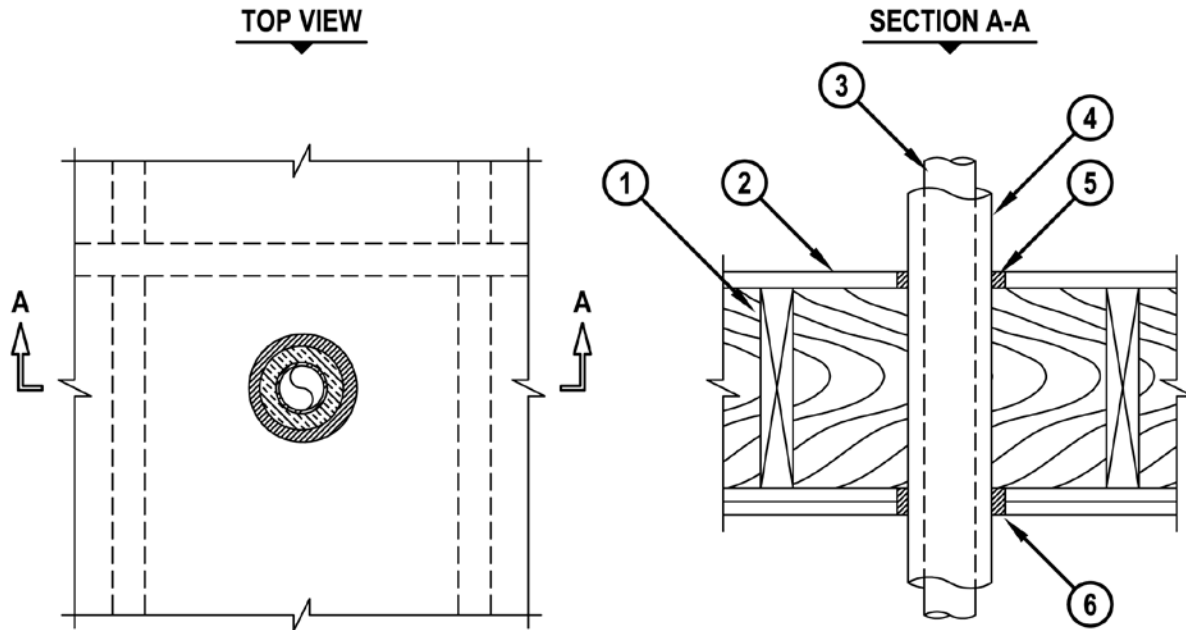
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UL/cUL SYSTEM NO. F-C-5037

INSULATED METAL PIPE THROUGH WOOD FLOOR/CEILING ASSEMBLY

F-RATING = 1-HR. OR 2-HR.

T-RATING = 1/4-HR. OR 1 3/4-HR.



FC5037e.091608

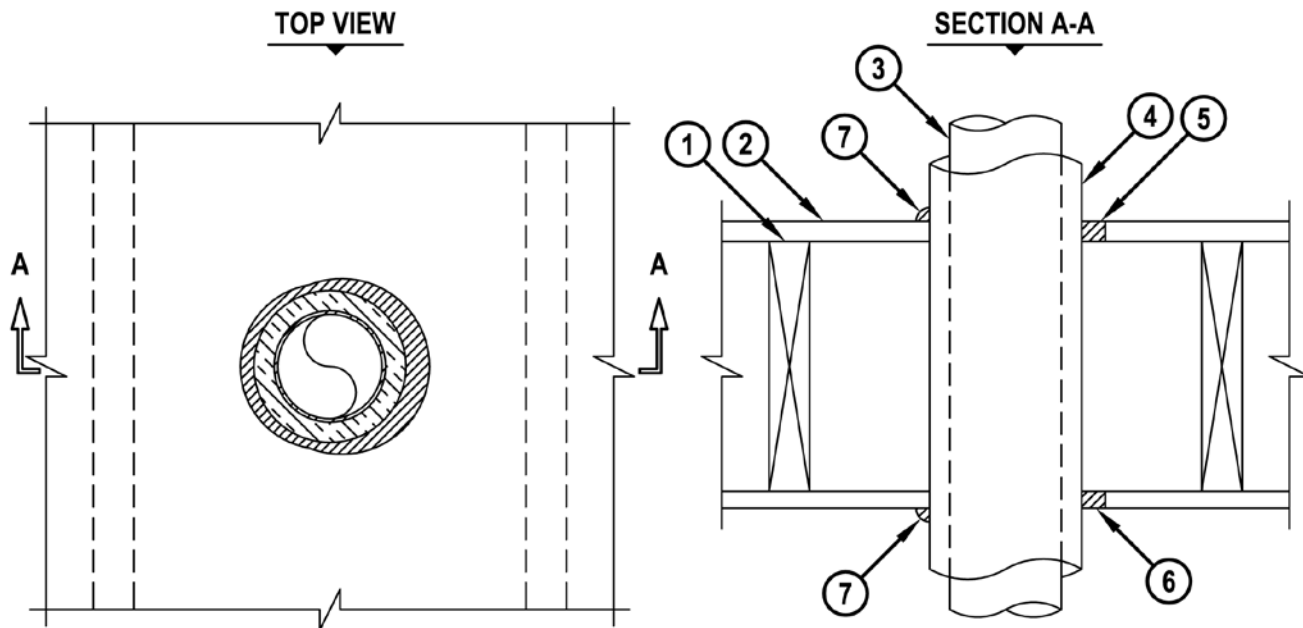
1. WOOD FLOOR/CEILING ASSEMBLY (UL/cUL CLASSIFIED L500 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. LUMBER OR PLYWOOD SUBFLOOR WITH FINISH FLOOR OF LUMBER, PLYWOOD, OR FLOOR TOPPING MIXTURE.
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 2" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 2" NOMINAL DIAMETER COPPER PIPE.
4. NOMINAL 3/4" THICK AB/PVC FLEXIBLE FOAM INSULATION.
5. MINIMUM 3/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT FLUSH WITH TOP SURFACE OF FLOOR OR SOLE PLATE.
6. HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT FLUSH WITH BOTTOM SURFACE OF CEILING OR LOWER TOP PLATE :
 - A. MINIMUM 5/8" DEPTH REQUIRED FOR 1-HR. FIRE-RATING.
 - B. MINIMUM 1-1/4" DEPTH REQUIRED FOR 2-HR. FIRE-RATING.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 5-1/8".
 2. ANNULAR SPACE = MINIMUM 1/2", MAXIMUM 1".
 3. CHASE WALL (NOT SHOWN, OPTIONAL)-THE THROUGH PENETRANT MAY BE ROUTED THROUGH A 1-HR. OR 2-HR. FIRE-RATED GYPSUM CHASE WALL.

UL/cUL SYSTEM NO. F-C-5065

INSULATED METAL PIPE THROUGH WOOD FLOOR ASSEMBLYF-RATING = 1-HR.
T-RATING = 3/4-HR.

FC5065b.071204



1. WOOD FLOOR/CEILING ASSEMBLY (UL/cUL CLASSIFIED L500 SERIES) (1-HR. FIRE-RATING).
2. LUMBER OR PLYWOOD SUBFLOOR WITH FINISH FLOOR OF LUMBER, PLYWOOD, OR FLOOR TOPPING MIXTURE.
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 4" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 4" NOMINAL DIAMETER CAST IRON OR DUCTILE IRON PIPE.
 - C. MAXIMUM 4" NOMINAL DIAMETER COPPER PIPE OR COPPER TUBING.
4. NOMINAL 3/4" THICK AB/PVC FLEXIBLE FOAM INSULATION.
5. MINIMUM 3/4" DEPTH HILTI CP 606 FLEXIBLE FIRESTOP SEALANT.
6. MINIMUM 5/8" DEPTH HILTI CP 606 FLEXIBLE FIRESTOP SEALANT.
7. MINIMUM 1/2" BEAD HILTI CP 606 FLEXIBLE FIRESTOP SEALANT AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 6-1/2".
 2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 7/8".
 3. CHASE WALL (NOT SHOWN, OPTIONAL) - THE THROUGH PENETRANT MAY BE ROUTED THROUGH A 1-HR. FIRE-RATED GYPSUM CHASE WALL.



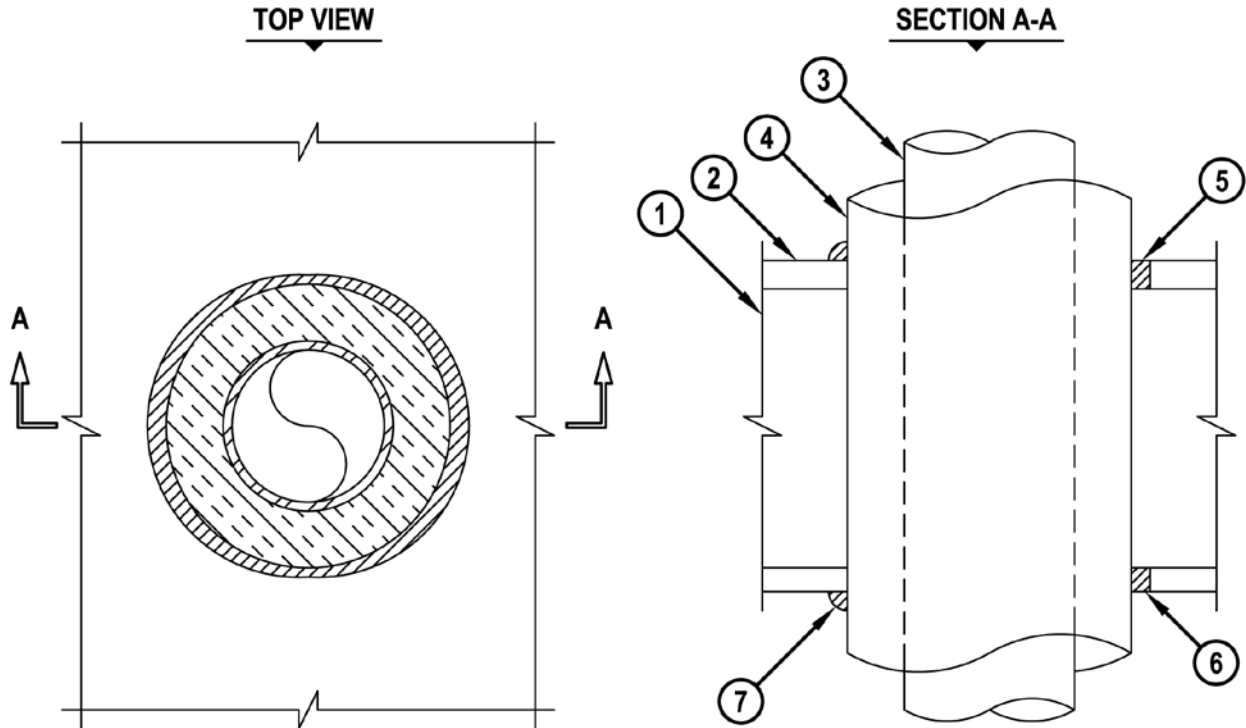
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UL/cUL SYSTEM NO. F-C-5066
INSULATED METAL PIPE THROUGH WOOD FLOOR ASSEMBLY

F-RATING = 1-HR.
T-RATING = 1-HR.

FC5066b.071204



1. WOOD FLOOR/CEILING ASSEMBLY (UL/cUL CLASSIFIED L500 SERIES) (1-HR. FIRE-RATING).
2. LUMBER OR PLYWOOD SUBFLOOR WITH FINISH FLOOR OF LUMBER, PLYWOOD, OR FLOOR TOPPING MIXTURE.
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 4" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - C. MAXIMUM 4" NOMINAL DIAMETER CAST IRON OR DUCTILE IRON PIPE.
 - B. MAXIMUM 4" NOMINAL DIAMETER COPPER PIPE OR COPPER TUBING.
4. NOMINAL 1-1/2" THICK GLASS-FIBER PIPE INSULATION.
5. MINIMUM 3/4" DEPTH HILTI CP 606 FLEXIBLE FIRESTOP SEALANT.
6. MINIMUM 5/8" DEPTH HILTI CP 606 FLEXIBLE FIRESTOP SEALANT.
7. MINIMUM 1/2" BEAD HILTI CP 606 FLEXIBLE FIRESTOP SEALANT AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 8".
2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 7/8".
3. CHASE WALL (NOT SHOWN, OPTIONAL) - THE THROUGH PENETRANT MAY BE ROUTED THROUGH A 1-HR. FIRE-RATED GYPSUM CHASE WALL.



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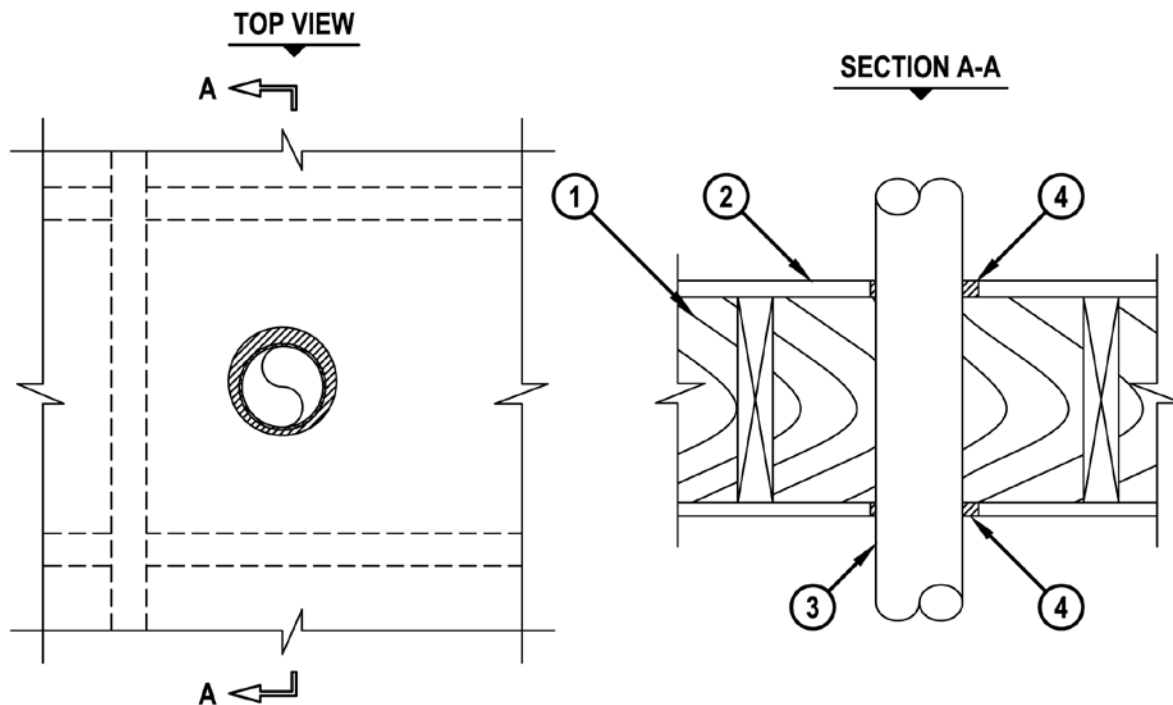
UL/cUL SYSTEM NO. F-C-7013

METAL DUCT (WITHOUT DAMPER) THROUGH WOOD FLOOR/CEILING ASSEMBLY

F-RATING = 1-HR.

T-RATING = 0-HR.

FC7013c.081108



1. WOOD FLOOR/CEILING ASSEMBLY (UL/cUL CLASSIFIED L500 SERIES) (1-HR. FIRE-RATING).
2. LUMBER OR PLYWOOD SUBFLOOR WITH FINISH FLOOR OF LUMBER, PLYWOOD, OR FLOOR TOPPING MIXTURE.
3. MAXIMUM 4" NOMINAL DIAMETER SHEET METAL DUCT (MINIMUM 28 GAUGE).
4. MINIMUM 3/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT FLUSH WITH TOP SURFACE OF FLOOR OR SOLE PLATE.
5. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT FLUSH WITH BOTTOM SURFACE OF CEILING OR LOWER TOP PLATE.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 5".
 2. ANNULAR SPACE = MINIMUM 1/4", MAXIMUM 3/4".
 3. CHASE WALL (NOT SHOWN, OPTIONAL) THE THROUGH PENETRANT MAY BE ROUTED THROUGH A 1-HR. FIRE-RATED GYPSUM CHASE WALL.



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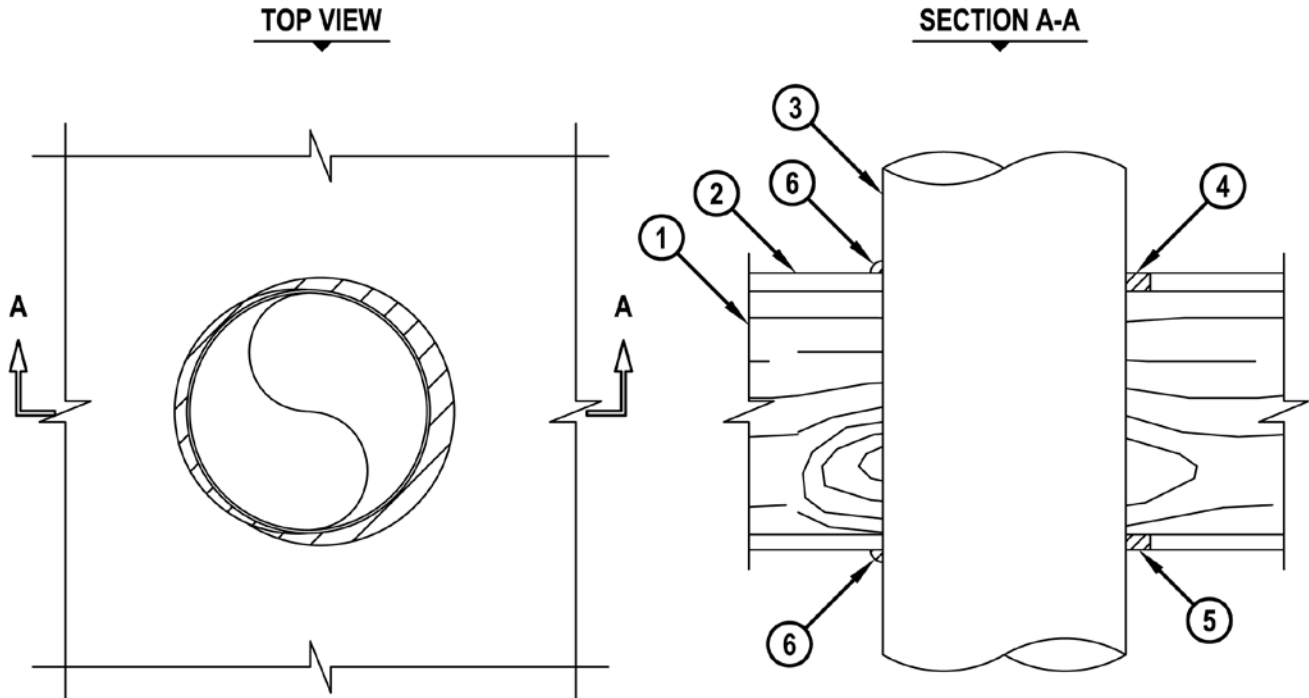
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UL/cUL SYSTEM NO. F-C-7025
SHEET METAL DUCT THROUGH 1-HR. WOOD FLOOR ASSEMBLY

F-RATING = 1-HR.

T-RATING = 0-HR.

FC7025b.050305



1. WOOD FLOOR ASSEMBLY (UL/cUL CLASSIFIED L500 SERIES) (1-HR. FIRE-RATING).
2. LUMBER OR PLYWOOD SUBFLOOR WITH FINISH FLOOR OF LUMBER, PLYWOOD, OR FLOOR TOPPING MIXTURE.
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 10" NOMINAL DIAMETER SHEET METAL DUCT (MIN. 28 GA.).
 - B. MAXIMUM 4" NOMINAL DIAMETER SHEET METAL DUCT (MIN. 30 GA.).
4. MINIMUM 3/4" DEPTH HILTI CP 606 FLEXIBLE FIRESTOP SEALANT.
5. MINIMUM 5/8" DEPTH HILTI CP 606 FLEXIBLE FIRESTOP SEALANT.
6. MINIMUM 1/2" BEAD HILTI CP 606 FLEXIBLE FIRESTOP SEALANT AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 11".
 2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1".
 3. CHASE WALL (NOT SHOWN, OPTIONAL). THE THROUGH PENETRANT, MAY BE ROUTED THROUGH A 1-HR. FIRE-RATED GYPSUM CHASE WALL.



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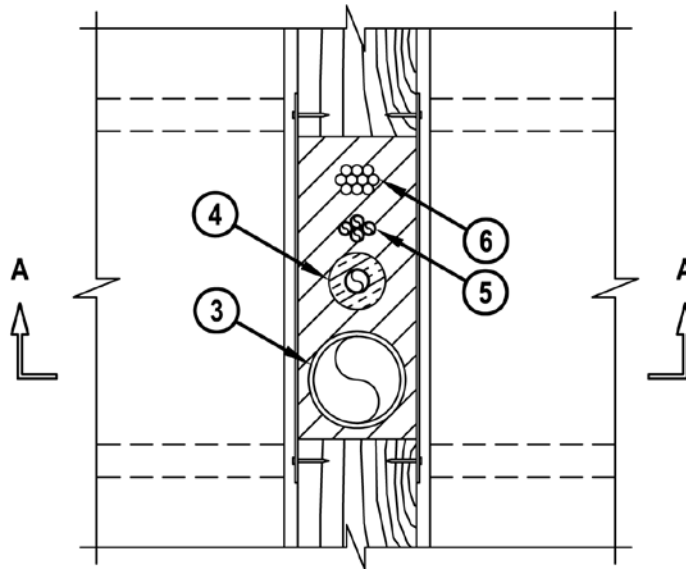
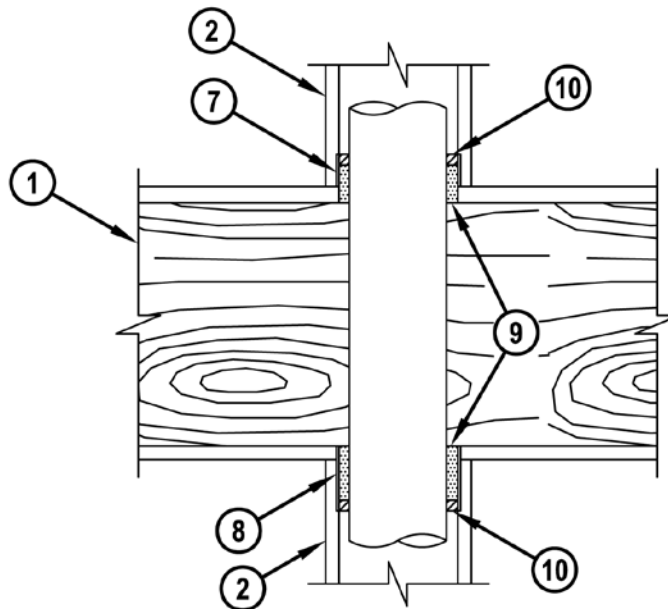
cUL SYSTEM NO. F-C-8003

MULTIPLE PENETRANTS THROUGH WOOD FLOOR/CEILING ASSEMBLY

F, FT, FH, AND FTH-RATINGS = 1-HR.



cUL FC8003a.122707

TOP VIEW**SECTION A-A**

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cUL SYSTEM NO. F-C-8003

MULTIPLE PENETRANTS THROUGH WOOD FLOOR/CEILING ASSEMBLY

F, FT, FH, AND FTH-RATINGS = 1-HR.



cUL FC8003a.122707

1. WOOD FLOOR/CEILING ASSEMBLY (cUL CLASSIFIED L500 SERIES) (1-HR. FIRE-RATING).
2. GYPSUM WALL ASSEMBLY (cUL CLASSIFIED U300 SERIES) (1-HR. FIRE-RATING) WITH SINGLE, DOUBLE OR STAGGERED WOOD STUDS (MINIMUM 2 X 6).
3. ONE OR MORE OF THE FOLLOWING METALLIC PIPES, CONDUITS OR TUBING MAY BE USED (ONLY ONE TO BE LARGER THAN 1" DIAMETER) :
 - A. MAXIMUM 4" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 5 OR HEAVIER).
 - B. MAXIMUM 4" NOMINAL DIAMETER CAST OR DUCTILE IRON PIPE.
 - C. MAXIMUM 4" NOMINAL DIAMETER COPPER PIPE OR TUBING.
 - D. MAXIMUM 4" NOMINAL DIAMETER STEEL CONDUIT OR EMT.
4. INSULATION MAY BE ANY OF THE FOLLOWING :
 - A. NOMINAL 3/4" THICK AB/PVC PIPE INSULATION MAY BE INSTALLED ON METALLIC PIPES OR TUBES (ITEM NO. 3A, 3B, AND 3C) NOT EXCEEDING NOMINAL 1" DIAMETER.
 - B. MAXIMUM 3/4" THICK GLASS-FIBER MAY BE INSTALLED ON METALLIC PIPES OR TUBES (ITEM NO. 3A, 3B, AND 3C) NOT EXCEEDING NOMINAL 3/4" DIAMETER (ONLY ONE PIPE OR TUBE TO BE INSTALLED WITH GLASS-FIBER).
5. MAXIMUM 1/2" DIAMETER SDR 9 PEX TUBING (CLOSED PIPING SYSTEM) (MAX. QTY. = 4, BUNDLED TOGETHER).
6. MAXIMUM 2-1/2" DIAMETER CABLE BUNDLE CONSISTING OF ANY COMBINATION OF THE FOLLOWING :
 - A. MAXIMUM 25 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
 - B. MAXIMUM 3/C NO. 8 STEEL METAL CLAD CABLE.
 - C. MAXIMUM RG/U COAXIAL CABLE WITH FLUORINATED ETHYLENE JACKET.
7. MINIMUM 1-1/2" WIDE (MIN. 30 GA.) STEEL STRAPS TO BRIDGE OPENING ON BOTH SIDES OF WALL WHEN SOLE PLATE IS REMOVED (SEE NOTE NO. 4 BELOW).
8. MINIMUM 3" WIDE (MIN. 30 GA.) STEEL STRAPS TO BRIDGE OPENING ON BOTH SIDES OF WALL WHEN DOUBLE TOP PLATES ARE REMOVED (SEE NOTE NO. 4 BELOW).
9. MINIMUM 1-1/2" AND 2-1/2" THICK GLASS-FIBER (MIN. 0.5 PCF DENSITY) FIRMLY PACKED INTO OPENINGS WITHIN SOLE PLATE AND TOP PLATES, RESPECTIVELY. PACKING MATERIAL RECESSED TO ACCOMMODATE FIRESTOP SEALANT.
10. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT OR HILTI CP 606 FLEXIBLE FIRESTOP SEALANT FLUSH WITH TOP SURFACE OF SOLE PLATE AND BOTTOM SURFACE OF TOP PLATE.

NOTES : 1. MAXIMUM SIZE OF OPENING = 14" x 5-1/2".
 2. ANNULAR SPACE BETWEEN PENETRANTS AND PERIPHERY OF OPENING = MINIMUM 0", MAXIMUM 1-1/2".
 3. ANNULAR SPACE BETWEEN PENETRANTS = MINIMUM 1/4", MAXIMUM 1-1/2".
 4. STEEL STRAPS TO OVERLAP PLATES MINIMUM 2" ON EACH SIDE OF OPENING AND SECURED WITH MINIMUM OF 2 NAILS OR SCREWS ON EACH SIDE.
 5. ANNULAR SPACE AROUND PIPE OR TUBE INSTALLED WITH GLASS-FIBER = MINIMUM 1/2", MAXIMUM 1-1/2".



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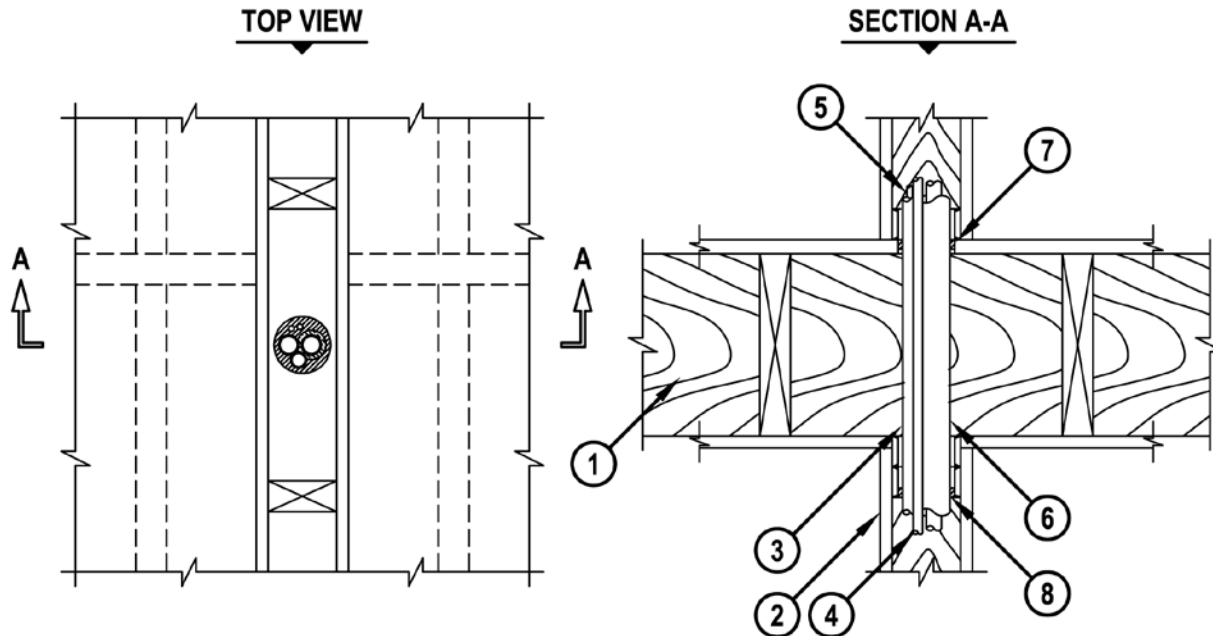
UL SYSTEM NO. F-C-8014

MULTIPLE PENETRATIONS THROUGH WOOD FLOOR/CEILING ASSEMBLY

F-RATING = 1-HR.

T-RATING = 0-HR.

FC8014d.012408



1. WOOD FLOOR/CEILING ASSEMBLY (UL CLASSIFIED L500 SERIES) (1-HR FIRE-RATING).
2. [OPTIONAL] GYPSUM WALL ASSEMBLY (UL CLASSIFIED U300 SERIES) (1-HR. FIRE-RATING) CONSISTING OF NOMINAL 2" x 6", OR PARALLEL 2" x 4" LUMBER PLATES AND STUDS.
3. METALLIC PIPE PENETRATIONS TO INCLUDE ANY OF THE FOLLOWING (MAXIMUM QUANTITY = 2, ONE 3/4" DIAMETER AND ONE 1/2" DIAMETER):
 - A. MAXIMUM 3/4" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 5 OR THINNER).
 - B. MAXIMUM 3/4" NOMINAL DIAMETER COPPER PIPE.
 - C. MAXIMUM 3/4" NOMINAL DIAMETER STEEL CONDUIT.
 - D. MAXIMUM 3/4" NOMINAL DIAMETER EMT.
4. MAXIMUM 1/2" NOMINAL DIAMETER PVC/CPVC PLASTIC PIPE (MAXIMUM QUANTITY = 1).
5. MAXIMUM 4/C NO. 18 AWG THERMOSTAT CABLE (MAXIMUM QUANTITY = 2).
6. NOMINAL 1/2" THICK AB/PVC INSULATION MAY BE INSTALLED ON ONE METALLIC PIPE.
7. MINIMUM 3/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT FLUSH WITH TOP SURFACE OF FLOOR OR SOLE PLATE OF CHASE WALL.
8. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT FLUSH WITH BOTTOM SURFACE OF CEILING OR LOWER TOP PLATE.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 3".
 2. PIPES AND CABLES TO BE BUNDLED TOGETHER.
 3. ANNULAR SPACE = MINIMUM 1/4", MAXIMUM 3/4".
 4. PVC = SCH 40, SOLID CORE; CPVC = SDR 17.

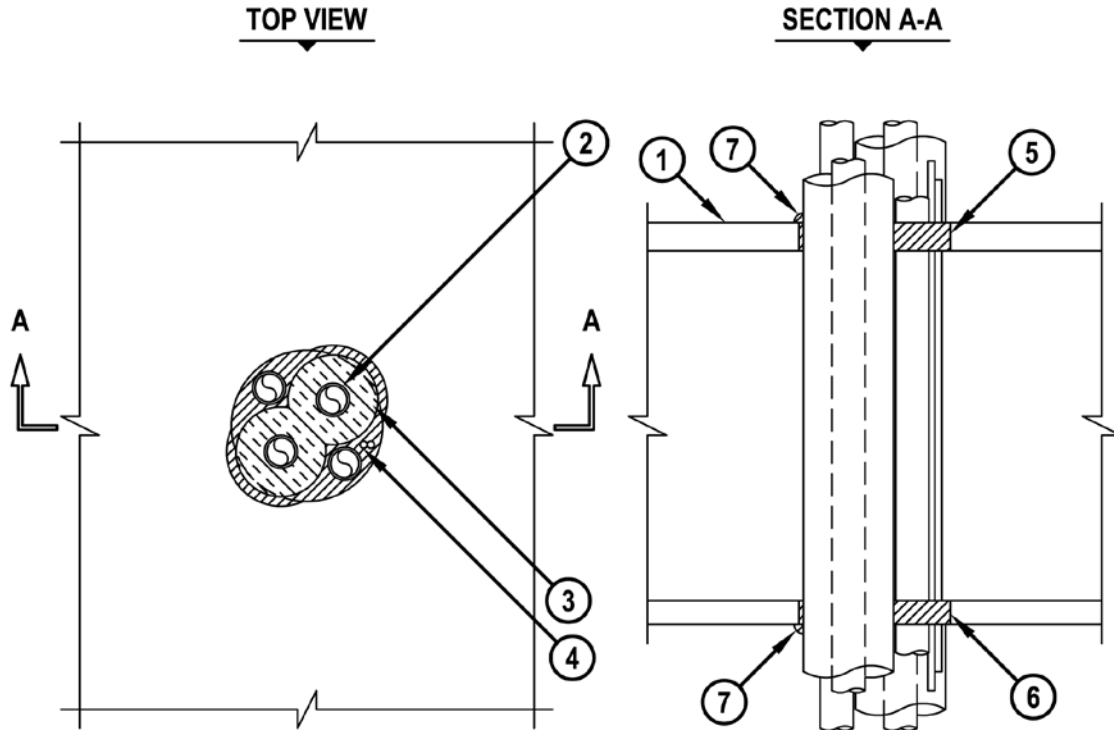


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UL/cUL SYSTEM NO. F-C-8032
MULTIPLE HVAC LINE SET THROUGH WOOD/FLOOR CEILING ASSEMBLY

F-RATING = 1-HR.
T-RATING = 1/4-HR.



1. WOOD FLOOR/CEILING ASSEMBLY (UL/cUL CLASSIFIED L500 SERIES) (1-HR. FIRE-RATING).
2. PENETRATING METALLIC ITEMS TO BE ANY OF THE FOLLOWING (ONE OR MORE):
 - A. MAXIMUM 3/4" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 3/4" NOMINAL DIAMETER COPPER PIPE OR TUBING.
3. NOMINAL 3/4" THICK AB/PVC PIPE INSULATION INSTALLED ON ONE OR MORE METALLIC PIPES.
4. MAXIMUM 4-PAIR NO. 18 AWG THERMOSTAT CABLE WITH PVC JACKET (MAXIMUM QUANTITY = 2).
5. MINIMUM 3/4" DEPTH HILTI CP 606 FLEXIBLE FIRESTOP SEALANT.
6. MINIMUM 5/8" DEPTH HILTI CP 606 FLEXIBLE FIRESTOP SEALANT.
7. MINIMUM 1/2" BEAD HILTI CP 606 FLEXIBLE FIRESTOP SEALANT APPLIED AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 4".
2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1".
3. CHASE WALL (NOT SHOWN). (OPTIONAL). THE THROUGH PENETRANT MAY BE ROUTED THROUGH A 1-HR. FIRE-RATED GYPSUM CHASE WALL ASSEMBLY.

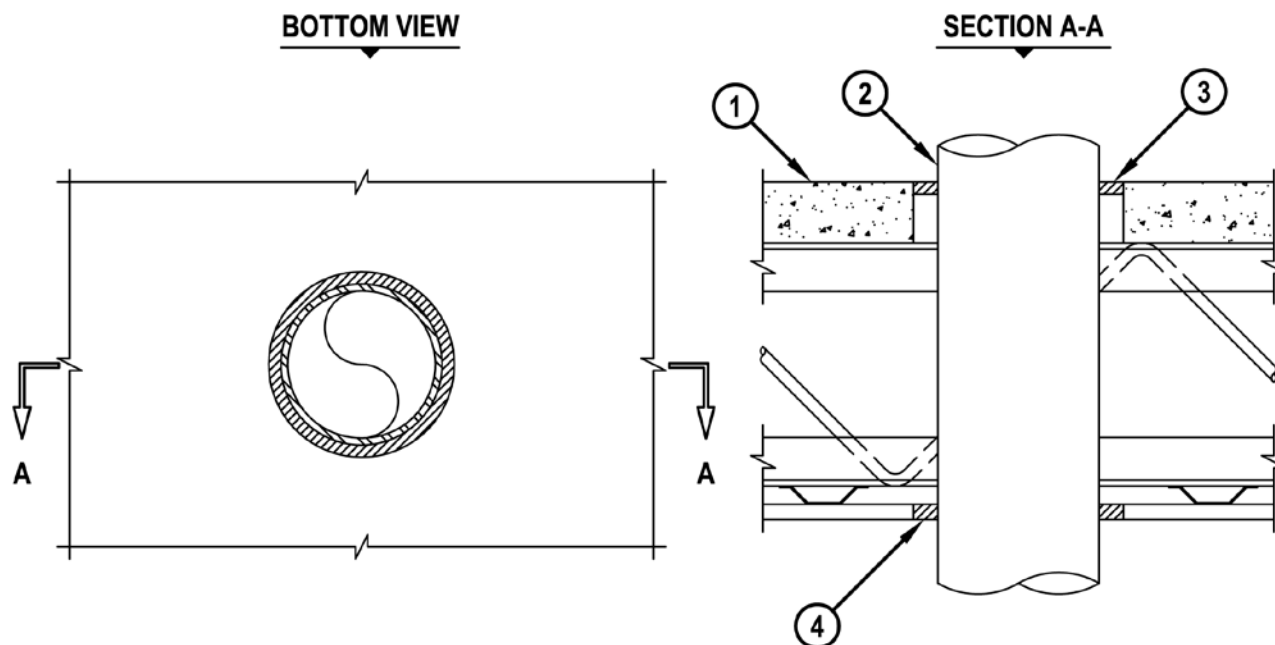
UL/cUL SYSTEM NO. F-E-1004

METAL PIPE THROUGH CONCRETE FLOOR/CEILING ASSEMBLY

F-RATING = 1-HR.

T-RATING = 0-HR.

FE1004b.070108



1. CONCRETE AND STEEL JOIST FLOOR/CEILING ASSEMBLY (UL/ULC CLASSIFIED G500 SERIES) (1-HR. FIRE-RATING).
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 6" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 40 OR HEAVIER).
 - B. MAXIMUM 6" NOMINAL DIAMETER CAST IRON PIPE.
 - C. MAXIMUM 4" NOMINAL DIAMETER COPPER PIPE OR TUBING.
 - D. MAXIMUM 6" NOMINAL DIAMETER STEEL CONDUIT.
 - E. MAXIMUM 4" NOMINAL DIAMETER EMT.
3. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
4. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.

NOTES : 1. DIAMETER OF OPENING TO BE MAXIMUM 1" LARGER THAN OUTSIDE DIAMETER OF METAL PIPE.
 2. ANNULAR SPACE = MINIMUM 1/4", MAXIMUM 3/4".



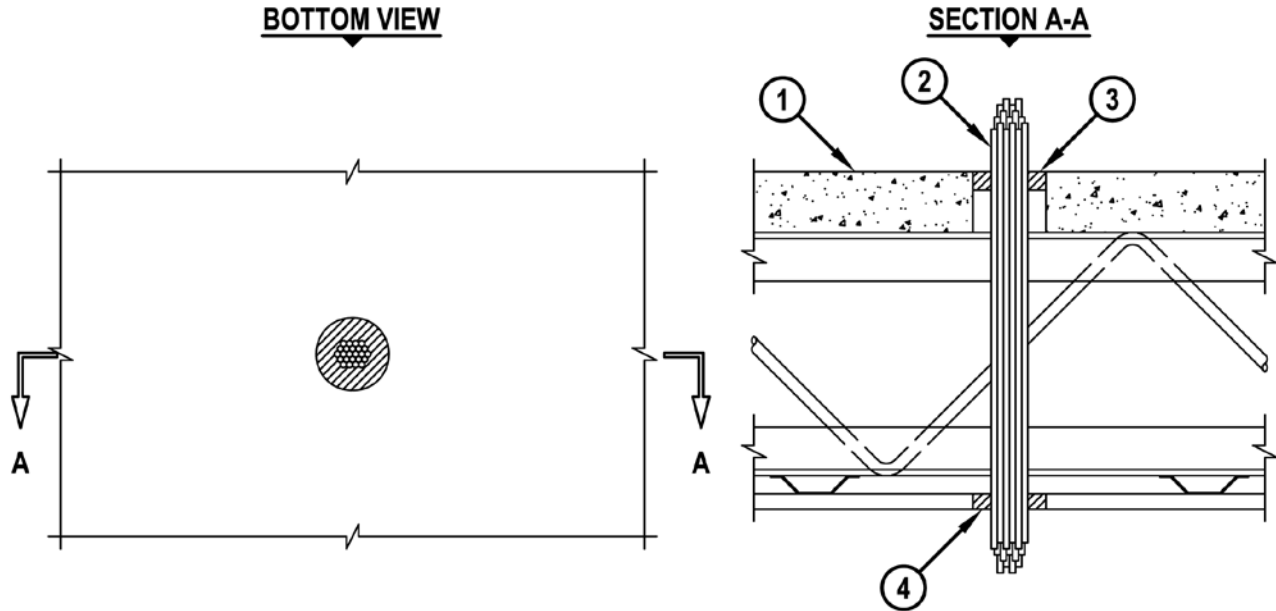
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UL/cUL SYSTEM NO. F-E-3005
CABLE BUNDLE THROUGH CONCRETE FLOOR/CEILING ASSEMBLY

F-RATING = 1-HR.
T-RATING = 1-HR.



FE3005c.022412

1. CONCRETE AND STEEL JOIST FLOOR/CEILING ASSEMBLY (UL/cUL CLASSIFIED G500 SERIES) (1-HR. FIRE-RATING).
2. CABLE BUNDLE TO CONSIST OF ANY OF THE FOLLOWING :
 - A. RG 59 COAXIAL CABLE WITH PVC JACKET.
 - B. MAXIMUM 25 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
 - C. MAXIMUM 3/C NO. 10 AWG CABLE (ROMEX).
 - D. MAXIMUM 3/C (+ GROUND) 2/0 AWG SER CABLE (ALUMINUM OR COPPER).
 - E. MAXIMUM 3/C NO. 10 AWG METAL-CLAD CABLE (AFC CABLE SYSTEMS, INC.).
 - F. MAXIMUM 1/2" DIAMETER FIBER-OPTIC CABLE (24 FIBER).
3. MINIMUM 3/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
4. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 3".
2. ANNULAR SPACE = NOMINAL 3/4".
3. CABLE BUNDLE TO FILL MAXIMUM 25% OF CROSS-SECTIONAL AREA OF OPENING.
4. APPLY HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT INTO INTERSTICES OF CABLES TO MAXIMUM EXTENT POSSIBLE.

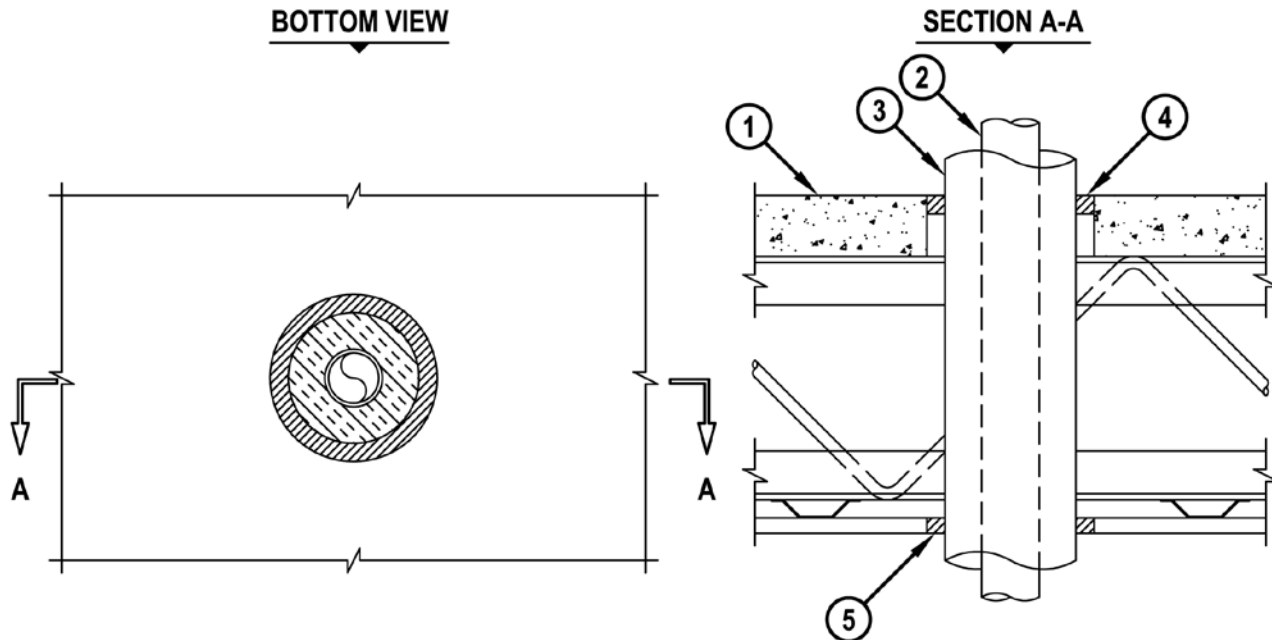
UL/cUL SYSTEM NO. F-E-5002

INSULATED METAL PIPE THROUGH CONCRETE FLOOR/CEILING ASSEMBLY

F-RATING = 1-HR.

T-RATING = 1-HR.

FE5002a.021902



1. CONCRETE AND STEEL JOIST FLOOR/CEILING ASSEMBLY (UL/ULC CLASSIFIED G500 SERIES) (1-HR. FIRE-RATING).
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 2" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 2" NOMINAL DIAMETER COPPER PIPE.
3. NOMINAL 1-1/2" THICKNESS GLASS-FIBER PIPE INSULATION.
4. MINIMUM 3/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
5. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.

NOTES : 1. DIAMETER OF OPENING TO BE MAXIMUM 1-1/2" LARGER THAN OUTSIDE DIAMETER OF INSULATED METAL PIPE.
 2. ANNULAR SPACE = MINIMUM 1/2", MAXIMUM 1".



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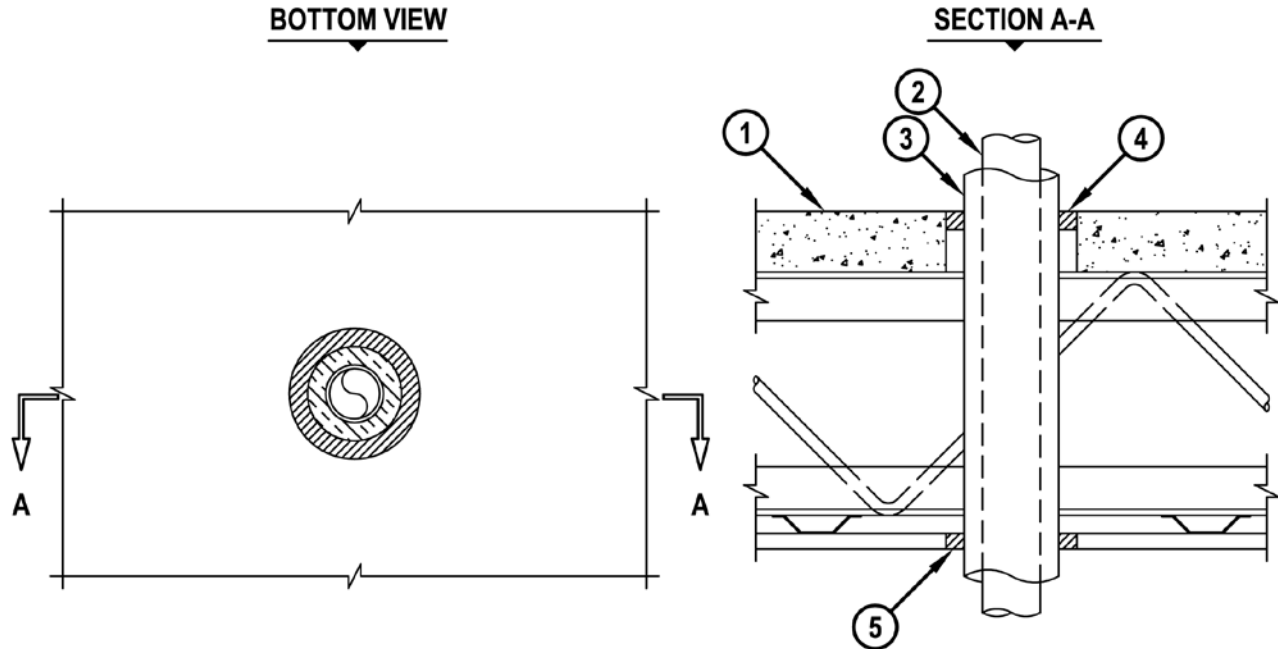
UL/cUL SYSTEM NO. F-E-5004

INSULATED METAL PIPE THROUGH CONCRETE FLOOR/CEILING ASSEMBLY

F-RATING = 1-HR.

T-RATING = 1/4-HR.

FE5004a.070502



1. CONCRETE AND STEEL JOIST FLOOR/CEILING ASSEMBLY (UL/ULC CLASSIFIED G500 SERIES) (1-HR. FIRE-RATING).
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 2" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 2" NOMINAL DIAMETER COPPER PIPE.
3. NOMINAL 3/4" THICK AB/PVC PIPE INSULATION.
4. MINIMUM 3/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
5. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING IN FLOOR = 5-1/8".
 2. DIAMETER OF CEILING OPENING TO BE 1-1/2" LARGER THAN
 OUTSIDE DIAMETER OF INSULATED METAL PIPE.
 2. ANNULAR SPACE = MINIMUM 1/2", MAXIMUM 1".



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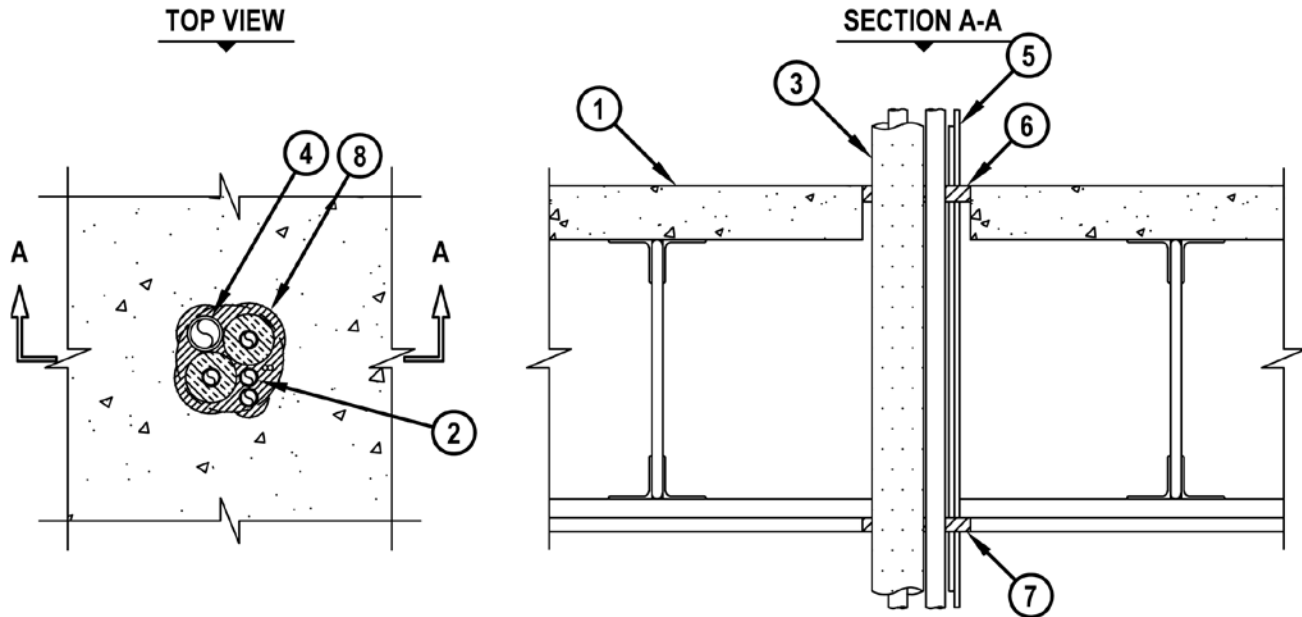
UL/cUL SYSTEM NO. F-E-8008

HVAC LINE SETS THROUGH CONCRETE FLOOR/CEILING ASSEMBLY

F-RATING = 1-HR.

T-RATING = 1-HR.

FE8008a.072605



1. CONCRETE AND STEEL JOIST FLOOR/CEILING ASSEMBLY (UL/cUL CLASSIFIED G500 SERIES) (1-HR. FIRE-RATING).
2. PENETRATING METALLIC ITEMS TO BE ANY OF THE FOLLOWING (ONE OR MORE) :
 - A. MAXIMUM 3/4" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 3/4" NOMINAL DIAMETER COPPER PIPE.
3. NOMINAL 3/4" THICK AB/PVC PIPE INSULATION INSTALLED ON ONE OR MORE METALLIC PIPES.
4. PENETRATING NONMETALLIC ITEMS TO BE ONE OF THE FOLLOWING (SEE NOTE NO. 3 BELOW) :
 - A. MAXIMUM 1-1/4" NOMINAL DIAMETER PVC PLASTIC PIPE (CELLULAR OR SOLID CORE).
 - B. MAXIMUM 1-1/4" NOMINAL DIAMETER CPVC PLASTIC PIPE (CLOSED PIPING SYSTEM ONLY).
5. MAXIMUM 4-PAIR NO. 18 AWG THERMOSTAT CABLE WITH PVC JACKET (MAXIMUM QUANTITY = 2).
6. MINIMUM 3/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
7. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
8. MINIMUM 1/4" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT AT POINT OF CONTACT.

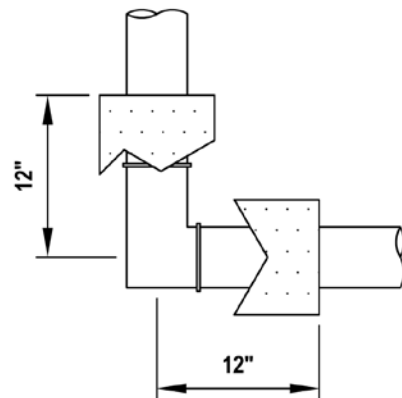
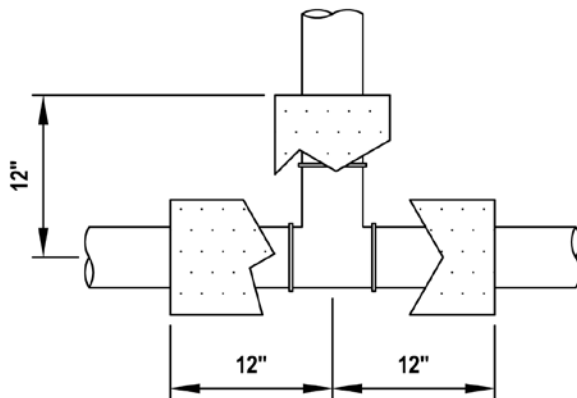
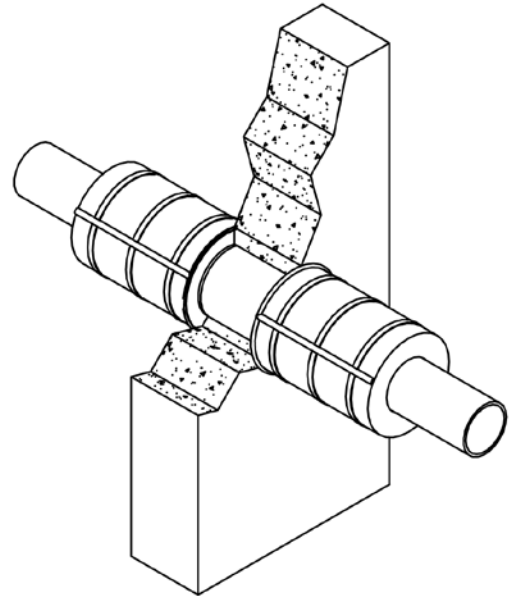
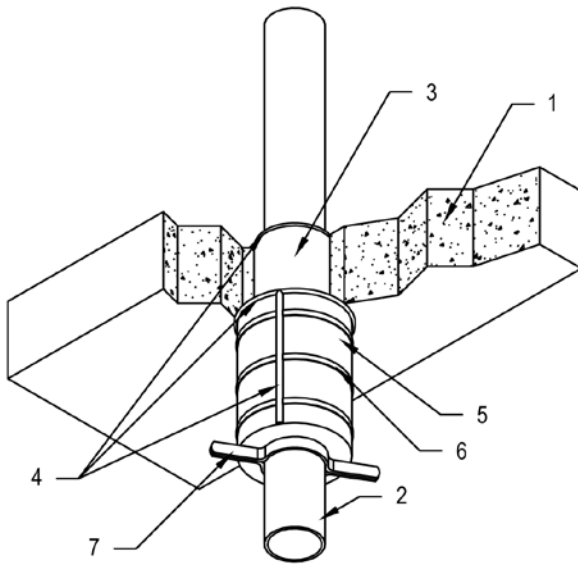
NOTES : 1. MAXIMUM DIAMETER OF OPENING = 5".
 2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1".
 3. NONMETALLIC PIPE SHALL BE SPACED MINIMUM 1-1/2" FROM NON-INSULATED THROUGH PENETRANTS.
 4. CLOSED OR VENTED PIPING SYSTEM (PVC = SCHEDULE 40; CPVC = SDR 13.5).



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

Hilti. Outperform. Outlast.Hilti (Canada) Corp. 1-800-363-4458 • www.hilti.ca • Hilti Firestop Systems Guide — Canada

Hilti (Canada) Corporation
Design Number HI/PHV 120-01
Through Penetration
FS-ONE Intumescent Firestop Sealant
ASTM E 814 (2011) & UL 1479 (2010)
F Rating: 2 Hours
T Rating: 2 Hours
H Rating: 2 Hours
CAN/ULC S115 (2011) at 2.5Pa
FTH: 2 Hours



Item 8



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Hilti (Canada) Corporation
Design Number HI/PHV 120-01
Through Penetration
FS-ONE Intumescent Firestop Sealant
ASTM E 814 (2011) & UL 1479 (2010)
F Rating: 2 Hours
T Rating: 2 Hours
H Rating: 2 Hours
CAN/ULC S115 (2011) at 2.5Pa
FTH: 2 Hours

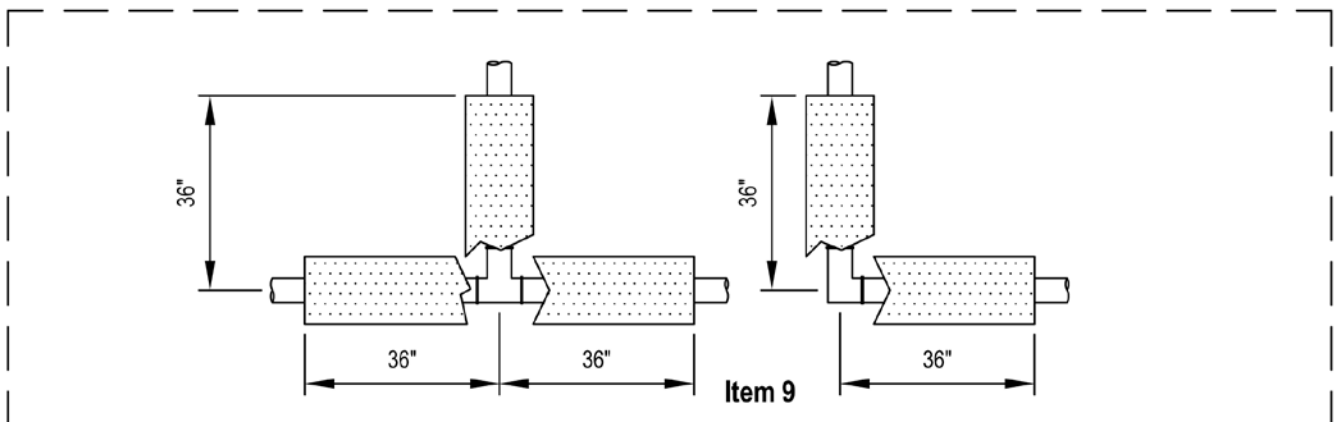
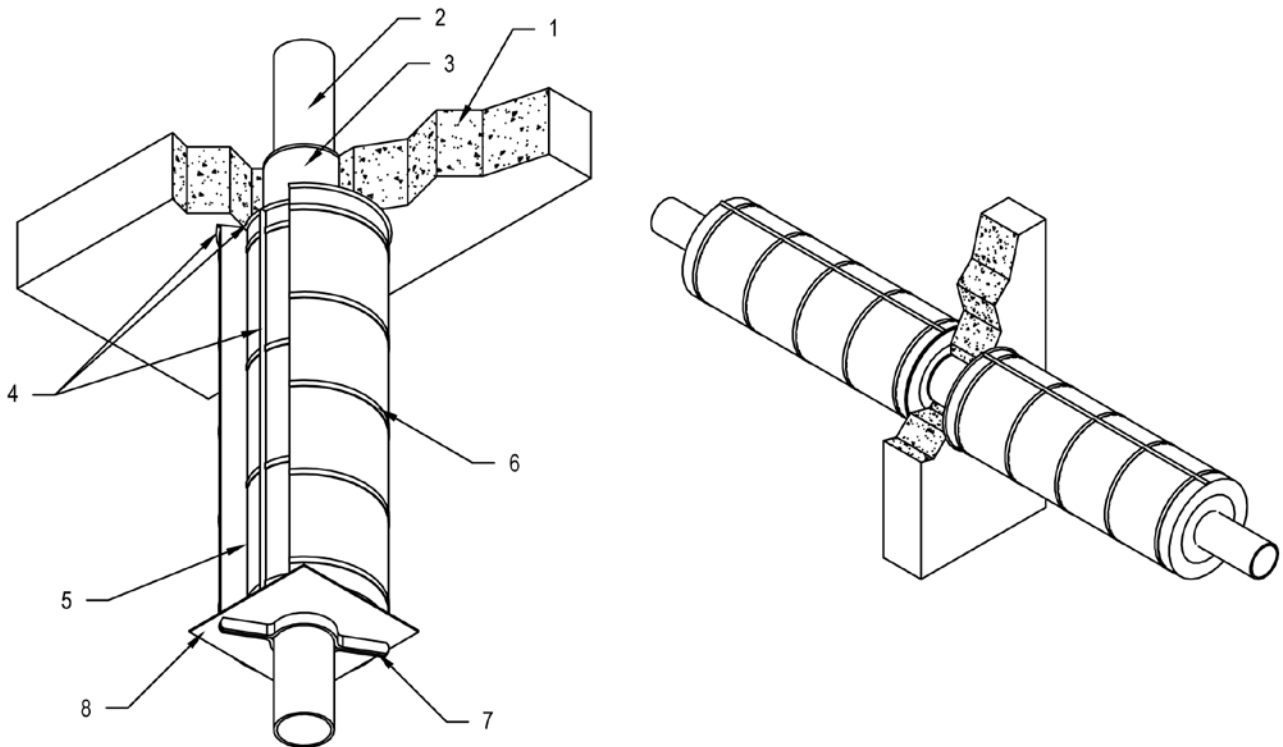
1. FLOOR/CEILING OR WALL ASSEMBLY: Use a two-hour fire-rated floor/ceiling assembly or concrete or block wall assembly consisting of minimum 7-inch (178 mm) thick normal weight (100-150 pcf (1600-2400 kg/m³)) reinforced concrete or 7-5/8-inch (194 mm) thick Concrete Masonry Units (CMU). Create a round through-opening with diameter of 6-inches (152 mm).
2. PENETRATING ITEM: Install one of the following penetrating items:
 - Maximum 4-inch (102 mm) Cast or Ductile Iron Pipe
 - Maximum 4-inch (102 mm) Rigid Steel Conduit or EMT
 - Maximum 4-inch (102 mm) Schedule 40 (or thicker) Steel Pipe
 Install penetrating item point contact or offset maximum 1-1/2-inches (38 mm) in the through-opening created in floor/ceiling or wall assembly (Item 1).
3. PACKING MATERIAL: Install minimum 4 pcf (64 kg/m³) density mineral wool batt insulation in the annular space, compressed 25% around the penetrating item (Item 2) as follows:
 - Floor Ceiling Assembly-Install nominal 6-3/4-inch (171 mm) layer recessed 1/4-inch (6 mm) from the top of the floor/ceiling assembly (Item 1)
 - Wall Assembly: Install nominal 6-1/2-inch (165 mm) layer recessed 1/4-inch (6 mm) from both surfaces of the wall assembly (Item 1).
4. CERTIFIED COMPANY: Hilti Corporation
 CERTIFIED PRODUCT: Sealant
 MODEL: FS-ONE Intumescent Firestop Sealant
 Apply nominal 1/4-inch (6 mm) layer of FS-ONE Intumescent Firestop Sealant to fill the 1/4-inch (6 mm) void left after installing the packing material (Item 3). After installing the insulation (Item 5) around the penetrating item (Item 2), apply a nominal 1/4-inch (6 mm) bead of FS-ONE Intumescent Firestop Sealant in the longitudinal seam of the insulation and at the insulation (Item 5) and floor/ceiling or wall assembly (Item 1) interface.
5. INSULATION: Install one layer of 12-inch (305 mm) long, 8 pcf (128 kg/m³) density hollow cylindrical mineral wool pipe insulation around penetrating item (Item 1) installed below the floor/ceiling assembly (Item 1) or on both sides of the wall assembly (Item 1). For penetrating items (Item 2) 2-inch (51 mm) or less in diameter, use minimum 1-inch (25 mm) thick insulation. For penetrating items (Item 2) with a diameter greater than 2-inches (51 mm), use minimum 2-inch (51 mm) thick insulation.
6. STAINLESS STEEL CLAMP: Install 1/2-inch (13 mm) wide stainless steel hose clamps to secure insulation (Item 5) around penetrating item (Item 2). Install hose clamps around insulation spaced 2-inches (51 mm) from the ends of the insulation and maximum 8-inches (203 mm) on center between.
7. RISER CLAMP: Install 4-inch (102 mm) galvanized steel riser clamp around penetrating item (Item 2) flush with the end of the insulation (Item 5) (not required on horizontal penetration).
8. TEE/ELBOW (Optional): Attach to penetrating item (Item 2) when required. When installing tee or elbow at a distance greater than 12-inches (305 mm) from the floor/ceiling or wall assembly (Item 1), insulation (Item 5) is only required from the floor/ceiling or wall assembly (Item 1) to the Tee or elbow. If the tee or elbow is less than 12-inches (305 mm) from the floor/ceiling or wall assembly (Item 1), insulation (Item 5) must be installed from the floor/ceiling or wall assembly (Item 1) to the tee or elbow and installed minimum 12-inches (305 mm) from the junction of the tee or elbow in both directions. Secure insulation (Item 5) around tee/elbow using stainless steel hose clamps (Item 6) spaced maximum 8-inches (203 mm) on center.



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HI/PHV 120-03



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Hilti (Canada) Corporation
Design Number HI/PHV 120-03
Through Penetration
FS-ONE Intumescent Firestop Sealant
ASTM E 814 (2011) & UL 1479 (2010)
F Rating: 2 Hours
T Rating: 2 Hours
H Rating: 2 Hours
CAN/ULC S115 (2005) at 2.5 Pa
FTH: 2 Hours

HI/PHV 120-03

1. FLOOR/CEILING OR WALL ASSEMBLY: Use a two-hour fire-rated floor/ceiling assembly or concrete or block wall assembly consisting of minimum 6-inch (152 mm) thick normal weight (100-150 pcf (1600-2400 kg/m³)) reinforced concrete or 6-inch (152 mm) thick hollow or concrete filled Concrete Masonry Units (CMU). Create a round through-opening with maximum diameter of 6-inches (152 mm).
2. PENETRATING ITEM: Install maximum 4-inch (102 mm) diameter copper tubing centered or offset maximum 1-7/8-inch (48 mm) in the through opening created in the floor/ceiling or wall assembly (Item 1).
3. PACKING MATERIAL: Install minimum 4 pcf (64 kg/m³) density mineral wool batt insulation in the annular space, compressed minimum 25% around the penetrating item (Item 2) as follows:
 - Floor Ceiling Assembly-Install nominal 5-3/4-inch (146 mm) layer recessed 1/4-inch (6 mm) from the top of the floor/ceiling assembly (Item 1)
 - Wall Assembly: Install nominal 5-1/2-inch (140 mm) layer recessed 1/4-inch (6 mm) from both surfaces of the wall assembly (Item 1).
4. CERTIFIED COMPANY: Hilti Corporation
 CERTIFIED PRODUCT: Sealant
 MODEL: FS-ONE Intumescent Firestop Sealant
 Apply nominal 1/4-inch (6 mm) layer of FS-ONE Intumescent Firestop Sealant to fill the 1/4-inch (6 mm) void left after installing the packing material (Item 3). After installing the insulation (Item 5) around the penetrating item (Item 2), apply a nominal 1/4-inch (6 mm) bead of FS-ONE Intumescent Firestop Sealant in the longitudinal seam of the insulation and at the insulation (Item 5) and floor/ceiling or wall assembly (Item 1) interface.
5. INSULATION: Install two layers of 2-inch thick, 36-inch (914 mm) long, 8 pcf (128 kg/m³) density hollow cylindrical mineral wool pipe insulation around penetrating item (Item 1) installed below the floor/ceiling assembly (Item 1) or on both sides of the wall assembly (Item 1).
6. STAINLESS STEEL CLAMP: Install 1/2-inch (13 mm) wide stainless steel hose clamps to secure insulation (Item 5) around penetrating item (Item 2). Install hose clamps around the inner layer of insulation spaced 2-inches (51 mm) from the ends of the insulation and 12-inches (305 mm) on center between. Install hose clamps around the outer layer of insulation spaced 2-inches (51 mm) from the ends of the insulation and 8-inches (203 mm) on center between.
7. RISER CLAMP: When Tees or elbows (Item 9) are not used, install 4-inch (102 mm) galvanized steel riser clamp around penetrating item (Item 2) flush with the end of the insulation (Item 5) (not required on horizontal penetration).
8. STEEL PLATE: When Tees or elbows (Item 9) are not used, install 12-inch X 12-inch steel plate between insulation (Item 5) and the riser clamp (Item 7) to prevent the insulation (Item 5) from sagging (not required on a horizontal penetration)..
9. TEE/ELBOW (Optional): Attach to penetrating item (Item 2) when required. When installing tee or elbow at a distance greater than 36-inches (914 mm) from the floor/ceiling or wall assembly (Item 1), insulation (Item 5) is only required from the floor/ceiling or wall assembly (Item 1) to the Tee or elbow. If the tee or elbow is less than 36-inches (914 mm) from the floor/ceiling or wall assembly (Item 1), insulation (Item 5) must be installed from the floor/ceiling or wall assembly (Item 1) to the tee or elbow and installed minimum 36-inches (914 mm) from the junction of the tee or elbow in both directions. Secure insulation (Item 5) around tee/elbow using stainless steel hose clamps (Item 6) spaced 12-inches on center on the inner layer and 8-inches (203 mm) on center on the outer layer.

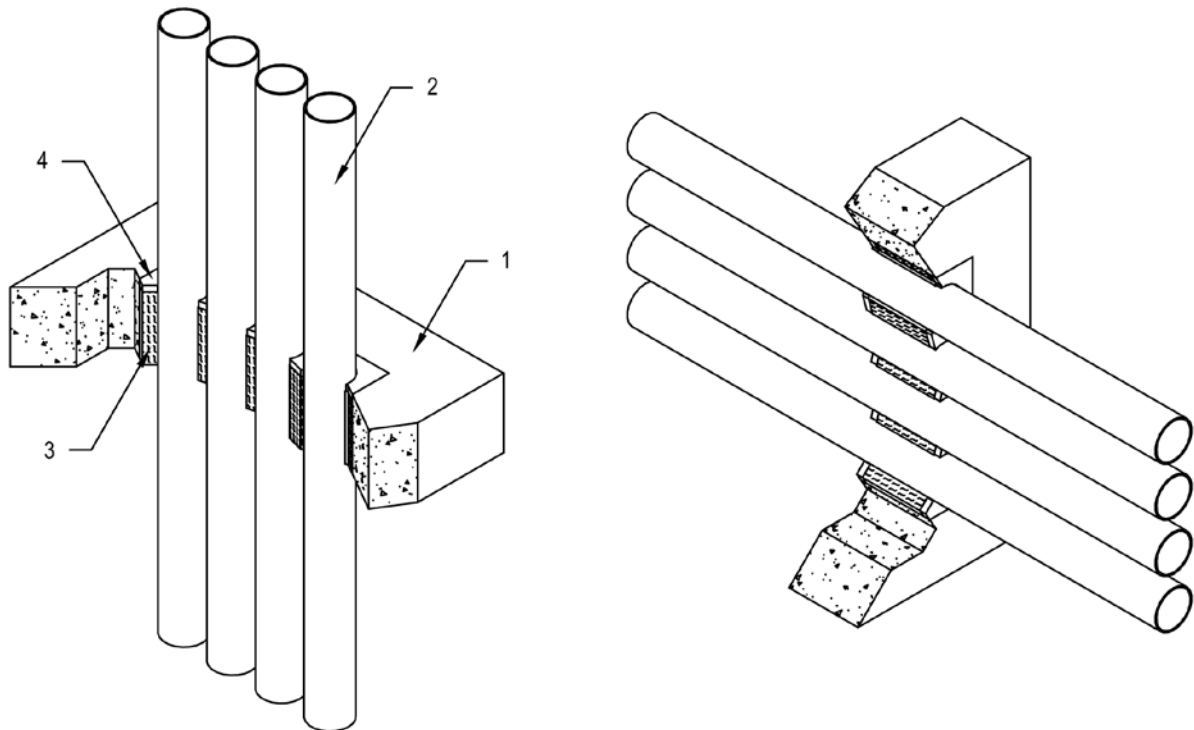


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 to UL 1479 and CAN/ULC-S115

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Hilti (Canada) Corporation
Design Number HI/PHV 120-05
Through Penetration
FS-ONE Intumescent Firestop Sealant
ASTM E 814 (2011) & UL 1479 (2010)
F Rating: 2 Hours
T Rating: 2 Hours
H Rating: 2 Hours
CAN/ULC S115 (2005) at 2.5Pa
FTH: 2 Hours

HI/PHV 120-05



1. **FLOOR/CEILING OR WALL ASSEMBLY:** Use a two-hour fire-rated floor/ceiling or wall assembly consisting of minimum 6-inch (152 mm) thick normal weight (100-150 pcf (1600-2400 kg/m³)) reinforced concrete or 6-inch (152 mm) thick hollow or concrete filled Concrete Masonry Units (CMU). Create a through-opening with a maximum area of 90 square inches (581 square cm) with a maximum dimension of 18-inches (457 mm) or maximum diameter of 6-inches (152 mm).
2. **PENETRATING ITEM:** Install one or more 4/C (aluminum conductor) 500 kcmil PVC jacketed metal clad power cables. Install penetrating item centered or offset in the through-opening created in floor/ceiling or wall assembly (Item 1). Offset may be 0-inch (0 mm) to 4-inch (102 mm) between cables and periphery of opening and 1 inch (25 mm) to 1-1/2 inch (38 mm) between cables.
3. **PACKING MATERIAL:** Install minimum 4 pcf (64 kg/m³) density mineral wool batt insulation in the annular space, compressed 25% around the penetrating item (Item 2) as follows:
 - Floor Ceiling Assembly-Install nominal 5-1/2-inch (140 mm) layer recessed 1/2-inch (13 mm) from the top of the floor/ceiling assembly (Item 1)
 - Wall Assembly: Install nominal 5 inch (127 mm) layer recessed 1/2-inch (13 mm) from both surfaces of the wall assembly (Item 1).
4. **CERTIFIED COMPANY:** Hilti Corporation
CERTIFIED PRODUCT: Sealant
MODEL: FS-ONE Intumescent Firestop Sealant
 Apply nominal 1/2-inch (13 mm) layer of FS-ONE Intumescent Firestop Sealant to fill the 1/2-inch (6 mm) void(s) left after installing the packing material (Item 3).



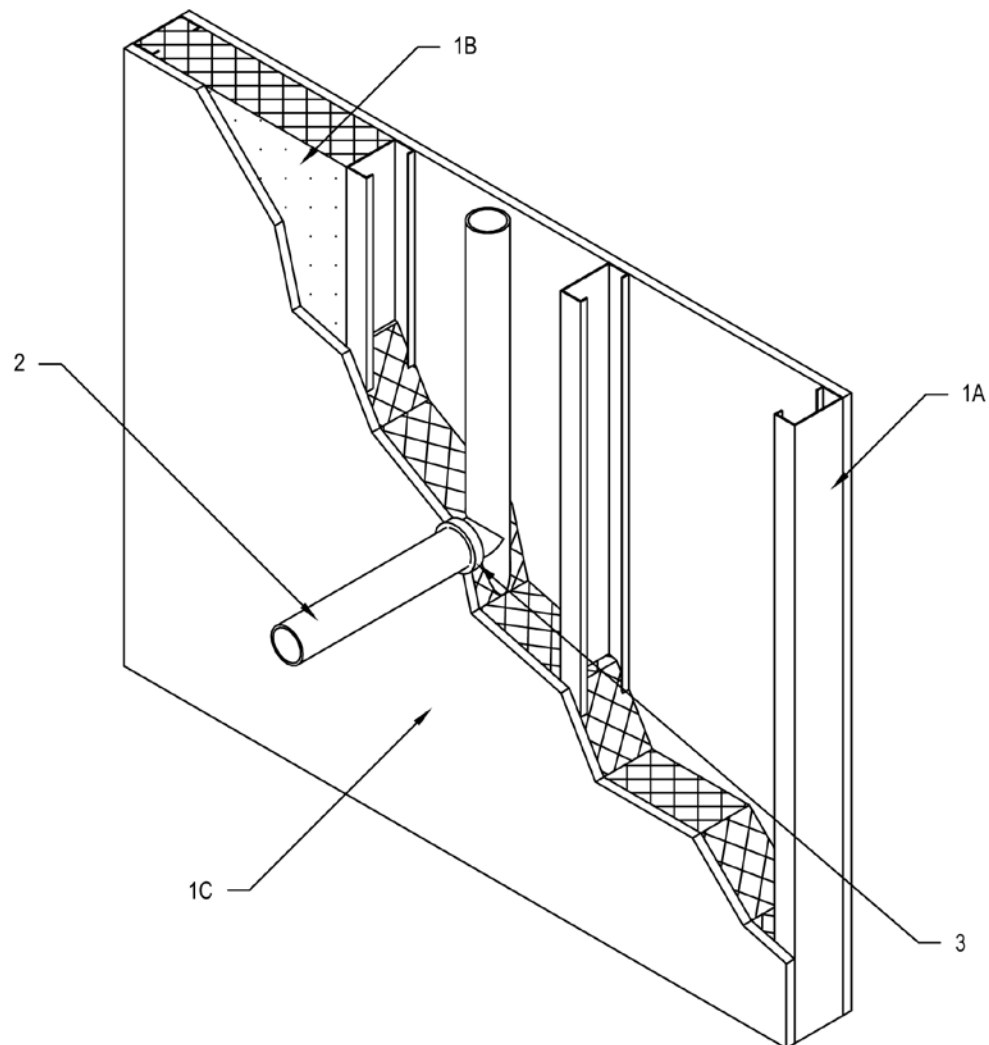
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Hilti (Canada) Corporation
Design Number HI/PV 60-01
Through Penetration
FS-ONE Intumescent Firestop Sealant
CAN/ULC S115 (2011) at 50 Pa

HI/PV 60-01

Penetrating Item	Rating		
	F	FT	FTH
Schedule 40 cellular or solid core PVC Pipe	1-Hour	30 Minutes	0
Rigid Non-Metallic Conduit	1-Hour	30 Minutes	0
Schedule 40 (or thicker) cellular or solid core ABS pipe	1-Hour	1-Hour	0



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Hilti (Canada) Corporation
Design Number HI/PV 60-01
Through Penetration
FS-ONE Intumescent Firestop Sealant
CAN/ULC S115 (2011) at 50 Pa

HI/PV 60-01

Penetrating Item	Rating		
	F	FT	FTH
Schedule 40 cellular or solid core PVC Pipe	1-Hour	30 Minutes	0
Rigid Non-Metallic Conduit	1-Hour	30 Minutes	0
Schedule 40 (or thicker) cellular or solid core ABS pipe	1-Hour	1-Hour	0

1. WALL ASSEMBLY: Construct a 1-hour fire-rated gypsum wall assembly consisting of the following elements:
 - A. STUDS: Use 3-5/8-inch (92 mm), 25 Gage steel studs or 2-inch x 4-inch wood studs spaced 16 inches (406 mm) on center.
 - B. INSULATION: Install minimum R-13 unfaced fiberglass batt insulation in the cavities between the studs (Item 1A).
 - C. GYPSUM BOARD: Use 5/8-inch (16 mm) thick Type X gypsum board secured to steel (Item 1A) using #6, 1-1/4-inch long Type S bugle head screws spaced 8-inches (203 mm) on center around the perimeter and in the field. Create maximum 3-inch opening in the gypsum board on one side of the wall assembly (Item 1).
2. PENETRATING ITEM: Install one of the following penetrating items:
 - Maximum 2-inch (51 mm) Schedule 40 cellular or solid core PVC Pipe
 - Maximum 2-inch (51 mm) Rigid Non-Metallic Conduit
 - Maximum 2-inch (51 mm) Schedule 40 (or thicker) cellular or solid core ABS pipe

Install penetrating item centered or point contact in the through-opening created in the wall assembly (Item 1). Offset may be between 0-inch (0 mm) to 1 inch (25 mm).
3. CERTIFIED COMPANY: Hilti Corporation
 CERTIFIED PRODUCT: Sealant
 MODEL: FS-ONE Intumescent Firestop Sealant
 Apply nominal 5/8-inch (16 mm) thick layer of FS-ONE Intumescent Firestop Sealant to fill the annular space between the penetrating item (Item 2) and the opening in the gypsum board (Item 1C). When the penetrating item (Item 2) is installed point contact, an additional 1/4-inch bead of sealant is to be installed around the penetrating item (Item 2) at the gypsum board (Item 1C) interface.



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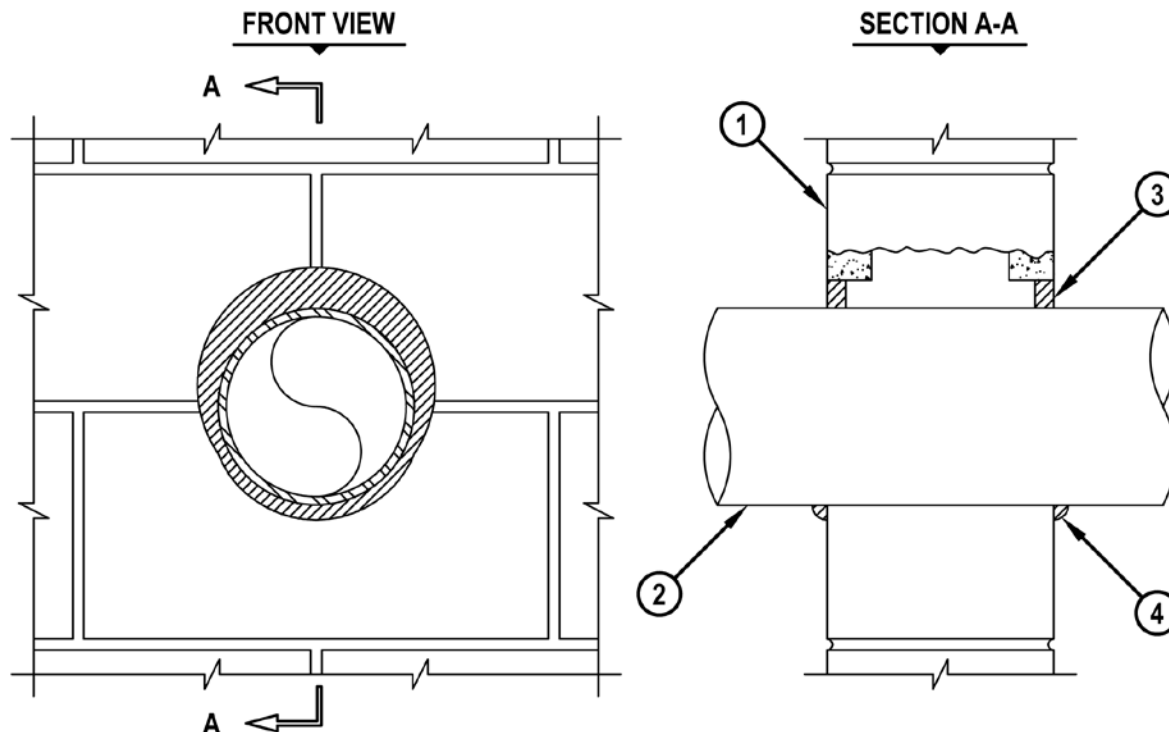
UL/cUL SYSTEM NO. W-J-1067

METAL PIPE THROUGH 1-HR. OR 2-HR. CONCRETE WALL OR CONCRETE BLOCK WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.
T-RATING = 0-HR.

L-RATING AT AMBIENT = LESS THAN 1 CFM/SQ. FT.
L-RATING AT 400° F = 4 CFM/SQ. FT.

WJ1067e.120902



1. CONCRETE WALL ASSEMBLY (1-HR. OR 2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MIN. 3-3/4" THICK, FOR 1-HR. FIRE-RATING).
 - B. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MIN. 5" THICK, FOR 2-HR. FIRE-RATING).
 - C. ANY UL/ULC CLASSIFIED CONCRETE BLOCK WALL.
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 30" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 30" NOMINAL DIAMETER CAST IRON PIPE.
 - C. MAXIMUM 6" NOMINAL DIAMETER COPPER PIPE.
 - D. MAXIMUM 6" NOMINAL DIAMETER STEEL CONDUIT.
 - E. MAXIMUM 4" NOMINAL DIAMETER EMT.
3. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
4. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 32-1/4".
 2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 2-1/4".
 3. PIPE MAY BE INSTALLED WITH CONTINUOUS POINT OF CONTACT.
 4. PIPE MAY BE INSTALLED AT AN ANGLE NOT GREATER THAN 45° FROM PERPENDICULAR.



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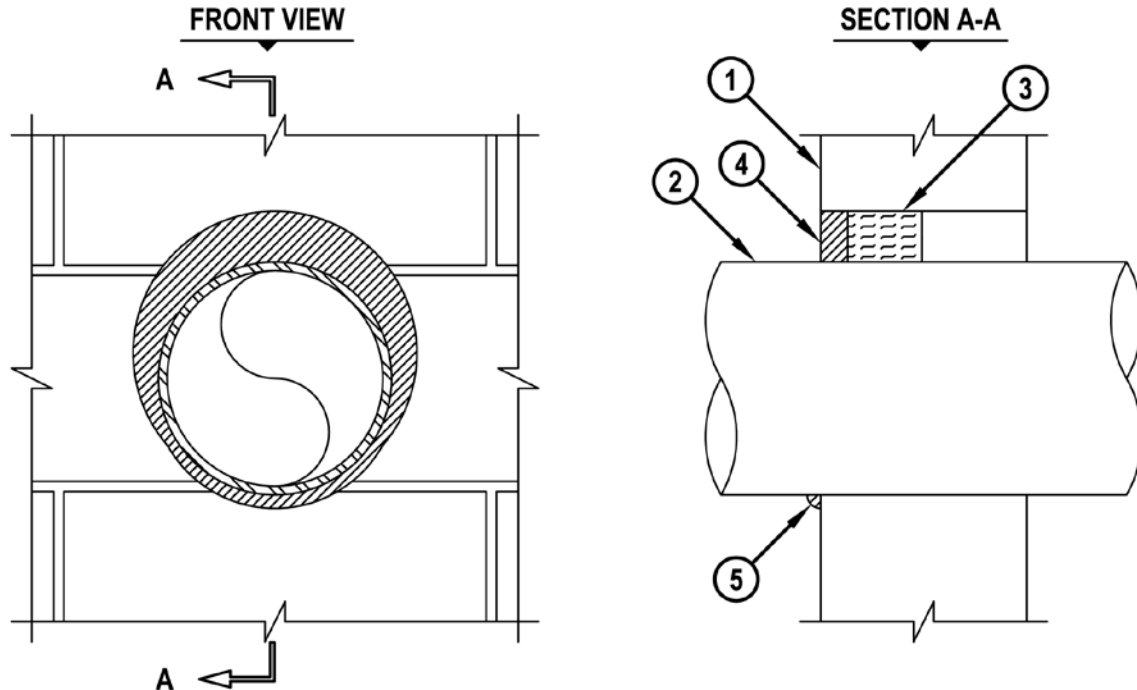
UL/cUL SYSTEM NO. W-J-1089

METAL PIPE THROUGH CONCRETE OR CONCRETE BLOCK SHAFT WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.

T-RATING = 0-HR.

WJ1089c.112102



1. CONCRETE WALL ASSEMBLY (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MIN. 3-3/4" THICK).
 - B. ANY UL/ULC CLASSIFIED CONCRETE BLOCK WALL.
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 8" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 8" NOMINAL DIAMETER CAST IRON PIPE.
 - C. MAXIMUM 4" NOMINAL DIAMETER COPPER PIPE.
 - D. MAXIMUM 6" NOMINAL DIAMETER STEEL CONDUIT.
 - E. MAXIMUM 4" NOMINAL DIAMETER EMT.
 - F. MAXIMUM 2" NOMINAL DIAMETER FLEXIBLE STEEL CONDUIT.
3. MINIMUM 1-5/8" OR 2-1/4" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED AND RECESSED ON ONE SIDE OF WALL, FOR 1-HR. OR 2-HR. FIRE-RATED WALLS, RESPECTIVELY.
4. MINIMUM 1-1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
5. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 10-1/2".
 2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1-7/8".
 3. THIS FIRESTOP SYSTEM WAS DESIGNED AND TESTED FOR APPLICATIONS IN WHICH THERE IS LIMITED OR NO ACCESS AVAILABLE ON ONE SIDE OF THE WALL.



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UL/cUL SYSTEM NO. W-J-1128

METAL PIPE THROUGH CONCRETE WALL OR BLOCK WALL ASSEMBLY

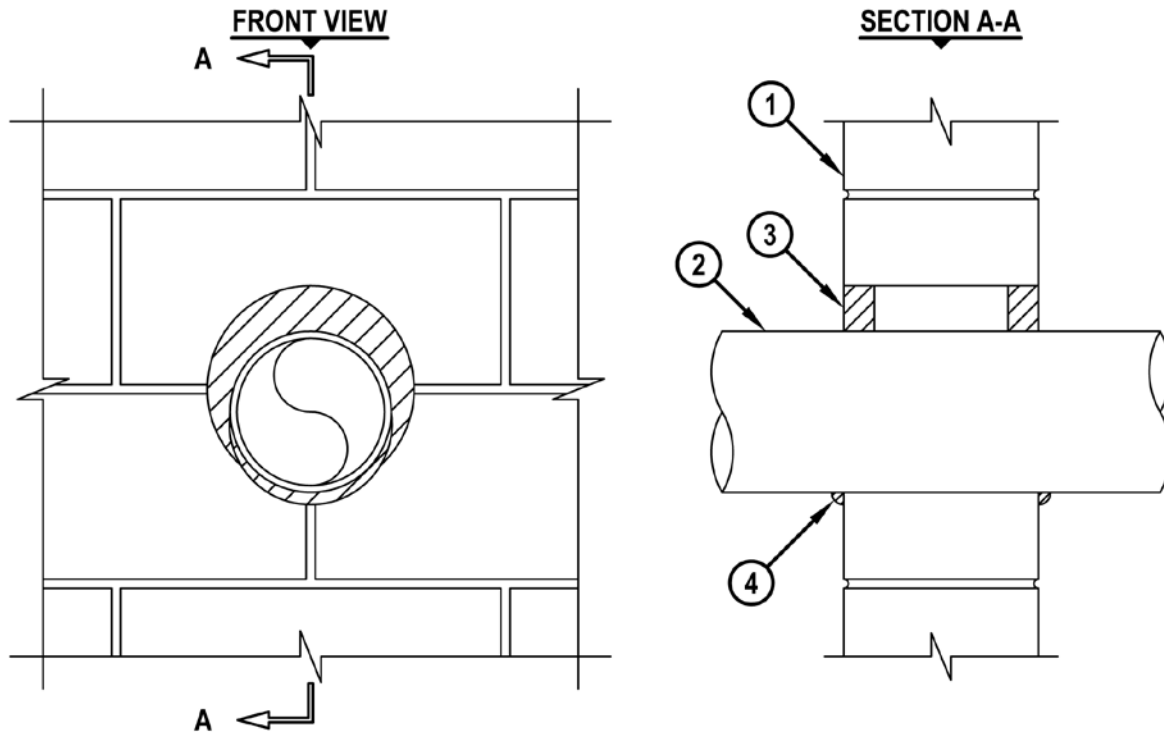
F-RATING = 2-HR.

T-RATING = 0-HR.

L-RATING AT AMBIENT = LESS THAN 1 CFM/SQ. FT.

L-RATING AT 400°F = LESS THAN 1 CFM/SQ. FT.

WJ1128b.081910



1. CONCRETE WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 5" THICK).
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 30" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 40 OR HEAVIER).
 - B. MAXIMUM 30" NOMINAL DIAMETER CAST IRON PIPE.
 - C. MAXIMUM 6" NOMINAL DIAMETER COPPER PIPE.
 - D. MAXIMUM 6" NOMINAL DIAMETER STEEL CONDUIT.
 - E. MAXIMUM 4" NOMINAL DIAMETER EMT.
3. MINIMUM 1-1/4" DEPTH HILTI CP 606 FLEXIBLE FIRESTOP SEALANT.
4. MINIMUM 1/2" BEAD HILTI CP 606 FLEXIBLE FIRESTOP SEALANT APPLIED AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 31-7/8".
 2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1-7/8".



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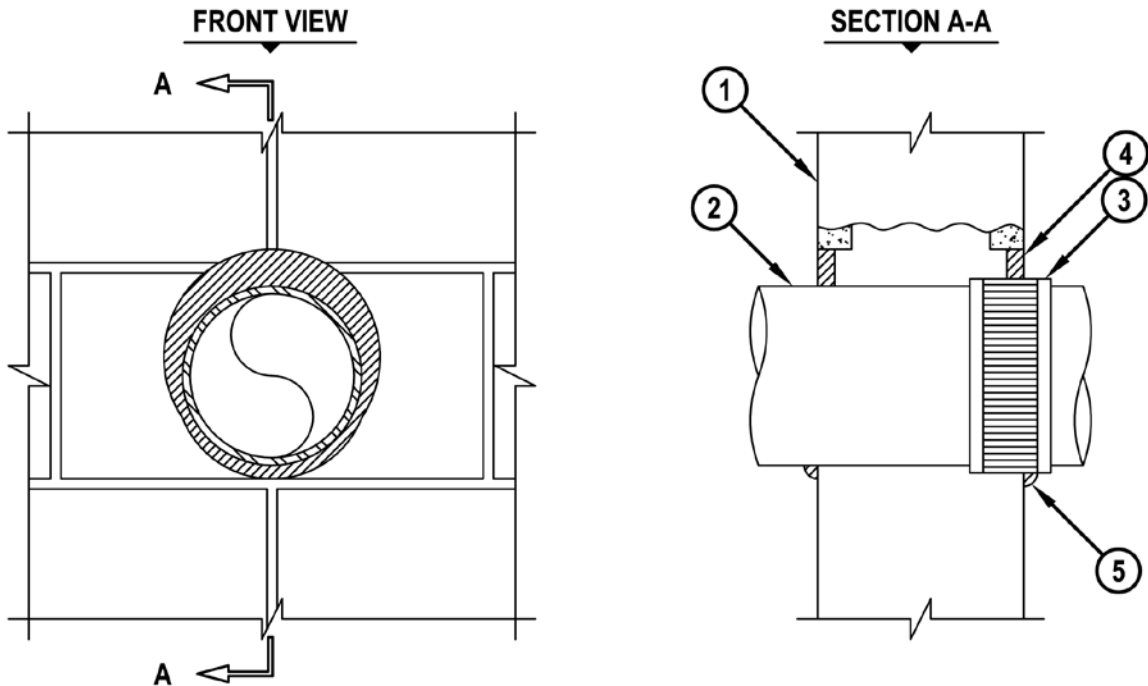
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Hilti (Canada) Corp. 1-800-363-4458 • www.hilti.ca • Hilti Firestop Systems Guide — Canada

UL/cUL SYSTEM NO. W-J-1174
**CAST IRON OR DUCTILE IRON PIPE THROUGH CONCRETE WALL
 OR CONCRETE BLOCK WALL ASSEMBLY**

F-RATING = 2-HR.
 T-RATING = 1/4-HR.

WJ1174a.110904



1. CONCRETE WALL ASSEMBLY (2-HR. FIRE-RATING):
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 5" THICK).
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. MAXIMUM 6" NOMINAL DIAMETER CAST IRON OR DUCTILE IRON PIPE.
3. CORRUGATED STAINLESS STEEL "NO-HUB" CONNECTOR INSTALLED ENTIRELY OR PARTIALLY WITHIN OPENING.
4. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
5. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT APPLIED AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 8".
 2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1".



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cUL SYSTEM NO. W-J-2019

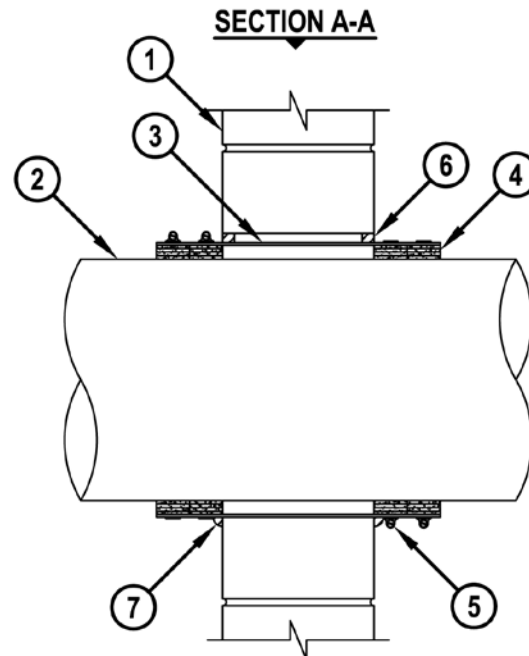
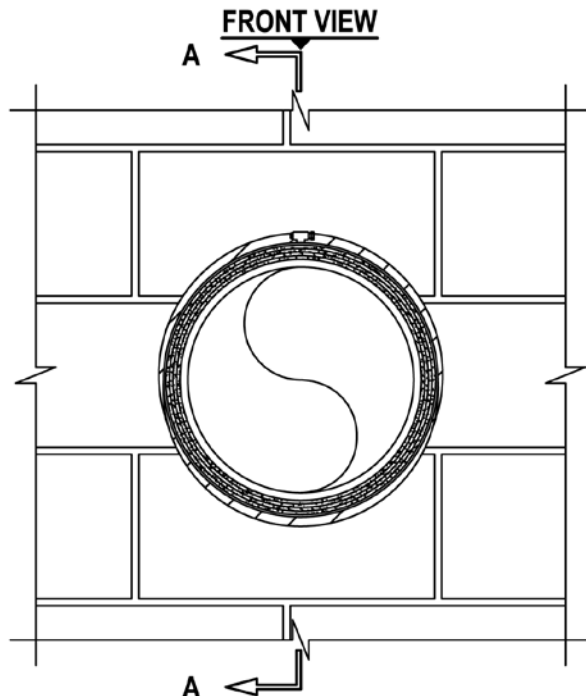
**PLASTIC PIPE THROUGH CONCRETE WALL OR BLOCK WALL ASSEMBLY**

F AND FT-RATING = 1-HR. OR 2-HR.

FH AND FTH-RATING = 0-HR.

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL

cUL WJ2019a.060706



1. CONCRETE WALL ASSEMBLY (1-HR. OR 2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 5" THICK) (1-HR. FIRE-RATING).
 - B. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 6" THICK) (2-HR. FIRE-RATING).
 - C. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL (2-HR. FIRE-RATING).
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 12" NOMINAL DIAMETER PVC PLASTIC PIPE (CELLULAR OR SOLID CORE).
 - B. MAXIMUM 12" NOMINAL DIAMETER CPVC PLASTIC PIPE (CLOSED PIPING SYSTEM ONLY).
3. MAXIMUM 14-1/2" NOMINAL DIAMETER SHEET METAL SLEEVE (MIN. 28 GA. STEEL) HAVING A MIN. 2" LAP ALONG LONGITUDINAL SEAM. LENGTH OF SLEEVE TO EXTEND 3-1/2" BEYOND EACH SURFACE OF WALL.
4. HILTI CP 648E WRAP STRIP (NOMINAL 3/16" THICK x 1-3/4" WIDE) CONTINUOUSLY WRAPPED AROUND THE OUTER CIRCUMFERENCE OF THE PIPE, COVERING FOUR TIMES, WITH ENDS BUTTED AND HELD IN PLACE WITH TAPE. TWO SETS OF WRAP STRIP INSTALLED WITHIN THE STEEL SLEEVE ON EACH SIDE OF THE WALL.
5. HILTI COLLAR CLAMPS (1/2" WIDE) FASTENED AROUND SHEET METAL SLEEVE AT THE CENTER OF EACH WRAP STRIP.
6. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
7. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 15".

2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1/2".



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cUL SYSTEM NO. W-J-2028



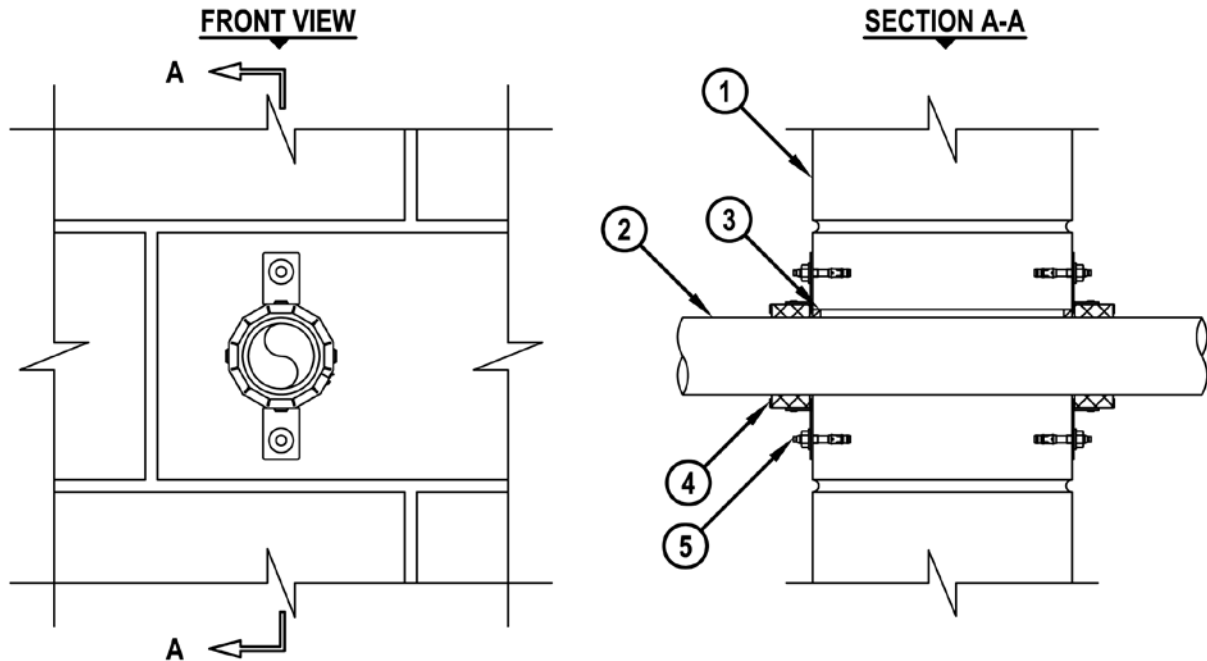
PLASTIC PIPE THROUGH CONCRETE WALL OR BLOCK WALL ASSEMBLY

F-RATING = 2-HR.

FT-RATING = 1/2-HR. OR 1-HR.

FH-RATING = 0-HR. OR 2-HR.

FTH-RATING = 0-HR., 1/2-HR. OR 1-HR.



cUL WJ2028a.042407

1. CONCRETE WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 5-1/2" THICK).
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING (CLOSED PIPING SYSTEMS ONLY) :
 - A. MAXIMUM 2" NOMINAL DIAMETER POLYPROPYLENE (PP) SDR 11 PLASTIC PIPE.
 - B. MAXIMUM 110mm FUSIOTHERM® (SDR 7.4 W/ FASER) PP PLASTIC PIPE MANUFACTURED BY AQUATHERM, INC.
 - C. MAXIMUM 50mm FUSIOTHERM® (SDR 11) PP PLASTIC PIPE MANUFACTURED BY AQUATHERM, INC.
3. MINIMUM 1/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT FLUSH WITH BOTH SURFACES OF WALL.
4. HILTI CP 643N FIRESTOP COLLAR WITH FASTENING HOOKS.
5. SECURE EACH FASTENING HOOK TO WALL ASSEMBLY WITH HILTI 3/16" DIAMETER TOGGLER BOLTS AND WASHERS OR 1/4" DIAMETER x 1-1/2" LONG STEEL EXPANSION BOLTS.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 5".
2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 5/8".



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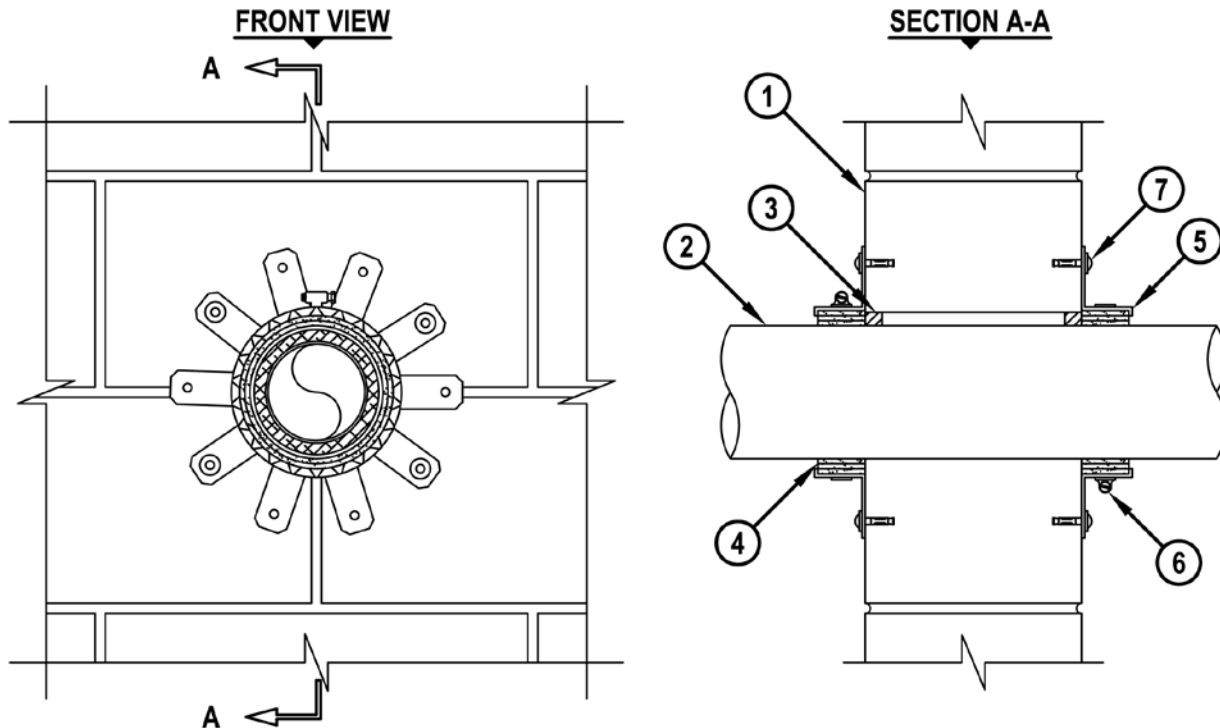
cUL SYSTEM NO. W-J-2029

PLASTIC PIPE THROUGH CONCRETE WALL OR BLOCK WALL ASSEMBLY

F, FT, FH AND FTH-RATINGS = 2-HR.



cUL-WJ2029a.022707



1. CONCRETE WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 6" THICK).
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 4" NOMINAL DIAMETER POLYPROPYLENE (PP) SDR 11 PLASTIC PIPE (CLOSED PIPING SYSTEM ONLY).
 - B. MAXIMUM 125mm FUSIOTHERM® (SDR 11 OR SDR 7.4 WITH FASER) PP PLASTIC PIPE MANUFACTURED BY AQUATHERM, INC. (CLOSED PIPING SYSTEM ONLY).
3. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT FLUSH WITH EACH SIDE OF WALL.
4. HILTI CP 648E WRAP STRIP (NOMINAL 3/16" THICK x 1-3/4" WIDE) CONTINUOUSLY WRAPPED AROUND THE OUTER CIRCUMFERENCE OF THE PIPE, COVERING THREE TIMES, WITH ENDS BUTTED AND HELD IN PLACE WITH TAPE. WRAP STRIP TO BE BUTTED TIGHTLY AGAINST BOTH SURFACES OF WALL.
5. HILTI 1-3/4" RETAINING COLLAR WRAPPED OVER THE WRAP STRIPS, OVERLAPPING MINIMUM 1".
6. HILTI COLLAR CLAMP FASTENED AT MID-HEIGHT OF RETAINING COLLAR.
7. MINIMUM 4 TABS OF RETAINING COLLAR (SYMMETRICALLY SPACED) SECURED TO BOTH SIDES OF WALL WITH 1/4" DIAMETER STEEL EXPANSION BOLTS WITH 3/4" DIAMETER STEEL WASHERS.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 5-1/2".

2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1/2".



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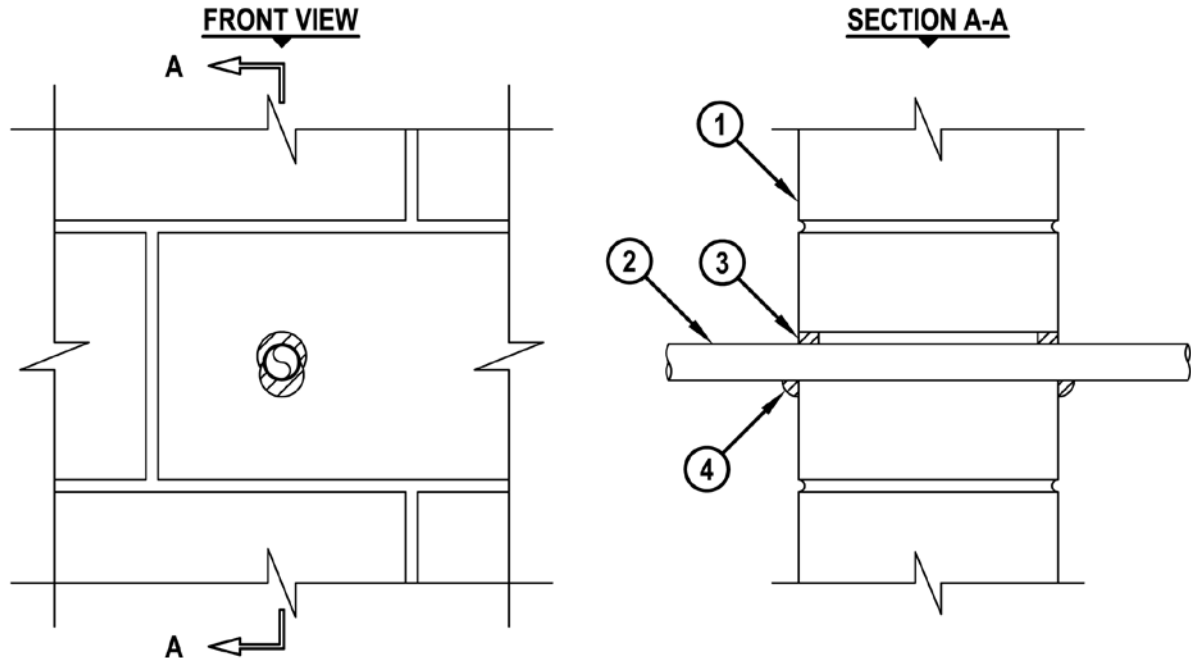
cUL SYSTEM NO. W-J-2030

**PLASTIC PIPE THROUGH CONCRETE WALL OR BLOCK WALL ASSEMBLY**

F-RATING = 2-HR.

FT, FH, AND FTH-RATINGS = 0-HR.

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL



cUL WJ2030a.062810

1. CONCRETE FLOOR OR WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 6" THICK).
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. MAXIMUM 1" NOMINAL DIAMETER SDR 9 CROSS-LINKED POLYETHYLENE (PEX) TUBING.
3. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
4. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT APPLIED AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 1-1/2".
 2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 3/8".



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cUL SYSTEM NO. W-J-2031

PLASTIC PIPE THROUGH CONCRETE WALL OR BLOCK WALL ASSEMBLY

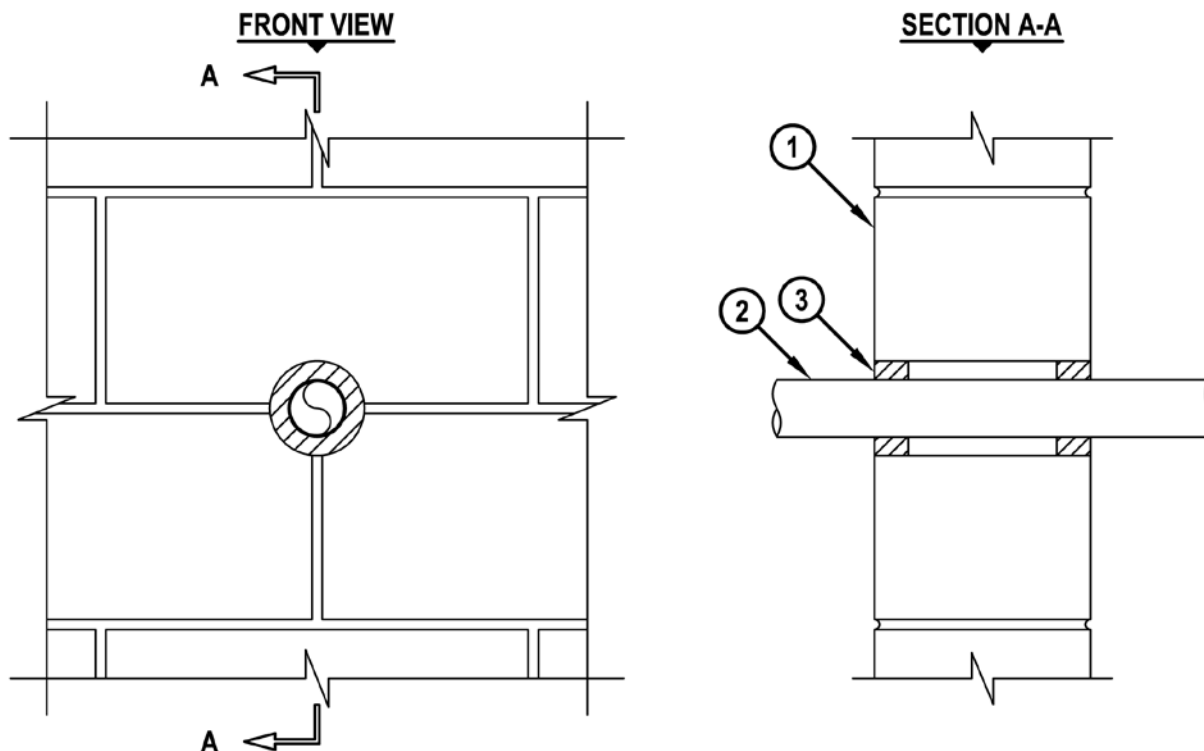
F-RATING = 1-HR. OR 2-HR.

FT, FH, AND FTH-RATINGS = 0-HR.

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL



cUL WJ2031a.062910



1. CONCRETE WALL ASSEMBLY (1-HR. OR 2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 6" THICK).
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. MAXIMUM 2" NOMINAL DIAMETER SDR 9 CROSS-LINKED POLYETHYLENE (PEX) TUBING.
3. HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT :
 - A. MINIMUM 5/8" DEPTH REQUIRED FOR 1-HR. FIRE-RATING.
 - B. MINIMUM 1-1/2" DEPTH REQUIRED FOR 2-HR. FIRE-RATING.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 3-1/2".
 2. ANNULAR SPACE = MINIMUM 1/4", MAXIMUM 7/8".

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cUL SYSTEM NO. W-J-2032

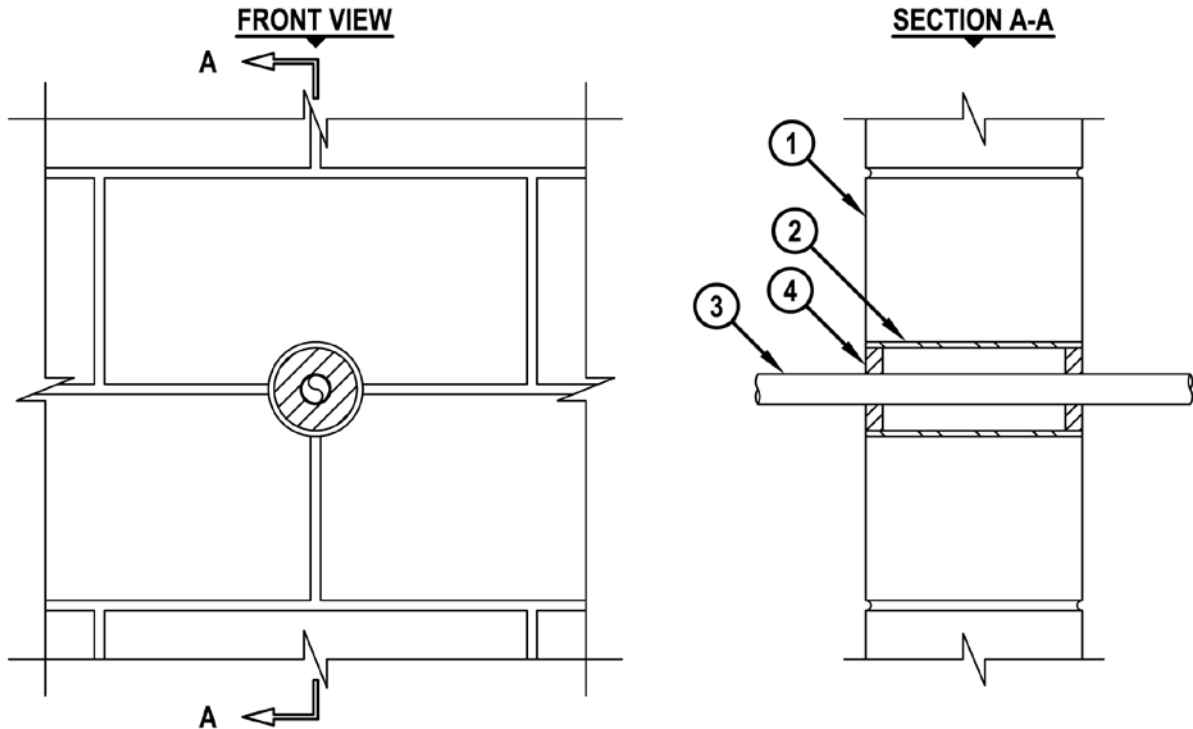


PLASTIC PIPE THROUGH CONCRETE WALL OR BLOCK WALL ASSEMBLY

F-RATING = 2-HR.

FT, FH, AND FTH-RATINGS = 0-HR.

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL



cUL WJ2032a.062910

1. CONCRETE WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 6" THICK).
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. [OPTIONAL] MAXIMUM 3" NOMINAL DIAMETER STEEL PIPE SLEEVE (SCHEDULE 10 OR HEAVIER).
3. MAXIMUM 1" NOMINAL DIAMETER SDR 9 CROSS-LINKED POLYETHYLENE (PEX) TUBING.
4. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 3".
2. ANNULAR SPACE = MINIMUM 1/4", MAXIMUM 1-3/8".



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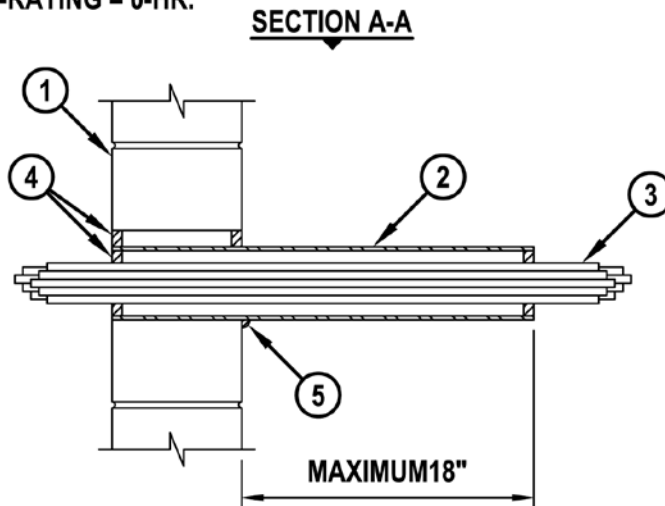
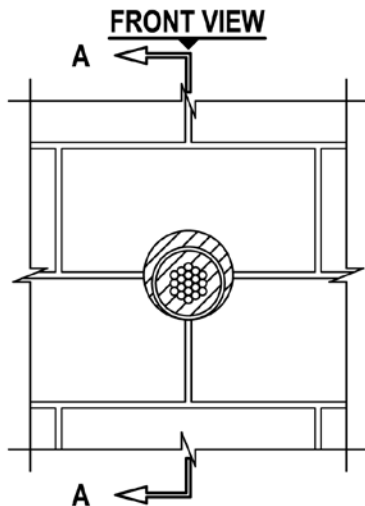
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UL/cUL SYSTEM NO. W-J-3060

CABLE BUNDLE THROUGH CONCRETE WALL OR BLOCK WALL ASSEMBLY

F-RATING = 2-HR.

T-RATING = 0-HR.



WJ3060g.022912

1. CONCRETE WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 5" THICK).
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL ASSEMBLY.
2. [OPTIONAL] MAXIMUM 4" NOMINAL DIAMETER EMT, STEEL PIPE (SCHEDULE 5 OR HEAVIER) OR 28 GA. GALVANIZED STEEL SLEEVE, CAST INTO WALL FLUSH WITH WALL SURFACES (SEE NOTE NO. 5 BELOW).
3. CABLE BUNDLE TO CONSIST OF ANY COMBINATION OF THE FOLLOWING :
 - A. MAXIMUM 7/C NO. 12 AWG POWER CABLE WITH PVC JACKET.
 - B. MAXIMUM 25 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
 - C. MAXIMUM RG 59 OR MAXIMUM RG 6/U COAXIAL CABLE WITH PVC JACKET.
 - D. MAXIMUM 3/C NO. 8 AWG METAL-CLAD CABLE.
 - E. MAXIMUM 5/8 DIAMETER FIBER-OPTIC CABLE WITH PVC JACKET.
 - F. MAXIMUM 4 PAIR NO. 22 AWG CAT 5 OR CAT 6 CABLE.
 - G. ANY CABLES, METAL-CLAD OR ARMORED CABLE, CURRENTLY UL CLASSIFIED UNDER THE THROUGH PENETRANTS PRODUCTS CATEGORY.
4. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT, CP 601S ELASTOMERIC FIRESTOP SEALANT, CP 606 FLEXIBLE FIRESTOP SEALANT OR CP 618 FIRESTOP PUTTY STICK.
5. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT, CP 601S ELASTOMERIC FIRESTOP SEALANT, CP 606 FLEXIBLE FIRESTOP SEALANT OR CP 618 FIRESTOP PUTTY STICK APPLIED AT WALL/SLEEVE INTERFACE WHEN STEEL SLEEVE EXTENDS BEYOND ONE OR BOTH SIDES OF WALL.

NOTES :

1. MAXIMUM DIAMETER OF OPENING WITH SLEEVE = 5-1/2".
2. MAXIMUM DIAMETER OF OPENING WITHOUT SLEEVE = 4".
3. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1".
4. CABLES TO FILL MAXIMUM 45% OF CROSS-SECTIONAL AREA OF OPENING.
5. WHEN SCHEDULE 5 STEEL PIPE OR EMT IS USED, SLEEVE MAY EXTEND UP TO 18" BEYOND WALL SURFACES. AS AN OPTION, SLEEVE MAY BE CONTINUOUS ON ONE SIDE OF WALL ASSEMBLY.



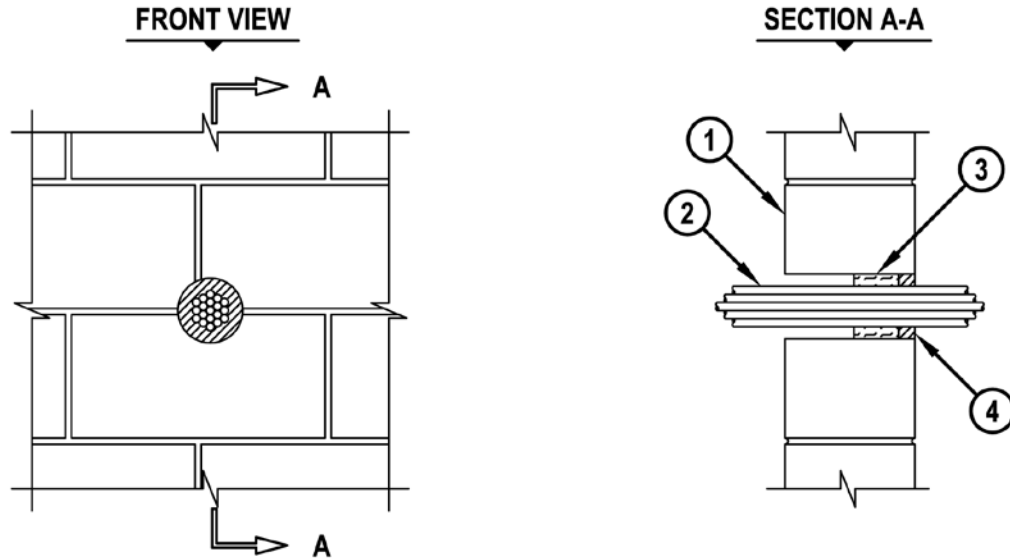
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UL/cUL SYSTEM NO. W-J-3061
**CABLE BUNDLE THROUGH CONCRETE OR CONCRETE
 BLOCK SHAFT WALL ASSEMBLY**

F-RATING = 1-HR. OR 2-HR.
 T-RATING = 0-HR.



WJ3061a.0081000

1. CONCRETE WALL ASSEMBLY (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN):
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MIN. 3-3/4" THICK).
 - B. ANY UL/ULC CLASSIFIED CONCRETE BLOCK WALL.
2. CABLE BUNDLE TO CONSIST OF ANY OF THE FOLLOWING:
 - A. MAXIMUM 7/C NO. 12 AWG CABLE.
 - B. MAXIMUM 25 PAIR NO. 24 AWG TELEPHONE CABLE.
 - C. RG 59 COAXIAL CABLE.
 - D. MAXIMUM 3/C NO. 12 AWG METAL CLAD CABLE.
 - E. MAXIMUM 5/8" DIAMETER FIBER-OPTIC CABLE.
3. MINIMUM 2-1/8" OR 2-3/4" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED AND RECESSED ON ONE SIDE OF THE WALL, FOR 1-HR. OR 2-HR. FIRE-RATED WALLS, RESPECTIVELY.
4. MINIMUM 1" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 4".
 2. CABLES TO FILL A MAXIMUM 33% OF CROSS-SECTIONAL AREA OF OPENING.
 3. ANNULAR SPACE = MINIMUM 1/4", MAXIMUM 3/4".
 4. THIS FIRESTOP SYSTEM WAS DESIGNED AND TESTED FOR APPLICATIONS IN WHICH THERE IS LIMITED OR NO ACCESS AVAILABLE ON ONE SIDE OF THE WALL.



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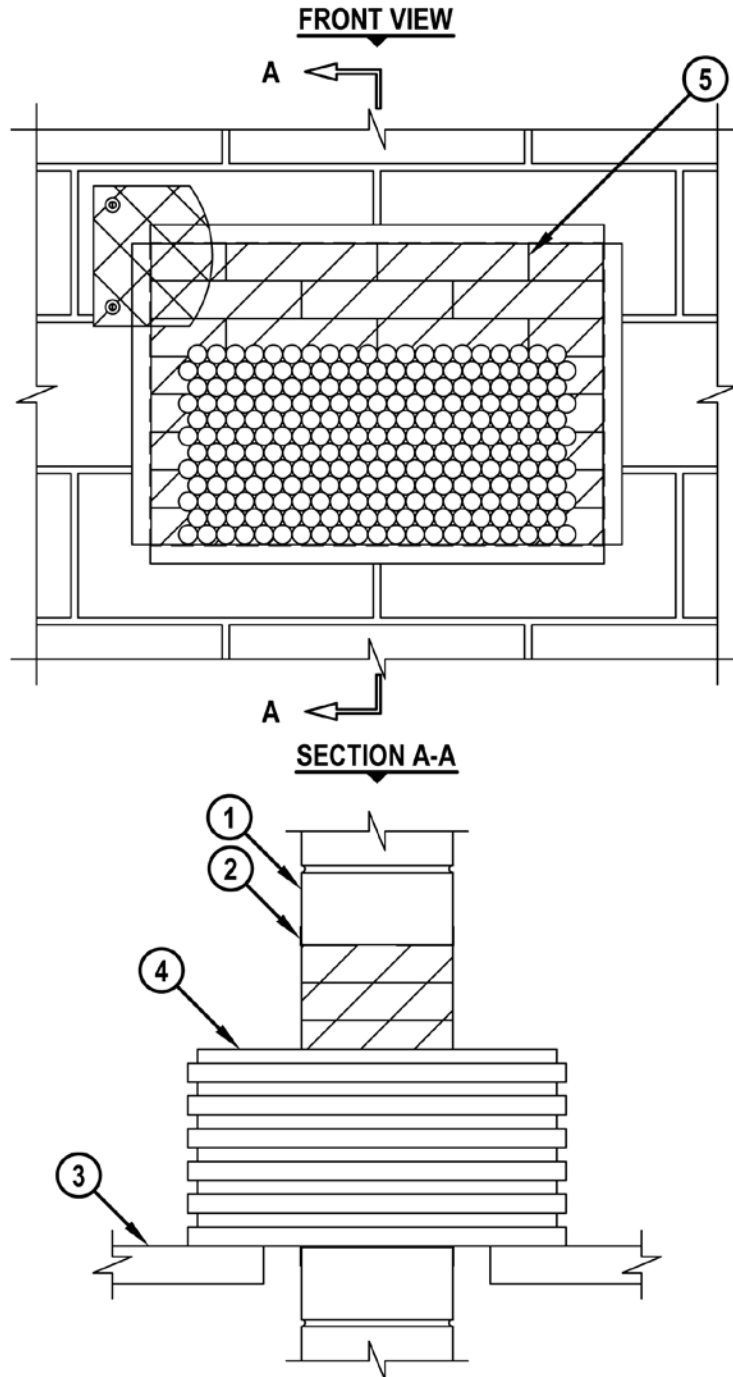
UL/cUL SYSTEM NO. W-J-3074

CABLE BUNDLE THROUGH CONCRETE WALL OR BLOCK WALL ASSEMBLY

F-RATING = 2-HR.

T-RATING = 0-HR. OR 1/2-HR.

WJ3074d.011012



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UL/cUL SYSTEM NO. W-J-3074

CABLE BUNDLE THROUGH CONCRETE WALL OR BLOCK WALL ASSEMBLY

F-RATING = 2-HR.

T-RATING = 0-HR. OR 1/2-HR.

WJ3074d.011012

1. CONCRETE WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 5" THICK).
 - B. ANY UL/cUL CLASSIFIED SOLID OR FILLED CONCRETE BLOCK WALL.
2. MAXIMUM 20" WIDE STEEL CABLE RACK MAY BE CONTINUOUS OR DISCONTINUOUS THROUGH WALL ASSEMBLY. WHEN THE RACK IS CONTINUOUS, THE T-RATING IS 0-HR.
3. [OPTIONAL] MINIMUM 1" x 3" x 0.039" ZINC COATED, OR PAINTED, STEEL ANGLES FRICTION FITTED TO FRAME ALL FOUR SIDES OF OPENING ON EACH SIDE OF WALL. STEEL FASTENERS MAY BE USED TO SECURE ANGLE TO WALL.
4. CABLES TO BE A COMBINATION OF ANY OF THE FOLLOWING :
 - A. MAXIMUM 750 KCMIL SINGLE CONDUCTOR POWER CABLE WITH PVC JACKET.
 - B. MAXIMUM 300 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
 - C. MAXIMUM 1/2" DIAMETER FIBER-OPTIC CABLE (24 FIBER).
5. HILTI CFS-BL FIRESTOP BLOCK OR HILTI FS 657 FIRE BLOCK (2" THICK x 8" WIDE x 5" DEEP, REFERENCE : FRONT VIEW) FIRMLY PACKED AND CENTERED WITHIN THE OPENING. EITHER ONE OR A COMBINATION OF BLOCK TYPES MAY BE USED.

NOTES :

1. MAXIMUM SIZE OF OPENING = 24" x 16".
2. CABLES TO FILL MAXIMUM 35% OF CROSS-SECTIONAL AREA OF OPENING.
3. ANNULAR SPACE = MINIMUM 0", MAXIMUM 8".
4. APPLY HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT, CP 618 FIRESTOP PUTTY STICK, OR CP 620 FIRE FOAM, INTO ANY VOID THAT MAY EXIST (AROUND PENETRANTS, INTO INTERSTICES OF CABLES, OR BETWEEN FIRESTOP/FIRE BLOCKS), TO MAXIMUM EXTENT POSSIBLE.
5. WHEN ANNULAR SPACE EXCEEDS 4" TO THE PERIPHERY, A NOMINAL 2" x 2" STEEL WIRE MESH (16 GA.) SHALL BE ATTACHED TO BOTH SIDES OF THE WALL BY MEANS OF 1/4" DIAMETER x 1" LONG STEEL CONCRETE ANCHORS AND 1-1/2" DIAMETER FENDER WASHERS (SPACED MAXIMUM 8" C/C). STEEL WIRE MESH SHALL BEGIN MAXIMUM 2-1/2" FROM THE PENETRANT AND OVERLAP MINIMUM 3" BEYOND THE PERIPHERY OF THE OPENING.



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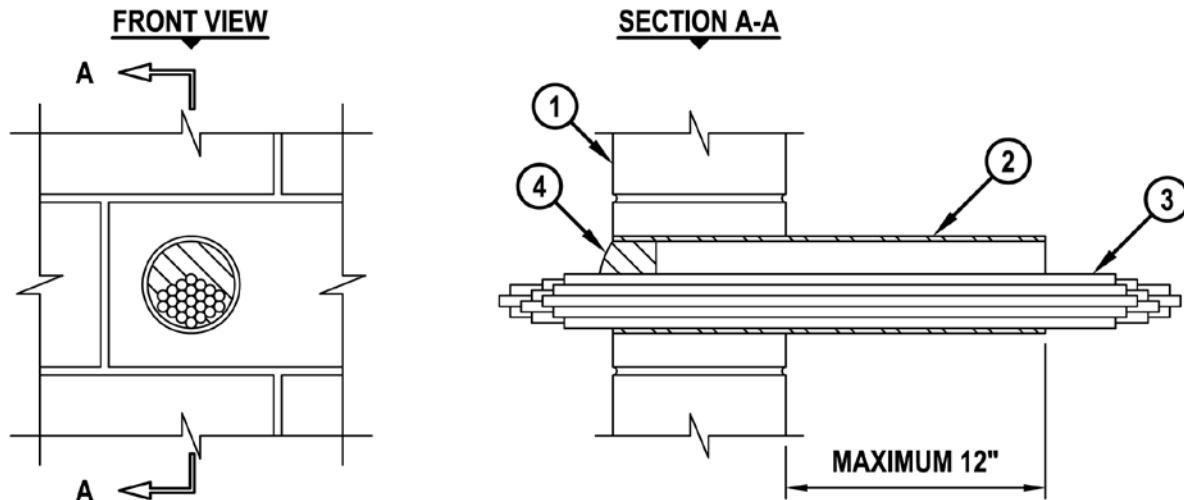
UL/cUL SYSTEM NO. W-J-3143

CABLE BUNDLE THROUGH CONCRETE WALL OR BLOCK WALL ASSEMBLY

F-RATING = 2-HR.

T-RATING = 0-HR.

WJ3143c.031212



1. CONCRETE WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 6" THICK).
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. [OPTIONAL] MAXIMUM 4" NOMINAL DIAMETER STEEL PIPE SLEEVE (SCHEDULE 5 OR HEAVIER). SLEEVE CAST OR GROUTED INTO WALL AND MAY EXTEND UP TO 12" BEYOND WALL SURFACE IN ANY COMBINATION (SEE NOTES NO. 3 AND 4 BELOW).
3. CABLE BUNDLE TO BE A COMBINATION OF ANY OF THE FOLLOWING :
 - A. MAXIMUM 300 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
 - B. MAXIMUM 750 KCMIL POWER CABLE WITH PVC JACKET.
 - C. MAXIMUM 7/C NO. 12 AWG POWER CABLE WITH PVC JACKET.
 - D. MAXIMUM 1/2" DIAMETER FIBER-OPTIC CABLE (MAXIMUM 24 FIBER).
 - E. MAXIMUM 3/C NO. 12 AWG METAL-CLAD CABLE WITH PVC JACKET.
 - F. MAXIMUM 1" DIAMETER METAL-CLAD TEK CABLE WITH PVC JACKET.
4. HILTI CFS-PL FIRESTOP PLUG OR HILTI CP 658T FIRESTOP PLUG CUT TO FIT AROUND THE CABLE BUNDLE AND INSTALLED TIGHTLY WITHIN SLEEVE SUCH THAT THE OUTER CIRCUMFERENCE OF THE DOME SHAPED PLUG IS FLUSH WITH EITHER END OF SLEEVE.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 4-1/2".
 2. CABLES TO FILL MAXIMUM 50% OF CROSS-SECTIONAL AREA OF THE OPENING.
 3. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1".
 4. SLEEVE IS REQUIRED WHEN WALL IS CONSTRUCTED OF CONCRETE BLOCKS.
 5. SLEEVE TO BE RIGIDLY SUPPORTED WHEN EXTENDING MORE THAN 6" BEYOND WALL SURFACE.



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UL/cUL SYSTEM NO. W-J-3189

CABLE BUNDLES THROUGH CONCRETE WALL OR BLOCK WALL

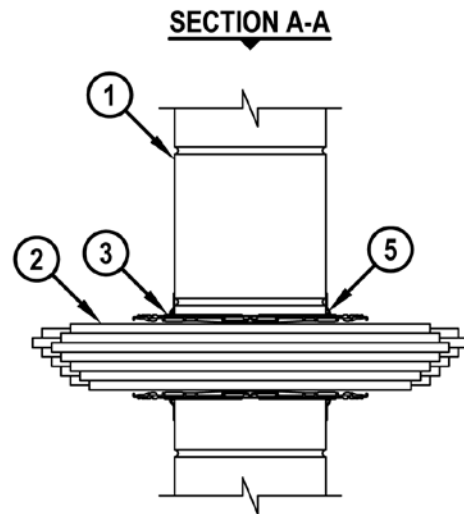
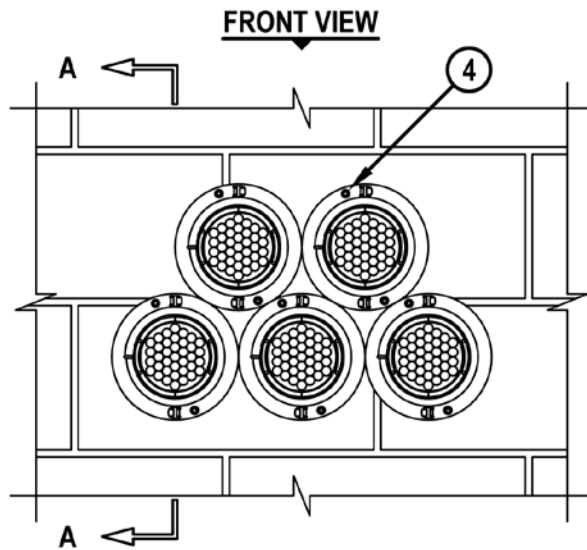
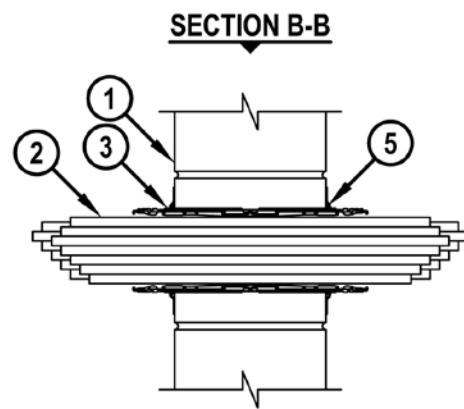
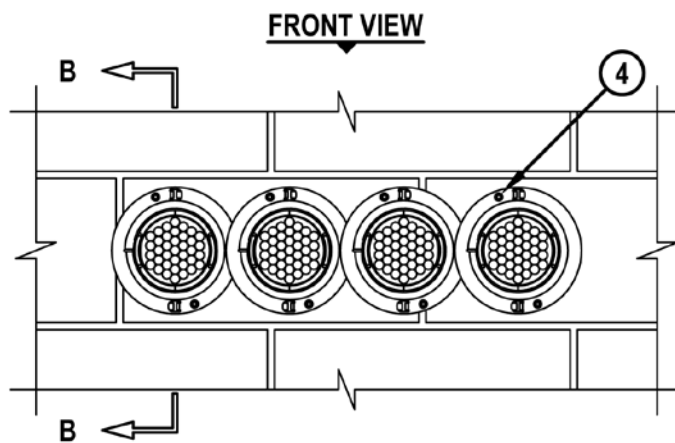
F-RATING = 2-HR.

T-RATING = 1/2-HR. OR 1 1/2-HR.

L-RATING AT AMBIENT = LESS THAN 1 CFM PER DEVICE (SEE TABLE BELOW)

L-RATING AT 400°F = 1 OR LESS THAN 1 CFM PER DEVICE (SEE TABLE BELOW)

WJ3189a.051712

**CONFIGURATION A****CONFIGURATION B**

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UL/cUL SYSTEM NO. W-J-3189

CABLE BUNDLES THROUGH CONCRETE WALL OR BLOCK WALL

F-RATING = 2-HR.

T-RATING = 1/2-HR. OR 1 1/2-HR.

L-RATING AT AMBIENT = LESS THAN 1 CFM PER DEVICE (SEE TABLE BELOW)

L-RATING AT 400°F = 1 OR LESS THAN 1 CFM PER DEVICE (SEE TABLE BELOW)

WJ3189a.051712

1. CONCRETE FLOOR OR WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 5" THICK).
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. CABLE BUNDLE TO BE A COMBINATION OF ANY OF THE FOLLOWING :
 - A. MAXIMUM 100 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
 - B. MAXIMUM 7/C NO. 12 AWG COPPER CONDUCTOR CONTROL CABLE WITH PVC OR XLPE JACKET AND INSULATION.
 - C. MAXIMUM 4/0 AWG TYPE RHH GROUND CABLE.
 - D. MAXIMUM 4 PAIR NO. 22 AWG CAT 5 OR CAT 6 COMPUTER CABLE.
 - E. MAXIMUM RG 6/U COAXIAL CABLE.
 - F. MAXIMUM 1/2" DIAMETER FIBER-OPTIC CABLE (24 FIBER) WITH PVC OR PE JACKET AND INSULATION.
 - G. MAXIMUM 20/C NO. 22 AWG SHIELDED PRINTER CABLE WITH PVC JACKET.
 - H. MAXIMUM 2/C NO. 18 AWG POWER OR NON-POWER LIMITED FIRE ALARM CABLE WITH OR WITHOUT METAL JACKET (MANUFACTURED BY AFC CABLE SYSTEMS, INC.).
 - I. MAXIMUM 1/4" DIAMETER S-VIDEO CABLE CONSISTING OF TWO MAXIMUM 24 AWG 75 OHM COAX OR TWISTED PAIR CABLE WITH PE INSULATION AND PVC JACKET.
 - J. MAXIMUM 3/C NO. 12 AWG METAL CLAD CABLE.
 - K. ANY CABLES, METAL-CLAD CABLES, OR ARMORED CABLES CURRENTLY LISTED UNDER THE THROUGH PENETRATING PRODUCTS CATEGORY.

CONFIGURATION A

3. MAXIMUM FIVE HILTI CP 653 SPEED SLEEVES [2" OR 4"] GROUPED IN A TWO ROW CONFIGURATION. INDIVIDUAL OPENINGS ARE SPACED MINIMUM 2-7/16" APART SUCH THAT DEVICE FLANGES OF ADJACENT DEVICES ARE NO CLOSER THAN POINT CONTACT. HILTI SPEED SLEEVE SLID INTO AND CENTERED WITHIN WALL. DEVICE FLANGES SPUN CLOCKWISE ONTO DEVICE THREADS, BUTTING TIGHTLY TO WALL SURFACES. INNER FABRIC MAY REMAIN OPEN EXCEPT FOR WHEN DEVICE CONTAINS NO CABLES AND WHEN L-RATING IS REQUIRED.
4. SECURE DEVICE FLANGES TO BOTH SIDES OF WALL WITH TWO MINIMUM 1-1/2" LONG MASONRY SCREWS OR ANCHORS.
5. MINIMUM 1/4" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT OR HILTI CP 606 FLEXIBLE FIRESTOP SEALANT APPLIED AROUND PERIPHERY OF EACH DEVICE ON BOTH SIDES OF WALL PRIOR TO INSTALLING DEVICE FLANGES.



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UL/cUL SYSTEM NO. W-J-3189

CABLE BUNDLES THROUGH CONCRETE WALL OR BLOCK WALL

F-RATING = 2-HR.

T-RATING = 1/2-HR. OR 1 1/2-HR.

L-RATING AT AMBIENT = LESS THAN 1 CFM PER DEVICE (SEE TABLE BELOW)

L-RATING AT 400°F = 1 OR LESS THAN 1 CFM PER DEVICE (SEE TABLE BELOW)

WJ3189a.051712

CONFIGURATION B

3. MAXIMUM FOUR HILTI CP 653 SPEED SLEEVES [2" OR 4"] GROUPED IN ONE ROW. INDIVIDUAL OPENINGS ARE SPACED MINIMUM 1-7/16" APART. DEVICE FLANGES MAY OVERLAP ONE ANOTHER. HILTI SPEED SLEEVE SLID INTO AND CENTERED WITHIN WALL. DEVICE FLANGES SPUN CLOCKWISE ONTO DEVICE THREADS, BUTTING TIGHTLY TO WALL SURFACES. INNER FABRIC MAY REMAIN OPEN EXCEPT FOR WHEN L-RATING IS REQUIRED.
4. SECURE DEVICE FLANGES TO BOTH SIDES OF WALL WITH TWO MINIMUM 1-1/2" LONG MASONRY SCREWS OR ANCHORS.
5. MINIMUM 1/4" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT OR HILTI CP 606 FLEXIBLE FIRESTOP SEALANT APPLIED AROUND PERIPHERY OF EACH DEVICE ON BOTH SIDES OF WALL PRIOR TO INSTALLING DEVICE FLANGES.

MAX CABLE FILL	CABLE TYPE	L RATING, CFM PER DEVICE	
		AMBIENT	400°F
0%	—	LESS THAN 1	LESS THAN 1
100%	ITEM 2D ONLY	LESS THAN 1	LESS THAN 1
100%	ANY CABLES (ITEM NO. 2) IN ANY COMBINATION	LESS THAN 1	1

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 2-1/2" [FOR 2" DEVICES] OR 4-1/2" [FOR 4" DEVICES].
 2. CABLES MAY REPRESENT 0% TO 100% VISUAL FILL OF DEVICE.
 3. L-RATING APPLIES ONLY WHEN INNER FABRIC SEAL IS TWISTED CLOSED.



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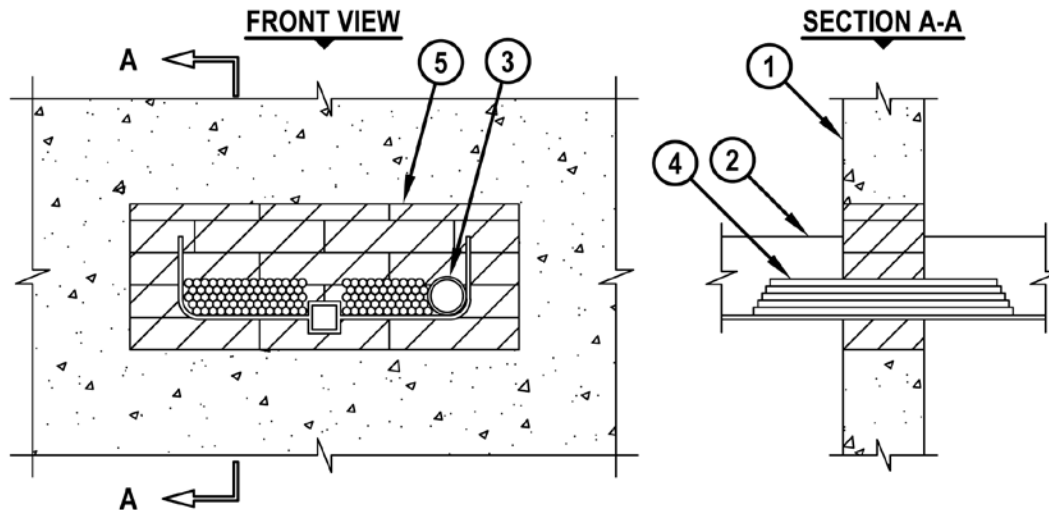
UL/cUL SYSTEM NO. W-J-4016

SPINE CABLE TRAY THROUGH CONCRETE WALL OR CONCRETE BLOCK WALL

F-RATING = 2-HR.

T-RATING = 0-HR.

NOTE : TESTED TO A 2.5 Pa PRESSURE DIFFERENTIAL



WJ4016e.011112

1. CONCRETE WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 5" THICK).
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. MAXIMUM 18" x 6" ALUMINUM SPINE CABLE TRAY.
3. MAXIMUM 2" NOMINAL DIAMETER INNERDUCT (CLOSED SYSTEM ONLY).
4. ANY OF THE FOLLOWING CABLES MAY BE USED WITHIN CABLE TRAY :
 - A. RG 59 COAXIAL CABLE.
 - B. MAXIMUM 6 PAIR NO. 24 AWG TELEPHONE CABLE.
 - C. DATA/COMMUNICATION CABLE (3 PAIR NO. 24 GAUGE MULTIPLE CONNECTOR).
 - D. MAXIMUM 3/C NO. 12 AWG METAL CLAD CABLE WITH PVC JACKET.
 - E. 24 FIBER-OPTIC CABLE.
 - F. MAXIMUM 2/C NO. 10 AWG (+GRND), ROMEX.
5. HILTI CFS-BL FIRESTOP BLOCK OR HILTI FS 657 FIRE BLOCK (2" THICK, 8" WIDE, 5" DEEP, REFERENCE : FRONT VIEW) FIRMLY PACKED AND CENTERED WITHIN WALL. ONE OR A COMBINATION OF BLOCK TYPES MAY BE USED (SEE NOTE NO. 5 BELOW).

NOTES : 1. MAXIMUM AREA OF OPENING = 216 SQ. IN., WITH A MAXIMUM DIMENSION OF 24".

2. ANNULAR SPACE = MINIMUM 1", MAXIMUM 4-1/2".

3. MAXIMUM AREA OF CABLES EQUAL 22% OF CROSS-SECTIONAL AREA OF CABLE TRAY (BASED ON A MAXIMUM 6" LOADING DEPTH).

4. APPLY HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT OR HILTI CP 618 FIRESTOP PUTTY STICK INTO INTERSTICES OF CABLES, BETWEEN CABLES AND CABLE TRAY, AND ANY VOIDS TO MAXIMUM EXTENT POSSIBLE.

5. FOR BLOCK WALLS, FIRESTOP/FIRE BLOCKS TO FILL ENTIRE THICKNESS OF WALL UNLESS WALL IS SOLID FILLED.



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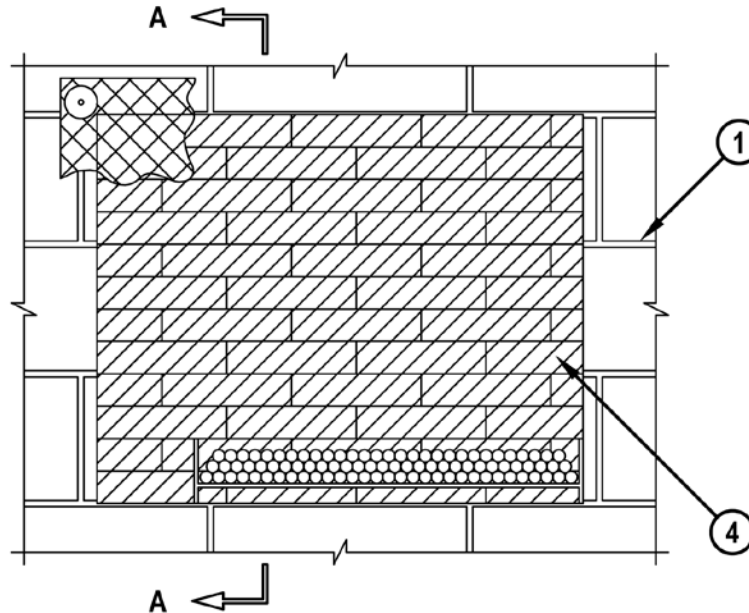
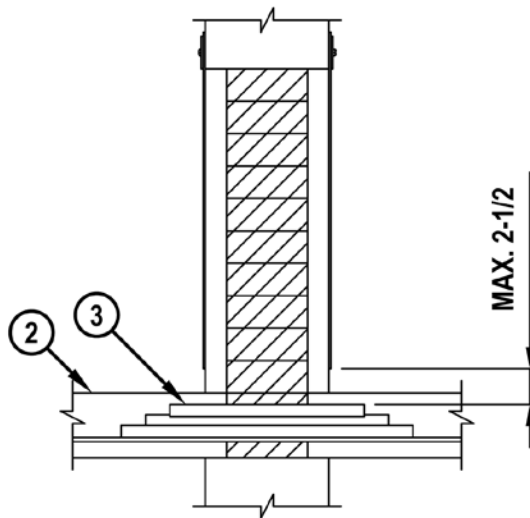
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UL/cUL SYSTEM NO. W-J-4029

CABLE TRAY THROUGH CONCRETE WALL OR BLOCK WALL ASSEMBLY

F-RATING = 2-HR.

T-RATING = 0-HR.

FRONT VIEW**SECTION A-A**

WJ4029c.011112



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UL/cUL SYSTEM NO. W-J-4029

CABLE TRAY THROUGH CONCRETE WALL OR BLOCK WALL ASSEMBLY

F-RATING = 2-HR.

T-RATING = 0-HR.

WJ4029c.01112

1. CONCRETE WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 5" THICK).
 - B. ANY UL/cUL CLASSIFIED SOLID OR FILLED CONCRETE BLOCK WALL.
2. MAXIMUM 24" WIDE x 4" DEEP, ALUMINUM OR STEEL, OPEN LADDER OR SOLID BACK CABLE TRAY.
3. CABLES TO BE ANY COMBINATION OF THE FOLLOWING :
 - A. MAXIMUM 300 PAIR NO. 24 AWG TELEPHONE CABLE.
 - B. MAXIMUM 750 KCMIL SINGLE CONDUCTOR POWER CABLE.
 - C. MAXIMUM 1/2" DIAMETER FIBER-OPTIC CABLE (24 FIBER).
 - D. MAXIMUM 3/C NO. 12 AWG METAL-CLAD CABLE.
4. HILTI CFS-BL FIRESTOP BLOCK OR HILTI FS 657 FIRE BLOCK (2" THICK x 8" WIDE x 5" DEEP, REFERENCE : FRONT VIEW) FIRMLY PACKED AND CENTERED WITHIN OPENING OR FLUSH WITH ONE SIDE. EITHER ONE OR A COMBINATION OF BLOCK TYPES MAY BE USED.

- NOTES :
1. MAXIMUM AREA OF OPENING = 900 SQ. IN., WITH A MAXIMUM DIMENSION OF 30".
 2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 26".
 3. CABLES TO FILL MAXIMUM 45% OF CROSS-SECTIONAL AREA OF CABLE TRAY.
 4. APPLY HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT, CP 618 FIRESTOP PUTTY STICK, OR CP 620 FIRE FOAM, IN ANY VOID THAT MAY EXIST (INTO INTERSTICES OF CABLES, BETWEEN CABLES AND CABLE TRAY, AND ANY VOIDS, TO MAXIMUM EXTENT POSSIBLE.
 5. WHEN ANNULAR SPACE EXCEEDS 4", ABOVE OR BELOW THE CABLE TRAY, OR 6" BETWEEN TRAY AND SIDE OF OPENING, A NOMINAL 2" x 2" STEEL WIRE MESH (16 GA.) SHALL BE ATTACHED TO BOTH SIDES OF THE WALL WITH 1/4" DIAMETER x 1" LONG STEEL CONCRETE ANCHORS AND 1-1/2" DIA. FENDER WASHERS (SPACED MAX. 8" C/C).
 6. [NOT SHOWN] AS AN ALTERNATE TO WIRE MESH, STEEL PLATE (MIN. 22 GA.) MAY BE USED. STEEL PLATE SHALL BE ATTACHED TO STEEL STRUTS (13/16" DEEP x 12 GA.) WITH 1/4" DIA. STEEL NUTS (SPACED 8" C/C). STRUT SHALL BE SECURED TO BOTH SURFACES OF THE WALL ASSEMBLY WITH 1/4" DIA. x 1" LG. STEEL CONCRETE ANCHORS WITH STEEL NUTS (SPACED MAX. 12" C/C).
 7. STEEL WIRE MESH/STEEL PLATE SHALL BEGIN MAXIMUM 2-1/2" FROM THE PENETRANT AND OVERLAP MINIMUM 3" BEYOND THE PERIPHERY OF THE OPENING.



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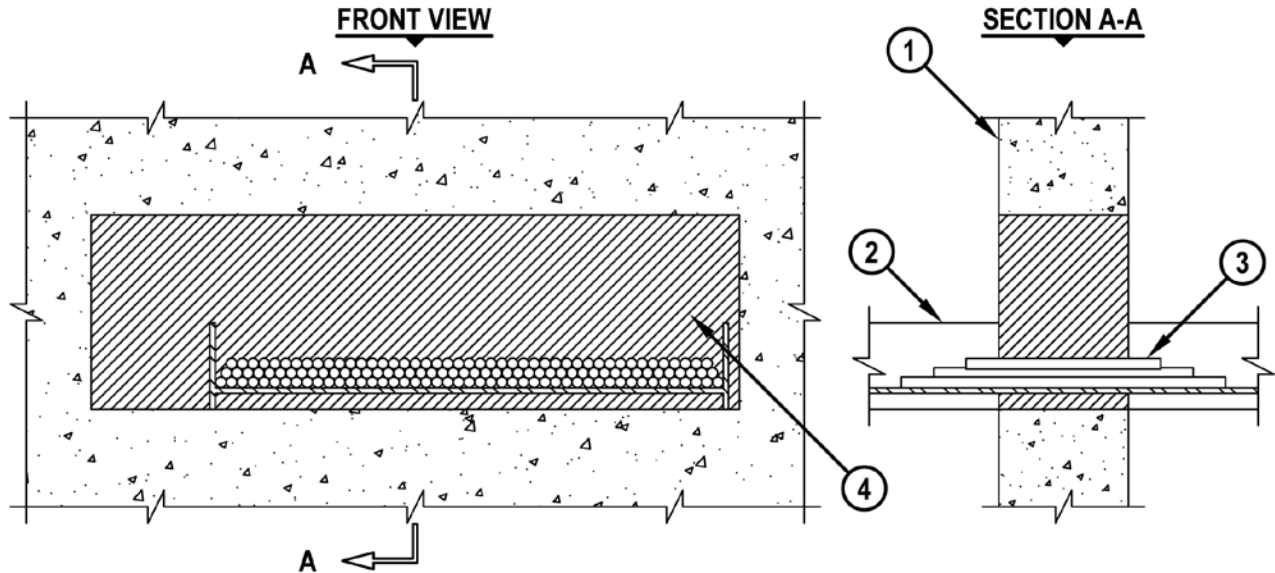
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UL/cUL SYSTEM NO. W-J-4030

CABLE TRAY THROUGH CONCRETE WALL OR BLOCK WALL ASSEMBLY

F-RATING = 1 AND 2-HR.

T-RATING = 0-HR.



WJ4030b.011112

1. CONCRETE WALL ASSEMBLY (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MIN. 4-3/4" THICK, FOR A 1-HR. FIRE-RATING).
 - B. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MIN. 6" THICK, FOR A 2-HR. FIRE-RATING).
 - C. ANY UL/cUL CLASSIFIED SOLID OR FILLED CONCRETE BLOCK WALL.
2. ALUMINUM OPEN LADDER CABLE TRAY (MAXIMUM SIZE : 24" x 4").
3. CABLES TO CONSIST OF ANY COMBINATION OF THE FOLLOWING :
 - A. MAXIMUM 300 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
 - B. MAXIMUM 500 KCMIL SINGLE CONDUCTOR POWER CABLE WITH PVC JACKET.
 - C. MAXIMUM 3/8" DIAMETER FIBER-OPTIC CABLE WITH PVC JACKET.
 - D. MAXIMUM 3/C NO. 12 AWG METAL-CLAD CABLE.
4. HILTI CP 620 FIRE FOAM :
 - A. MINIMUM 4-3/4" THICKNESS, FOR A 1-HR. FIRE-RATING.
 - B. MINIMUM 6" THICKNESS, FOR A 2-HR. FIRE-RATING.

NOTES : 1. MAXIMUM AREA OF OPENING = 270 SQ. IN., WITH A MAXIMUM DIMENSION OF 30".
 2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 5".
 3. MAXIMUM AREA OF CABLES SHALL BE 45% OF CROSS-SECTIONAL AREA OF CABLE TRAY.
 4. [OPTIONAL - NOT SHOWN] HILTI CFS-BL FIRESTOP BLOCK OR HILTI FS 657 FIRE BLOCK (FIRMLY PACKED AND CENTERED WITHIN WALL ASSEMBLY) MAY BE APPLIED IN A SINGLE LAYER ABOVE CABLES WITHIN CABLE TRAY (2" THICK x 8" WIDE x 5" DEEP).



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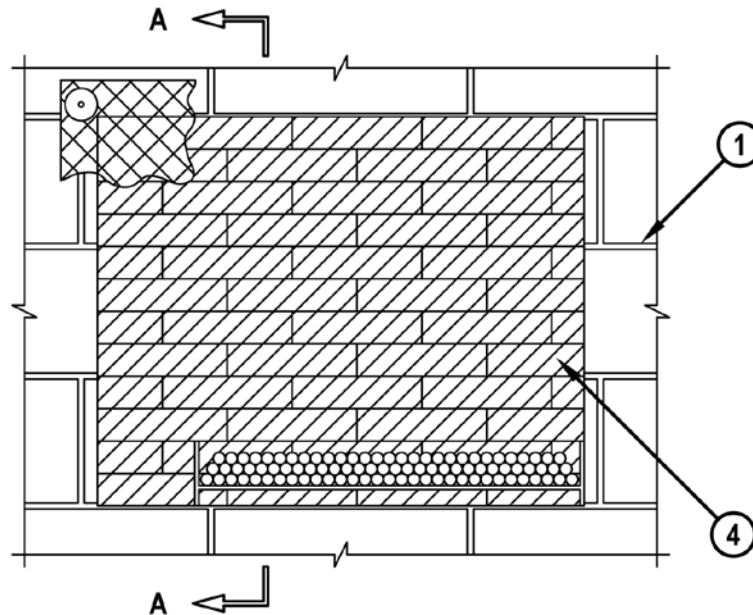
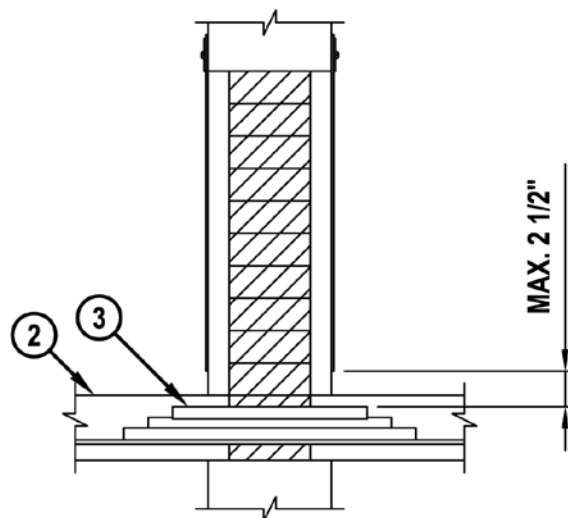
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UL/cUL SYSTEM NO. W-J-4072

CABLE TRAY THROUGH CONCRETE WALL OR BLOCK WALL ASSEMBLY

F-RATING = 2-HR.

T-RATING = 0-HR.

FRONT VIEW**SECTION A-A**

WJ4072a.010412



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UL/cUL SYSTEM NO. W-J-4072

CABLE TRAY THROUGH CONCRETE WALL OR BLOCK WALL ASSEMBLY

F-RATING = 2-HR.

T-RATING = 0-HR.

WJ4072a.010412

1. CONCRETE WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MIN. 5" THICK).
 - B. ANY UL/cUL CLASSIFIED SOLID OR FILLED CONCRETE BLOCK WALL.
2. MAXIMUM 24" WIDE x 4" DEEP, ALUMINUM OR STEEL, OPEN LADDER OR SOLID BACK CABLE TRAY.
3. CABLES TO BE ANY COMBINATION OF THE FOLLOWING :
 - A. MAXIMUM 300 PAIR NO. 24 AWG TELEPHONE CABLE.
 - B. MAXIMUM 750 KCMIL SINGLE CONDUCTOR POWER CABLE.
 - C. MAXIMUM 1/2" DIAMETER FIBER-OPTIC CABLE (24 FIBER).
 - D. MAXIMUM 3/C NO. 12 AWG METAL-CLAD CABLE.
4. HILTI CFS-BL FIRESTOP BLOCK (2" THICK x 8" WIDE x 5" DEEP, REFERENCE : FRONT VIEW) FIRMLY PACKED AND CENTERED WITHIN OPENING OR FLUSH WITH ONE SIDE (SEE NOTE NO. 7 BELOW).

- NOTES :**
1. MAXIMUM AREA OF OPENING = 900 SQ. IN., WITH A MAXIMUM DIMENSION OF 30".
 2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 26".
 3. CABLES TO FILL MAXIMUM 45% OF CROSS-SECTIONAL AREA OF CABLE TRAY.
 4. APPLY HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT, CP 618 FIRESTOP PUTTY STICK, OR CP 620 FIRE FOAM, IN ANY VOID THAT MAY EXIST (INTO INTERSTICES OF CABLES, BETWEEN CABLES AND CABLE TRAY) TO MAXIMUM EXTENT POSSIBLE.
 5. WHEN ANNULAR SPACE EXCEEDS 12", ABOVE, BELOW, OR TO THE SIDES OF THE CABLE TRAY, A NOMINAL 2" x 2" STEEL WIRE MESH (16 GA.) SHALL BEGIN MAXIMUM 2-1/2" FROM PENETRATING ITEM AND OVERLAP MINIMUM 3" BEYOND THE PERIPHERY OF THE OPENING. WIRE MESH SHALL BE ATTACHED TO BOTH SIDES OF THE WALL WITH 1/4" DIAMETER x 1" LONG STEEL CONCRETE ANCHORS AND 1-1/2" DIA. FENDER WASHERS (SPACED MAX. 8" C/C).
 6. [NOT SHOWN] AS AN ALTERNATE TO WIRE MESH, STEEL PLATE (MIN. 22 GA.) MAY BE USED. STEEL PLATE SHALL BE ATTACHED TO STEEL STRUTS (13/16" DEEP x 12 GA.) WITH 1/4" DIA. STEEL NUTS (SPACED 8" C/C). STRUT SHALL BE SECURED TO BOTH SURFACES OF THE WALL ASSEMBLY WITH 1/4" DIA. x 1" LG. STEEL CONCRETE ANCHORS WITH STEEL NUTS (SPACED MAX. 12" C/C).
 7. FOR BLOCK WALLS, FIRESTOP BLOCKS TO FILL ENTIRE THICKNESS OF WALL UNLESS WALL IS SOLID FILLED.



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UL/cUL SYSTEM NO. W-J-5042

INSULATED METAL PIPE THROUGH CONCRETE WALL OR CONCRETE BLOCK WALL

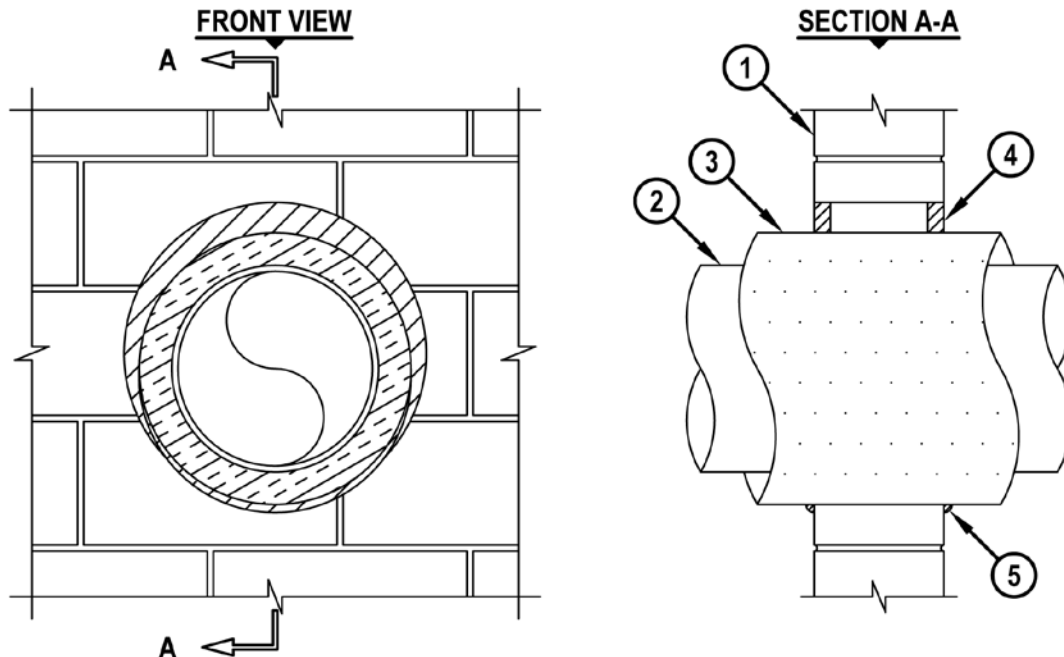
F-RATING = 1-HR., 2-HR., OR 3-HR.

T-RATING = 0-HR., 1/2-HR., 1-HR., OR 1-1/4-HR. (SEE UL FIRE RESISTANCE DIRECTORY)

L-RATING AT AMBIENT = 4 CFM/SQ FT

L-RATING AT 400° F = LESS THAN 1 CFM/SQ FT

WJ5042g.061912



1. CONCRETE WALL ASSEMBLY (1-HR., 2-HR., OR 3-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MIN. 3-3/4" THICK, FOR 1-HR. FIRE-RATING).
 - B. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MIN. 5" THICK, FOR 2-HR. FIRE-RATING).
 - C. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MIN. 7-1/4" THICK, FOR 3-HR. FIRE-RATING).
 - D. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 12" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 12" NOMINAL DIAMETER CAST OR DUCTILE IRON PIPE.
 - C. MAXIMUM 6" NOMINAL DIAMETER COPPER PIPE OR TUBING (FOR 3-HR. WALLS, COPPER PIPE OR TUBING SHALL BE MAXIMUM 4" NOMINAL DIAMETER).
3. NOMINAL 1", 1-1/2", OR 2" THICK GLASS-FIBER PIPE INSULATION.
4. HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT :
 - A. MINIMUM 5/8" DEPTH REQUIRED FOR 1-HR. OR 2-HR. FIRE-RATING.
 - B. MINIMUM 1" DEPTH REQUIRED FOR 3-HR. FIRE-RATING.
5. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT APPLIED AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 18-5/8".

2. ANNULAR SPACE (FOR 1-HR. OR 2-HR. FIRE-RATING) = MINIMUM 0", MAXIMUM 1-7/8".

3. ANNULAR SPACE (FOR 3-HR. FIRE-RATING) = MINIMUM 0", MAXIMUM 1-1/4".



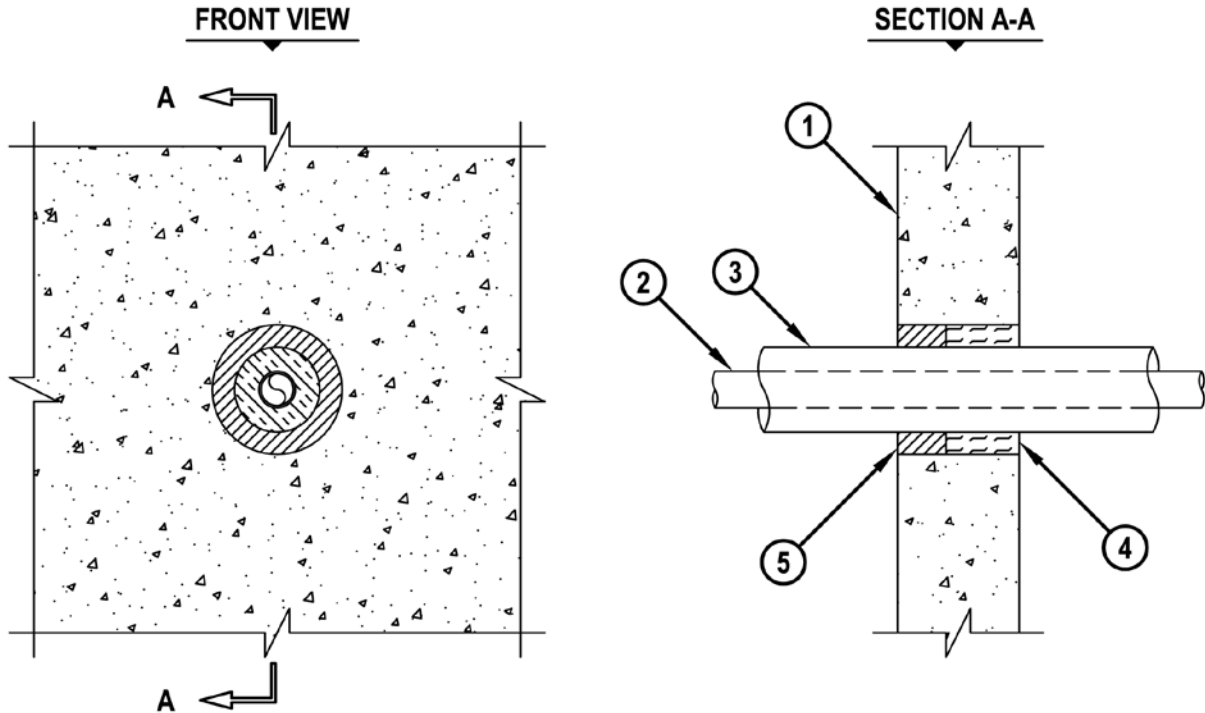
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UL/cUL SYSTEM NO. W-J-5066
**INSULATED METAL PIPE THROUGH CONCRETE WALL OR CONCRETE
 BLOCK SHAFT WALL ASSEMBLY**

F-RATING = 1-HR. OR 2-HR.
 T-RATING = 1/2-HR.

WJ5066a.021402



1. CONCRETE WALL ASSEMBLY (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN) :
 A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MIN. 3-3/4" THICK).
 B. ANY UL/ULC CLASSIFIED CONCRETE BLOCK WALL.
2. MAXIMUM 1" NOMINAL DIAMETER COPPER PIPE.
3. NOMINAL 3/4" THICKNESS AB/PVC PIPE INSULATION.
4. MINIMUM 1-5/8" OR 2-1/4" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED AND RECESSED ON ONE SIDE OF WALL FOR 1-HR. OR 2-HR. FIRE-RATED WALL, RESPECTIVELY.
5. MINIMUM 1-1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 4".
 2. ANNULAR SPACE = MINIMUM 1/4", MAXIMUM 1-1/8".
 3. THIS FIRESTOP SYSTEM WAS DESIGNED AND TESTED FOR APPLICATIONS IN WHICH THERE IS LIMITED OR NO ACCESS AVAILABLE ON ONE SIDE OF WALL.



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UL/cUL SYSTEM NO. W-J-5067

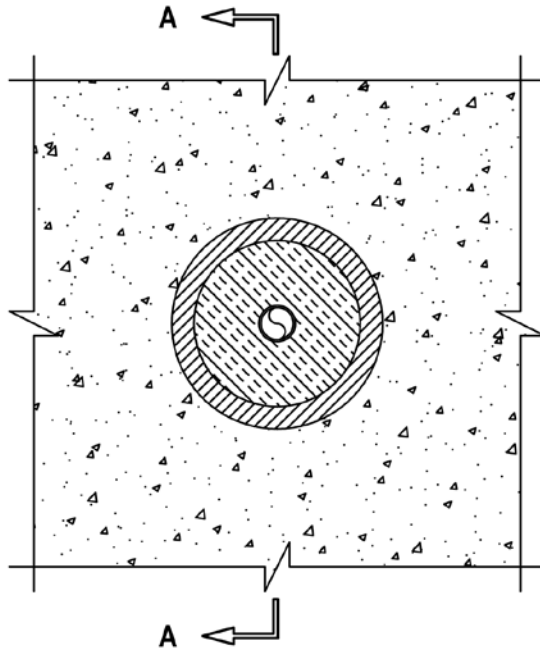
INSULATED METAL PIPE THROUGH CONCRETE WALL OR CONCRETE BLOCK SHAFT WALL ASSEMBLY

F-RATING = 1-HR.

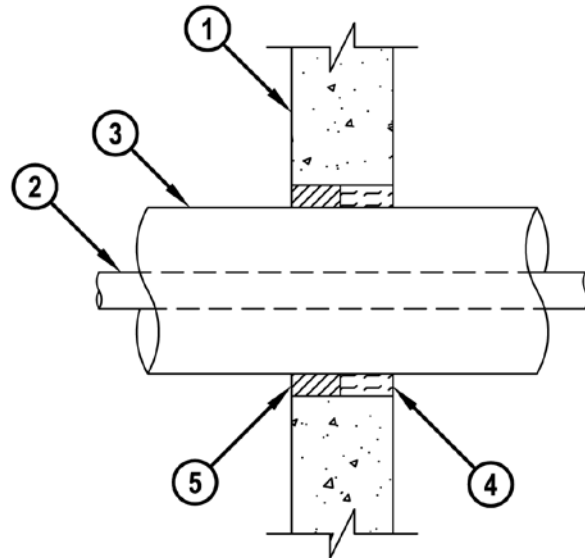
T-RATING = 1-HR.

WJ5067b.012903

FRONT VIEW



SECTION A-A



1. CONCRETE WALL ASSEMBLY (1-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MIN. 3-1/8" THICK).
 - B. ANY UL/ULC CLASSIFIED CONCRETE BLOCK WALL.
2. MAXIMUM 1" NOMINAL DIAMETER COPPER PIPE.
3. NOMINAL 2" THICKNESS GLASS-FIBER PIPE INSULATION.
4. MINIMUM 1-5/8" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED AND RECESSED ON ONE SIDE OF WALL.
5. MINIMUM 1-1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 6-1/2".
 2. ANNULAR SPACE = MINIMUM 1/4", MAXIMUM 1-1/8".
 3. THIS FIRESTOP SYSTEM WAS DESIGNED AND TESTED FOR APPLICATIONS IN WHICH THERE IS LIMITED OR NO ACCESS AVAILABLE ON ONE SIDE OF WALL.



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UL/cUL SYSTEM NO. W-J-5134

INSULATED METAL PIPE THROUGH CONCRETE WALL OR BLOCK WALL ASSEMBLY

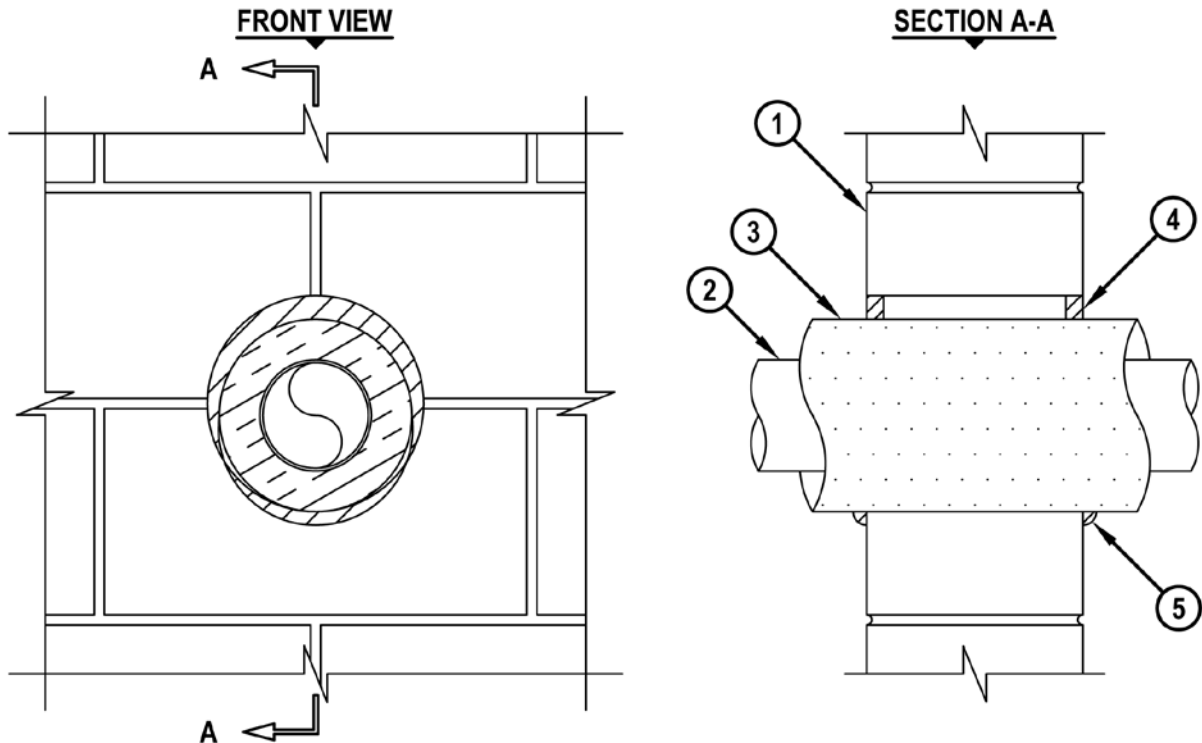
F-RATING = 2-HR.

T-RATING = 0-HR. OR 1-HR.

L-RATING AT AMBIENT = 4 CFM/SQ FT

L-RATING AT 400°F = LESS THAN 1 CFM/SQ FT

WJ5134c.032112



1. CONCRETE WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 6" THICK).
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 4" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 5 OR HEAVIER).
 - B. MAXIMUM 4" NOMINAL DIAMETER CAST OR DUCTILE IRON PIPE.
 - C. MAXIMUM 4" NOMINAL DIAMETER COPPER PIPE OR TUBING.
3. MINIMUM 1" TO MAXIMUM 1-1/2" THICK GLASS-FIBER PIPE INSULATION (3.5 PCF DENSITY).
4. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT, HILTI CP 606 FLEXIBLE FIRESTOP SEALANT OR HILTI CP 601S ELASTOMERIC FIRESTOP SEALANT.
5. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT, HILTI CP 606 FLEXIBLE FIRESTOP SEALANT OR HILTI CP 601S ELASTOMERIC FIRESTOP SEALANT APPLIED AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 8".
 2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 7/8".
 3. L-RATINGS APPLY ONLY WHEN HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT IS USED.



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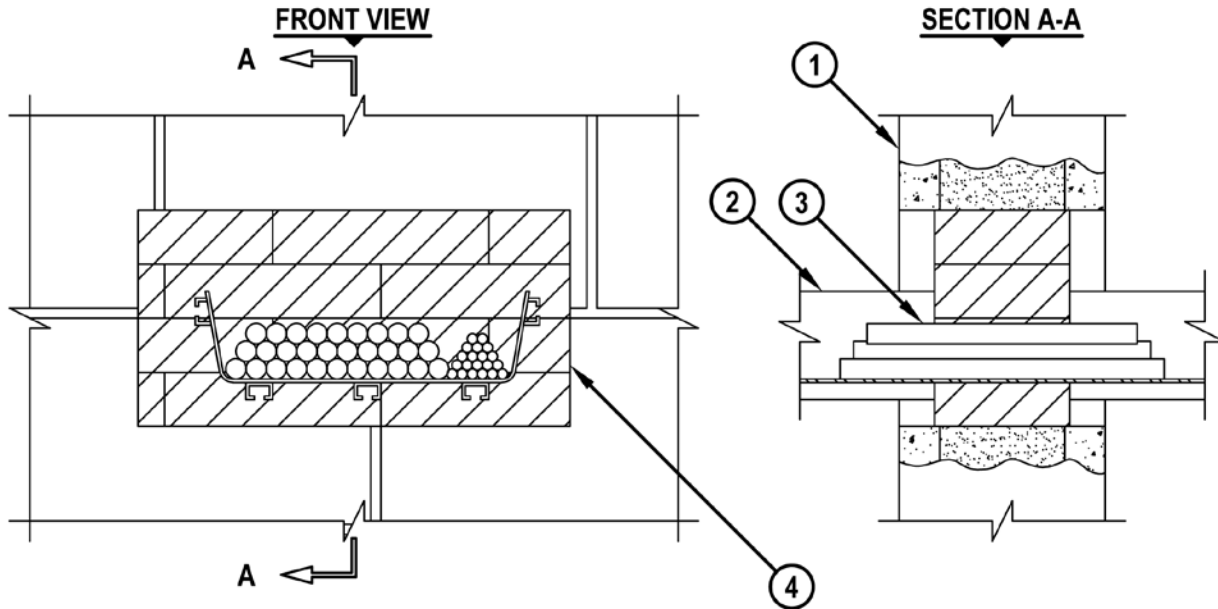
UL/cUL SYSTEM NO. W-J-6003

FIBER OPTIC TRAY THROUGH CONCRETE WALL OR BLOCK WALL ASSEMBLY

F-RATING = 2-HR.

T-RATING = 1-HR. OR 1 1/2-HR.

WJ6003c.011012



1. CONCRETE WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 5" THICK).
 - B. ANY UL/cUL CLASSIFIED SOLID OR FILLED CONCRETE BLOCK WALL.
2. MAXIMUM 12" x 4" FIBER OPTIC CABLE TRAY (ABS) WITH OPTIONAL COVER PLATE (SEE NOTE NO. 3 BELOW).
3. MAXIMUM 1/2" DIAMETER FIBER OPTIC CABLES WITH PVC JACKET, MAY BE INSTALLED WITHIN CABLE TRAY. CABLES TO FILL MAXIMUM 40% OF CROSS-SECTIONAL AREA OF FIBER OPTIC CABLE TRAY.
4. HILTI CFS-BL FIRESTOP BLOCK OR HILTI FS 657 FIRE BLOCK (2" THICK x 8" WIDE x 5" DEEP, REFERENCE : FRONT VIEW) FIRMLY PACKED AND CENTERED WITH THE OPENING. EITHER ONE OR A COMBINATION OF BLOCK TYPES MAY BE USED.

NOTES : 1. MAXIMUM SIZE OF OPENING = 16" x 8".

2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 4".

3. WHEN OPTIONAL COVER PLATE IS USED, FIRESTOP/FIRE BLOCKS SHALL BE PLACED WITHIN THE FIBER OPTIC CABLE TRAY TO FILL VOID.

4. APPLY HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT, CP 618 FIRESTOP PUTTY STICK, OR CP 620 FIRE FOAM, INTO ANY VOID THAT MAY EXIST (AROUND PENETRANTS, INTO INTERSTICES OF CABLES, OR BETWEEN FIRESTOP/FIRE BLOCKS), TO MAXIMUM EXTENT POSSIBLE.



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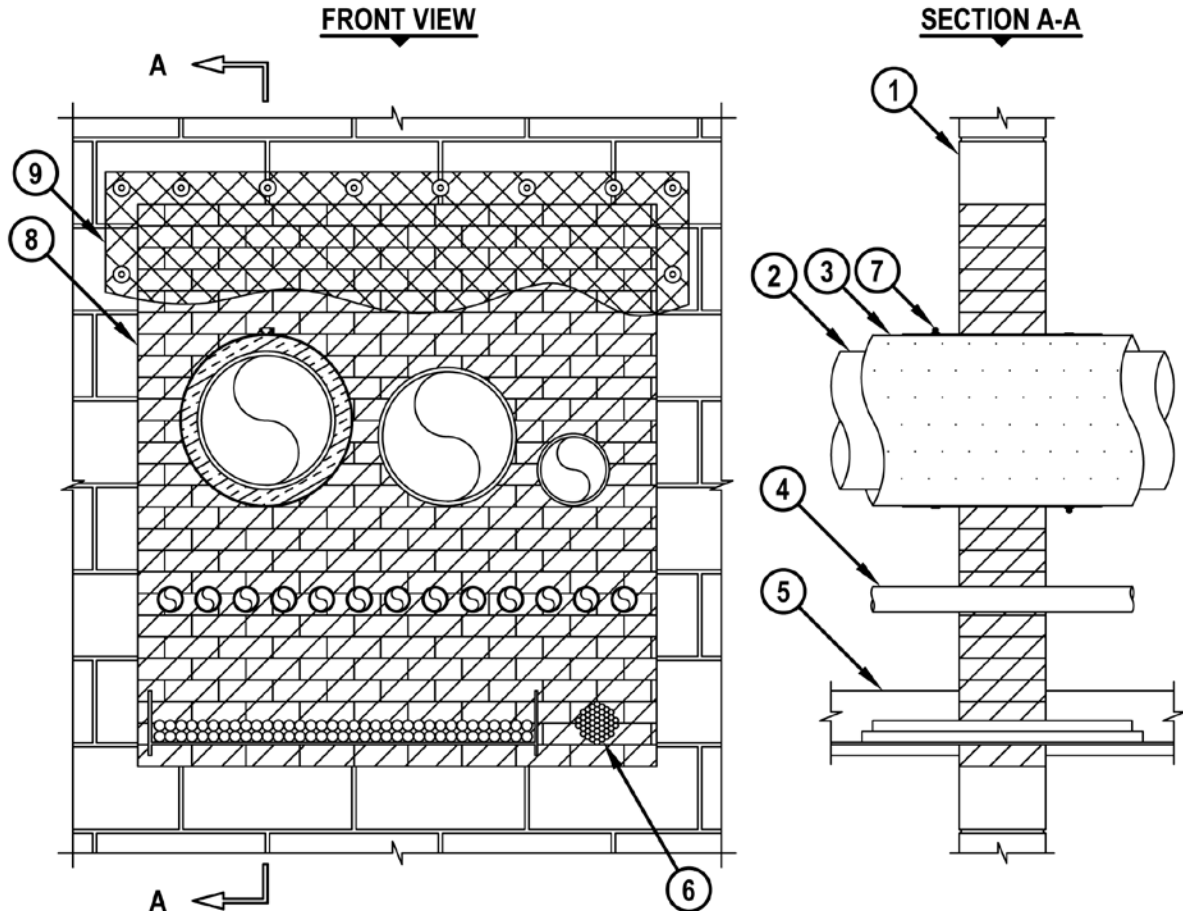
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UL/cUL SYSTEM NO. W-J-8007

MULTIPLE PENETRATING ITEMS THROUGH CONCRETE BLOCK WALL

F-RATING = 4-HR.

T-RATING = 0-HR.



WJ8007g.011012

1. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL ASSEMBLY (MIN. 7-5/8" THICK) (4-HR FIRE-RATING).
2. MAXIMUM 12" NOMINAL DIAMETER STEEL PIPE, MAXIMUM 12" NOMINAL DIAMETER CAST IRON PIPE, MAXIMUM 6" NOMINAL DIAMETER COPPER OR CONDUIT, OR MAXIMUM 4" NOMINAL DIAMETER EMT (MAX. QTY = 3).
3. MAXIMUM 1-1/2" THICK GLASS FIBER PIPE INSULATION.
4. MAXIMUM 2" DIAMETER STEEL CONDUIT (MAX. QTY. = 13).
5. ALUMINUM CABLE TRAY (MAXIMUM SIZE = 36" x 6"). ANY OF THE FOLLOWING TYPES OF CABLE MAY BE USED WITH MAXIMUM 40% FILL OF CABLE TRAY :
 - A. 24 FIBER OPTIC CABLE (MAXIMUM 1/2" DIAMETER) WITH PVC JACKET.
 - B. 300 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
 - C. 500 KCMIL SINGLE CONDUCTOR POWER CABLE WITH NYLON JACKET.
 - D. 7/C NO. 12 AWG COPPER CONDUCTOR CABLE WITH PVC JACKET.



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UL/cUL SYSTEM NO. W-J-8007

MULTIPLE PENETRATING ITEMS THROUGH CONCRETE BLOCK WALL

F-RATING = 4-HR.

T-RATING = 0-HR.

WJ8007g.011012

6. MAXIMUM 4" DIAMETER CABLE BUNDLE TO INCLUDE ANY OF THE FOLLOWING :
- A. 300 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
 - B. 24 FIBER OPTIC CABLE (MAXIMUM 1/2" DIAMETER) WITH PVC JACKET.
 - C. 3/C NO. 18 METAL CLAD CABLE.
 - D. RGU/59 COAXIAL CABLE WITH PVC JACKET.
 - E. ROMEX (2/C NO. 10 +GROUND) WITH PVC JACKET.
 - F. 7/C NO. 12 AWG CABLE WITH PVC JACKET.
7. MINIMUM 6" LONG JACKET FORMED OF MINIMUM 0.010" THICKNESS STEEL SHEET SECURED IN PLACE WITH ONE STEEL BAND CLAMP. ENDS OF THE JACKET TO OVERLAP BY A MINIMUM 2" AND EXTEND 1" INTO WALL ON BOTH SIDES OF ASSEMBLY.
8. HILTI CFS-BL FIRESTOP BLOCK OR HILTI FS 657 FIRE BLOCK (2" THICK x 5" WIDE x 8" DEEP, REFERENCE : FRONT VIEW) FIRMLY PACKED WITHIN OPENING. EITHER ONE OR A COMBINATION OF BLOCK TYPES MAY BE USED.
9. SEE NOTE NO. 3 BELOW.

ANNULAR SPACE	MINIMUM	MAXIMUM
BETWEEN CABLE TRAY AND ADJACENT PENETRATING ITEMS	2"	4-1/2"
BETWEEN CABLE TRAY AND PERIPHERY OF OPENING	1"	3"
BETWEEN PIPES, CONDUITS, OR TUBING (ITEM 2)	1-1/2"	4-3/4"
BETWEEN PIPES, CONDUITS, OR TUBING (ITEM 2) AND PERIPHERY OF OPENING	3"	4-1/4"
BETWEEN STEEL CONDUITS (ITEM 4)	1-1/8"	1-1/8"
BETWEEN STEEL CONDUITS (ITEM 4) AND ADJACENT PENETRATING ITEMS	4-1/2"	4-3/4"
BETWEEN STEEL CONDUITS (ITEM 4) AND PERIPHERY OF OPENING	1-1/8"	2-1/2"
BETWEEN CABLE BUNDLE AND ADJACENT PENETRATING ITEMS	2"	6"
BETWEEN CABLE BUNDLE AND PERIPHERY OF OPENING	1-1/2"	2-1/4"

NOTES : 1. MAXIMUM AREA OF OPENING = 2496 SQUARE INCHES, WITH MAXIMUM DIMENSION OF 52".

2. APPLY HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT OR HILTI CP 618 FIRESTOP PUTTY STICK INTO INTERSTICES OF CABLES, BETWEEN CABLES AND CABLE TRAY, AND ANY VOIDS TO MAXIMUM EXTENT POSSIBLE.

3. WHEN ANNULAR SPACE EXCEEDS 4", A NOMINAL 2" x 2" STEEL WIRE MESH (16 GA.) SHALL BE ATTACHED TO BOTH SIDES OF THE WALL BY MEANS OF 1/4" HILTI TOGGLER BOLTS WITH 1-1/2" DIAMETER FENDER WASHERS (SPACED MAXIMUM 8" C/C). STEEL WIRE MESH CUT TO FIT THE CONTOUR OR PENETRANT AND OVERLAP MINIMUM 3" BEYOND THE PERIPHERY OF THE OPENING.



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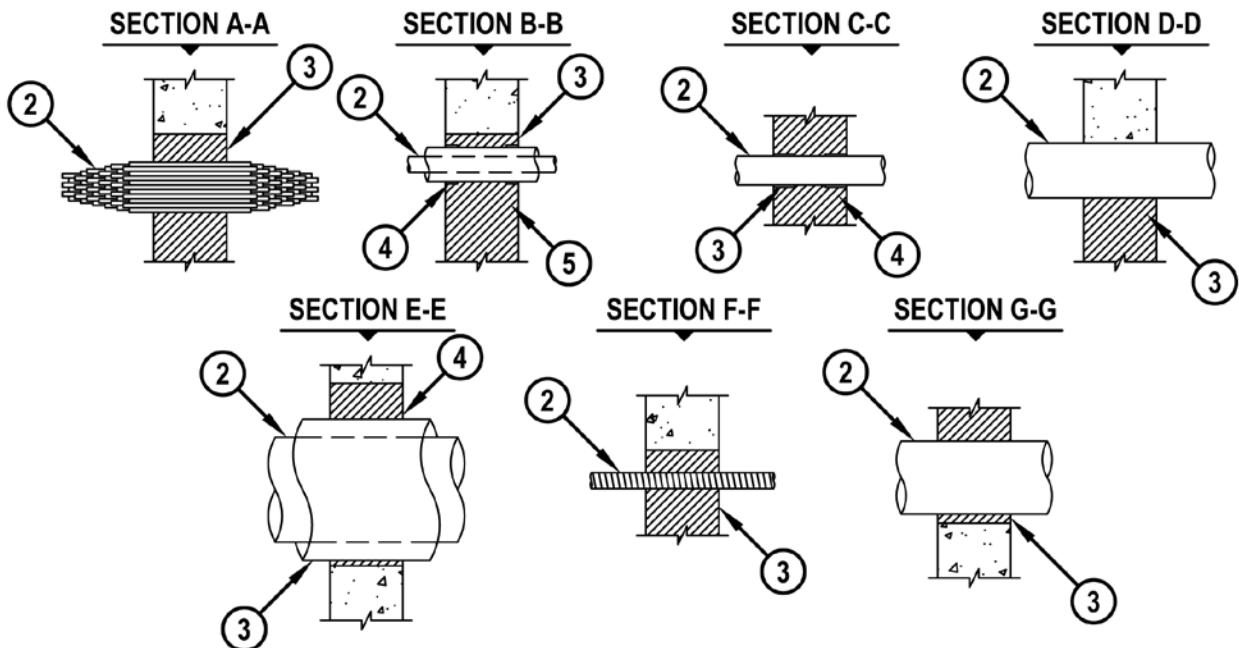
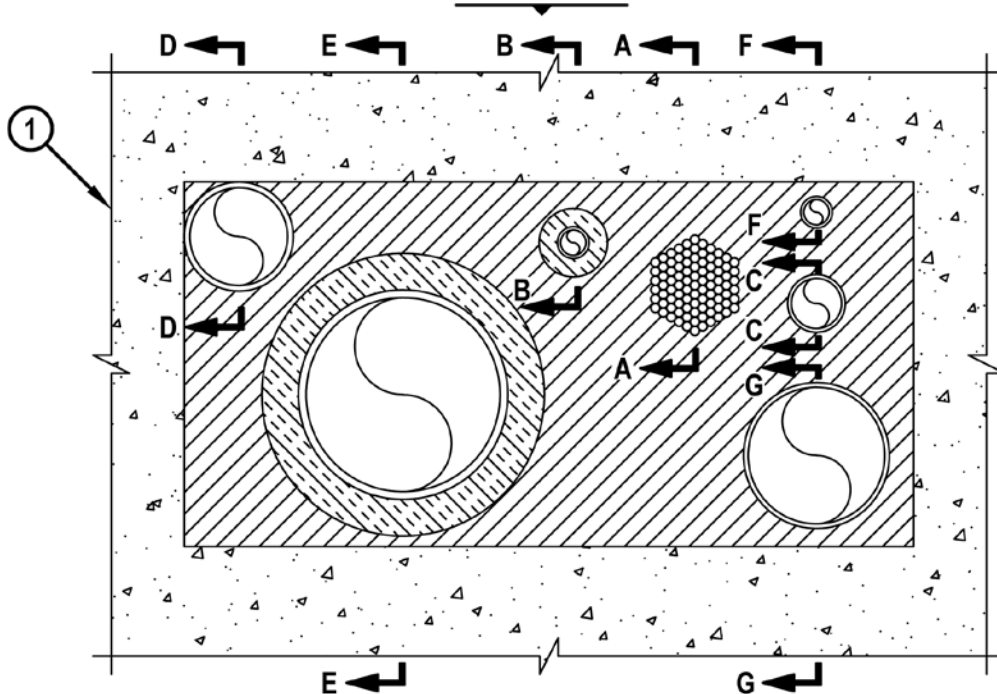
UL/cUL SYSTEM NO. W-J-8017

MULTIPLE PENETRATING ITEMS THROUGH CONCRETE WALL OR BLOCK WALL

F-RATING = 1 AND 2-HR.

T-RATING = 0, 1/2, 1, 1-1/2 AND 2-HR.

FRONT VIEW



WJ8017d.061505



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UL/cUL SYSTEM NO. W-J-8017

MULTIPLE PENETRATING ITEMS THROUGH CONCRETE WALL OR BLOCK WALL

F-RATING = 1 AND 2-HR.

T-RATING = 0, 1/2, 1, 1-1/2 AND 2-HR.

WJ8017d.061505

1. CONCRETE WALL ASSEMBLY (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MIN. 4-3/4" THICK, FOR A 1-HR. FIRE-RATING)
 - B. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MIN. 6" THICK, FOR A 2-HR. FIRE-RATING).
 - C. ANY UL/cUL CLASSIFIED SOLID OR FILLED CONCRETE BLOCK WALL.

FIRESTOP CONFIGURATION A

2. MAXIMUM 4" DIAMETER CABLE BUNDLE CONSISTING OF ANY OF THE FOLLOWING CABLES :
 - A. MAXIMUM 25 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
 - B. MAXIMUM RG 59 COAXIAL CABLE WITH PVC JACKET.
 - C. MAXIMUM 7/C NO. 12 AWG POWER CABLE WITH PVC JACKET.
 - D. MAXIMUM 3/8" DIAMETER FIBER-OPTIC CABLE WITH PVC JACKET.
 - E. MAXIMUM 3/C NO. 12 AWG METAL-CLAD CABLE.
 - F. MAXIMUM 3/C NO. 8 (+ GROUND) ROMEX POWER CABLE WITH PVC JACKET.
3. HILTI CP 620 FIRE FOAM INSTALLED FLUSH WITH BOTH SURFACES OF THE WALL :
 - A. MINIMUM 4-3/4" THICKNESS, FOR A 1-HR. FIRE-RATING.
 - B. MINIMUM 6" THICKNESS, FOR A 2-HR. FIRE-RATING.

NOTE : MINIMUM ANNULAR SPACE BETWEEN THE CABLE BUNDLE AND THE PERIPHERY OF THE OPENING AND BETWEEN ADJACENT PENETRANTS = 3/8" AND 4", RESPECTIVELY.

FIRESTOP CONFIGURATION B

2. MAXIMUM 1" NOMINAL DIAMETER COPPER PIPE OR TUBING.
3. NOMINAL 3/4" THICK AB/PVC PIPE INSULATION.
4. HILTI CP 648E WRAP STRIP (NOMINAL 3/16" THICK x 1" WIDE) CONTINUOUSLY WRAPPED AROUND THE OUTER CIRCUMFERENCE OF THE INSULATED PIPE, ONCE, AND HELD IN PLACE WITH TAPE, FLUSH WITH BOTH SURFACES OF WALL.
5. HILTI CP 620 FIRE FOAM INSTALLED FLUSH WITH BOTH SURFACES OF THE WALL :
 - A. MINIMUM 4-3/4" THICKNESS, FOR A 1-HR. FIRE-RATING.
 - B. MINIMUM 6" THICKNESS, FOR A 2-HR. FIRE-RATING.

NOTE : MINIMUM SPACING BETWEEN INSULATED PIPE AND PERIPHERY OF OPENING AND ADJACENT PENETRANTS = 3/8" AND 1-1/2", RESPECTIVELY.

FIRESTOP CONFIGURATION C

2. MAXIMUM 2" NOMINAL DIAMETER PVC PLASTIC PIPE (SCHEDULE 40, SOLID OR CELLULAR CORE) (CLOSED OR VENTED PIPING SYSTEM).
3. HILTI CP 648E WRAP STRIP (NOMINAL 3/16" THICK x 1-3/4" WIDE) CONTINUOUSLY WRAPPED AROUND THE OUTER CIRCUMFERENCE OF THE PLASTIC PIPE, ONCE, AND HELD IN PLACE WITH TAPE, FLUSH WITH BOTH SURFACES OF WALL.
4. HILTI CP 620 FIRE FOAM INSTALLED FLUSH WITH BOTH SURFACES OF THE WALL :
 - A. MINIMUM 4-3/4" THICKNESS, FOR A 1-HR. FIRE-RATING.
 - B. MINIMUM 6" THICKNESS, FOR A 2-HR. FIRE-RATING.



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UL/cUL SYSTEM NO. W-J-8017

MULTIPLE PENETRATING ITEMS THROUGH CONCRETE WALL OR BLOCK WALL

F-RATING = 1 AND 2-HR.

T-RATING = 0, 1/2, 1, 1-1/2 AND 2-HR.

FIRESTOP CONFIGURATION C (continued...)

NOTES : 1. MINIMUM SPACING BETWEEN PVC PIPE AND PERIPHERY OF OPENING = 3/8".
 2. MINIMUM SPACING BETWEEN NONMETALLIC AND METALLIC PENETRANTS = 1" & 3-1/2" RESPECTIVELY

WJ8017d.061505

FIRESTOP CONFIGURATION D

2. MAXIMUM 4" NOMINAL DIAMETER STEEL PIPE, CAST IRON PIPE, COPPER PIPE, STEEL CONDUIT, OR EMT.
3. HILTI CP 620 FIRE FOAM INSTALLED FLUSH WITH BOTH SURFACES OF THE WALL :
 - A. MINIMUM 4-3/4" THICKNESS, FOR A 1-HR. FIRE-RATING.
 - B. MINIMUM 6" THICKNESS, FOR A 2-HR. FIRE-RATING.

NOTE : MINIMUM SPACING BETWEEN COPPER PIPE AND PERIPHERY OF OPENING AND ADJACENT PENETRANTS = 0" AND 3-1/2", RESPECTIVELY.

FIRESTOP CONFIGURATION E

2. MAXIMUM 8" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 40 OR HEAVIER).
3. NOMINAL 1-1/2" THICK GLASS-FIBER PIPE INSULATION.
4. HILTI CP 620 FIRE FOAM INSTALLED FLUSH WITH BOTH SURFACES OF THE WALL :
 - A. MINIMUM 4-3/4" THICKNESS, FOR A 1-HR. FIRE-RATING.
 - B. MINIMUM 6" THICKNESS, FOR A 2-HR. FIRE-RATING.

NOTE : MINIMUM SPACING BETWEEN INSULATED PIPE AND PERIPHERY OF OPENING AND ADJACENT PENETRANTS = 3/8" AND 2", RESPECTIVELY.

FIRESTOP CONFIGURATION F

2. MAXIMUM 1" DIAMETER FLEXIBLE STEEL CONDUIT.
3. HILTI CP 620 FIRE FOAM INSTALLED FLUSH WITH BOTH SURFACES OF THE WALL :
 - A. MINIMUM 4-3/4" THICKNESS, FOR A 1-HR. FIRE-RATING.
 - B. MINIMUM 6" THICKNESS, FOR A 2-HR. FIRE-RATING.

NOTE : MINIMUM SPACING BETWEEN STEEL CONDUIT AND PERIPHERY OF OPENING AND ADJACENT PENETRANTS = 3/8" AND 3-1/2" RESPECTIVELY.

FIRESTOP CONFIGURATION G

2. MAXIMUM 6" NOMINAL DIAMETER SHEET METAL DUCT (MIN. 28 GA.).
3. HILTI CP 620 FIRE FOAM INSTALLED FLUSH WITH BOTH SURFACES OF THE WALL :
 - A. MINIMUM 4-3/4" THICKNESS, FOR A 1-HR. FIRE-RATING.
 - B. MINIMUM 6" THICKNESS, FOR A 2-HR. FIRE-RATING.

NOTE : MINIMUM SPACING BETWEEN SHEET METAL DUCT AND PERIPHERY OF OPENING AND ADJACENT PENETRANTS = 3/8" AND 1-1/2", RESPECTIVELY.

NOTES : 1. MAXIMUM SIZE OF OPENING = 30" x 15".
 2. A MAXIMUM OF SEVEN FIRESTOP CONFIGURATIONS MAY BE INSTALLED WITHIN THE OPENING.

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cUL SYSTEM NO. W-L-0003

**BLANK OPENING THROUGH GYPSUM WALL ASSEMBLY**

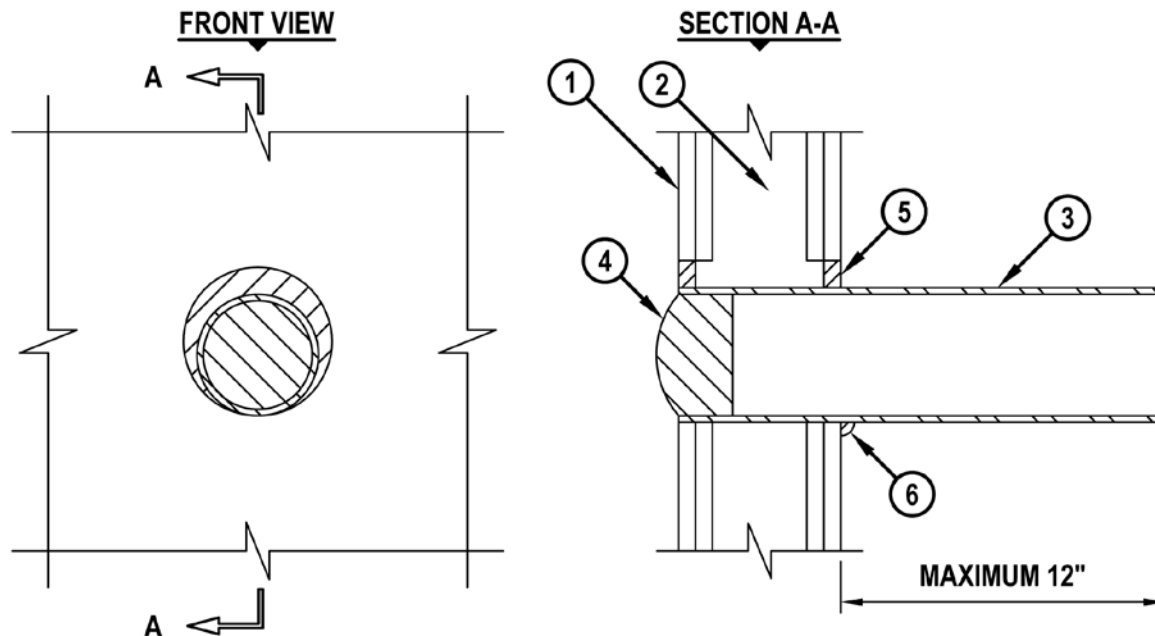
F-RATING = 1-HR. OR 2-HR.

FT-RATING = 0-HR.

FH-RATING = 0-HR.

FTH-RATING = 0-HR.

cUL WL0003b.031212



1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U300, U400, V400, OR W400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. [NOT SHOWN] WOOD STUDS TO CONSIST OF NOMINAL 2" x 4" LUMBER (SPACED MAXIMUM 16" O/C). STEEL STUDS TO BE MINIMUM 3-1/2" WIDE (SPACED MAXIMUM 24" O/C).
3. MAXIMUM 4" NOMINAL DIAMETER STEEL PIPE SLEEVE (SCHEDULE 5 OR HEAVIER). SLEEVE MAY EXTEND UP TO 12" BEYOND EITHER OR BOTH WALL SURFACE.
4. ONE HILTI CFS-PL FIRESTOP PLUG OR HILTI CP 658T FIRESTOP PLUG INSTALLED TIGHTLY WITHIN SLEEVE SUCH THAT THE OUTER CIRCUMFERENCE OF THE DOME SHAPED PLUG IS FLUSH WITH EITHER END OF SLEEVE.
5. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT TO BE APPLIED WHEN ANNULAR SPACE EXISTS.
6. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT APPLIED AT SLEEVE/WALL INTERFACE WHEN SLEEVE EXTENDS PAST WALL.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 5-1/2".
2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1".



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UL/cUL SYSTEM NO. W-L-0014

BLANK OPENING IN GYPSUM WALL ASSEMBLY

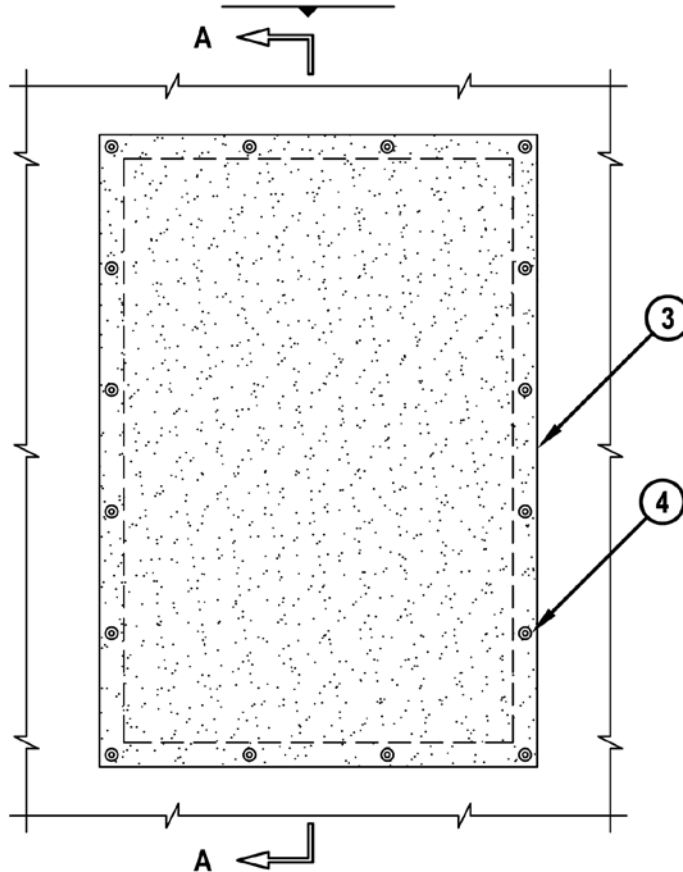
F-RATING = 1 AND 2-HR.

T-RATING = 1-HR.

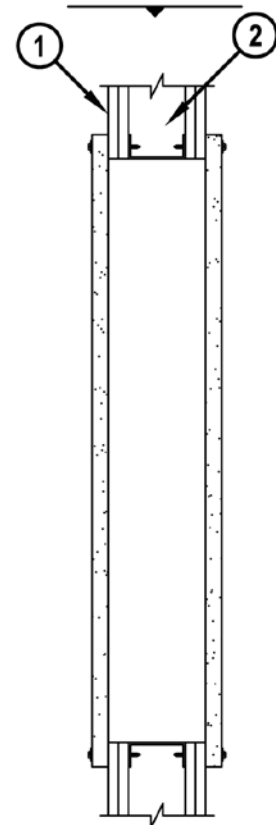
L-RATING AT AMBIENT = LESS THAN 1 CFM/SQ. FT.

L-RATING AT 400°F = LESS THAN 1 CFM/SQ. FT.

FRONT VIEW



SECTION A-A



WL0014b.090605

1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U300 OR U400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. (NOT SHOWN). WOOD STUDS TO CONSIST OF NOMINAL 2" x 4" LUMBER. STEEL STUDS TO BE MINIMUM 3-1/2" WIDE. OPENING TO BE COMPLETELY "FRAMED-OUT" WITH STUD MATERIAL.
3. HILTI CP 675 T FIRESTOP BOARD CUT TO OVERLAP OPENING MINIMUM 1" ON ALL SIDES.
4. FASTEN HILTI CP 675 T FIRESTOP BOARD TO FRAMING MATERIAL UTILIZING 3" LONG STEEL SCREWS WITH R-32 STEEL WASHERS AT EACH CORNER OF OPENING AND MAXIMUM 8" C/C AROUND PERIMETER OF FIRESTOP BOARD ON BOTH SIDES OF WALL (SEE NOTE NO. 2 BELOW).

NOTES : 1. MAXIMUM SIZE OF OPENING = 24" x 36".

2. PRIOR TO FASTENING HILTI CP 675 T FIRESTOP BOARD TO WALL ASSEMBLY, APPLY A MINIMUM 1/8" WIDE BEAD OF HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT OR MINIMUM 1" WIDE CP 619 T PUTTY ROLL AROUND PERIMETER OF EACH BOARD.



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UL/cUL SYSTEM NO. W-L-1054

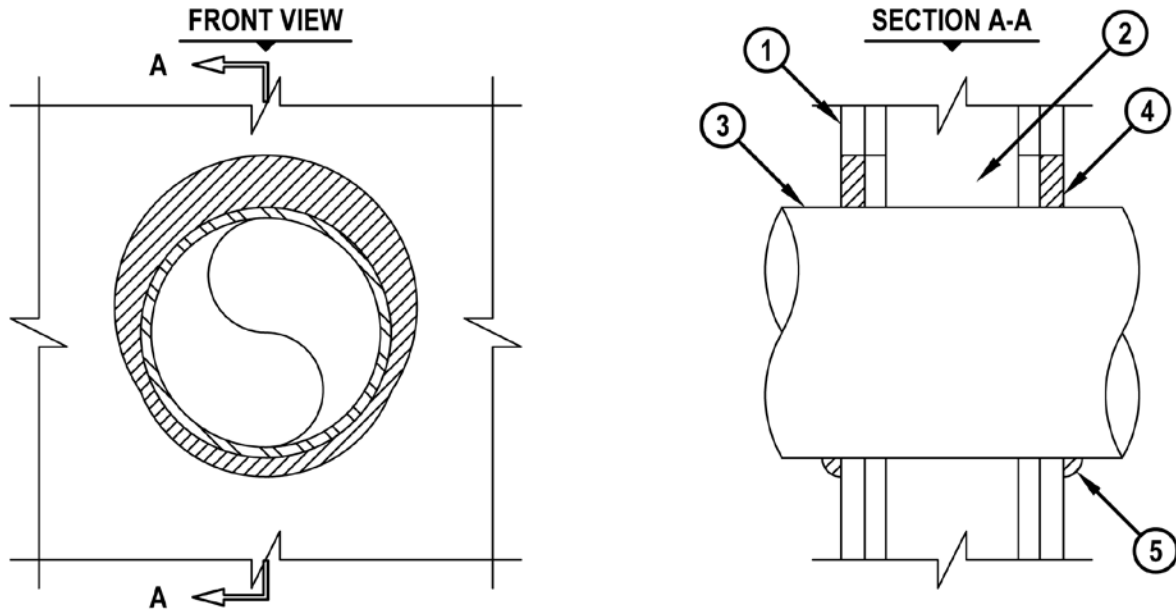
METAL PIPE THROUGH 1-HR. OR 2-HR. GYPSUM WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.

T-RATING = 0-HR.

L-RATING AT AMBIENT = LESS THAN 1 CFM/SQ. FT.

L-RATING AT 400°F = 4 CFM/SQ. FT.



WL1054q.110602

1. GYPSUM WALL ASSEMBLY (UL/ULC CLASSIFIED U300 OR U400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. (NOT SHOWN). WOOD STUDS TO CONSIST OF NOMINAL 2" x 4" LUMBER. STEEL STUDS TO BE MINIMUM 2-1/2" WIDE.
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 30" DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 30" DIAMETER CAST IRON PIPE.
 - C. MAXIMUM 6" NOMINAL DIAMETER COPPER PIPE.
 - D. MAXIMUM 6" NOMINAL DIAMETER STEEL CONDUIT.
 - E. MAXIMUM 4" NOMINAL DIAMETER EMT.
4. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
5. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT AT POINT OF CONTACT.

NOTES :

1. MAXIMUM DIAMETER OF OPENING :
 - A. 32-1/4" FOR STEEL STUD WALLS.
 - B. 14-1/2" FOR WOOD STUD WALLS.
2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 2-1/4".
3. PIPE MAY BE INSTALLED WITH CONTINUOUS POINT OF CONTACT.
4. PIPE MAY BE INSTALLED AT AN ANGLE NOT GREATER THAN 45° FROM PERPENDICULAR.



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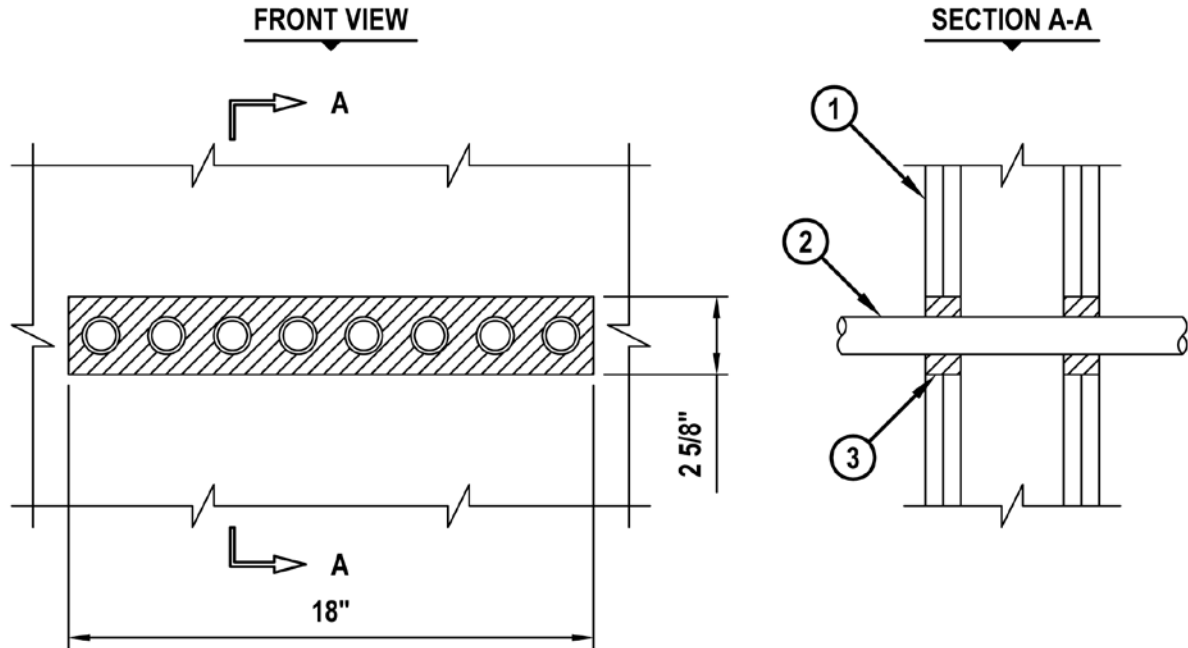
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UL/cUL SYSTEM NO. WL1095
METAL PIPE THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1 AND 2-HR.
 T-RATING = 1 AND 2-HR.
 L-RATING AT AMBIENT = LESS THAN 1 CFM/SQ. FT.
 L-RATING AT 400° F = 4 CFM/SQ. FT.

WL1095d.091699



1. GYPSUM WALL ASSEMBLY (UL/ULC CLASSIFIED U300 OR U400 SERIES)
 (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. ONE OR MORE 1" NOMINAL DIAMETER EMT.
3. HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT:
 - A. MINIMUM 5/8" DEPTH, FOR A 1-HR. FIRE-RATING.
 - B. MINIMUM 1-1/4" DEPTH, FOR A 2-HR. FIRE-RATING.

NOTE : ANNULAR SPACE = MINIMUM 1/2", MAXIMUM 1".



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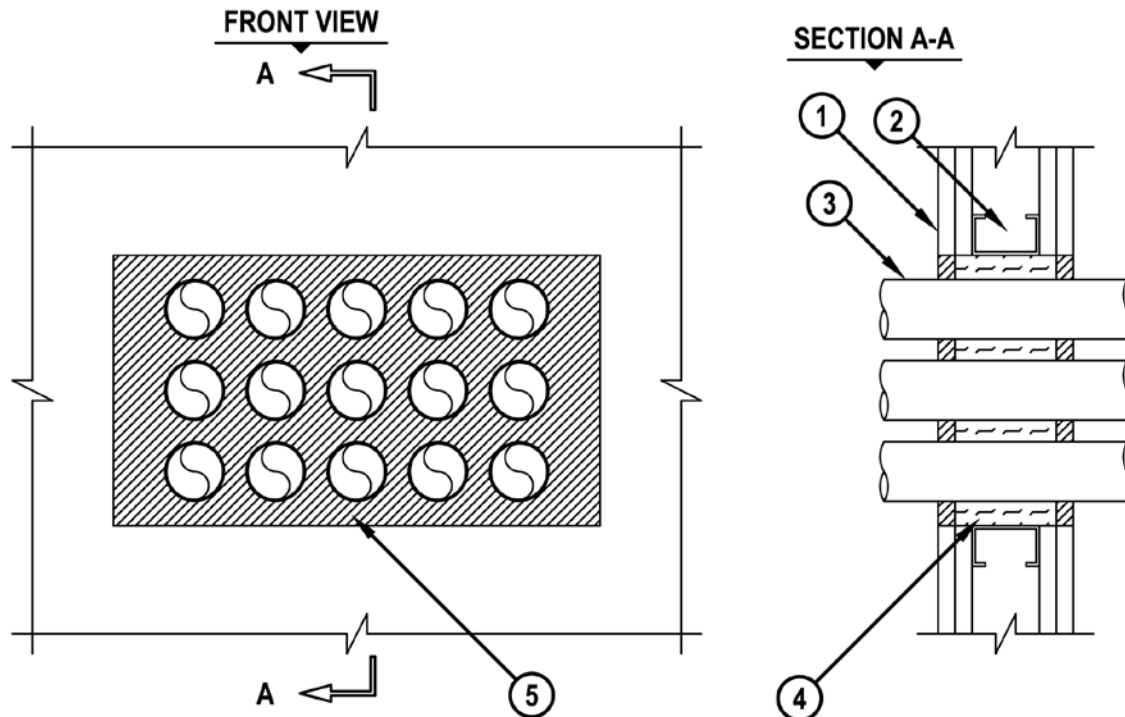
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UL/cUL SYSTEM NO. W-L-1176

MULTIPLE METAL PIPES THROUGH 1-HR. OR 2-HR. GYPSUM WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.

T-RATING = 1/2-HR.



WL1176d.073103

1. GYPSUM WALL ASSEMBLY (UL/ULC CLASSIFIED U300 OR U400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. WOOD STUDS TO CONSIST OF NOMINAL 2" x 4" LUMBER. STEEL STUDS TO BE MINIMUM 2-1/2" WIDE. OPENING TO BE "FRAMED-OUT".
3. ONE OR MORE MAXIMUM 2" NOMINAL DIAMETER EMT OR STEEL CONDUIT.
4. MINIMUM 2-1/2" OR 2-3/4" THICKNESS MINERAL WOOL (MINIMUM 4 PCF DENSITY) TIGHTLY PACKED FOR 1-HR. OR 2-HR. FIRE-RATING, RESPECTIVELY.
5. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.

NOTES : 1. MAXIMUM SIZE OF OPENING = 18" x 10". MAXIMUM WIDTH OF OPENING IN WOOD STUD WALLS IS LIMITED TO 14-1/2".

2. ANNULAR SPACE BETWEEN PIPES AND PERIPHERY OF OPENING = MINIMUM 1/2", MAXIMUM 2-3/8".

3. ANNULAR SPACE BETWEEN PIPES = MINIMUM 1/2", MAXIMUM 5/8".

4. EMT OR STEEL CONDUIT MAY BE INSTALLED AT AN ANGLE NOT GREATER THAN 45° FROM PERPENDICULAR.



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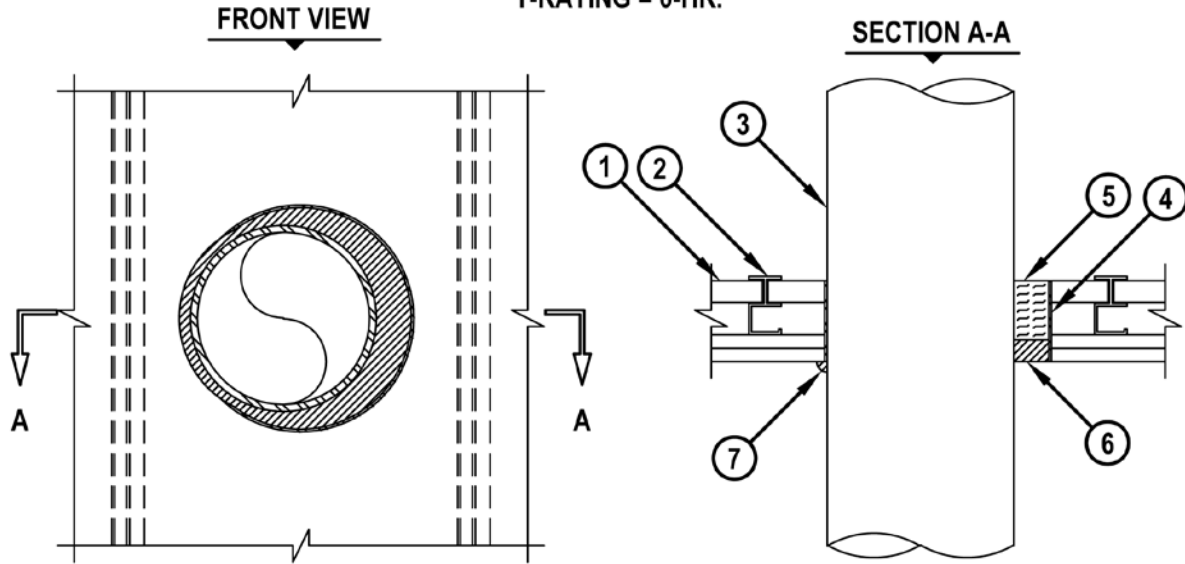
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UL/cUL SYSTEM NO. W-L-1206

METAL PIPE THROUGH GYPSUM SHAFT WALL ASSEMBLY

F-RATING = 1 AND 2-HR.

T-RATING = 0-HR.



WL1206e.090105

1. GYPSUM SHAFT WALL ASSEMBLY (UL/ULC CLASSIFIED U400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. "C-T" SHAPED STUDS (1-5/8" WIDE x 2-1/2" DEEP, MIN. 25 GA.) SPACED MAXIMUM 24" C/C.
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 8" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 8" NOMINAL DIAMETER CAST IRON PIPE.
 - C. MAXIMUM 4" NOMINAL DIAMETER COPPER PIPE.
 - D. MAXIMUM 6" NOMINAL DIAMETER STEEL CONDUIT.
 - E. MAXIMUM 4" NOMINAL DIAMETER EMT.
 - F. MAXIMUM 2" NOMINAL DIAMETER FLEXIBLE STEEL CONDUIT.
4. MAXIMUM 10-1/2" DIAMETER STEEL SLEEVE (MIN. 28 GA. SHEET METAL OR NO. 8 STEEL WIRE MESH) HAVING A MINIMUM 1" OVERLAP ALONG THE LONGITUDINAL SEAM.
5. MINIMUM 1-5/8" OR 2-1/4" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED AND RECESSED ON ONE SIDE OF WALL, FOR 1-HR. OR 2-HR. FIRE-RATED WALLS RESPECTIVELY.
6. MINIMUM 1-1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
7. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 10-1/2".

2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1-7/8".

3. AS AN ALTERNATE TO THE ABOVE SHAFT WALL ASSEMBLY, A 1 OR 2-HR. GYPSUM WALL ASSEMBLY MAY BE USED (U300, U400 OR V400 SERIES). STEEL STUDS TO BE MINIMUM 2-1/2" WIDE. WOOD STUDS TO CONSIST OF NOMINAL 2 x 4 LUMBER.

4. WHEN SYSTEM IS INSTALLED IN A STANDARD WALL ASSEMBLY, MINERAL WOOL SHOULD BE INSTALLED FLUSH WITH EITHER SIDE OF WALL AND RECESSED FROM OTHER SIDE TO ACCOMMODATE SEALANT.



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UL/cUL SYSTEM NO. W-L-1290

METAL PIPE THROUGH 1-HR. OR 2-HR. GYPSUM WALL ASSEMBLY

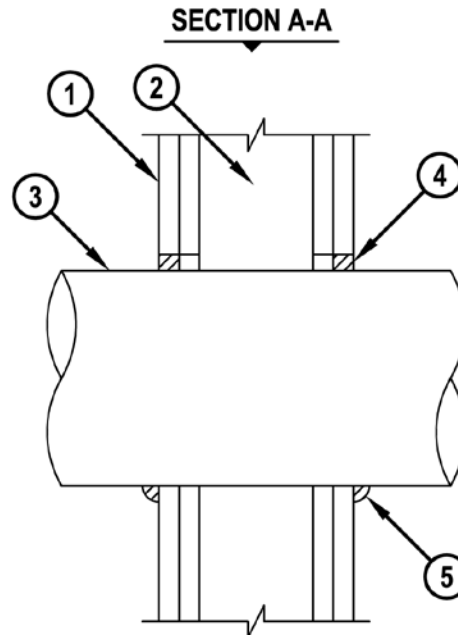
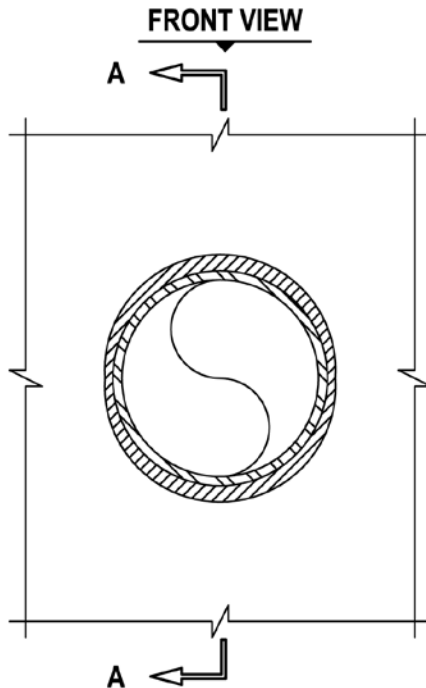
F-RATING = 1-HR. OR 2-HR.

T-RATING = 0-HR.

L-RATING AT AMBIENT = LESS THAN 1 CFM/SQ FT.

L-RATING AT 400°F = LESS THAN 1 CFM/SQ FT.

WL1290c.041305



1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U300 OR U400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. (NOT SHOWN). WOOD STUDS TO CONSIST OF NOMINAL 2" x 4" LUMBER. STEEL STUDS TO BE MINIMUM 2-1/2" WIDE.
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 4" DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 4" DIAMETER CAST IRON PIPE.
 - C. MAXIMUM 4" NOMINAL DIAMETER COPPER PIPE.
 - D. MAXIMUM 4" NOMINAL DIAMETER STEEL CONDUIT.
 - E. MAXIMUM 4" NOMINAL DIAMETER EMT.
4. MINIMUM 5/8" DEPTH HILTI CP 606 FLEXIBLE FIRESTOP SEALANT.
5. MINIMUM 1/2" BEAD HILTI CP 606 FLEXIBLE FIRESTOP SEALANT AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 5".
 2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1/2".
 3. PIPE MAY BE INSTALLED AT AN ANGLE NOT GREATER THAN 45° FROM PERPENDICULAR.



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UL/cUL SYSTEM NO. W-L-1297

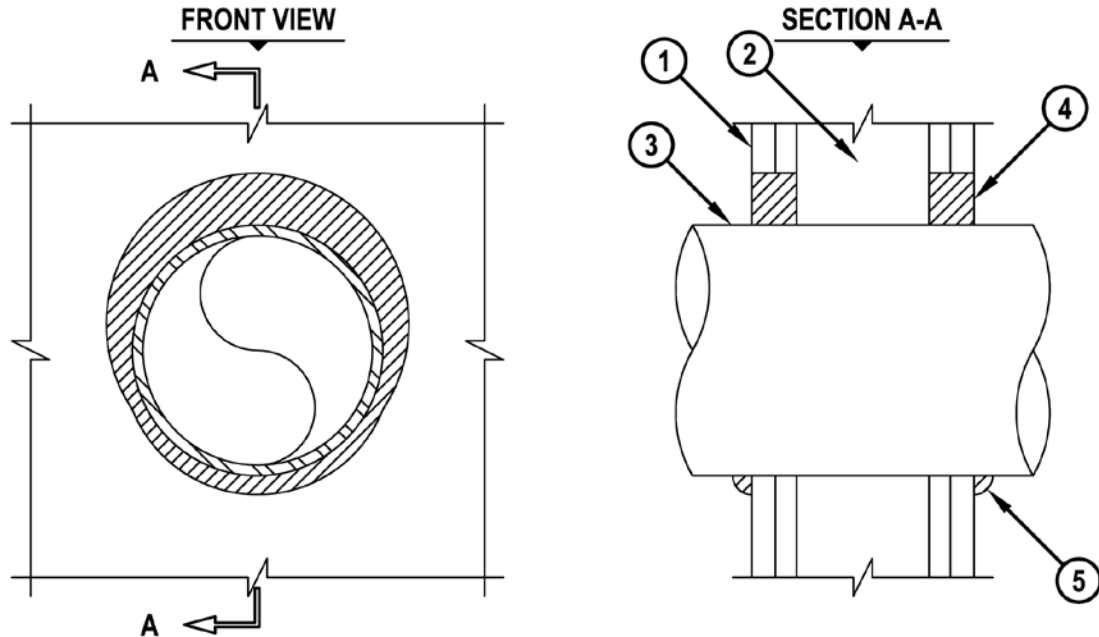
METAL PIPE THROUGH 1-HR. OR 2-HR. GYPSUM WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.

T-RATING = 0-HR.

L-RATING AT AMBIENT = LESS THAN 1 CFM/SQ FT.

L-RATING AT 400°F = LESS THAN 1 CFM/SQ FT.



WL1297d.032505

1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U300, U400, OR V400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. (NOT SHOWN). WOOD STUDS TO CONSIST OF NOMINAL 2" x 4" LUMBER. STEEL STUDS TO BE MINIMUM 2-1/2" WIDE.
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING:
 - A. MAXIMUM 30" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 30" NOMINAL DIAMETER CAST IRON OR DUCTILE IRON PIPE.
 - C. MAXIMUM 6" NOMINAL DIAMETER COPPER PIPE OR TUBING.
 - D. MAXIMUM 6" NOMINAL DIAMETER STEEL CONDUIT.
 - E. MAXIMUM 4" NOMINAL DIAMETER EMT.
4. HILTI CP 606 FLEXIBLE FIRESTOP SEALANT:
 - A. MINIMUM 5/8" DEPTH OF SEALANT FOR A 1-HR. FIRE-RATING.
 - B. MINIMUM 1-1/4" DEPTH OF SEALANT FOR A 2-HR. FIRE-RATING.
5. MINIMUM 1/2" BEAD HILTI CP 606 FLEXIBLE FIRESTOP SEALANT APPLIED AT POINT OF CONTACT.

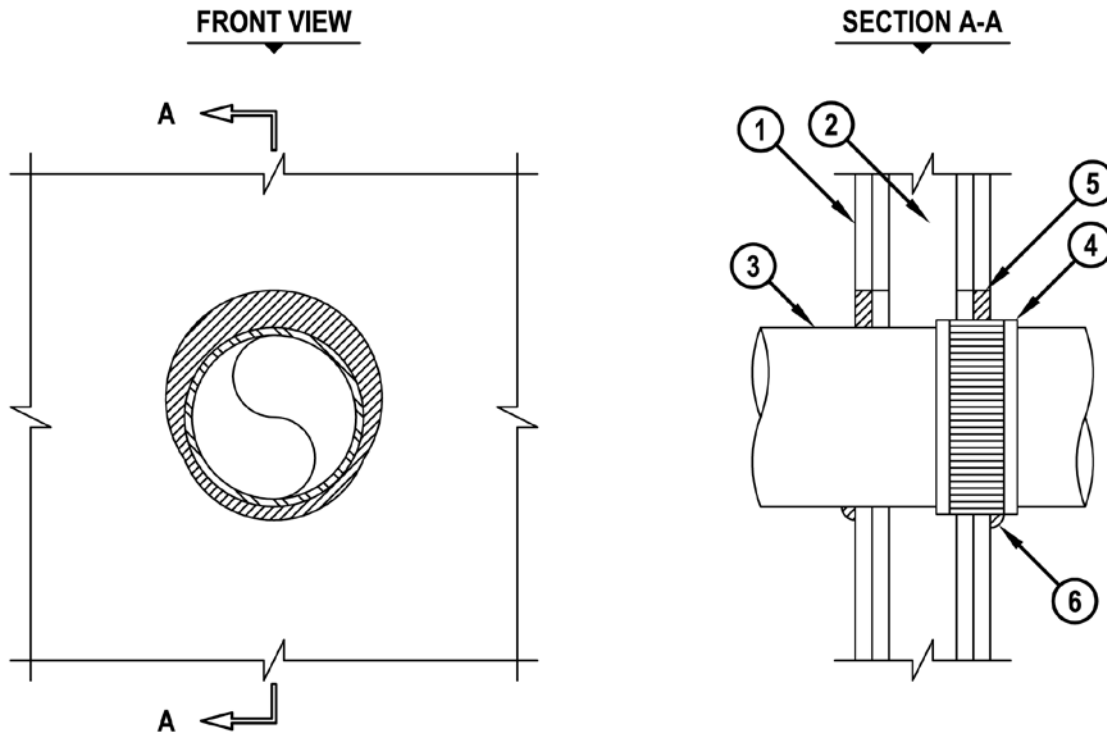
NOTES : 1. MAXIMUM DIAMETER OF OPENING = 32".
 2. ANNULAR SPACE IN 1-HR. WALLS = MINIMUM 0", MAXIMUM 1".
 3. ANNULAR SPACE IN 2-HR. WALLS = MINIMUM 0", MAXIMUM 2".
 4. PENETRANT MAY BE INSTALLED AT AN ANGLE NOT GREATER THAN 45° FROM PERPENDICULAR.



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UL/cUL SYSTEM NO. W-L-1359
CAST IRON PIPE THROUGH GYPSUM WALL ASSEMBLY
 F-RATING = 1-HR. OR 2-HR.
 T-RATING = 1/4-HR.

WL1359a.110904



1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U300, U400, OR V400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. (NOT SHOWN). WOODS TO CONSIST OF NOMINAL 2" x 4" LUMBER. STEEL STUDS TO BE MINIMUM 2-1/2" WIDE.
3. MAXIMUM 6" NOMINAL DIAMETER CAST IRON OR DUCTILE IRON PIPE.
4. CORRUGATED STAINLESS STEEL "NO-HUB" CONNECTOR INSTALLED ENTIRELY OR PARTIALLY WITHIN OPENING.
5. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
6. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT APPLIED AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 8".
 2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1".



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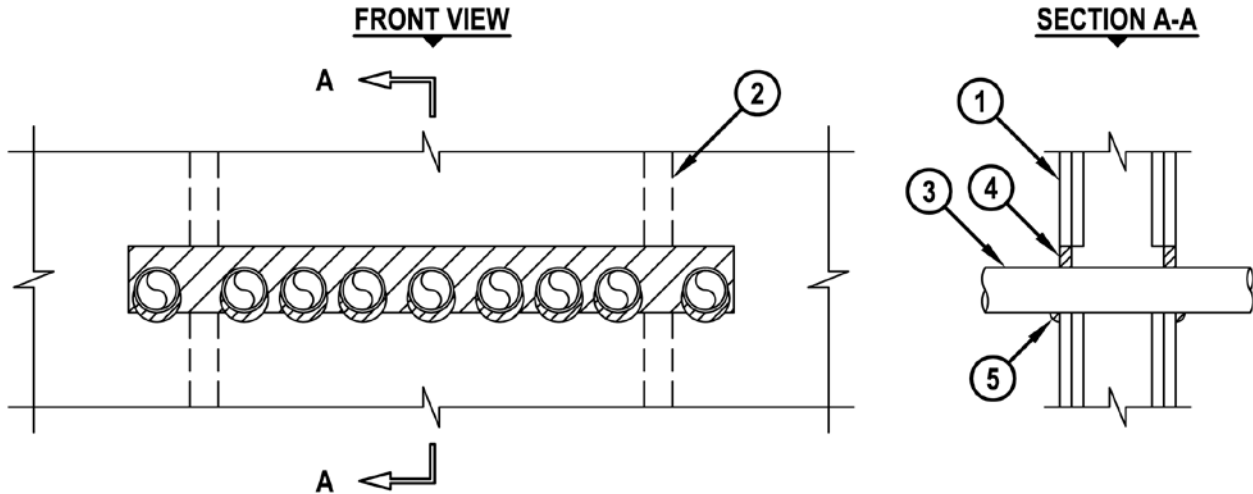
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UL/cUL SYSTEM NO. W-L-1389

MULTIPLE METALLIC PIPES THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.

T-RATING = 0-HR.



WL1389b.091306

1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U400 OR V400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. STEEL STUDS TO BE MINIMUM 3-5/8" WIDE.
3. ANY COMBINATION OF THE FOLLOWING PIPES MAY BE INSTALLED IN A SINGLE ROW :
 - A. MAXIMUM 2" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 5 OR HEAVIER).
 - B. MAXIMUM 2" NOMINAL DIAMETER STEEL CONDUIT.
 - C. MAXIMUM 2" NOMINAL DIAMETER EMT.
4. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT (SEE NOTE NO. 4 BELOW).
5. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT APPLIED AT POINT OF CONTACT (SEE NOTE NO. 4 BELOW).

NOTES : 1. MAXIMUM SIZE OF OPENING = 32" x 3-1/2".
 2. ANNULAR SPACE BETWEEN PIPES AND PERIPHERY OF OPENING = MINIMUM 0", MAXIMUM 1-3/8".
 3. ANNULAR SPACE BETWEEN PIPES = MINIMUM 0", MAXIMUM 1-1/4".
 4. AS AN ALTERNATE TO FS-ONE ON 1-HR. RATED WALLS ONLY, HILTI CP 606 FLEXIBLE FIRESTOP SEALANT MAY BE USED.



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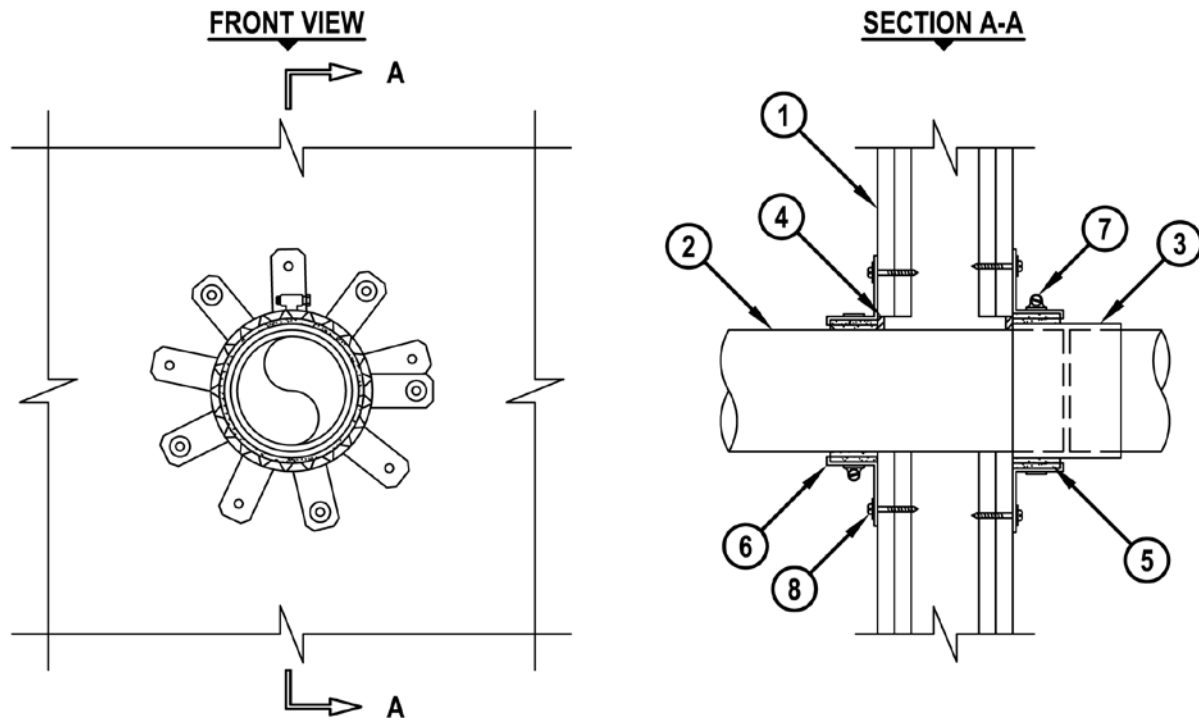
**PLASTIC PIPE THROUGH GYPSUM WALL ASSEMBLY**

F AND FH-RATINGS = 1-HR. OR 2-HR.

FT AND FTH-RATINGS = 3/4-HR., 1-HR., OR 1-1/2-HR.

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL

cUL WL2018f.022212



1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN) TO INCLUDE THE FOLLOWING CONSTRUCTION FEATURES :

A. [NOT SHOWN] STEEL STUDS TO BE MINIMUM 2-1/2" WIDE (SPACED MAXIMUM 24" OC).

B. NOMINAL 5/8" THICK GYPSUM WALLBOARD. TYPE, NUMBER OF LAYERS, AND SHEET ORIENTATION AS SPECIFIED IN THE INDIVIDUAL UL DESIGN.



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PLASTIC PIPE THROUGH GYPSUM WALL ASSEMBLY

F AND FH-RATINGS = 1-HR. OR 2-HR.

FT AND FTH-RATINGS = 3/4-HR., 1-HR., OR 1-1/2-HR.

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL



cUL WL2018f.022212

2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING (ALSO SEE NOTE NO. 3 BELOW) :
 - A. MAXIMUM 4" NOMINAL DIAMETER PVC PLASTIC PIPE (CELLULAR OR SOLID CORE).
 - B. MAXIMUM 4" NOMINAL DIAMETER CPVC PLASTIC PIPE (SDR 11 OR SDR 13.5) (CLOSED PIPING SYSTEM ONLY).
 - C. MAXIMUM 4" NOMINAL DIAMETER ABS PLASTIC PIPE (CELLULAR OR SOLID CORE).
 - D. MAXIMUM 4" NOMINAL DIAMETER FRPP PLASTIC PIPE.
 - E. MAXIMUM 4" NOMINAL DIAMETER AQUARISE CPVC PLASTIC PIPE (SDR 11) MANUFACTURED BY IPEX, INC. (CLOSED PIPING SYSTEM ONLY).
 - F. MAXIMUM 4" NOMINAL DIAMETER RIGID NONMETALLIC CONDUIT (SCH 40 PVC).
3. [OPTIONAL] PIPE COUPLING TO BE SAME SIZE AND TYPE OF PIPE (SEE NOTE NO. 5 BELOW).
4. MINIMUM 1/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
5. HILTI CP 648E WRAP STRIP CONTINUOUSLY WRAPPED AROUND THE OUTER CIRCUMFERENCE OF THE PIPE, AND HELD IN PLACE WITH TAPE (SIZE OF WRAP STRIP AND NUMBER OF LAYERS ARE SHOWN IN THE TABLE BELOW) (ALSO SEE NOTE NO. 4 BELOW).
6. HILTI RETAINING COLLAR (SIZED TO MATCH WRAP STRIP) WRAPPED OVER WRAP STRIPS, OVERLAPPING MINIMUM 1".
7. NOMINAL 1/2" WIDE STAINLESS STEEL HOSE CLAMP(S) SECURED AT MID-HEIGHT OF STEEL RETAINING COLLAR.
8. FASTEN EVERY OTHER TAB OF RETAINING COLLAR TO GYPSUM WALL WITH 1-1/2" LONG STEEL LAMINATE DRYWALL SCREWS AND 1-1/4" DIAMETER FENDER WASHERS.

MAXIMUM PIPE SIZE	FIRESTOP PRODUCT	NUMBER OF LAYERS
3"	CP 648E W25/1"	2
3"	CP 648E W45/1-3/4"	1
4"	CP 648E W25/1"	3
4"	CP 648E W45/1-3/4"	2

- NOTES :**
1. MAXIMUM DIAMETER OF OPENING = 5".
 2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1/2".
 3. CLOSED OR VENTED PIPING SYSTEMS (PVC, ABS & FRPP = SCH 40; CPVC = SDR 11 OR 13.5).
 4. AS AN ALTERNATE TO HILTI CP 648E WRAP STRIPS, ON NOMINAL 3" AND 4" DIAMETER PIPES ONLY (WITHOUT PIPE COUPLING), HILTI CP 648S/3" AND CP 648S/4" MAY BE USED. SINGLE LAYER OF HILTI CP 648S TO BE WRAPPED AROUND THE THE OUTER CIRCUMFERENCE OF THE PIPE AND HELD IN PLACE WITH INTEGRATED TAPE PRIOR TO FASTENING RETAINING COLLAR.
 5. PIPE COUPLING MAY BE INSTALLED FLUSH WITH EITHER SIDE OF WALL OR RECESSED SUCH THAT THE COUPLING EXTENDS 1/4" BEYOND THE RETAINING COLLAR ON EITHER SIDE OF THE WALL.



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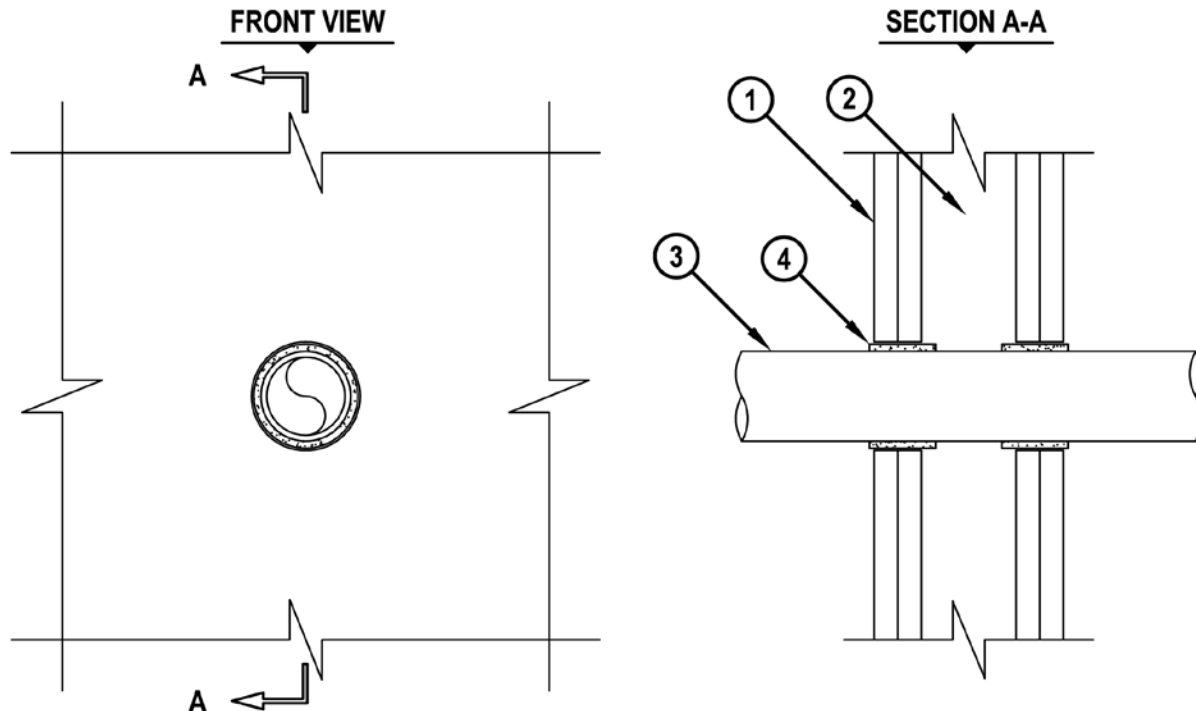
**PLASTIC PIPE THROUGH 2-HR. GYPSUM WALL ASSEMBLY**

F AND FH-RATING = 2-HR.

FT AND FTH-RATING = 1-HR.

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL

cULWL2020b.052705



1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U300 OR U400 SERIES) (2-HR. FIRE-RATING).
2. [NOT SHOWN] WOOD STUDS TO CONSIST OF NOMINAL 2" x 4" LUMBER. STEEL STUDS TO BE MINIMUM 2-1/2" WIDE.
3. MAXIMUM 2" NOMINAL DIAMETER PVC PLASTIC PIPE (SOLID CORE).
4. HILTI CP 648E WRAP STRIP (NOMINAL 3/16" THICK x 1-3/4" WIDE) CONTINUOUSLY WRAPPED AROUND THE OUTER CIRCUMFERENCE OF THE PIPE, COVERING ONE TIME, WITH ENDS BUTTED AND HELD IN PLACE WITH TAPE. WRAP STRIP TO BE SLID INTO ANNULAR SPACE, SUCH THAT 1/8" OF THE WRAP STRIP PROTRUDES FROM THE WALL SURFACE. WRAP STRIPS REQUIRED ON BOTH SIDES OF THE WALL.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 3-5/8".

2. AS AN ALTERNATE TO ITEM NO. 4 ABOVE, TWO LAYERS OF HILTI CP 648E WRAP STRIP (NOMINAL 3/16" THICK x 1" WIDE) MAY BE INSTALLED.

3. ANNULAR SPACE = NOMINAL 1/4" FOR ONE WRAP, NOMINAL 1/2" FOR TWO WRAPS

4. VENTED PIPING SYSTEM (PVC = SCHEDULE 40).



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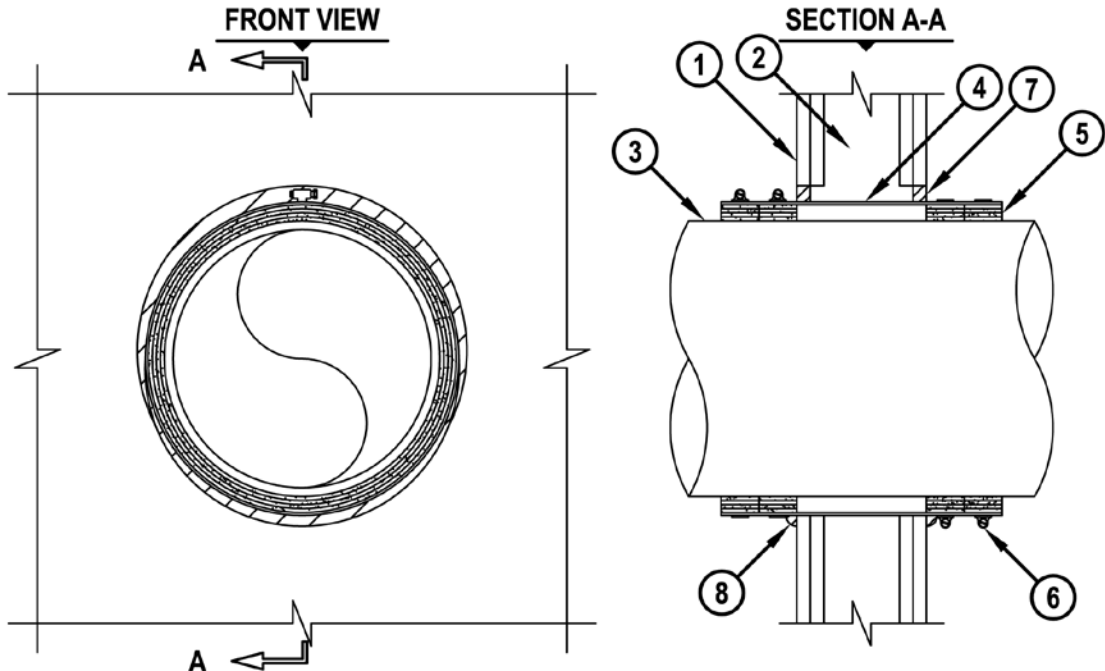
cUL SYSTEM NO. W-L-2027

PLASTIC PIPE THROUGH 1-HR. OR 2-HR. GYPSUM WALL ASSEMBLY

F AND T-RATING = 1 AND 2-HR.

FH AND FTH-RATING = 0-HR.

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL



1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U400 SERIES WALL) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. [NOT SHOWN] STEEL STUDS TO BE MINIMUM 3-1/2" WIDE.
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING:
 - A. MAXIMUM 12" NOMINAL DIAMETER PVC PLASTIC PIPE (CELLULAR OR SOLID CORE).
 - B. MAXIMUM 12" NOMINAL DIAMETER CPVC PLASTIC PIPE (CLOSED PIPING SYSTEM ONLY).
4. MAXIMUM 14-1/2" DIAMETER SHEET METAL SLEEVE (MIN. 28 GA.) HAVING A MINIMUM 2" LAP ALONG LONGITUDINAL SEAM. LENGTH OF SLEEVE TO EXTEND 3-1/2" BEYOND EACH SURFACE OF WALL.
5. HILTI CP 648E WRAP STRIP (NOMINAL 3/16" THICK x 1-3/4" WIDE) CONTINUOUSLY WRAPPED AROUND THE OUTER CIRCUMFERENCE OF THE PIPE, COVERING FOUR TIMES, WITH ENDS BUTTED AND HELD IN PLACE WITH TAPE. BUTTED ENDS IN SUCCESSIVE LAYER SHALL BE OFFSET. TWO SETS OF WRAP STRIP INSTALLED WITHIN THE SHEET METAL SLEEVE ON EACH SIDE OF THE WALL.
6. HILTI COLLAR CLAMP(S) (1/2" WIDE) FASTENED AROUND SHEET METAL SLEEVE AT THE CENTER OF EACH WRAP STRIP.
7. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
8. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT APPLIED AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 15".
 2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 3/4".
 3. CLOSED OR VENTED PIPING SYSTEM (PVC = SCHEDULE 40; CPVC = SDR 13.5).



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PLASTIC PIPE THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.

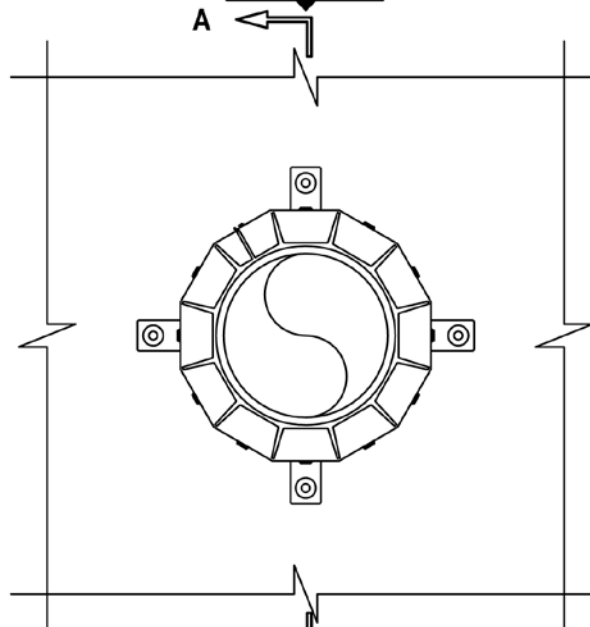
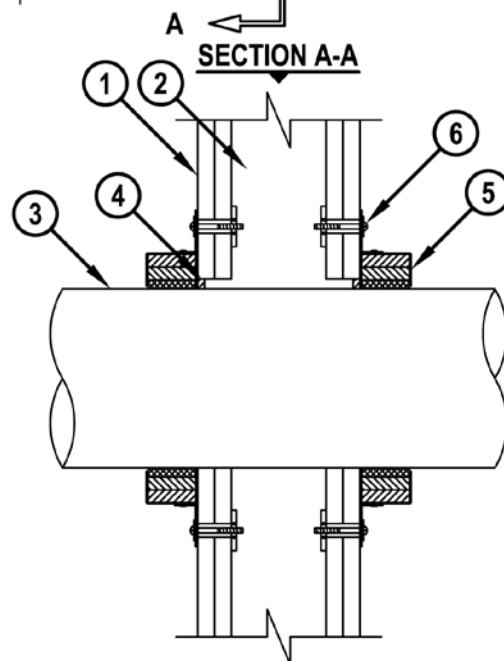
FT-RATING = 0-HR. OR 1-HR.

FH AND FTH-RATINGS = 0-HR.

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL



cUL WL2028d.022212

FRONT VIEW**SECTION A-A**

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PLASTIC PIPE THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.

FT-RATING = 0-HR. OR 1-HR.

FH AND FTH-RATINGS = 0-HR.

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL



cUL WL2028d.022212

1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U300, U400, OR V400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. [NOT SHOWN] WOOD STUDS TO CONSIST OF NOMINAL 2" x 4" LUMBER. STEEL STUDS TO BE MINIMUM 2-1/2" WIDE.
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING (SEE NOTE NO. 3 BELOW) :
 - A. MAXIMUM 6" NOMINAL DIAMETER PVC PLASTIC PIPE (CELLULAR OR SOLID CORE).
 - B. MAXIMUM 6" NOMINAL DIAMETER ABS PLASTIC PIPE (CELLULAR OR SOLID CORE).
 - C. MAXIMUM 6" NOMINAL DIAMETER FRPP PLASTIC PIPE.
 - D. MAXIMUM 6" NOMINAL DIAMETER CPVC PLASTIC PIPE (SDR 11 OR SDR 13.5).
 - E. MAXIMUM 6" NOMINAL DIAMETER AQUARISE CPVC PLASTIC PIPE (SDR 11) MANUFACTURED BY IPEX, INC. (CLOSED PIPING SYSTEM ONLY).
 - F. MAXIMUM 4" NOMINAL DIAMETER RIGID NONMETALLIC CONDUIT (SCH 40 PVC).
4. MINIMUM 1/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
5. HILTI CP 643N FIRESTOP COLLAR WITH FASTENING HOOKS (SEE TABLE BELOW).
6. ATTACH EACH FASTENING HOOK TO WALL ASSEMBLY WITH HILTI 3/16" TOGGLER BOLTS AND WASHERS. FOR PIPES 4" OR SMALLER, COLLARS MAY BE FASTENED WITH NO. 10 x 1-1/2" LONG DRYWALL OR LAMINATE SCREWS WITH 3/4" STEEL WASHERS.

NOMINAL PIPE DIAMETER	PRODUCT DESCRIPTION	NO. OF FASTENING HOOKS	MAXIMUM HOLE SIZE
1-1/2"	CP 643 50/1.5 N	2	2-1/8"
2"	CP 643 63/2" N	2	2-5/8"
3"	CP 643 90/3" N	3	4"
4"	CP 643 110/4" N	3	5"
6"	CP 643 160/6" N	4	7"

NOTES : 1. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1/2".

2. CLOSED OR VENTED PIPING SYSTEM (PVC, ABS, FRPP = SCH 40; CPVC = SDR 11 OR 13.5).



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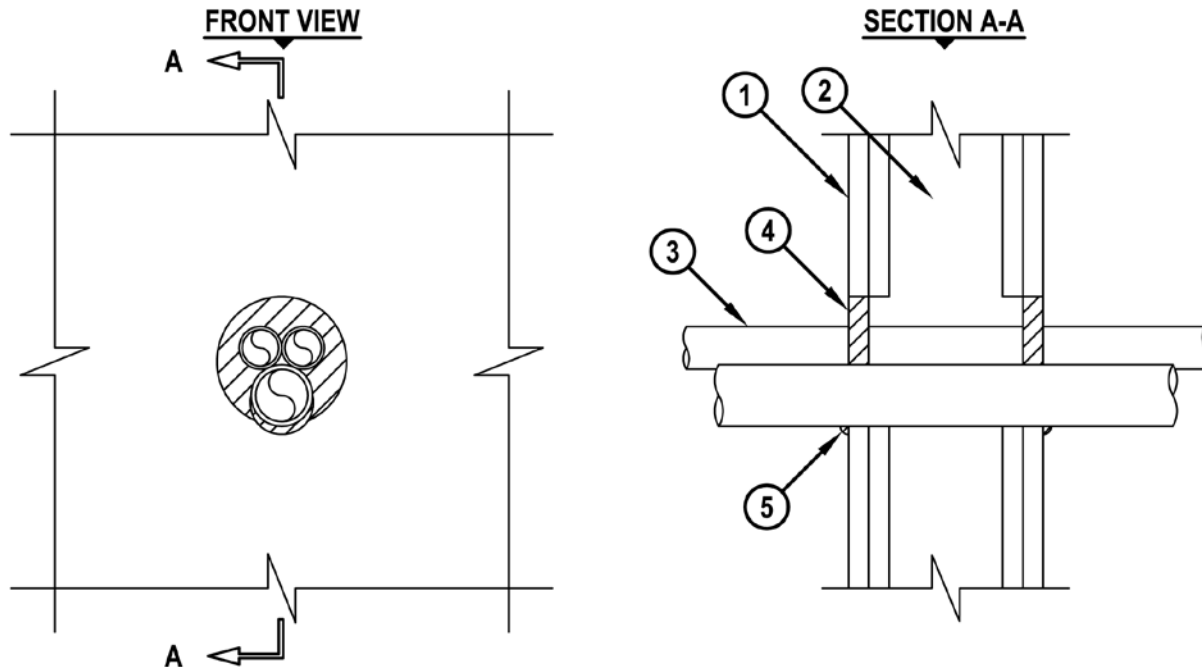
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cUL SYSTEM NO. W-L-2038

**MULTIPLE PLASTIC PIPE THOROUGH GYPSUM WALL ASSEMBLY**

F-RATING = 1-HR. OR 2-HR.
FT, FH AND FTH-RATING = 0-HR.

cUL WL2038b.061708



1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U300, U400 OR V400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. [NOT SHOWN] WOOD STUDS TO CONSIST OF NOMINAL 2" X 4" LUMBER. STEEL STUDS TO BE MINIMUM 3-1/2" WIDE.
3. PENETRATING ITEMS TO BE ONE OR MORE OF THE FOLLOWING :
 - A. MAXIMUM 1-1/2" NOMINAL DIAMETER PVC PLASTIC PIPE (CELLULAR OR SOLID CORE) (CLOSED PIPING SYSTEM).
 - B. MAXIMUM 1-1/2" NOMINAL DIAMETER CPVC PLASTIC PIPE (CLOSED PIPING SYSTEM ONLY).
 - C. MAXIMUM 1-1/2" NOMINAL DIAMETER RIGID NONMETALLIC CONDUIT (RNC).
 - D. MAXIMUM 1" NOMINAL DIAMETER CROSS-LINKED POLYETHYLENE (PEX) TUBING (CLOSED PIPING SYSTEM).
 - E. MAXIMUM 1-1/2" NOMINAL DIAMETER AQUARISE CPVC PLASTIC PIPE (SDR 11) MANUFACTURED BY IPEX, INC. (CLOSED PIPING SYSTEM ONLY).
4. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
5. MINIMUM 1/4" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT APPLIED AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 4".
 2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1".
 3. PVC, RNC = SCHEDULE 40; CPVC = SDR 13.5; PEX = SDR 9.



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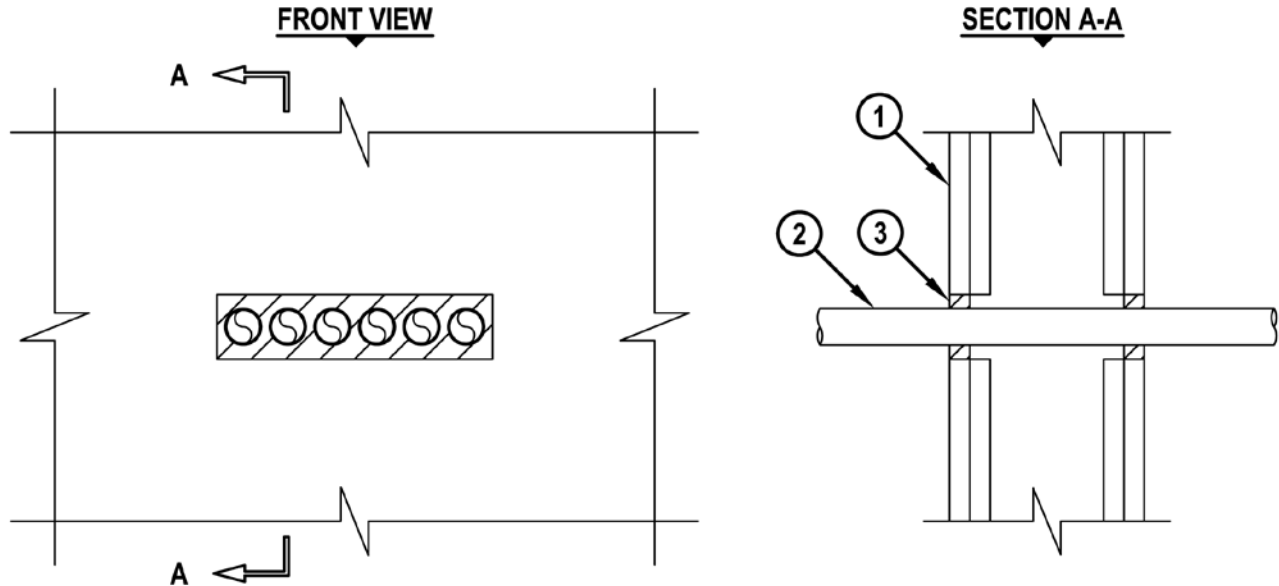
cUL SYSTEM NO. W-L-2047

MULTIPLE PEX TUBING THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.
FT, FH, FTH-RATINGS = 0-HR.



cUL WL2047a.042407



1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U400 OR V400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN) TO INCLUDE THE FOLLOWING CONSTRUCTION FEATURES :
 - A. [NOT SHOWN] WOOD STUDS TO CONSIST OF NOMINAL 2" x 4" LUMBER (SPACED MAXIMUM 16" OC). STEEL STUDS TO BE MINIMUM 3-1/2" WIDE (SPACED MAXIMUM 24" OC).
 - B. NOMINAL 5/8" THICK GYPSUM WALLBOARD. TYPE, NUMBER OF LAYERS, AND SHEET ORIENTATION AS SPECIFIED IN THE INDIVIDUAL UL DESIGN.
2. MAXIMUM 1" NOMINAL DIAMETER SDR 9 CROSS-LINKED POLYETHYLENE (PEX) TUBING (CLOSED PIPING SYSTEM ONLY) (MAX. QTY. = 6).
3. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.

NOTES : 1. MAXIMUM SIZE OF OPENING = 8-1/2" x 2".
2. ANNULAR SPACE = MINIMUM 1/4", MAXIMUM 1".



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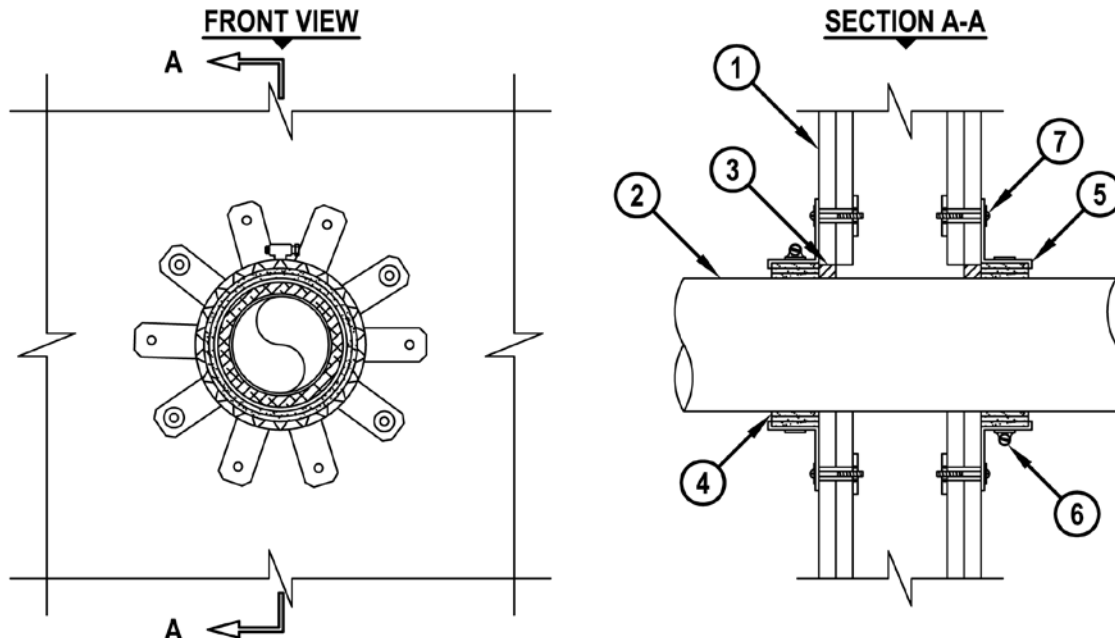
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cUL SYSTEM NO. W-L-2052

**PLASTIC PIPE THROUGH GYPSUM WALL ASSEMBLY**

F, FT, FH AND FTH-RATINGS = 1-HR. OR 2-HR.

cUL WL2052a.022707



1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U300, U400, OR V400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN) TO INCLUDE THE FOLLOWING CONSTRUCTION FEATURES :
 - A. [NOT SHOWN] WOOD STUDS TO CONSIST OF NOMINAL 2" x 4" LUMBER (SPACED MAXIMUM 16" OC). STEEL STUDS TO BE MINIMUM 3-1/2" WIDE (SPACED MAXIMUM 24" OC).
 - B. NOMINAL 5/8" THICK GYPSUM WALLBOARD. TYPE, NUMBER OF LAYERS, AND SHEET ORIENTATION AS SPECIFIED IN THE INDIVIDUAL UL DESIGN.
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 4" NOMINAL DIAMETER POLYPROPYLENE (PP) SDR 11 PLASTIC PIPE (CLOSED PIPING SYSTEM ONLY).
 - B. MAXIMUM 125mm FUSIOTHERM® (SDR 11 OR SDR 7.4 WITH FASER) PP PLASTIC PIPE MANUFACTURED BY AQUATHERM, INC. (CLOSED PIPING SYSTEM ONLY).
3. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT FLUSH WITH EACH SIDE OF WALL.
4. HILTI CP 648E WRAP STRIP (NOMINAL 3/16" THICK x 1-3/4" WIDE) CONTINUOUSLY WRAPPED AROUND THE OUTER CIRCUMFERENCE OF THE PIPE, COVERING THREE TIMES, WITH ENDS BUTTED AND HELD IN PLACE WITH TAPE. WRAP STRIP TO BE BUTTED TIGHTLY AGAINST BOTH SURFACES OF GYPSUM WALL.
5. HILTI 1-3/4" RETAINING COLLAR WRAPPED OVER THE WRAP STRIPS, OVERLAPPING MINIMUM 1".
6. HILTI COLLAR CLAMP FASTENED AT MID-HEIGHT OF RETAINING COLLAR.
7. MINIMUM 4 TABS OF RETAINING COLLAR (SYMMETRICALLY SPACED) SECURED TO BOTH SIDES OF GYPSUM WALL WITH 1/4" DIAMETER LONG STEEL TOGGLE BOLTS WITH 3/4" DIAMETER STEEL WASHERS.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 5-1/2".
2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1/2".



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cUL SYSTEM NO. W-L-2060

PLASTIC PIPE THROUGH GYPSUM WALL ASSEMBLY

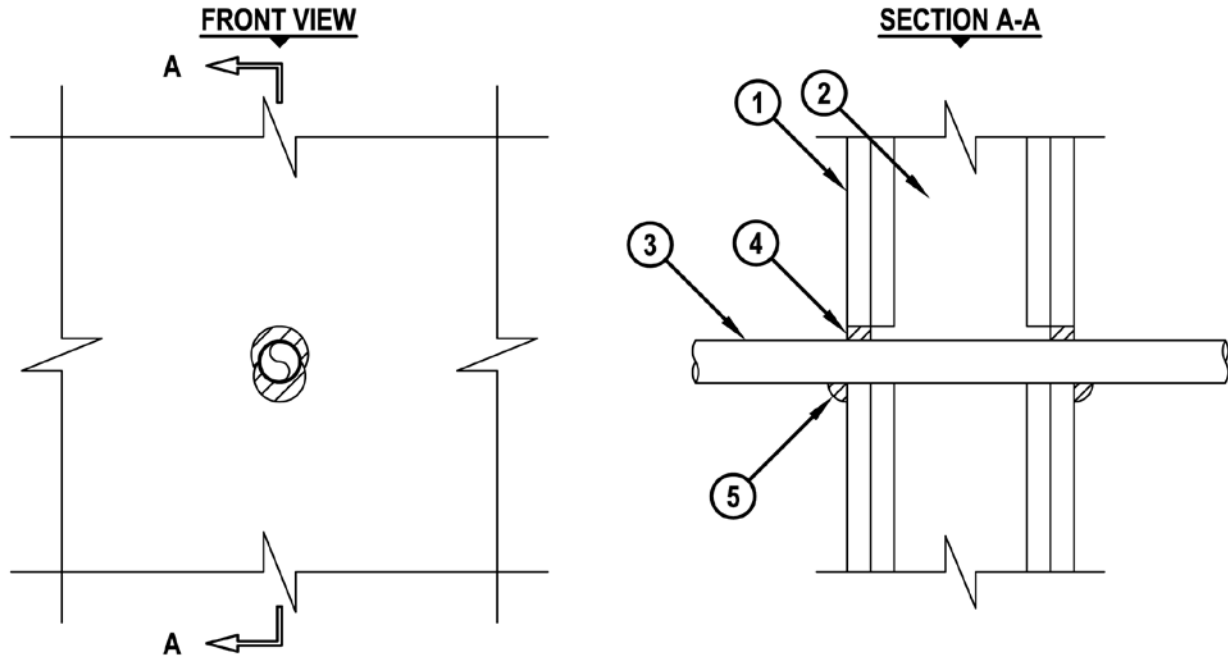
F-RATING = 1-HR. OR 2-HR.

FT, FH, AND FTH-RATINGS = 0-HR.

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL



cUL WL2060a.050310



1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U300, U400, OR V400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. [NOT SHOWN] WOOD STUDS TO CONSIST OF NOMINAL 2 x 4 LUMBER. STEEL STUDS TO BE MINIMUM 3-1/2" WIDE.
3. MAXIMUM 1" NOMINAL DIAMETER SDR 9 CROSS-LINKED POLYETHYLENE (PEX) TUBING.
4. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
5. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT APPLIED AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 1-1/2".
2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 3/8".



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cUL SYSTEM NO. W-L-2061

PLASTIC PIPE THROUGH GYPSUM WALL ASSEMBLY

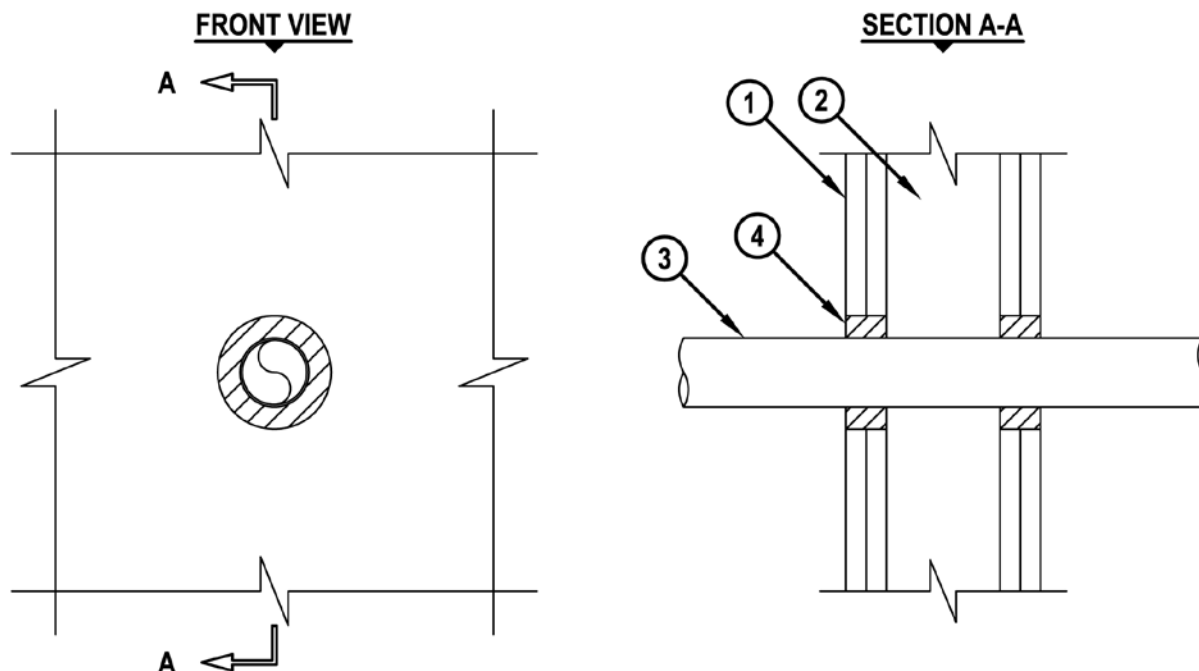
F-RATING = 1-HR. OR 2-HR.

FT, FH, AND FTH-RATINGS = 0-HR.

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL



cUL WL2061a.050310



1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U300, U400, OR V400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. [NOT SHOWN] WOOD STUDS TO CONSIST OF NOMINAL 2 x 4 LUMBER. STEEL STUDS TO BE MINIMUM 3-1/2" WIDE.
3. MAXIMUM 2" NOMINAL DIAMETER SDR 9 CROSS-LINKED POLYETHYLENE (PEX) TUBING.
4. HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT :
 - A. MINIMUM 5/8" DEPTH REQUIRED FOR 1-HR. FIRE-RATING.
 - B. MINIMUM 1-1/2" DEPTH REQUIRED FOR 2-HR. FIRE-RATING.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 3-1/2".
 2. ANNULAR SPACE = MINIMUM 1/4", MAXIMUM 7/8".



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cUL SYSTEM NO. W-L-2565

PLASTIC PIPE THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.

T, FT, AND FTH-RATINGS = 0-HR.

NOTE : TESTED TO A 50 Pa PRESSURE DIFFERENTIAL

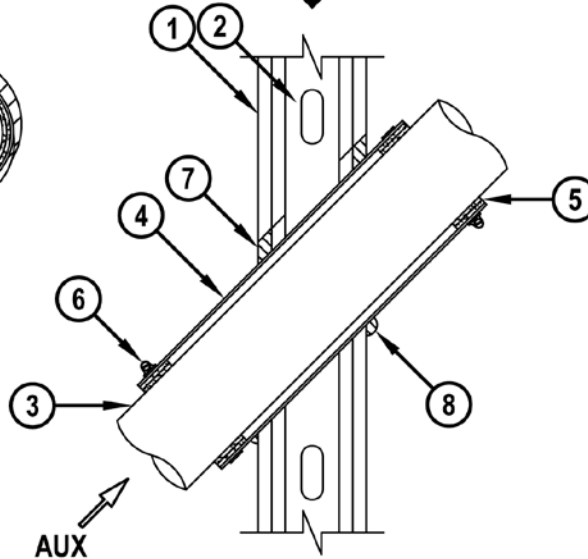


cUL WL2565a.032112

AUXILIARY VIEW



CROSS-SECTIONAL VIEW



1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U400, V400, OR W400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. STEEL STUDS TO BE MINIMUM 2-1/2" WIDE (SPACED MAXIMUM 24" O/C).
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING AND INSTALLED AT AN ANGLE NOT GREATER THAN 45° FROM PERPENDICULAR :
 - A. MAXIMUM 4" NOMINAL DIAMETER PVC PLASTIC PIPE (CELLULAR OR SOLID CORE).
 - B. MAXIMUM 4" NOMINAL DIAMETER ABS PLASTIC PIPE (CELLULAR OR SOLID CORE).
 - C. MAXIMUM 4" NOMINAL DIAMETER CPVC PLASTIC PIPE (CLOSED PIPING SYSTEM ONLY).
4. MAXIMUM 5-1/4" NOMINAL DIAMETER SHEET METAL SLEEVE (MIN. 28 GA.) HAVING A MINIMUM 1" LAP ALONG LONGITUDINAL SEAM. LENGTH OF SLEEVE TO EXTEND 2" BEYOND EACH SURFACE OF WALL.
5. HILTI CP 648E WRAP STRIP (NOMINAL 3/16" THICK x 1-3/4" WIDE) CONTINUOUSLY WRAPPED AROUND THE OUTER CIRCUMFERENCE OF THE PIPE, COVERING TWO TIMES, AND HELD IN PLACE WITH TAPE. WRAP STRIP IS INSTALLED FLUSH WITH ENDS OF SHEET METAL SLEEVE.
6. NOMINAL 1/2" WIDE STAINLESS STEEL HOSE CLAMP(S) FASTENED AROUND SHEET METAL SLEEVE AT THE CENTER OF EACH WRAP STRIP.
7. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
8. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT APPLIED AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 6".

2. ANNULAR SPACE BETWEEN SLEEVE AND PERIPHERY OF OPENING = MIN. 0", MAX. 3/4".

3. CLOSED OR VENTED PIPING SYSTEM (PVC & ABS = SCHEDULE 40; CPVC = SDR 13.5).


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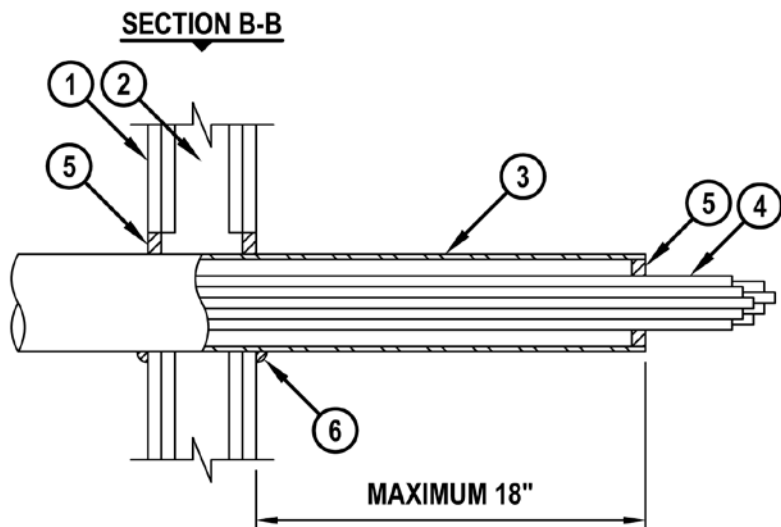
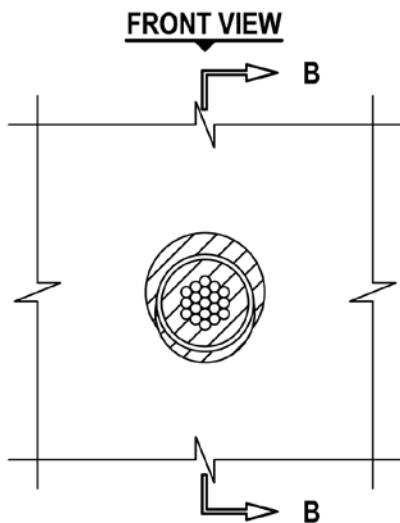
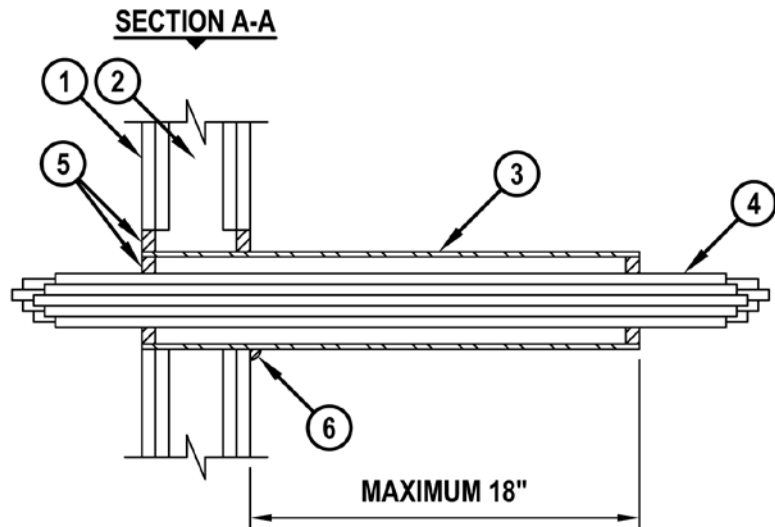
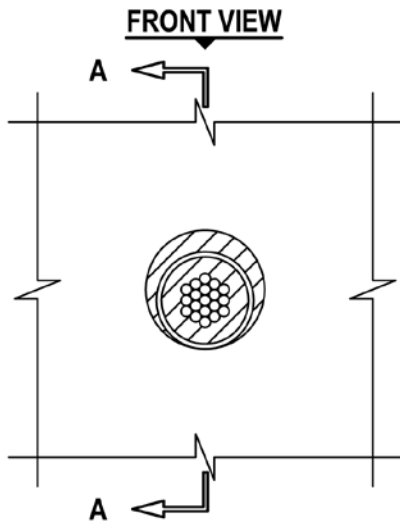
UL/cUL SYSTEM NO. W-L-3065

CABLE BUNDLE THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.

T-RATING = 0-HR. OR 3/4-HR.

WL3065y.040312



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UL/cUL SYSTEM NO. W-L-3065

CABLE BUNDLE THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.

T-RATING = 0-HR. OR 3/4-HR.

WL3065y.040312

1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U300, U400, OR V400) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. [NOT SHOWN] WOOD STUDS TO CONSIST OF NOMINAL 2" x 4" LUMBER. STEEL STUDS TO BE MINIMUM 2-1/2" WIDE.
3. [OPTIONAL] MAXIMUM 4" NOMINAL DIAMETER EMT, STEEL PIPE (SCHEDULE 5 OR HEAVIER) OR 28 GA. GALVANIZED STEEL SLEEVE (SEE NOTE NO. 6 BELOW).
4. CABLE BUNDLE TO CONSIST OF ANY COMBINATION OF THE FOLLOWING (SEE NOTE NO. 5 BELOW) :
 - A. MAXIMUM 7/C NO. 12 AWG POWER CABLE WITH PVC JACKET.
 - B. MAXIMUM 25 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
 - C. MAXIMUM 1/2" DIAMETER RG/U COAXIAL CABLE WITH PVC JACKET.
 - D. MAXIMUM 3/C NO. 8 AWG METAL-CLAD CABLE.
 - E. MAXIMUM 3/C (+GROUND) NO. 8 AWG COPPER CONDUCTOR CABLE (ROMEX).
 - F. MAXIMUM 5/8" DIAMETER FIBER-OPTIC CABLE WITH PVC JACKET.
 - G. MAXIMUM 3/4" DIAMETER COPPER GROUND CABLE WITH OR WITHOUT PVC JACKET.
 - H. MAXIMUM 1-1/4" DIAMETER SINGLE OR MULTIPLE CONDUCTOR TYPE MI CABLE (SEE NOTE NO. 4 BELOW).
 - I. ANY CABLES, METAL-CLAD CABLES, OR ARMORED CABLES CURRENTLY LISTED UNDER THE THROUGH PENETRATING PRODUCTS CATEGORY.
 - J. MAXIMUM 4/C (+GRND) NO. 300 KCMIL ALUMINUM SER CABLE.
 - K. MAXIMUM 4 PAIR NO. 22 AWG CAT 5 OR CAT 6 CABLE.
 - L. MAXIMUM RG 6/U COAXIAL CABLE WITH FLUORINATED ETHYLENE JACKET.
5. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT, CP 601S ELASTOMERIC FIRESTOP SEALANT, CP 606 FLEXIBLE FIRESTOP SEALANT OR CP 618 FIRESTOP PUTTY STICK.
6. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT, CP 601S ELASTOMERIC FIRESTOP SEALANT, CP 606 FLEXIBLE FIRESTOP SEALANT OR CP 618 FIRESTOP PUTTY STICK APPLIED AT WALL/SLEEVE INTERFACE WHEN STEEL SLEEVE EXTENDS BEYOND ONE OR BOTH SIDES OF WALL.

NOTES :

1. MAXIMUM DIAMETER OF OPENING WITH SLEEVE = 5-1/2".
2. MAXIMUM DIAMETER OF OPENING WITHOUT SLEEVE = 4".
3. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1".
4. A MINIMUM 1/8" SEPARATION SHOULD BE MAINTAINED BETWEEN MI CABLES AND ANY OTHER TYPES OF CABLE.
5. CABLES TO FILL MAXIMUM 45% OF CROSS-SECTIONAL AREA OF OPENING.
6. WHEN SCHEDULE 5 STEEL PIPE OR EMT IS USED, OPEN ENDED SLEEVE MAY EXTEND UP TO 18" BEYOND WALL SURFACE. AS AN OPTION, SCHEDULE 5 STEEL PIPE OR EMT SLEEVE MAY EXTEND CONTINUOUSLY BEYOND ONE WALL SURFACE.
7. WHEN NO SLEEVE IS USED, CABLES MAY BE INSTALLED AT AN ANGLE NOT GREATER THAN 45° FROM PERPENDICULAR.



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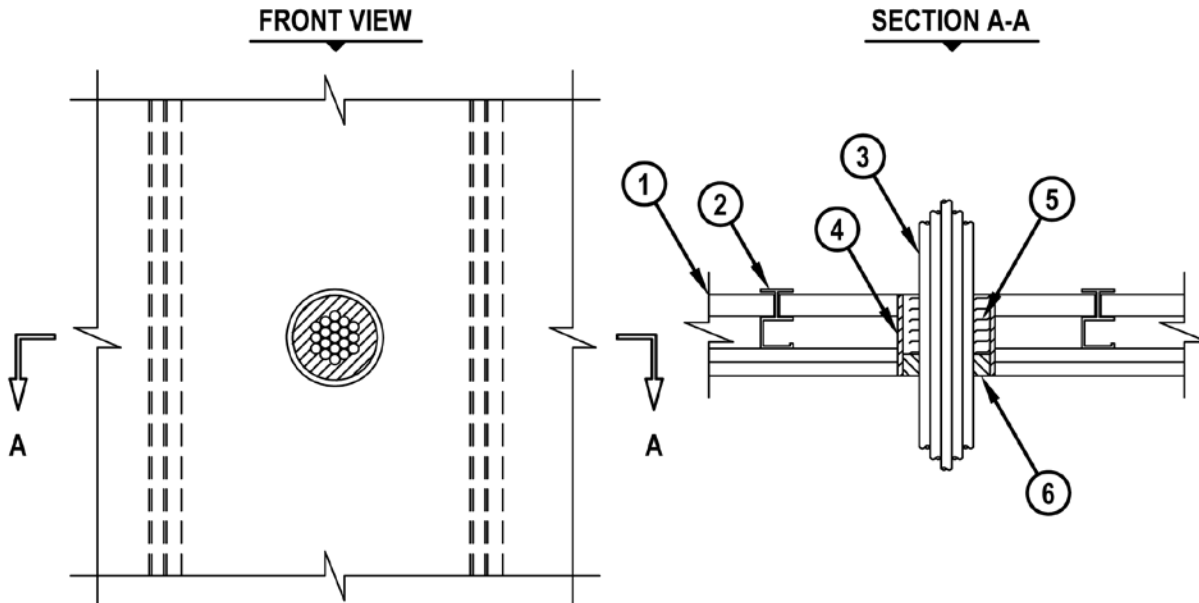
UL/cUL SYSTEM NO. W-L-3161

CABLE BUNDLE THROUGH GYPSUM SHAFT WALL ASSEMBLY

F-RATING = 1 AND 2-HR.

T-RATING = 0-HR.

WL3161c.090805



1. GYPSUM SHAFT WALL ASSEMBLY (UL/ULC CLASSIFIED U400 SERIES) (1-HR. OR 2-HR. FIRE- RATING) (2-HR. SHOWN).
2. "C-T" SHAPED STUDS (1-5/8" WIDE x 2-1/2" DEEP, MIN. 25 GA.) SPACED A MAXIMUM 24" C/C.
3. CABLE BUNDLE TO CONSIST OF ANY OF THE FOLLOWING:
 - A. MAXIMUM 7/C NO. 12 AWG CABLE.
 - B. MAXIMUM 25 PAIR NO. 24 AWG TELEPHONE CABLE.
 - C. RG 59 COAXIAL CABLE.
 - D. MAXIMUM 3/C NO. 12 AWG METAL CLAD CABLE.
 - E. MAXIMUM 5/8" DIAMETER FIBER-OPTIC CABLE.
4. MAXIMUM 4" DIAMETER STEEL SLEEVE (MIN. 28 GA. SHEET METAL OR NO. 8 STEEL WIRE MESH).
5. MIN. 2-1/8" OR 2-3/4" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED AND RECESSED ON ONE SIDE OF THE WALL, FOR 1-HR. OR 2-HR. FIRE-RATED WALLS, RESPECTIVELY.
6. MINIMUM 1" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 4".

2. CABLES TO FILL A MAXIMUM 33 % OF CROSS-SECTIONAL AREA OF OPENING.

3. ANNULAR SPACE = MINIMUM 1/4", MAXIMUM 3/4".

4. AS AN ALTERNATE TO THE ABOVE SHAFT WALL ASSEMBLY, A 1 OR 2-HR. GYPSUM WALL ASSEMBLY MAY BE USED (U300, U400 OR V400 SERIES). STEEL STUDS TO BE MINIMUM 2-1/2" WIDE. WOOD STUDS TO CONSIST OF NOMINAL 2 x 4 LUMBER.

5. WHEN SYSTEM IS INSTALLED IN A STANDARD WALL ASSEMBLY, MINERAL WOOL SHOULD BE INSTALLED FLUSH WITH EITHER SIDE OF WALL AND RECESSED FROM OTHER SIDE TO ACCOMMODATE SEALANT.



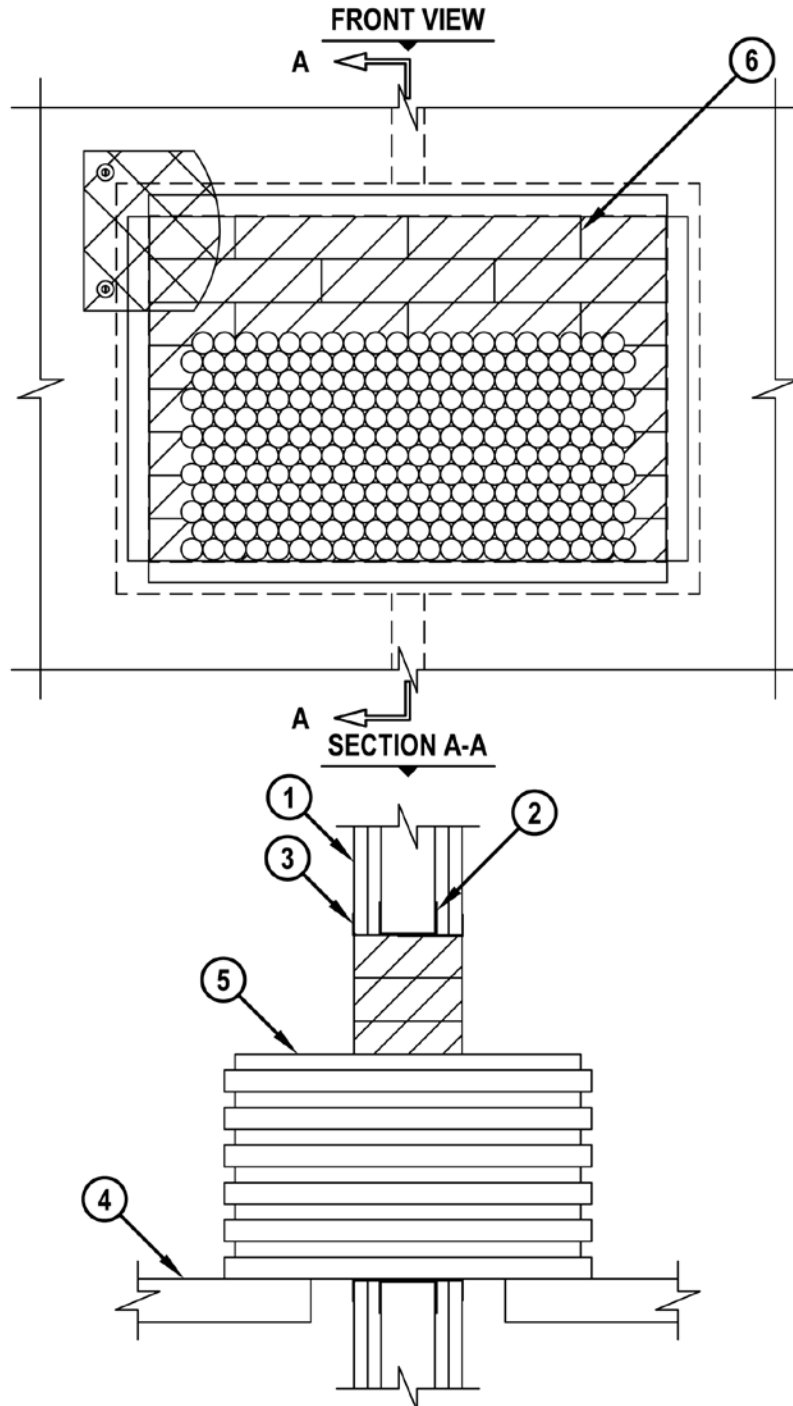
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UL/cUL SYSTEM NO. W-L-3185
CABLE BUNDLE THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.
T-RATING = 0-HR. OR 1/2-HR.



WL3185d.011112



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UL/cUL SYSTEM NO. W-L-3185

CABLE BUNDLE THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.

T-RATING = 0-HR. OR 1/2-HR.

WL3185d.011112

1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U300, U400, V400, OR W400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. WOOD STUDS TO CONSIST OF NOMINAL 2" x 4" LUMBER. STEEL STUDS TO BE MINIMUM 2-1/2" WIDE. OPENING TO BE COMPLETELY "FRAMED-OUT".
3. [OPTIONAL] MINIMUM 1" x 3" x 0.039" ZINC COATED, OR PAINTED, STEEL ANGLES FRICTION FITTED TO FRAME ALL FOUR SIDES OF OPENING ON EACH SIDE OF WALL. STEEL FASTENERS MAY BE USED TO SECURE ANGLE TO WALL.
4. MAXIMUM 20" WIDE STEEL CABLE RACK MAY BE CONTINUOUS OR DISCONTINUOUS THROUGH WALL ASSEMBLY (SEE NOTE NO. 4 BELOW).
5. CABLES TO BE A COMBINATION OF ANY OF THE FOLLOWING :
 - A. MAXIMUM 750 KCMIL SINGLE CONDUCTOR POWER CABLE WITH PVC JACKET.
 - B. MAXIMUM 300 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
 - C. MAXIMUM 1/2" DIAMETER FIBER-OPTIC CABLE (24 FIBER).
6. HILTI CFS-BL FIRESTOP BLOCK OR HILTI FS 657 FIRE BLOCK (2" THICK x 8" WIDE x 5" DEEP, REFERENCE : FRONT VIEW) FIRMLY PACKED AND CENTERED WITHIN THE OPENING. EITHER ONE OR A COMBINATION OF BLOCK TYPES MAY BE USED.

NOTES :

1. MAXIMUM AREA OF OPENING = 384 SQ. IN., WITH A MAXIMUM DIMENSION OF 24".
2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 8".
3. CABLES TO FILL MAXIMUM 35% OF CROSS-SECTIONAL AREA OF OPENING.
4. FOR WALLS CONSTRUCTED OF STEEL STUDS LARGER THAN 3-5/8", FIRESTOP/FIRE BLOCKS SHALL BE INSTALLED 8" DEEP, RECESSED UP TO A MAXIMUM 1/2" FROM OUTER WALL SURFACES.
5. WHEN STEEL CABLE RACK PENETRATES WALL, THE T-RATING IS 0-HR.
6. APPLY HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT, CP 618 FIRESTOP PUTTY STICK, OR CP 620 FIRE FOAM, INTO ANY VOID THAT MAY EXIST (AROUND PENETRANTS, INTO INTERSTICES OF CABLES, OR BETWEEN FIRESTOP/FIRE BLOCKS), TO MAXIMUM EXTENT POSSIBLE.
7. WHEN ANNULAR SPACE EXCEEDS 4" TO THE PERIPHERY, A NOMINAL 2" x 2" STEEL WIRE MESH (16 GA.) SHALL BE ATTACHED TO BOTH SIDES OF THE WALL BY MEANS OF 1/4" HILTI TOGGLER BOLTS WITH 1-1/2" DIAMETER FENDER WASHERS (SPACED MAX. 8" C/C) OR ATTACHED TO STEEL STUDS WITH STEEL SCREWS AND 1-7/16" DIAMETER FENDER WASHERS (SPACED MAX. 6" C/C). STEEL WIRE MESH SHALL BEGIN MAXIMUM 2-1/2" FROM THE PENETRANT AND OVERLAP MINIMUM 3" BEYOND THE PERIPHERY OF THE OPENING.



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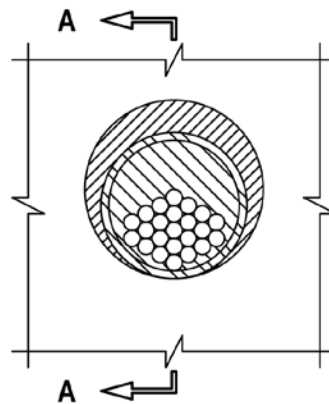
UL/cUL SYSTEM NO. W-L-3224
CABLE BUNDLE THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.

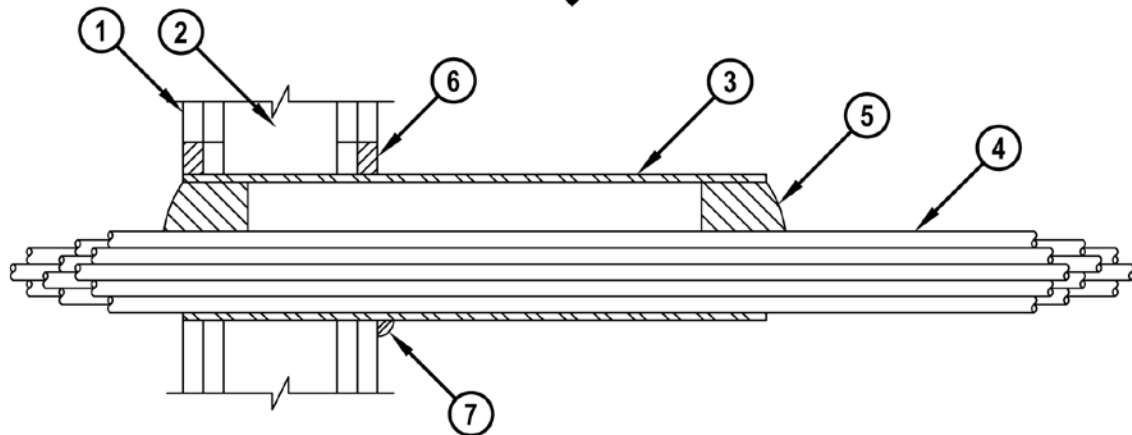
T-RATING = 0-HR.

WL3224c.011112

FRONT VIEW



SECTION A-A



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UL/cUL SYSTEM NO. W-L-3224

CABLE BUNDLE THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.

T-RATING = 0-HR.

WL3224c.01112

1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U300, U400, OR V400 SERIES) (1-HR. OR 2-HR. FIRE-RATING).
2. [NOT SHOWN] WOOD STUDS TO CONSIST OF NOMINAL 2" x 4" LUMBER. STEEL STUDS TO BE MINIMUM 3-1/2" WIDE.
3. [OPTIONAL] NOMINAL 2" OR 4" DIAMETER STEEL PIPE SLEEVE (SCHEDULE 5 OR HEAVIER), STEEL CONDUIT, OR EMT SLEEVE. SLEEVE MAY EXTEND UP TO 12" BEYOND WALL SURFACE IN ANY COMBINATION.
4. CABLE BUNDLE TO BE A COMBINATION OF ANY OF THE FOLLOWING :
 - A. MAXIMUM 300 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
 - B. MAXIMUM 750 KCMIL POWER CABLE WITH PVC JACKET.
 - C. MAXIMUM 7/C NO. 12 AWG POWER CABLE WITH PVC JACKET.
 - D. MAXIMUM 1/2" DIAMETER FIBER-OPTIC CABLE (MAXIMUM 24 FIBER).
 - E. MAXIMUM 3/C NO. 12 AWG METAL-CLAD CABLE WITH PVC JACKET.
 - F. MAXIMUM 1" DIAMETER METAL-CLAD TEK CABLE WITH PVC JACKET.
 - G. MAXIMUM 2/0 ALUMINUM SER CABLE.
 - H. RG 59 COAXIAL CABLE WITH PVC JACKET.
5. HILTI CFS-PL FIRESTOP PLUG OR HILTI CP 658T FIRESTOP PLUG CUT TO FIT AROUND THE CABLE BUNDLE AND INSTALLED TIGHTLY WITHIN SLEEVE SUCH THAT THE OUTER CIRCUMFERENCE OF THE DOME SHAPED PLUG IS FLUSH WITH BOTH SURFACES OF THE WALL OR SLEEVE.
6. MINIMUM 5/8" DEPTH HILTI CP 618 FIRESTOP PUTTY STICK OR FS-ONE INTUMESCENT FIRESTOP SEALANT TO BE APPLIED WHEN ANNULAR SPACE EXISTS.
7. MINIMUM 1/2" BEAD HILTI CP 618 FIRESTOP PUTTY STICK OR FS-ONE INTUMESCENT FIRESTOP SEALANT APPLIED AT SLEEVE/WALL INTERFACE WHEN SLEEVE EXTENDS PAST WALL.

NOTES : 1. WHEN SLEEVE IS USED : MAXIMUM DIAMETER OF OPENING = 5-1/2", ANNULAR SPACE = MINIMUM 0", MAXIMUM 3" INSIDE SLEEVE, AND MINIMUM 0", MAXIMUM 1" OUTSIDE SLEEVE.

2. WHEN SLEEVE IS NOT USED, DIAMETER OF OPENING = NOMINAL 2" OR 4", ANNULAR SPACE = MINIMUM 0", MAXIMUM 3".

3. CABLES TO FILL MAXIMUM 60% OF CROSS-SECTIONAL AREA OF OPENING/SLEEVE.

4. [OPTIONAL] HILTI CP 618 FIRESTOP PUTTY STICK OR HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT MAY BE FORCED INTO INTERSTICES OF CABLES.



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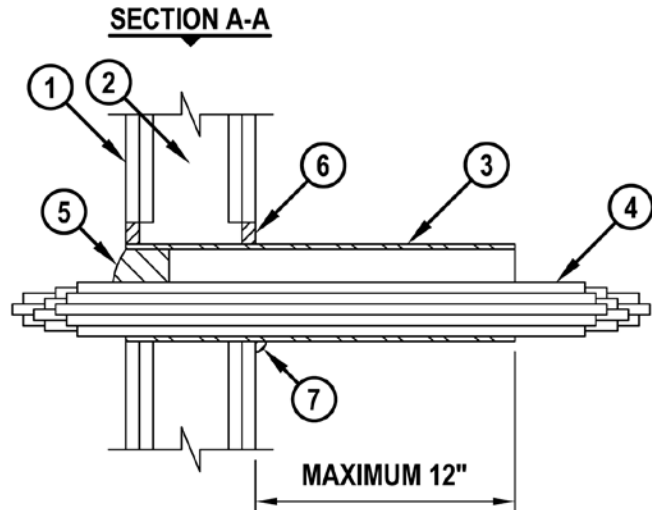
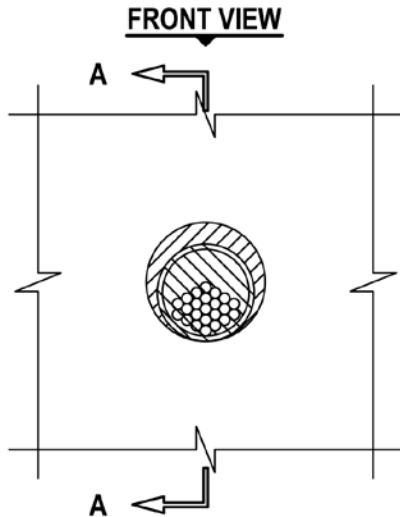
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UL/cUL SYSTEM NO. W-L-3272

CABLE BUNDLE THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.

T-RATING = 0-HR.



WL3272c.011112

1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U300, U400 OR V400 SERIES) (1-HR. OR 2-HR. FIRE-RATING).
2. [NOT SHOWN] WOOD STUDS TO CONSIST OF NOMINAL 2" x 4" LUMBER. STEEL STUDS TO BE MINIMUM 3-1/2" WIDE.
3. NOMINAL 2" OR 4" DIAMETER STEEL PIPE SLEEVE (SCHEDULE 5 OR HEAVIER). SLEEVE MAY EXTEND UP TO 12" BEYOND WALL SURFACE IN ANY COMBINATION (SEE NOTE NO. 4 BELOW).
4. CABLE BUNDLE TO BE A COMBINATION OF ANY OF THE FOLLOWING :
 - A. MAXIMUM 300 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
 - B. MAXIMUM 750 KCMIL POWER CABLE WITH PVC JACKET.
 - C. MAXIMUM 7/C NO. 12 AWG POWER CABLE WITH PVC JACKET.
 - D. MAXIMUM 1/2" DIAMETER FIBER-OPTIC CABLE (MAXIMUM 24 FIBER).
 - E. MAXIMUM 3/C NO. 12 AWG METAL-CLAD CABLE WITH PVC JACKET.
 - F. MAXIMUM 1" DIAMETER METAL-CLAD TEK CABLE WITH PVC JACKET.
5. ONE HILTI CFS-PL FIRESTOP PLUG OR HILTI CP 658T FIRESTOP PLUG CUT TO FIT AROUND THE CABLE BUNDLE AND INSTALLED TIGHTLY WITHIN SLEEVE SUCH THAT THE OUTER CIRCUMFERENCE OF THE DOME SHAPED PLUG IS FLUSH WITH EITHER END OF SLEEVE.
6. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT TO BE APPLIED WHEN ANNULAR SPACE EXISTS.
7. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT APPLIED AT SLEEVE/WALL INTERFACE WHEN SLEEVE EXTENDS PAST WALL.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 5-1/2".
 2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1".
 3. CABLES TO FILL MAXIMUM 50% OF CROSS-SECTIONAL AREA OF THE OPENING.
 4. SLEEVE TO BE RIGIDLY SUPPORTED WHEN EXTENDING MORE THAN 2" BEYOND WALL SURFACE.



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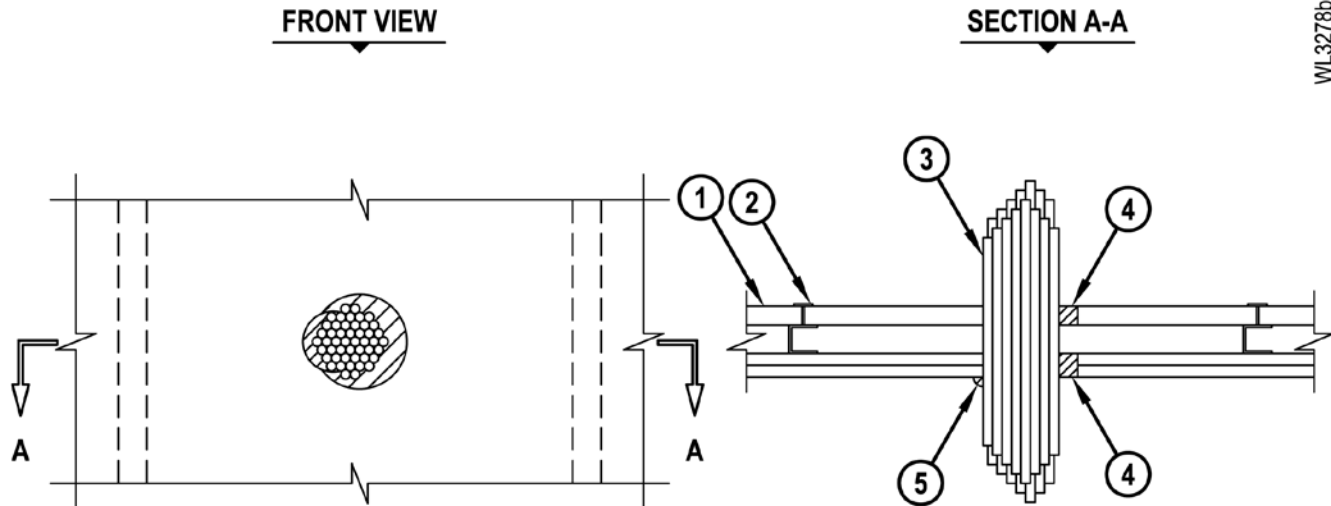
UL/cUL SYSTEM NO. W-L-3278

CABLE BUNDLE THROUGH GYPSUM SHAFT WALL ASSEMBLY

F-RATING = 2-HR.

T-RATING = 0-HR. OR 1/4-HR.

WL3278b.012908



1. GYPSUM SHAFT WALL ASSEMBLY (UL/cUL CLASSIFIED U400 OR V400 SERIES) (2-HR. FIRE-RATING).
2. "C-T", "C-H" OR "I" SHAPED STEEL STUDS (MINIMUM 1-1/2" DEEP x 2-1/2" WIDE, MIN. 25 GA.) SPACED MAXIMUM 24" C/C.
3. MAXIMUM 4" DIAMETER CABLE BUNDLE CONSISTING OF ANY COMBINATION OF THE FOLLOWING :
 - A. MAXIMUM 100 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
 - B. MAXIMUM 500 KCMIL POWER CABLE WITH PVC JACKET.
 - C. MAXIMUM RG/U COAXIAL CABLE WITH FLUORINATED ETHYLENE OR PVC JACKET.
 - D. MAXIMUM 3/C NO. 8 AWG STEEL CABLE CABLE.
 - E. MAXIMUM 1-1/4" DIAMETER SINGLE OR MULTIPLE CONDUCTOR TYPE MI CABLE (SEE NOTE NO. 3 BELOW).
4. MINIMUM 1" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT FLUSH WITH EACH SURFACE OF WALL ASSEMBLY.
5. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT APPLIED AT POINT OF CONTACT ON FINISHED SIDE OF SHAFT WALL.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 5".
 2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1".
 3. A MINIMUM 1/8" SEPARATION SHOULD BE MAINTAINED BETWEEN MI CABLES AND ANY OTHER TYPES OF CABLE.

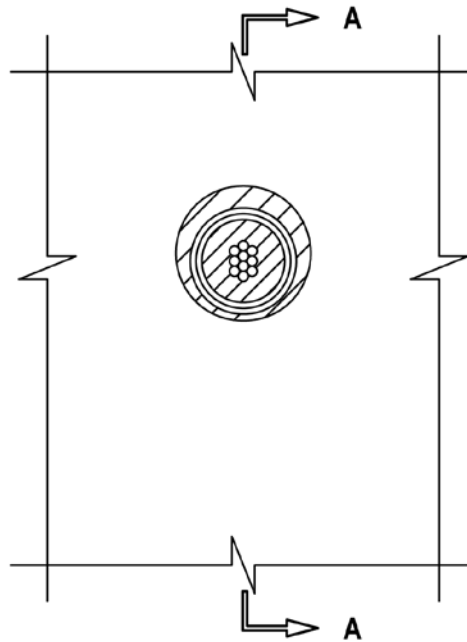
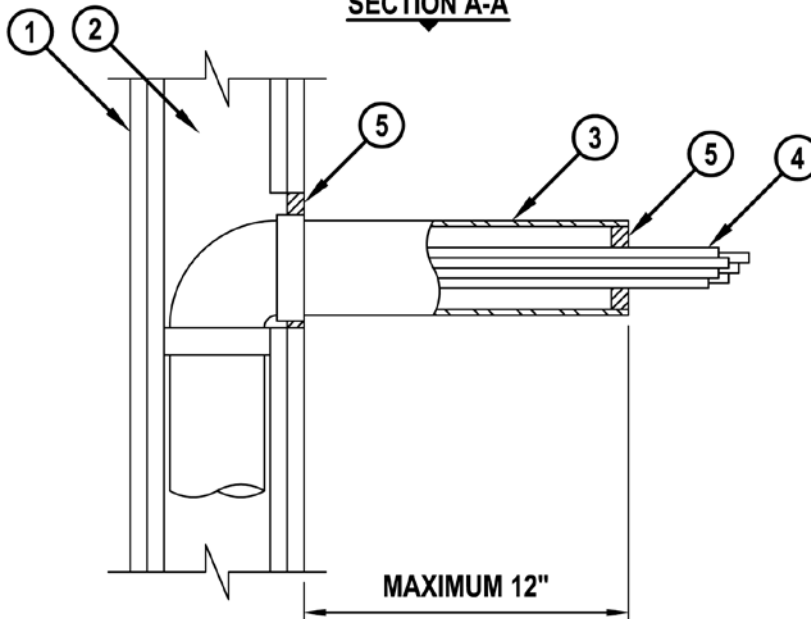


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UL/cUL SYSTEM NO. W-L-3320
CABLE BUNDLE THROUGH GYPSUM WALL ASSEMBLY
F-RATING = 1-HR. OR 2-HR.
T-RATING = 0-HR.

WL3320b.060909

FRONT VIEW**SECTION A-A**

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UL/cUL SYSTEM NO. W-L-3320

CABLE BUNDLE THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.

T-RATING = 0-HR.

WL3320b.060909

1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U300, U400 OR V400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. [NOT SHOWN] WOOD STUDS TO CONSIST OF NOMINAL 2" x 4" LUMBER. STEEL STUDS TO BE MINIMUM 3-1/2" WIDE.
3. MAXIMUM 3" NOMINAL DIAMETER EMT, STEEL CONDUIT, OR STEEL PIPE SLEEVE (SCHEDULE 5 OR HEAVIER). SLEEVE TO BE RIGIDLY SUPPORTED ON PENETRATED SIDE OF WALL.
4. CABLE BUNDLE TO CONSIST OF ANY COMBINATION OF THE FOLLOWING :
 - A. MAXIMUM 7/C NO. 12 AWG POWER CABLE WITH PVC JACKET.
 - B. MAXIMUM 25 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
 - C. RG/U COAXIAL CABLE WITH PVC JACKET.
 - D. MAXIMUM 3/C NO. 8 AWG METAL CLAD CABLE.
 - E. MAXIMUM 3/C (+GRND) NO. 8 AWG METAL CLAD CABLE.
 - F. MAXIMUM 5/8" DIAMETER FIBER-OPTIC CABLE WITH PVC JACKET.
 - G. MAXIMUM 3/4" DIAMETER COPPER GROUND CABLE WITH OR WITHOUT PVC JACKET.
 - H. MAXIMUM 1-1/4" DIAMETER SINGLE OR MULTIPLE CONDUCTOR TYPE MI CABLE (SEE NOTE NO. 4 BELOW).
5. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT, HILTI CP 606 FLEXIBLE FIRESTOP SEALANT, HILTI CP 601S ELASTOMERIC FIRESTOP SEALANT OR HILTI CP 618 FIRESTOP PUTTY STICK.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 5".
2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1".
3. [NOT SHOWN] WHEN ANNULAR SPACE IS 0", APPLY MINIMUM 1/2" BEAD HILTI SEALANT OR PUTTY AT POINT OF CONTACT.
4. A MINIMUM 1/8" SEPARATION SHOULD BE MAINTAINED BETWEEN MI CABLES AND ANY OTHER TYPE OF CABLE.
5. CABLES TO FILL MAXIMUM 45% CROSS-SECTIONAL AREA OF SLEEVE.
6. SLEEVE MAY EXTEND UP TO 12" BEYOND WALL SURFACE.

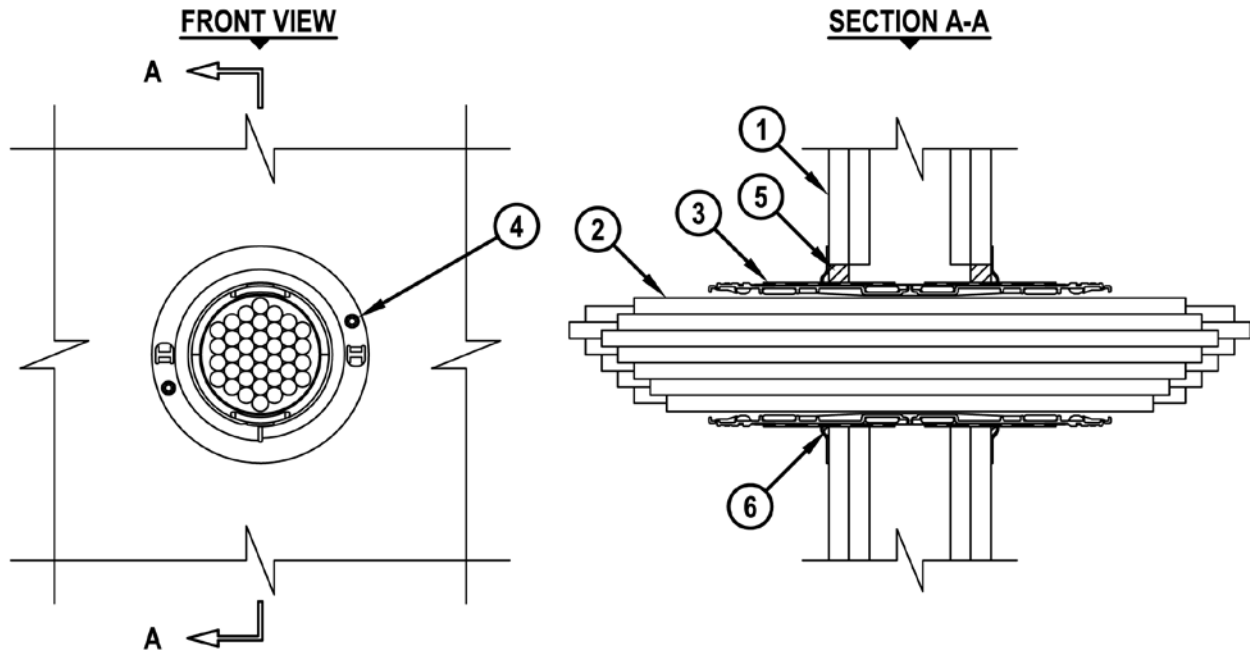


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UL/cUL SYSTEM NO. W-L-3335
CABLE BUNDLE THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.
 T-RATING = 0-HR., 1-HR., 1 3/4-HR., OR 2-HR.
 L-RATING AT AMBIENT = LESS THAN 1 CFM (SEE TABLE)
 L-RATING AT 400°F = 1 OR LESS THAN 1 CFM (SEE TABLE)



WL3335d.031612

1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U300, U400 OR V400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN) TO INCLUDE THE FOLLOWING CONSTRUCTION FEATURES :
 - A. [NOT SHOWN] WOOD STUDS TO CONSIST OF NOMINAL 2" x 4" LUMBER (SPACED MAXIMUM 16" OC). STEEL STUDS TO BE MINIMUM 2-1/2" WIDE (SPACED MAXIMUM 24" OC).
 - B. NOMINAL 5/8" THICK GYPSUM WALLBOARD. TYPE, NUMBER OF LAYERS, AND SHEET ORIENTATION AS SPECIFIED IN THE INDIVIDUAL UL DESIGN.



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UL/cUL SYSTEM NO. W-L-3335

CABLE BUNDLE THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.

T-RATING = 0-HR., 1-HR., 1 3/4-HR., OR 2-HR.

L-RATING AT AMBIENT = LESS THAN 1 CFM (SEE TABLE)

L-RATING AT 400°F = 1 OR LESS THAN 1 CFM (SEE TABLE)

WL3335d.031612

2. CABLE BUNDLE TO BE A COMBINATION OF ANY OF THE FOLLOWING :
- A. MAXIMUM 100 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
 - B. MAXIMUM 7/C NO. 12 AWG COPPER CONDUCTOR CONTROL CABLE WITH PVC OR XLPE JACKET AND INSULATION.
 - C. MAXIMUM 4/0 AWG TYPE RHH GROUND CABLE.
 - D. MAXIMUM 4 PAIR NO. 22 AWG CAT 5 OR CAT 6 COMPUTER CABLE.
 - E. MAXIMUM RG 6/U COAXIAL CABLE.
 - F. MAXIMUM 1/2" DIAMETER FIBER-OPTIC CABLE (24 FIBER) WITH PVC OR PE JACKET AND INSULATION.
 - G. MAXIMUM 20/C NO. 22 AWG SHIELDED PRINTER CABLE WITH PVC JACKET.
 - H. MAXIMUM 2/C NO. 18 AWG POWER OR NON-POWER LIMITED FIRE ALARM CABLE WITH OR WITHOUT METAL JACKET (MANUFACTURED BY AFC CABLE SYSTEMS, INC.).
 - I. MAXIMUM 1/4" DIAMETER S-VIDEO CABLE CONSISTING OF TWO MAXIMUM 24 AWG 75 OHM COAX OR TWISTED PAIR CABLE WITH PE INSULATION AND PVC JACKET.
 - J. MAXIMUM 3/C NO. 12 AWG METAL CLAD CABLE.
 - K. ANY CABLES, METAL-CLAD CABLES, OR ARMORED CABLES CURRENTLY LISTED UNDER THE THROUGH PENETRATING PRODUCTS CATEGORY.
3. HILTI CP 653 SPEED SLEEVE (2" OR 4") SLID INTO AND CENTERED WITHIN WALL. DEVICE FLANGES SPUN CLOCKWISE ONTO DEVICE THREADS, BUTTING TIGHTLY TO BOTH SIDES OF WALL.
4. SECURE DEVICE FLANGES TO BOTH SIDES OF WALL WITH TWO MINIMUM 1-1/2" LONG DRYWALL SCREWS.
5. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT, CP 606 FLEXIBLE FIRESTOP SEALANT, OR CP 618 FIRESTOP PUTTY STICK FLUSH WITH BOTH SURFACES OF WALL.
6. [FOR L-RATING] MINIMUM 1/4" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT OR CP 606 FLEXIBLE FIRESTOP SEALANT APPLIED AT POINT OF CONTACT.

MAX CABLE FILL	CABLE TYPE	L RATING, CFM/SQ FT		L RATING, CFM	
		AMBIENT	400°F	AMBIENT	400°F
0%	—	LESS THAN 1	LESS THAN 1	LESS THAN 1	LESS THAN 1
100%	ITEM 2D ONLY	5	1	LESS THAN 1	LESS THAN 1
100%	ANY CABLES (ITEM NO. 2) IN ANY COMBINATION	9	10	LESS THAN 1	1

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 3" (FOR 2" DEVICE) OR 5" (FOR 4" DEVICE).
 2. CABLES MAY REPRESENT 0% TO 100% VISUAL FILL OF DEVICE.
 3. ANNULAR SPACE BETWEEN DEVICE AND PERIPHERY OF OPENING = MINIMUM 0".
 4. L-RATING APPLIES ONLY WHEN HILTI FS-ONE OR CP 606 FIRESTOP SEALANT IS USED AND INNER FABRIC SEAL IS TWISTED CLOSED.
 5. [OPTIONAL] INNER FABRIC MAY REMAIN OPEN WHEN L-RATING IS NOT REQUIRED.



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UL/cUL SYSTEM NO. W-L-3384

CABLE BUNDLES THROUGH GYPSUM WALL ASSEMBLY

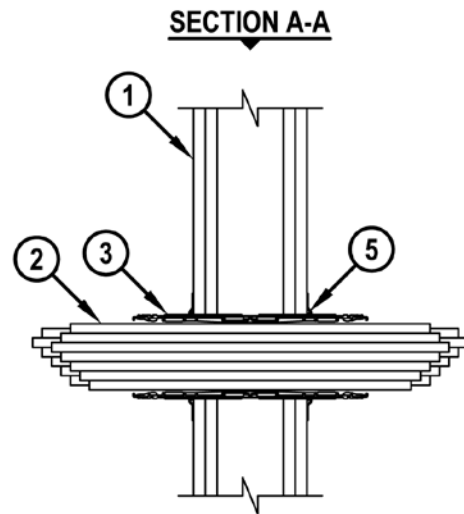
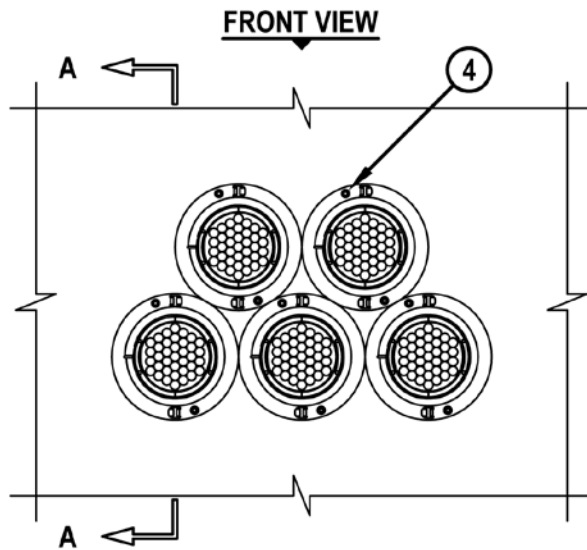
F-RATING = 1-HR. OR 2-HR.

T-RATING = 1/2-HR. OR 1 1/2-HR.

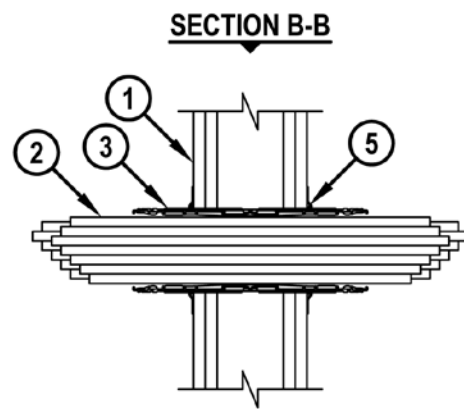
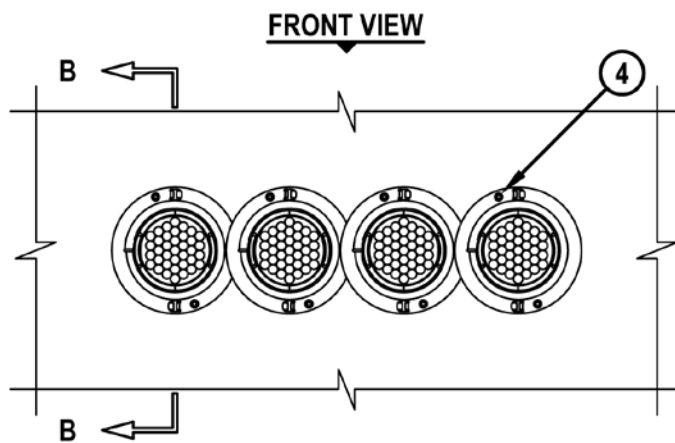
L-RATING AT AMBIENT = LESS THAN 1 CFM PER DEVICE (SEE TABLE BELOW)

L-RATING AT 400°F = 1 OR LESS THAN 1 CFM PER DEVICE (SEE TABLE BELOW)

WL3384a.051712



CONFIGURATION A



CONFIGURATION B

UL/cUL SYSTEM NO. W-L-3384

CABLE BUNDLES THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.

T-RATING = 1/2-HR. OR 1 1/2-HR.

L-RATING AT AMBIENT = LESS THAN 1 CFM PER DEVICE (SEE TABLE BELOW)

L-RATING AT 400°F = 1 OR LESS THAN 1 CFM PER DEVICE (SEE TABLE BELOW)

WL3384a.051712

1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U400, V400, OR W400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN) TO INCLUDE THE FOLLOWING CONSTRUCTION FEATURES :
 - A. [NOT SHOWN] STEEL STUDS TO BE MINIMUM 3-1/2" WIDE (SPACED MAXIMUM 24" OC).
 - B. NOMINAL 5/8" THICK GYPSUM WALLBOARD. TYPE, NUMBER OF LAYERS, AND SHEET ORIENTATION AS SPECIFIED IN THE INDIVIDUAL UL DESIGN.
2. CABLE BUNDLE TO BE A COMBINATION OF ANY OF THE FOLLOWING :
 - A. MAXIMUM 100 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
 - B. MAXIMUM 7/C NO. 12 AWG COPPER CONDUCTOR CONTROL CABLE WITH PVC OR XLPE JACKET AND INSULATION.
 - C. MAXIMUM 4/0 AWG TYPE RHH GROUND CABLE.
 - D. MAXIMUM 4 PAIR NO. 22 AWG CAT 5 OR CAT 6 COMPUTER CABLE.
 - E. MAXIMUM RG 6/U COAXIAL CABLE.
 - F. MAXIMUM 1/2" DIAMETER FIBER-OPTIC CABLE (24 FIBER) WITH PVC OR PE JACKET AND INSULATION.
 - G. MAXIMUM 20/C NO. 22 AWG SHIELDED PRINTER CABLE WITH PVC JACKET.
 - H. MAXIMUM 2/C NO. 18 AWG POWER OR NON-POWER LIMITED FIRE ALARM CABLE WITH OR WITHOUT METAL JACKET (MANUFACTURED BY AFC CABLE SYSTEMS, INC.).
 - I. MAXIMUM 1/4" DIAMETER S-VIDEO CABLE CONSISTING OF TWO MAXIMUM 24 AWG 75 OHM COAX OR TWISTED PAIR CABLE WITH PE INSULATION AND PVC JACKET.
 - J. MAXIMUM 3/C NO. 12 AWG METAL CLAD CABLE.
 - K. ANY CABLES, METAL-CLAD CABLES, OR ARMORED CABLES CURRENTLY LISTED UNDER THE THROUGH PENETRATING PRODUCTS CATEGORY.

CONFIGURATION A

3. MAXIMUM FIVE HILTI CP 653 SPEED SLEEVES [2" OR 4"] GROUPED IN A TWO ROW CONFIGURATION. INDIVIDUAL OPENINGS ARE SPACED MINIMUM 2-7/16" APART SUCH THAT DEVICE FLANGES OF ADJACENT DEVICES ARE NO CLOSER THAN POINT CONTACT. HILTI SPEED SLEEVE SLID INTO AND CENTERED WITHIN WALL. DEVICE FLANGES SPUN CLOCKWISE ONTO DEVICE THREADS, BUTTING TIGHTLY TO WALL SURFACES. INNER FABRIC MAY REMAIN OPEN EXCEPT FOR WHEN DEVICE CONTAINS NO CABLES AND WHEN L-RATING IS REQUIRED.
4. SECURE DEVICE FLANGES TO BOTH SIDES OF WALL WITH TWO MINIMUM 1-1/2" LONG DRYWALL SCREWS.
5. MINIMUM 1/4" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT OR HILTI CP 606 FLEXIBLE FIRESTOP SEALANT APPLIED AROUND PERIPHERY OF EACH DEVICE ON BOTH SIDES OF WALL PRIOR TO INSTALLING DEVICE FLANGES.



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UL/cUL SYSTEM NO. W-L-3384

CABLE BUNDLES THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.

T-RATING = 1/2-HR. OR 1 1/2-HR.

L-RATING AT AMBIENT = LESS THAN 1 CFM PER DEVICE (SEE TABLE BELOW)

L-RATING AT 400°F = 1 OR LESS THAN 1 CFM PER DEVICE (SEE TABLE BELOW)

WL3384a.051712

CONFIGURATION B

3. MAXIMUM FOUR HILTI CP 653 SPEED SLEEVES [2" OR 4"] GROUPED IN ONE ROW. INDIVIDUAL OPENINGS ARE SPACED MINIMUM 1-7/16" APART. DEVICE FLANGES MAY OVERLAP ONE ANOTHER. HILTI SPEED SLEEVE SLID INTO AND CENTERED WITHIN WALL. DEVICE FLANGES SPUN CLOCKWISE ONTO DEVICE THREADS, BUTTING TIGHTLY TO WALL SURFACES. INNER FABRIC MAY REMAIN OPEN EXCEPT FOR WHEN L-RATING IS REQUIRED.
4. SECURE DEVICE FLANGES TO BOTH SIDES OF WALL WITH TWO MINIMUM 1-1/2" LONG DRYWALL SCREWS.
5. MINIMUM 1/4" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT OR HILTI CP 606 FLEXIBLE FIRESTOP SEALANT APPLIED AROUND PERIPHERY OF EACH DEVICE ON BOTH SIDES OF WALL PRIOR TO INSTALLING DEVICE FLANGES.

MAX CABLE FILL	CABLE TYPE	L RATING, CFM PER DEVICE	
		AMBIENT	400°F
0%	—	LESS THAN 1	LESS THAN 1
100%	ITEM 2D ONLY	LESS THAN 1	LESS THAN 1
100%	ANY CABLES (ITEM NO. 2) IN ANY COMBINATION	LESS THAN 1	1

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 2-1/2" [FOR 2" DEVICES] OR 4-1/2" [FOR 4" DEVICES].
 2. CABLES MAY REPRESENT 0% TO 100% VISUAL FILL OF DEVICE.
 3. L-RATING APPLIES ONLY WHEN INNER FABRIC SEAL IS TWISTED CLOSED.



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UL/cUL SYSTEM NO. W-L-4011

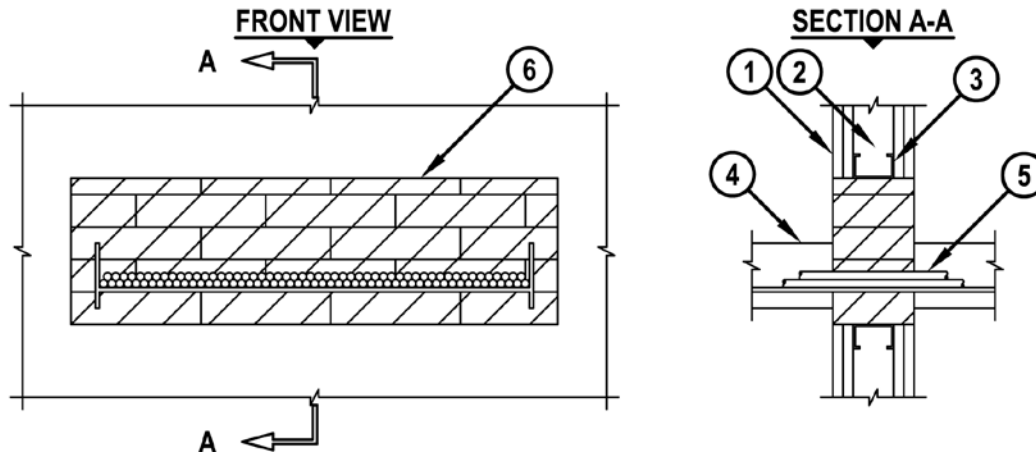
CABLE TRAY THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.

T-RATING = 0-HR.

L-RATING AT AMBIENT = 5 CFM/SQ. FT.

L-RATING AT 400°F = 2 CFM/SQ. FT.



WL4011m.011112

1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U300, U400, V400, OR W400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. [NOT SHOWN] WOOD STUDS TO CONSIST OF NOMINAL 2" x 4" LUMBER. STEEL STUDS TO BE MINIMUM 2-1/2" WIDE.
3. OPENING TO BE "FRAMED OUT" WITH ADDITIONAL FRAMING MEMBERS.
4. MAXIMUM 24" x 6" ALUMINUM OR STEEL OPEN LADDER OR SOLID BACK CABLE TRAY.
5. CABLES TO BE ANY COMBINATION OF THE FOLLOWING :
 - A. MAXIMUM 300 PAIR NO. 24 AWG TELEPHONE CABLE.
 - B. MAXIMUM 750 KCMIL SINGLE CONDUCTOR POWER CABLE.
 - C. MAXIMUM 1/2" DIAMETER FIBER-OPTIC CABLE (24 FIBER).
 - D. MAXIMUM 3/C NO. 12 AWG METAL CLAD CABLE.
6. HILTI CFS-BL FIRESTOP BLOCK OR HILTI FS 657 FIRE BLOCK (2" THICK x 8" WIDE x 5" DEEP, REFERENCE : FRONT VIEW) FIRMLY PACKED AND CENTERED WITHIN OPENING. EITHER ONE OR A COMBINATION OF BLOCK TYPES MAY BE USED.

- NOTES :**
1. MAXIMUM SIZE OF OPENING = 30" x 9".
 2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 4".
 3. MAXIMUM AREA OF CABLES EQUALS 45% OF CROSS-SECTIONAL AREA OF CABLE TRAY BASED ON A MAXIMUM 5" CABLE LOADING DEPTH.
 4. FOR WALLS CONSTRUCTED OF STEEL STUDS LARGER THAN 3-5/8", FIRESTOP/FIRE BLOCKS SHOULD BE INSTALLED 8" DEEP, RECESSED UP TO A MAXIMUM 1/2" FROM OUTER WALL SURFACES.
 5. APPLY HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT OR CP 618 FIRESTOP PUTTY STICK INTO INTERSTICES OF CABLES, BETWEEN CABLES AND CABLE TRAY, AND ANY VOIDS TO MAXIMUM EXTENT POSSIBLE.
 6. L-RATINGS ONLY APPLY WHEN HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT IS USED.



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UL/cUL SYSTEM NO. W-L-4019

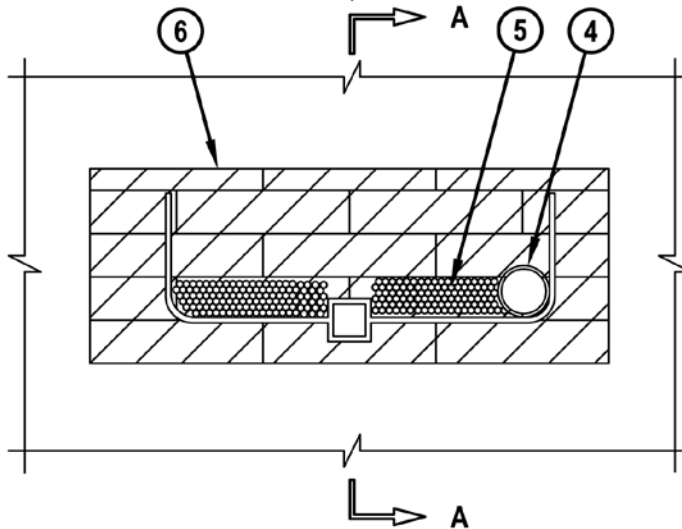
SPINE CABLE TRAY THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.

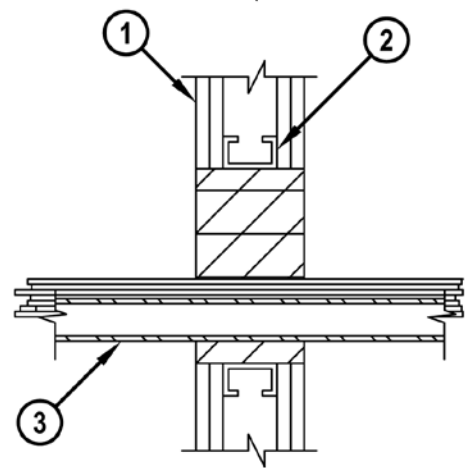
T-RATING = 0-HR.

NOTE : TESTED TO A 2.5 Pa PRESSURE DIFFERENTIAL

FRONT VIEW



SECTION A-A



1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U300 OR U400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR SHOWN).
2. OPENING TO BE FRAMED OUT WITH METAL STUDS.
3. MAXIMUM 18" x 6" SPINE CABLE TRAY (ALUMINUM OR STEEL).
4. MAXIMUM 2" NOMINAL DIAMETER INNERDUCT (CLOSED SYSTEM ONLY).
5. ANY OF THE FOLLOWING CABLES MAY BE USED WITH CABLE TRAY:
 - A. RG 59 COAXIAL CABLE.
 - B. MAX. 6 PAIR NO. 24 AWG TELEPHONE CABLE.
 - C. DATA-COMMUNICATION CABLE (24 GAUGE MULTIPLE CONNECTOR).
 - D. MAX. 3/C NO. 12 AWG METAL CLAD CABLE.
 - E. 24 FIBER-OPTIC CABLE (MAX. 1/4" DIAMETER).
 - F. MAXIMUM 2/C NO. 12 (+GRND), ROMEX.
6. HILTI CFS-BL FIRESTOP BLOCK OR HILTI FS 657 FIRE BLOCK (2" THICK x 8" WIDE x 5" DEEP, REFERENCE : FRONT VIEW) FIRMLY PACKED WITHIN OPENING. EITHER ONE OR A COMBINATION OF BLOCK TYPES MAY BE USED.

NOTES : 1. MAXIMUM AREA OF OPENING = 216 SQ. IN., WITH A MAXIMUM DIMENSION OF 24".
 2. ANNULAR SPACE = MINIMUM 1", MAXIMUM 4-1/2".
 3. MAXIMUM AREA OF CABLES EQUALS 22% OF CROSS-SECTIONAL AREA OF CABLE TRAY.
 4. APPLY HILTI FS-ONE FIRESTOP SEALANT OR HILTI CP 618 FIRESTOP PUTTY STICK INTO INTERSTICES OF CABLES, BETWEEN CABLES AND CABLE TRAY, AND ANY VOIDS TO MAXIMUM EXTENT POSSIBLE.



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WL4019d.011112

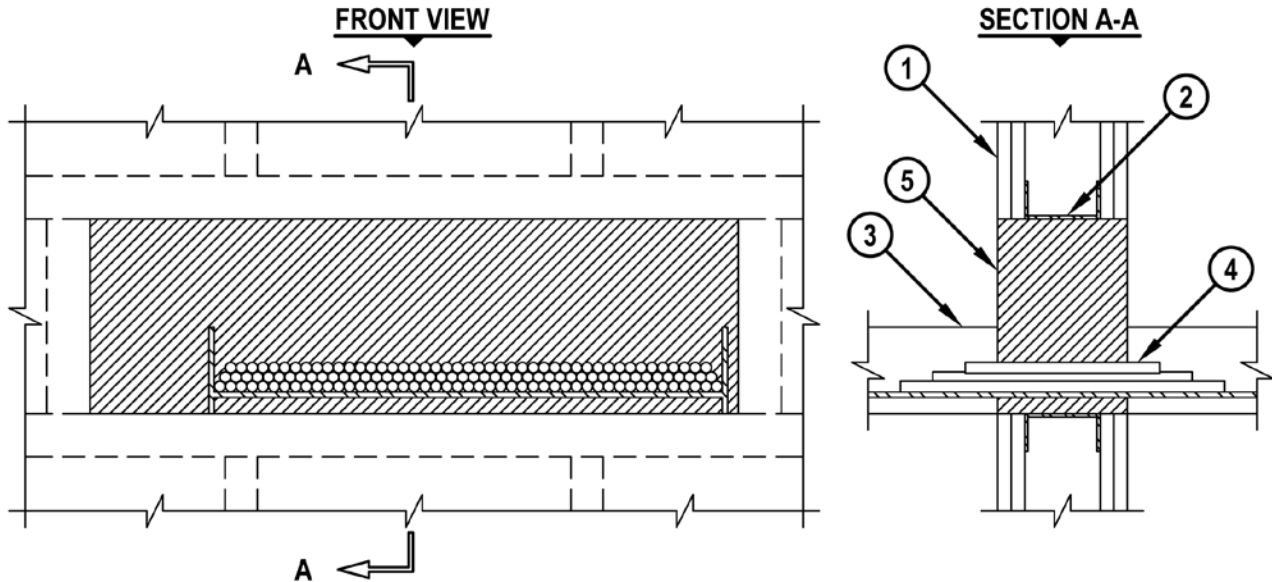
UL/cUL SYSTEM NO. W-L-4034

CABLE TRAY THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.

T-RATING = 0-HR.

WL4034c.011012



1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U400 OR V400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. OPENING TO BE "FRAMED OUT" WITH LIGHTGAGE STEEL STUDS (MINIMUM 3-1/2" WIDE).
3. MAXIMUM 24" x 4" ALUMINUM OPEN LADDER CABLE TRAY.
4. CABLES TO BE ANY COMBINATION OF THE FOLLOWING :
 - A. MAXIMUM 300 PAIR NO. 24 AWG TELEPHONE CABLE.
 - B. MAXIMUM 500 KCMIL SINGLE CONDUCTOR POWER CABLE.
 - C. MAXIMUM 3/8" DIAMETER FIBER-OPTIC CABLE.
 - D. MAXIMUM 3/C NO. 12 AWG METAL-CLAD CABLE.
5. HILTI CP 620 FIRE FOAM INSTALLED FLUSH WITH BOTH SURFACES OF THE WALL :
 - A. MINIMUM 4-3/4" THICKNESS, FOR A 1-HR. FIRE-RATING.
 - B. MINIMUM 6" THICKNESS, FOR A 2-HR. FIRE-RATING.

NOTES : 1. MAXIMUM SIZE OF OPENING = 30" x 9".
 2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 5".
 3. MAXIMUM AREA OF CABLES SHALL BE 45% OF CROSS-SECTIONAL AREA OF CABLE TRAY BASED ON A MAXIMUM 3" CABLE LOADING DEPTH.
 4. [OPTIONAL - NOT SHOWN] HILTI CFS-BL FIRESTOP BLOCK OR HILTI FS 657 FIRE BLOCK (CENTERED WITHIN WALL ASSEMBLY) MAY BE APPLIED IN A SINGLE LAYER ABOVE CABLES WITHIN CABLE TRAY (2" THICK x 8" WIDE x 5" DEEP). EITHER ONE OR A COMBINATION OF BLOCK TYPES MAY BE USED.



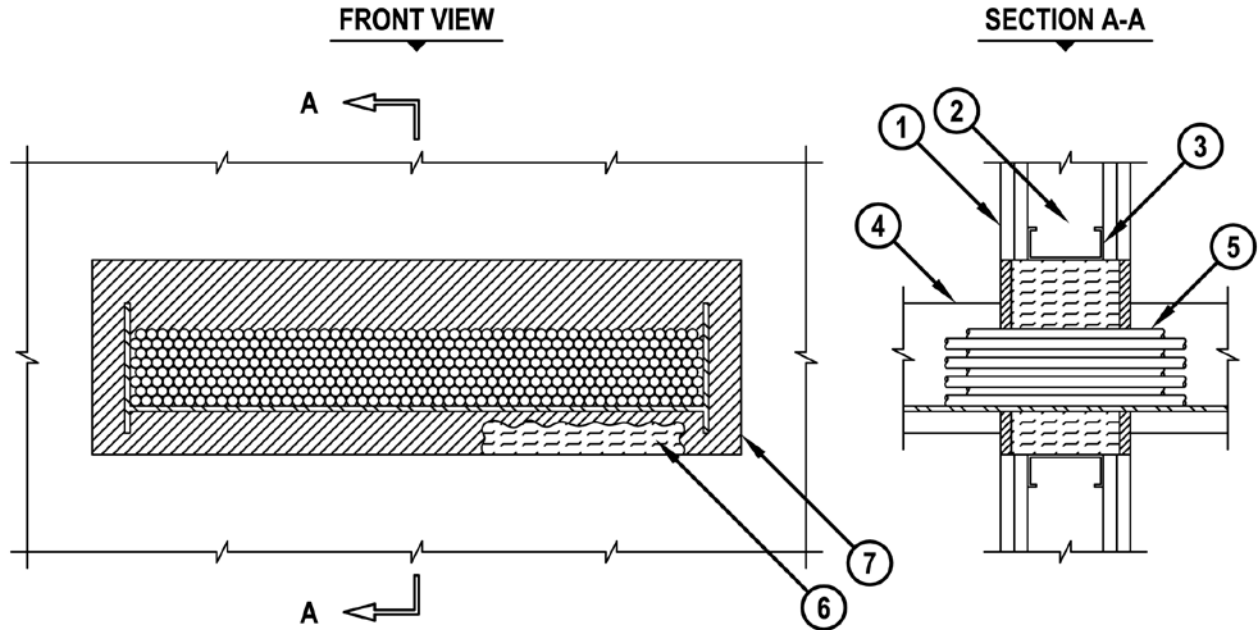
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UL/cUL SYSTEM NO. W-L-4060
CABLE TRAY THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.
T-RATING = 1/2-HR.



WL4060a.102804

1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U300, U400, OR V400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. (NOT SHOWN). WOOD STUDS TO CONSIST OF NOMINAL 2" x 4" LUMBER. STEEL STUDS TO BE MINIMUM 3-1/2" WIDE.
3. OPENING TO BE "FRAMED-OUT" WITH ADDITIONAL FRAMING MEMBERS.
4. ALUMINUM OR STEEL OPEN LADDER CABLE TRAY (MAXIMUM SIZE : 24" x 6")
5. CABLES TO BE ANY COMBINATION OF THE FOLLOWING:
 - A. MAXIMUM 300 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
 - B. MAXIMUM 750 KCMIL SINGLE CONDUCTOR POWER CABLE WITH PVC JACKET.
 - C. MAXIMUM 1/2" DIAMETER FIBER-OPTIC CABLE (MAXIMUM 24 FIBER) WITH PVC JACKET.
 - D. MAXIMUM 3/C NO. 12 AWG METAL CLAD CABLE.
6. MINIMUM 3-3/4" OR 5" THICKNESS MINERAL WOOL (MINIMUM 4 PCF DENSITY) TIGHTLY PACKED FOR A 1-HR. OR 2-HR. FIRE-RATING, RESPECTIVELY.
7. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.

NOTES : 1. MAXIMUM SIZE OF OPENING TO BE ONE OF THE FOLLOWING:
A. 30" x 9" FOR STEEL STUD WALLS.
B. 14-1/2" x 9" FOR WOOD STUD WALLS.
2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 3".
3. MAXIMUM AREA OF CABLES SHALL BE 40% OF CROSS-SECTIONAL AREA OF CABLE TRAY (APPROXIMATE 5" CABLE LOADING DEPTH).

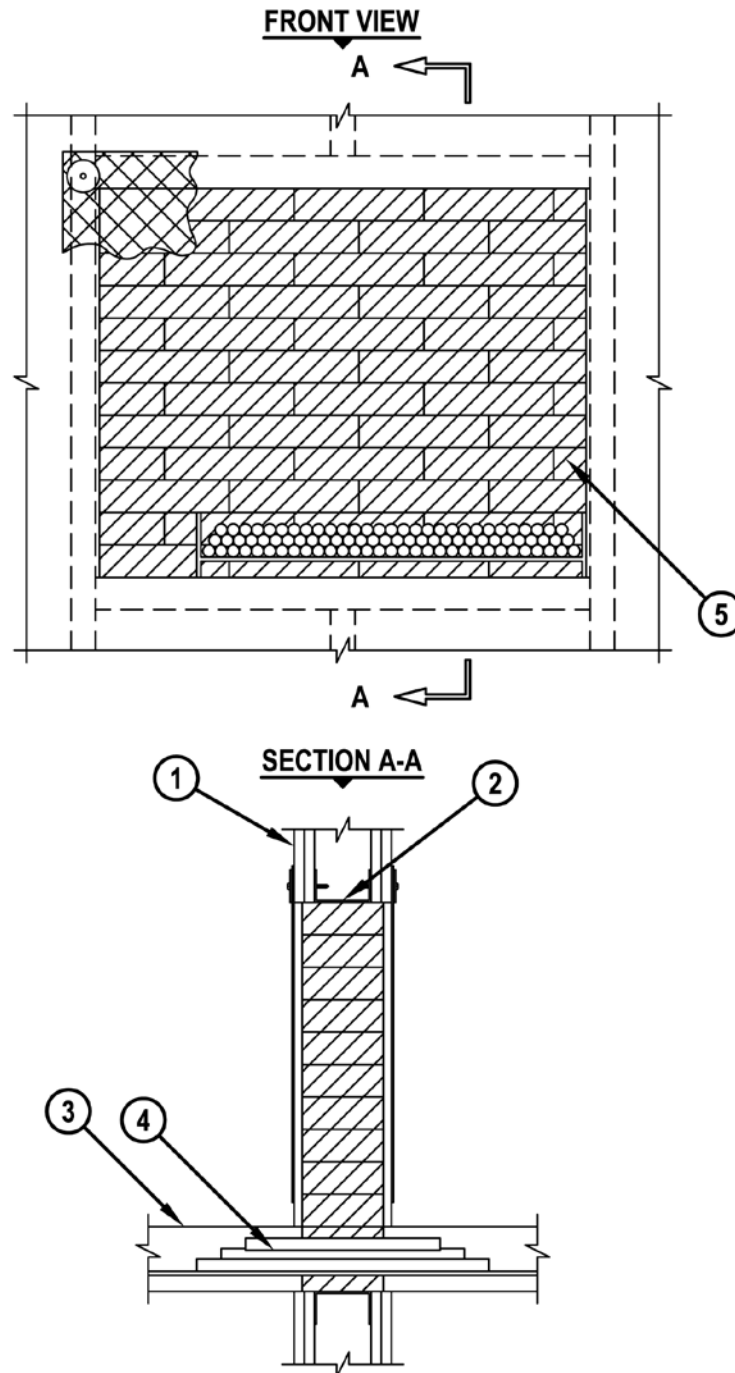


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UL/cUL SYSTEM NO. W-L-4081
CABLE TRAY THROUGH GYPSUM WALL ASSEMBLY
F-RATING = 1-HR. OR 2-HR.
T-RATING = 0-HR.

WL4081a.010412



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UL/cUL SYSTEM NO. W-L-4081

CABLE TRAY THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.

T-RATING = 0-HR.

WL4081a.010412

1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U300, U400, V400, OR W400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. WOOD STUDS TO CONSIST OF NOMINAL 2" x 4" LUMBER. STEEL STUDS TO BE MINIMUM 2-1/2" WIDE. OPENING TO BE COMPLETELY "FRAMED-OUT".
3. MAXIMUM 24" WIDE x 4" DEEP, ALUMINUM OR STEEL, OPEN LADDER OR SOLID BACK, CABLE TRAY.
4. CABLES TO BE ANY COMBINATION OF THE FOLLOWING :
 - A. MAXIMUM 300 PAIR NO. 24 AWG TELEPHONE CABLE.
 - B. MAXIMUM 750 KCMIL SINGLE CONDUCTOR POWER CABLE.
 - C. MAXIMUM 1/2" DIAMETER FIBER-OPTIC CABLE (24 FIBER).
 - D. MAXIMUM 3/C NO. 12 AWG METAL-CLAD CABLE.
5. HILTI CFS-BL FIRESTOP BLOCK (2" THICK x 8" WIDE x 5" DEEP, REFERENCE : FRONT VIEW) FIRMLY PACKED AND CENTERED WITHIN WALL.

- NOTES :**
1. MAXIMUM SIZE OF OPENING = 900 SQ. IN., WITH A MAXIMUM DIMENSION OF 30".
 2. ANNULAR SPACE [FOR STEEL STUD WALLS] = MINIMUM 0", MAXIMUM 26".
 3. ANNULAR SPACE [FOR WOOD STUD WALLS] = MINIMUM 1", MAXIMUM 26".
 4. CABLES TO FILL MAXIMUM 45% OF CROSS-SECTIONAL AREA OF CABLE TRAY BASED ON A MAXIMUM 3" CABLE LOADING DEPTH.
 5. APPLY HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT, CP 618 FIRESTOP PUTTY STICK, OR CP 620 FIRE FOAM, IN ANY VOID THAT MAY EXIST (INTO INTERSTICES OF CABLES, BETWEEN CABLES AND CABLE TRAY, AND ANY VOIDS TO MAXIMUM EXTENT POSSIBLE.
 6. FOR WALLS CONSTRUCTED OF STEEL STUDS LARGER THAN 3-5/8", FIRESTOP BLOCKS SHOULD BE INSTALLED 8" DEEP. FIRESTOP BLOCKS MAY BE RECESSED MAXIMUM 1/2" FROM SURFACE OF WALL.
 7. WHEN ANNULAR SPACE EXCEEDS 12", A NOMINAL 2" x 2" STEEL WIRE MESH (16 GA.) SHALL BE ATTACHED TO BOTH SIDES OF THE WALL BY MEANS OF 1/4" HILTI TOGGLER BOLTS WITH 1-1/2" DIAMETER FENDER WASHERS (SPACED MAX. 8" C/C) OR ATTACHED TO STEEL STUDS WITH STEEL SCREWS AND 1-7/16" DIAMETER FENDER WASHERS (SPACED MAX. 6" C/C). STEEL WIRE MESH SHALL BEGIN MAXIMUM 2-1/2" FROM THE PENETRANT AND OVERLAP MINIMUM 3" BEYOND THE PERIPHERY OF THE OPENING.
 8. [NOT SHOWN] AS AN ALTERNATE TO WIRE MESH, STEEL PLATE (MIN. 22 GA.) MAY BE USED. STEEL PLATE SHALL BE ATTACHED TO STEEL STRUTS (13/16" DEEP x 12 GA.) WITH 1/4" DIA. STEEL NUTS (SPACED 8" C/C). STRUT SHALL BE SECURED TO BOTH SURFACES OF THE WALL ASSEMBLY WITH 1/4" DIA. TOGGLER BOLTS OR ATTACHED TO STEEL STUDS WITH STEEL SCREWS AND WASHERS (SPACED MAX. 12" C/C).



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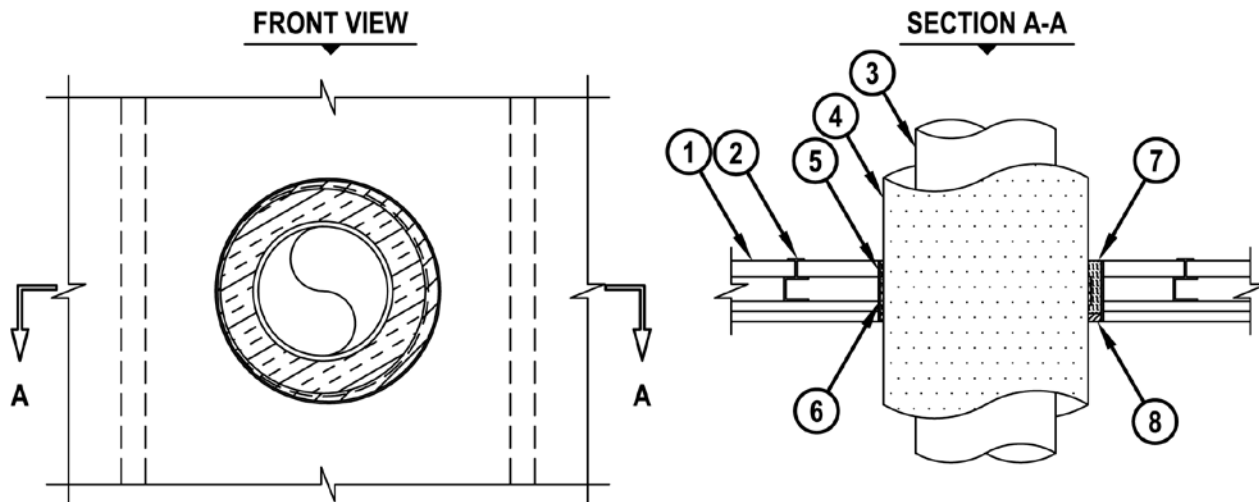
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cUL SYSTEM NO. W-L-5010

**INSULATED METAL PIPE THROUGH GYPSUM SHAFT WALL ASSEMBLY**

F-RATING = 1-HR. OR 2-HR.
 FT-RATING = 0-HR. OR 1-HR.
 FH AND FTH-RATINGS = 0-HR.

cUL WL5010b.051809



1. GYPSUM SHAFT WALL ASSEMBLY (UL/cUL CLASSIFIED U400 OR V400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. "C-H" OR "C-T" SHAPED STEEL STUDS (MINIMUM 1-1/2" WIDE x 2-1/2" DEEP, MIN. 25 GA.) SPACED MAXIMUM 24" C/C.
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 8" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 8" NOMINAL DIAMETER CAST OR DUCTILE IRON PIPE.
 - C. MAXIMUM 2" NOMINAL DIAMETER COPPER PIPE OR TUBING.
4. MAXIMUM 2" THICK GLASS-FIBER PIPE INSULATION.
5. MAXIMUM 14" DIAMETER SHEET METAL SLEEVE (MIN. 28 GA.) HAVING MINIMUM 1" OVERLAP ALONG LONGITUDINAL SEAM.
6. HILTI CP 648E WRAP STRIP (NOMINAL 3/16" THICK x 1-3/4" WIDE) CONTINUOUSLY WRAPPED AROUND THE OUTER CIRCUMFERENCE OF THE PIPE, COVERING ONE TIME, WITH ENDS BUTTED AND HELD IN PLACE WITH TAPE. WRAP STRIP RECESSED SUCH THAT LEADING EDGE OF WRAP STRIP IS FLUSH WITH INNER SURFACE OF GYPSUM BOARD LINER PANEL.
7. MINIMUM 2-3/4" OR 3-1/4" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED AND RECESSED ON ONE SIDE OF WALL FOR FIRESTOP SEALANT.
8. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 14".
 2. ANNULAR SPACE = MINIMUM 3/16", MAXIMUM 13/16".
 3. THIS FIRESTOP SYSTEM WAS DESIGNED AND TESTED FOR APPLICATIONS IN WHICH THERE IS LIMITED OR NO ACCESS AVAILABLE ON ONE SIDE OF THE WALL.



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cUL SYSTEM NO. W-L-5011

INSULATED METAL PIPE THROUGH GYPSUM SHAFT WALL ASSEMBLY

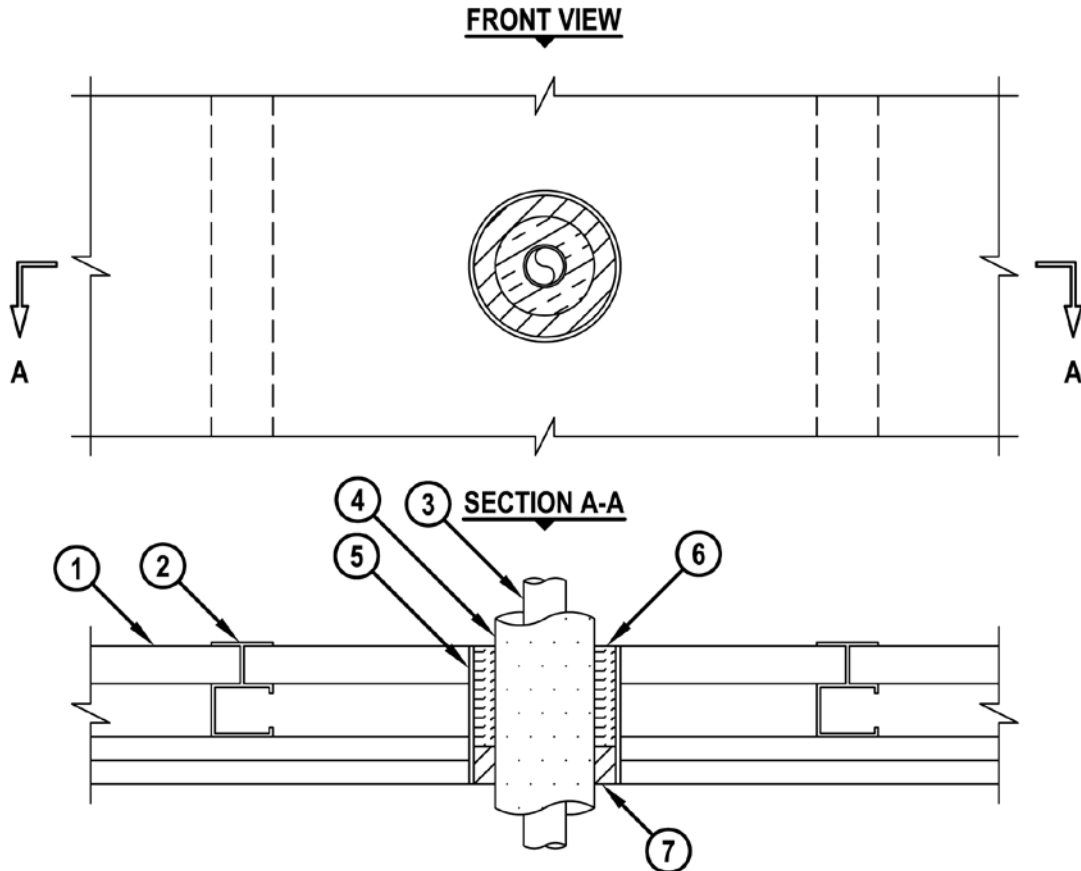
F-RATING = 1-HR. OR 2-HR.

FT-RATING = 1/4-HR.

FH AND FTH-RATINGS = 0-HR.



cUL WL5011a.032807



1. GYPSUM SHAFT WALL ASSEMBLY (UL/cUL CLASSIFIED U400 SERIES) (1-HR. OR 2-HR. FIRE-RATING).
2. "C-T" SHAPED STEEL STUDS (1-5/8" WIDE x 2-1/2" DEEP, MINIMUM 25 GA.) SPACED MAXIMUM 24" C/C.
3. MAXIMUM 1" NOMINAL DIAMETER COPPER PIPE.
4. MAXIMUM 3/4" THICK AB/PVC FLEXIBLE FOAM PIPE INSULATION.
5. MAXIMUM 4" DIAMETER SHEET METAL SLEEVE (MINIMUM 28 GA.) HAVING MINIMUM 1" OVERLAP ALONG LONGITUDINAL SEAM.
6. MINIMUM 2" OR 2-1/2" THICKNESS MINERAL WOOL (MINIMUM 4 PCF DENSITY) TIGHTLY PACKED AND RECESSED ON ONE SIDE OF WALL FOR 1-HR. OR 2-HR. FIRE-RATED WALLS RESPECTIVELY.
7. MINIMUM 1" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 4".
2. ANNULAR SPACE = MINIMUM 1/4", MAXIMUM 1-1/8".



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UL/cUL SYSTEM NO. W-L-5028

INSULATED METAL PIPE THROUGH GYPSUM WALL ASSEMBLY

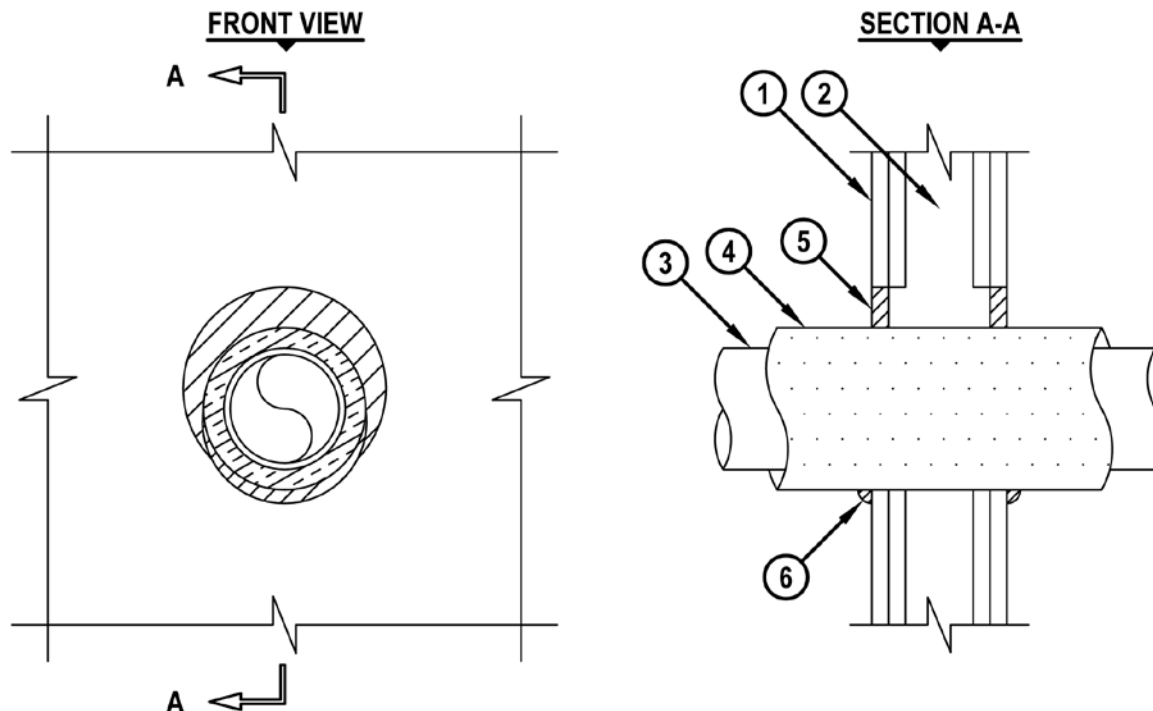
F-RATING = 1-HR. OR 2-HR.

T-RATING = 0-HR. OR 3/4-HR.

L-RATING AT AMBIENT = LESS THAN 1 CFM/SQ FT

L-RATING AT 400°F = LESS THAN 1 CFM/SQ FT

WL5028k-02912



1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U300 OR U400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. [NOT SHOWN] WOOD STUDS TO CONSIST OF NOMINAL 2" x 4" LUMBER. STEEL STUDS TO BE MINIMUM 2-1/2" WIDE.
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 4" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 40 OR HEAVIER).
 - B. MAXIMUM 2" NOMINAL DIAMETER COPPER PIPE OR TUBING.
4. MINIMUM 1/2" TO MAXIMUM 3/4" THICK AB/PVC FLEXIBLE FOAM PIPE INSULATION.
5. MINIMUM 5/8" DEPTH HILTI FS-ONE HIGH PERFORMANCE INTUMESCENT FIRESTOP SEALANT.
6. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 7-1/2".
 2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1-1/2".



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UL/cUL SYSTEM NO. W-L-5029

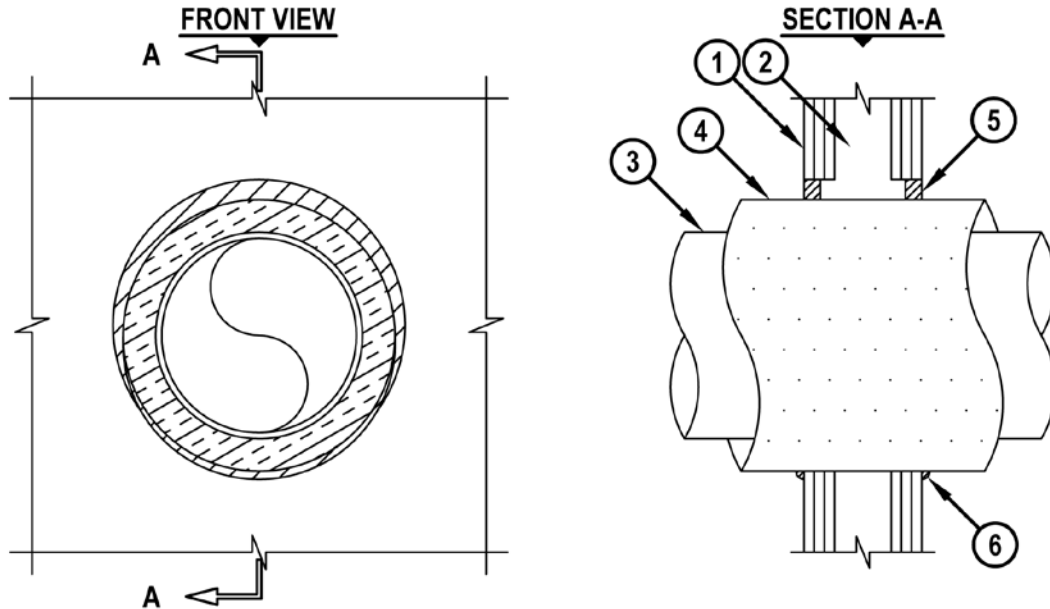
INSULATED METAL PIPE THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1-HR., 2-HR., OR 3-HR.

T-RATING = 0-HR., 1/2-HR., 1-HR., OR 1-1/4-HR. (SEE UL FIRE RESISTANCE DIRECTORY)

L-RATING AT AMBIENT = 4 CFM/SQ FT

L-RATING AT 400° F = LESS THAN 1 CFM/SQ FT



1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U300, U400, V400, OR W400 SERIES) (1-HR., 2-HR., OR 3-HR. FIRE-RATING) (3-HR. SHOWN).
2. [NOT SHOWN] WOOD STUDS TO CONSIST OF NOMINAL 2" x 4" LUMBER. STEEL STUDS TO BE MINIMUM 2-1/2" (FOR 1-HR. OR 2-HR. FIRE-RATING) OR 3-1/2" (FOR 3-HR. FIRE-RATING) WIDE.
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 12" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 12" NOMINAL DIAMETER CAST OR DUCTILE IRON PIPE.
 - C. MAXIMUM 6" NOMINAL DIAMETER COPPER PIPE OR TUBING (FOR 3-HR. WALLS, COPPER PIPE OR TUBING SHALL BE MAXIMUM 4" NOMINAL DIAMETER).
4. NOMINAL 1", 1-1/2" OR 2" THICK GLASS-FIBER PIPE INSULATION OR MAXIMUM 2" THICK CALCIUM SILICATE PIPE INSULATION (SEE NOTE NO. 4 BELOW).
5. HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT :
 - A. MINIMUM 5/8" DEPTH REQUIRED FOR 1-HR. OR 2-HR. FIRE-RATING.
 - B. MINIMUM 1" DEPTH REQUIRED FOR 3-HR. FIRE-RATING.
6. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT APPLIED AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 18-5/8".
 2. ANNULAR SPACE (FOR 1-HR. OR 2-HR. FIRE-RATING) = MINIMUM 0", MAXIMUM 1-7/8".
 3. ANNULAR SPACE (FOR 3-HR. FIRE-RATING) = MINIMUM 0", MAXIMUM 1-1/4".
 4. WHEN CALCIUM SILICATE PIPE INSULATION IS USED, SECURE INSULATION TO PIPE WITH STAINLESS STEEL BANDS OR MINIMUM 18 AWG STAINLESS STEEL WIRE AT MAXIMUM 12" O.C.



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WL5029p.061912

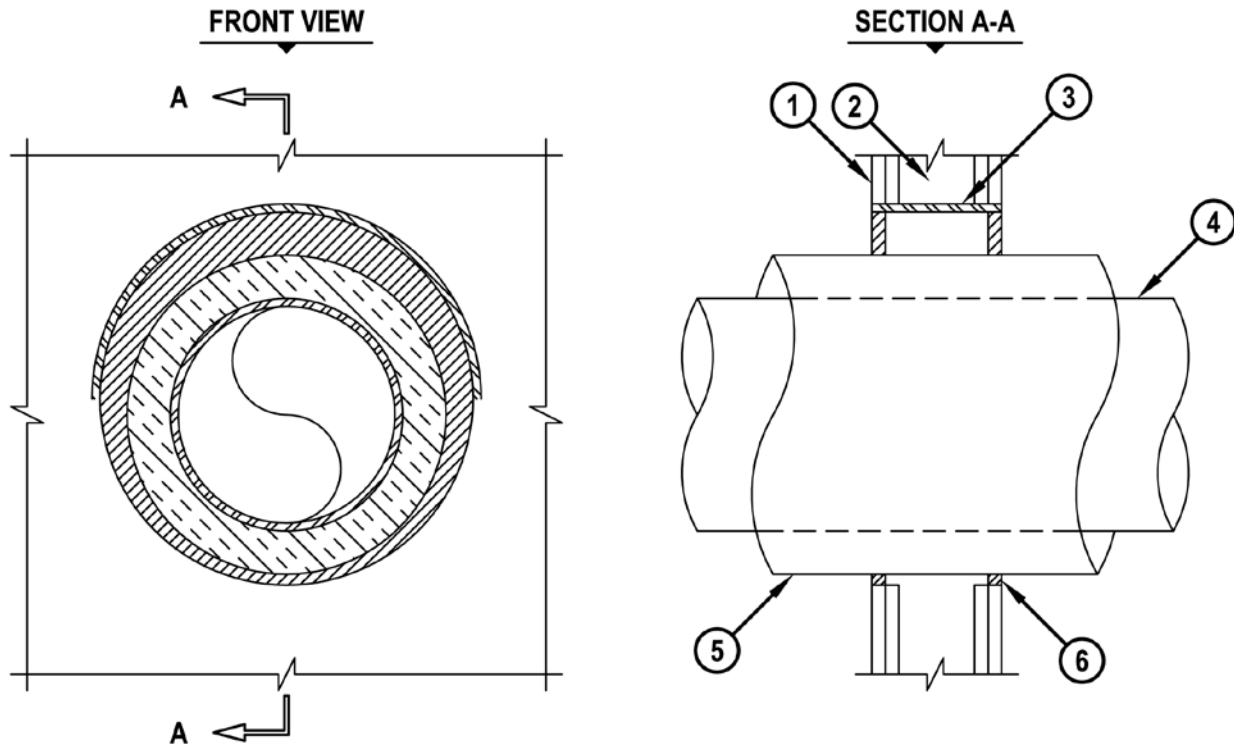
UL/cUL SYSTEM NO. W-L-5096

INSULATED METAL PIPE THROUGH A SLEEVE IN GYPSUM WALL

F-RATING = 1-HR. OR 2-HR.

T-RATING = 0-HR., 1/2-HR., OR 1-HR.

WL5096f.022702



1. GYPSUM WALL ASSEMBLY (UL/ULC CLASSIFIED U300 OR U400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. (NOT SHOWN). WOOD STUDS TO CONSIST OF NOMINAL 2" x 4" LUMBER. STEEL STUDS TO BE MINIMUM 2-1/2" WIDE.
3. (OPTIONAL) : MAXIMUM 18" DIAMETER STEEL PIPE SLEEVE (SCHEDULE 40 OR HEAVIER).
4. PENETRATING ITEM TO BE ANY OF THE FOLLOWING :
 - A. MAXIMUM 12" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 40 OR HEAVIER).
 - B. MAXIMUM 6" NOMINAL DIAMETER COPPER PIPE.
5. MAXIMUM 2" THICK GLASS-FIBER PIPE INSULATION.
6. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
7. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT APPLIED AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING :
 A. 18" FOR STEEL STUD WALLS.
 B. 14-1/2" FOR WOOD STUD WALLS.
 2. ANNULAR SPACE FOR INSULATED STEEL PIPE = 0", MAXIMUM 1/2".
 3. ANNULAR SPACE FOR INSULATED COPPER PIPE = 0", MAXIMUM 1-7/8".



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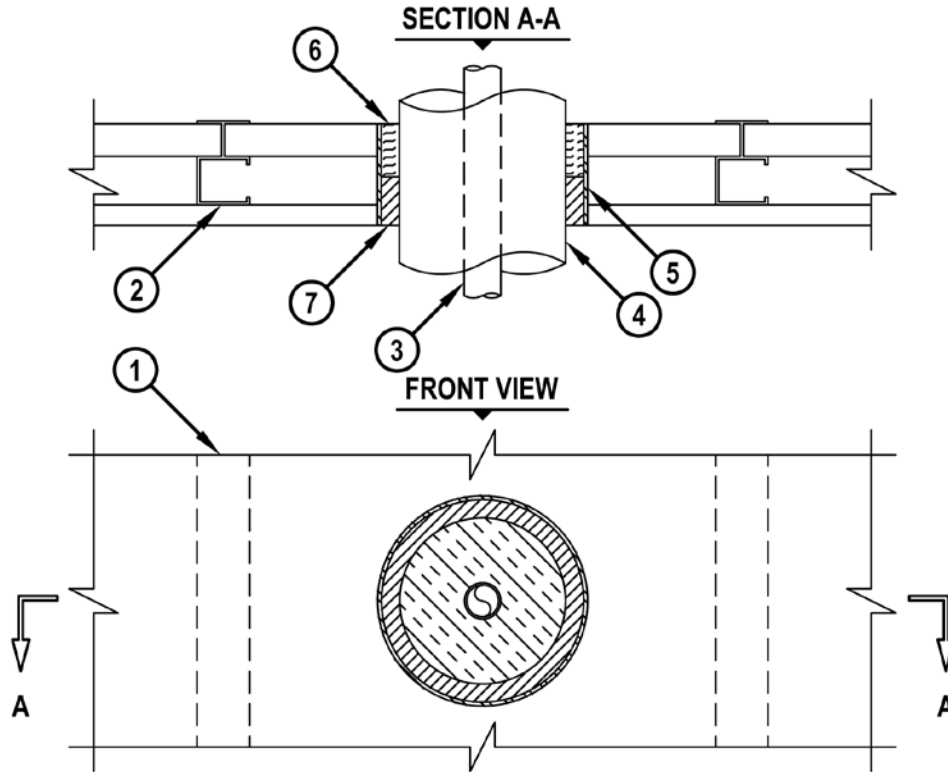
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UL/cUL SYSTEM NO. W-L-5144

INSULATED METAL PIPE THROUGH GYPSUM SHAFT WALL ASSEMBLY

F-RATING = 1-HR.

T-RATING = 1-HR.



1. GYPSUM SHAFT WALL ASSEMBLY (UL/ULC CLASSIFIED U400 SERIES) (1-HR. FIRE-RATING).
2. "C-T" SHAPED STEEL STUDS (1-5/8" WIDE x 2-1/2" DEEP, MIN. 25 GA.) SPACED MAXIMUM 24" C/C.
3. MAXIMUM 1" NOMINAL DIAMETER COPPER TUBE.
4. NOMINAL 2" THICK GLASS-FIBER PIPE INSULATION.
5. MAXIMUM 6-1/2" DIAMETER SHEET METAL SLEEVE (MIN. 28 GA.) OR NO. 8 STEEL WIRE MESH HAVING MINIMUM 1" OVERLAP ALONG LONGITUDINAL SEAM.
6. MINIMUM 1-5/8" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) TIGHTLY PACKED AND RECESSED ON ONE SIDE OF WALL FOR FIRESTOP SEALANT.
7. MINIMUM 1-1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 6-1/2".

2. ANNULAR SPACE = MINIMUM 1/4", MAXIMUM 1-1/8".

3. AS AN ALTERNATE TO THE ABOVE SHAFT WALL ASSEMBLY, A 1 OR 2-HR. GYPSUM WALL ASSEMBLY MAY BE USED (U300, U400 OR V400 SERIES). STEEL STUDS TO BE MINIMUM 2-1/2" WIDE. WOOD STUDS TO CONSIST OF NOMINAL 2 x 4 LUMBER.

4. WHEN SYSTEM IS INSTALLED IN A STANDARD WALL ASSEMBLY, MINERAL WOOL SHOULD BE INSTALLED FLUSH WITH EITHER SIDE OF WALL AND RECESSED FROM OTHER SIDE TO ACCOMMODATE SEALANT.



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WL5144c.090805

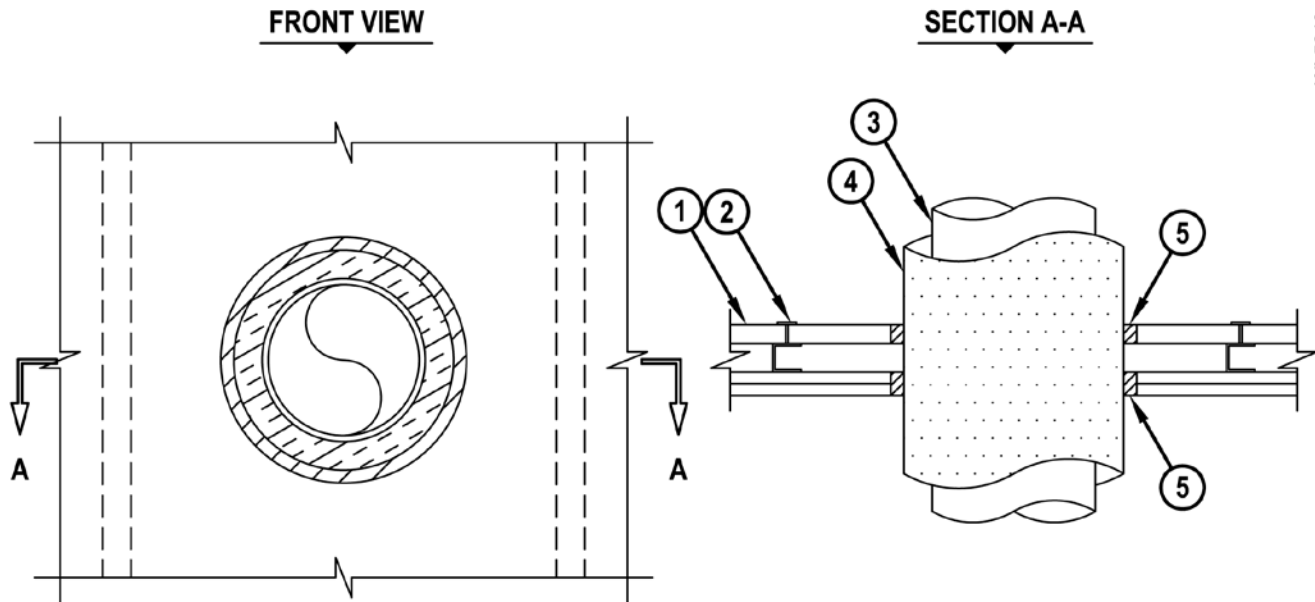
UL/cUL SYSTEM NO. W-L-5240

INSULATED METALLIC PIPE THROUGH GYPSUM SHAFT WALL ASSEMBLY

F-RATING = 2-HR.

T-RATING = 1/2 AND 1-1/4-HR.

WL5240a.072505



1. GYPSUM SHAFT WALL ASSEMBLY (UL/cUL CLASSIFIED U400 OR V400 SERIES) (2-HR. FIRE-RATING).
2. "C-T" OR "C-H" SHAPED STEEL STUDS (MINIMUM 1-1/2" DEEP x 2-1/2" WIDE, MIN. 25 GA.) SPACED MAXIMUM 24" C/C.
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 8" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 8" NOMINAL DIAMETER DIAMETER CAST OR DUCTILE IRON PIPE.
 - C. MAXIMUM 4" NOMINAL DIAMETER COPPER PIPE OR TUBING.
4. NOMINAL 1" OR 1-1/2" THICK GLASS-FIBER PIPE INSULATION.
5. MINIMUM 1" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT FLUSH WITH EACH SURFACE OF WALL ASSEMBLY.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 13".
 2. ANNULAR SPACE = MINIMUM 1/4", MAXIMUM 1-1/8".



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UL/cUL SYSTEM NO. W-L-5257

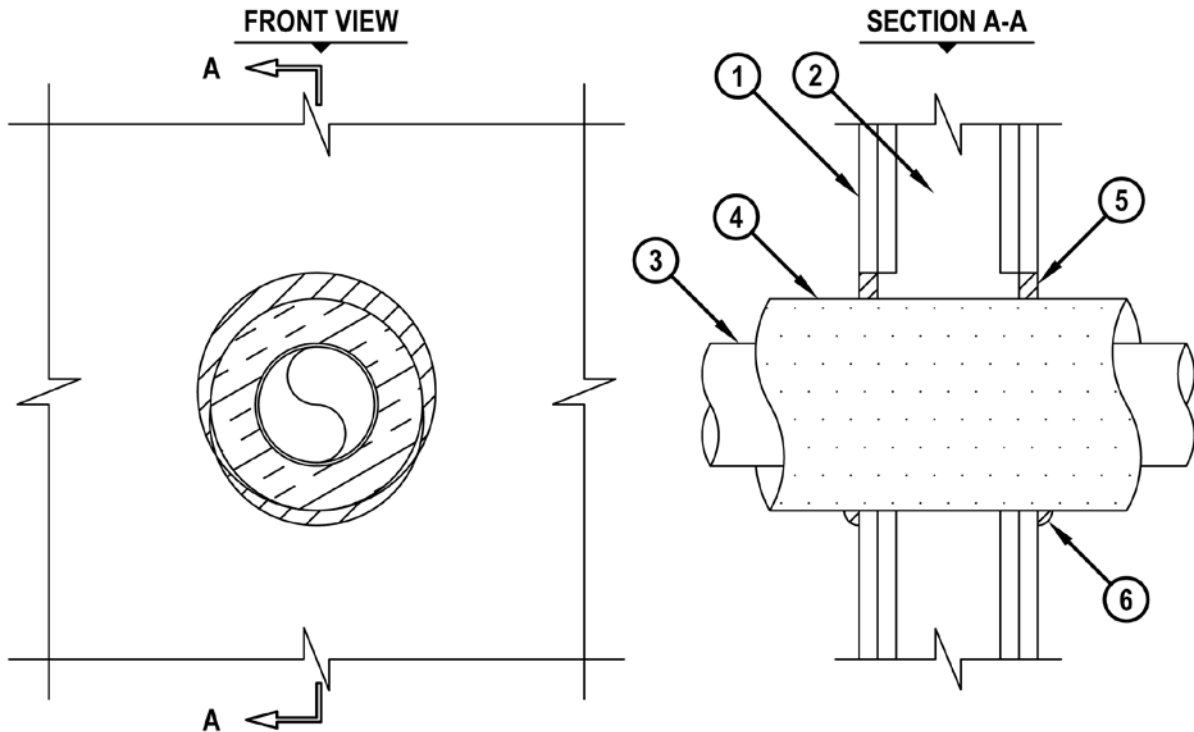
INSULATED METAL PIPE THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.

T-RATING = 0-HR. OR 1-HR.

L-RATING AT AMBIENT = 4 CFM/SQ FT

L-RATING AT 400°F = LESS THAN 1 CFM/SQ FT



1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U300, U400, V400, OR W400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. [NOT SHOWN] WOOD STUDS TO CONSIST OF NOMINAL 2" x 4" LUMBER. STEEL STUDS TO BE MINIMUM 3-1/2" WIDE.
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 4" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 5 OR HEAVIER).
 - B. MAXIMUM 4" NOMINAL DIAMETER CAST OR DUCTILE IRON PIPE.
 - C. MAXIMUM 4" NOMINAL DIAMETER COPPER PIPE OR TUBING.
4. MINIMUM 1" TO MAXIMUM 1-1/2" THICK GLASS-FIBER PIPE INSULATION (3.5 PCF DENSITY).
5. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT, HILTI CP 606 FLEXIBLE FIRESTOP SEALANT OR HILTI CP 601S ELASTOMERIC FIRESTOP SEALANT.
6. MINIMUM 1/2" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT, HILTI CP 606 FLEXIBLE FIRESTOP SEALANT OR HILTI CP 601S ELASTOMERIC FIRESTOP SEALANT APPLIED AT POINT OF CONTACT.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 8".

2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 7/8".

3. L-RATINGS APPLY ONLY WHEN HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT IS USED.



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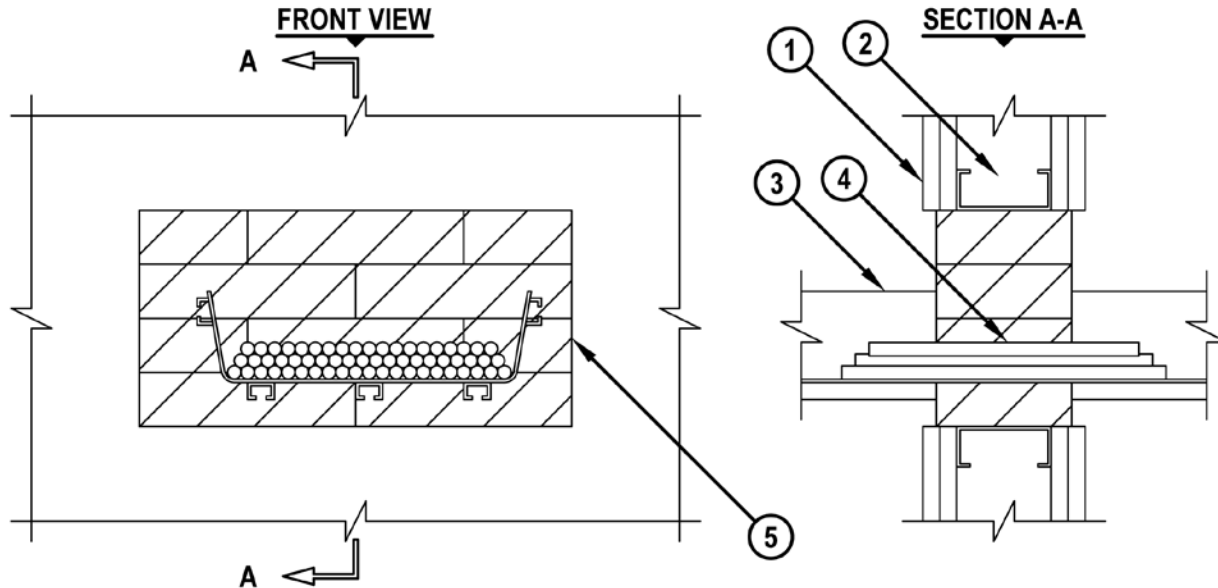
UL/cUL SYSTEM NO. W-L-6017

FIBER OPTIC TRAY THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.

T-RATING = 1-HR. OR 1 1/2-HR.

WL6017c.011112



1. GYPSUM WALL ASSEMBLY (UL CLASSIFIED U300 OR U400 SERIES WALL) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. WOOD STUDS TO CONSIST OF NOMINAL 2" x 4" LUMBER. STEEL STUDS TO BE MINIMUM 2-1/2" WIDE. OPENING TO BE COMPLETELY "FRAMED-OUT".
3. MAXIMUM 12" x 4" FIBER OPTIC CABLE TRAY (ABS) WITH OPTIONAL COVER PLATE (SEE NOTE NO. 4 BELOW).
4. MAXIMUM 1/2" DIAMETER FIBER OPTIC CABLES WITH PVC JACKET, MAY BE INSTALLED WITHIN CABLE TRAY. CABLES TO FILL MAXIMUM 40% OF CROSS-SECTIONAL AREA OF FIBER OPTIC CABLE TRAY.
5. HILTI CFS-BL FIRESTOP BLOCK OR HILTI FS 657 FIRE BLOCK (2" THICK x 8" WIDE x 5" DEEP, REFERENCE : FRONT VIEW) FIRMLY PACKED AND CENTERED WITH THE OPENING. EITHER ONE OR A COMBINATION OF BLOCK TYPES MAY BE USED.

NOTES : 1. MAXIMUM SIZE OF OPENING = 128 SQ. IN. WITH A MAXIMUM DIMENSION OF 16".

2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 4".

3. FOR WALLS CONSTRUCTED OF STEEL STUDS LARGER THAN 3-5/8", FIRE BLOCKS SHALL BE INSTALLED 8" DEEP, RECESSED UP TO A MAXIMUM 1/2" FROM OUTER WALL SURFACES.

4. WHEN OPTIONAL COVER PLATE IS USED, FIRESTOP/FIRE BLOCKS SHALL BE PLACED WITHIN THE FIBER OPTIC CABLE TRAY TO FILL VOID.

5. APPLY HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT, CP 618 FIRESTOP PUTTY STICK, OR CP 620 FIRE FOAM, INTO ANY VOID THAT MAY EXIST (AROUND PENETRANTS, INTO INTERSTICES OF CABLES, OR BETWEEN FIRESTOP/FIRE BLOCKS), TO MAXIMUM EXTENT POSSIBLE.



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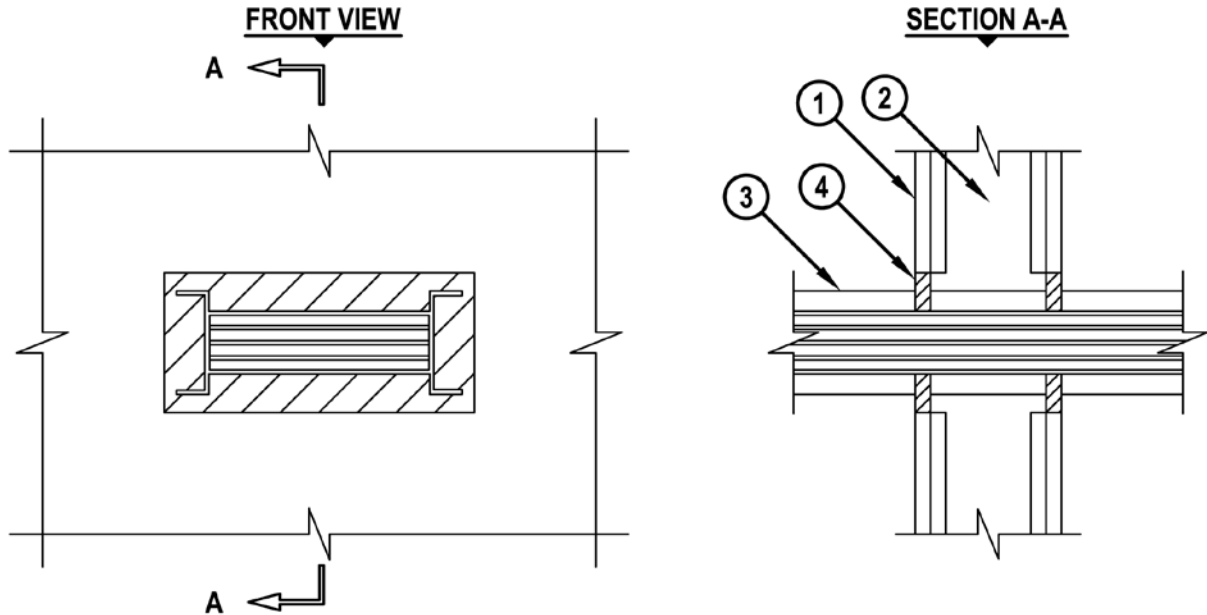
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UL/cUL SYSTEM NO. W-L-6019

ELECTRICAL BUSWAY THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.

T-RATING = 1/4-HR.



WL6019b.062106

1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U300 OR U400 SERIES WALL) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. WOOD STUDS TO CONSIST OF NOMINAL 2" x 4" LUMBER. STEEL STUDS TO BE MINIMUM 3-5/8" WIDE.
3. ELECTRICAL BUSWAY (NOMINAL 11-1/4" WIDE x 4-1/4" DEEP, OR SMALLER) "I" SHAPED ALUMINUM ENCLOSURE CONTAINING FACTORY MOUNTED ALUMINUM BARS RATED FOR 600V, 4000A, OR COPPER BARS RATED FOR 600V, 5000A.
4. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.

NOTES : 1. MAXIMUM SIZE OF OPENING = 12-3/4" x 5-3/4".
2. ANNULAR SPACE = MINIMUM 1/4", MAXIMUM 1-1/4".



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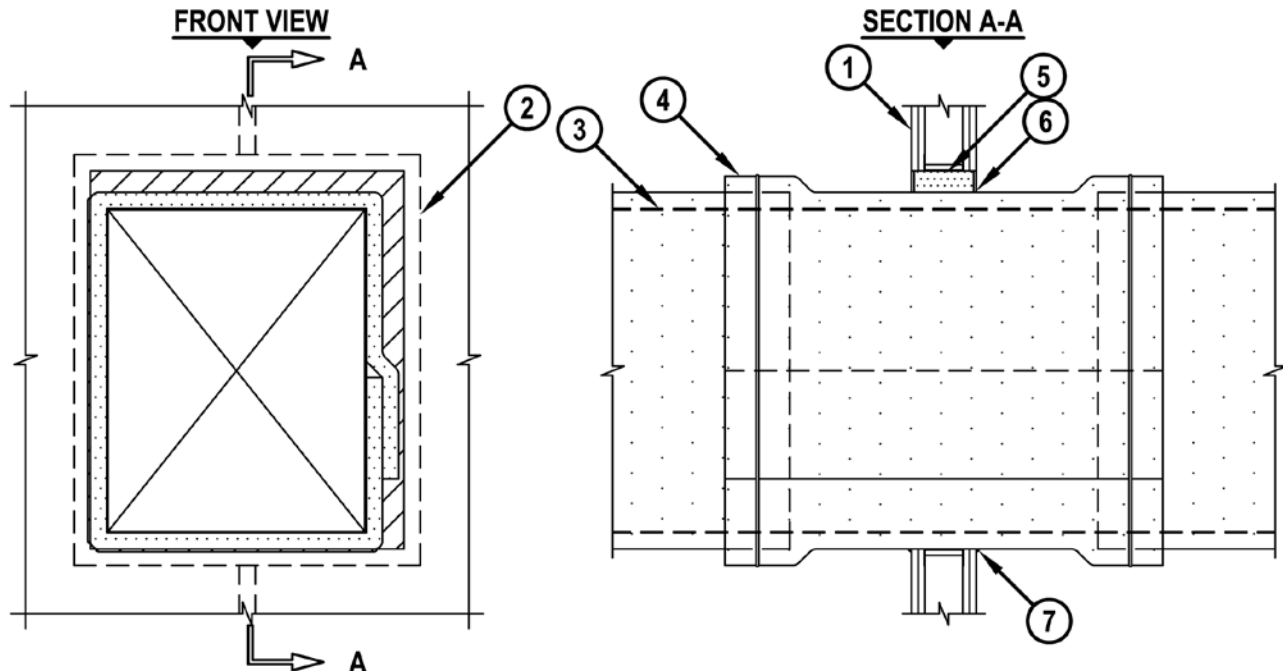
UL/cUL SYSTEM NO. W-L-7121

INSULATED DUCT (THERMAL CERAMICS) THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.

T-RATING = 1-HR. OR 2-HR.

WL7121a.051006



1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U300, U400 OR V400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. STEEL STUDS TO BE MINIMUM 3-1/2" WIDE. OPENING TO BE "FRAMED OUT" ON ALL SIDES OF OPENING.
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MINIMUM 26 GAUGE GALVANIZED STEEL AIR DUCT HAVING A MAXIMUM PERIMETER OF 108" AND A MAXIMUM INDIVIDUAL DIMENSION OF 30".
 - B. MINIMUM 16 GAUGE CARBON STEEL GREASE DUCT HAVING A MAXIMUM PERIMETER OF 108" AND A MAXIMUM INDIVIDUAL DIMENSION OF 30".
4. NOMINAL 1-1/2" THICK FIREMASTER® FAST WRAP MANUFACTURED BY THERMAL CERAMICS (SEE NOTES NO. 3 AND 4 BELOW).
5. MINIMUM 3-1/2" THICK UNFACED SCRAP DUCT WRAP MATERIAL COMPRESSED 50% INTO OPENING AND RECESSED TO ACCOMMODATE SEALANT.
6. MINIMUM 1/4" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
7. MINIMUM 1/4" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT APPLIED AT POINT OF CONTACT.

NOTES : 1. MAXIMUM AREA OF OPENING = 7 SQ. FT., WITH MAXIMUM DIMENSION OF 35".
 2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 2".
 3. GREASE DUCT SHALL BE WRAPPED IN ACCORDANCE WITH GREASE DUCT ASSEMBLY NO. G-14. GREASE DUCT ASSEMBLIES ARE FOR USE IN 2-HR. RATED WALLS ONLY.
 4. AIR DUCT SHALL BE WRAPPED IN ACCORDANCE WITH VENTILATION DUCT ASSEMBLY NO. V-19.



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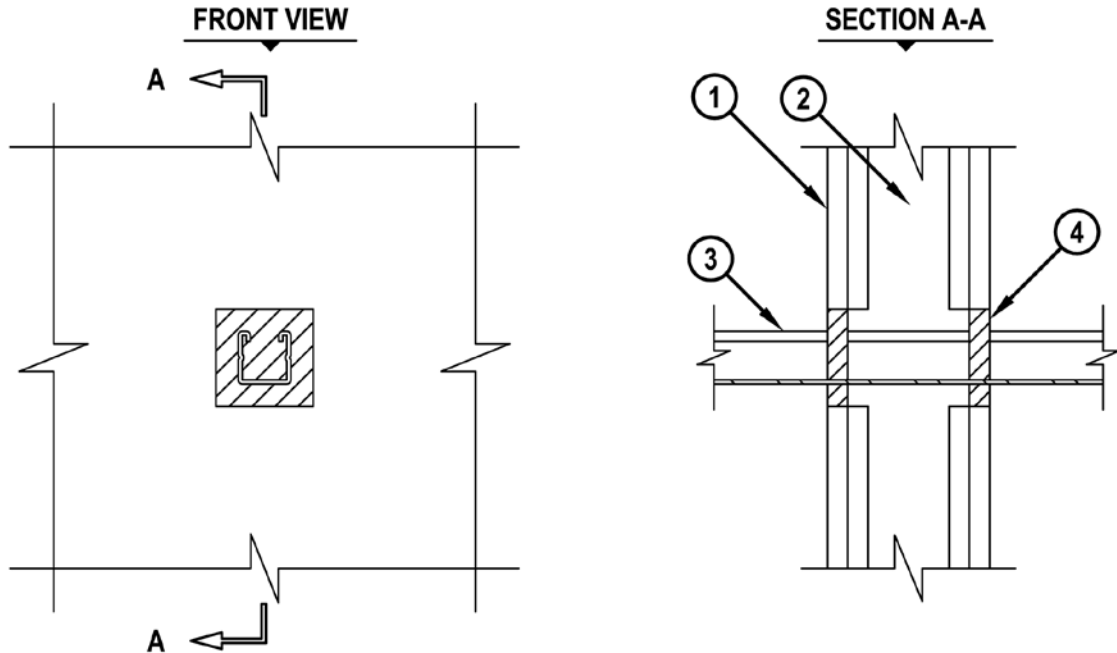
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UL/cUL SYSTEM NO. W-L-7130

MECHANICAL SUPPORT MEMBERS THROUGH GYPSUM WALL SSEMBLY

F-RATING = 1-HR OR 2-HR.

T-RATING = 0-HR.



WL7130a.032405

1. GYPSUM WALL ASSEMBLY (UL CLASSIFIED U300, U400 OR V400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. [NOT SHOWN] WOOD STUDS TO CONSIST OF NOMINAL 2" x 4" LUMBER. STEEL STUDS TO BE MINIMUM 2-1/2" WIDE.
3. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
 - A. MAXIMUM 1-5/8" x 1-5/8" GALVANIZED OR PAINTED STEEL CHANNEL STRUT (MINIMUM 0.105" THICK).
 - B. MAXIMUM 3-1/4" x 1-5/8" GALVANIZED OR PAINTED STEEL "H" STRUT (MINIMUM 0.105" THICK).
 - C. MAXIMUM 3/8" DIAMETER UNJACKETED GALVANIZED STEEL CABLE.
 - D. MAXIMUM 1" DIAMETER GALVANIZED THREADED STEEL ROD.
 - E. MAXIMUM 2" x 2" x 1/8" THICK STEEL ANGLE.
4. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT OR HILTI CP 606 FLEXIBLE FIRESTOP SEALANT.

NOTES : 1. MAXIMUM SIZE OF OPENING = 5" x 3" [OR MAXIMUM 3" DIAMETER].
 2. ANNULAR SPACE = MINIMUM 1/8", MAXIMUM 7/8".
 3. PENETRANT MAY BE INSTALLED AT AN ANGLE NOT GREATER THAN 45° FROM PERPENDICULAR.
 4. WHEN HILTI CP 606 FLEXIBLE FIRESTOP SEALANT IS USED ON AN ANGLED PENETRANT THROUGH A 2-HR FIRE RATED WALL, FIRMLY PACK 1/2" THICKNESS OF MINERAL WOOL (MIN. 4 PCF DENSITY) INTO OPENING AS A PERMANENT FORM.



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UL/cUL SYSTEM NO. W-L-7155

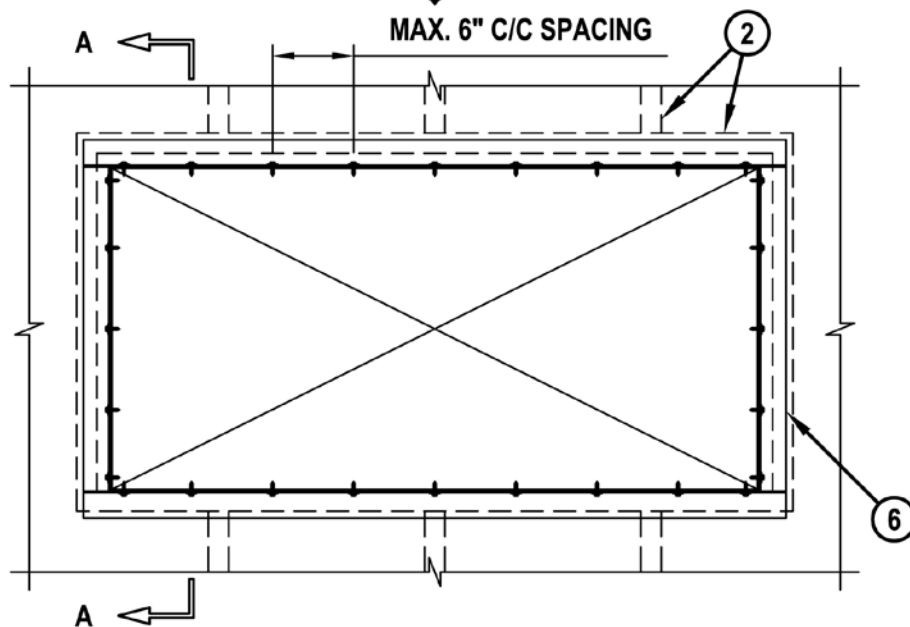
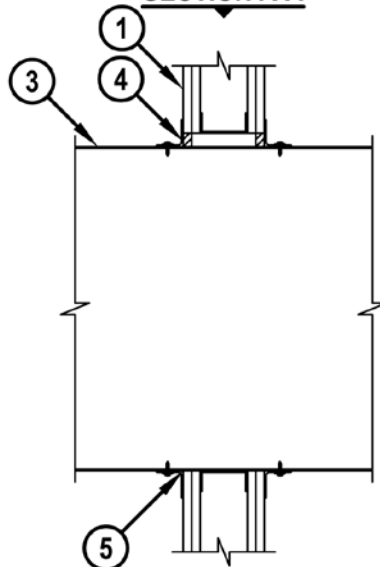
SHEET METAL DUCT THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.

T-RATING = 0-HR.

L-RATING AT AMBIENT = LESS THAN 1 CFM/SQ FT

L-RATING AT 400°F = LESS THAN 1 CFM/SQ FT

FRONT VIEW**SECTION A-A**

WL7155c.022912



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UL/cUL SYSTEM NO. W-L-7155

SHEET METAL DUCT THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.

T-RATING = 0-HR.

L-RATING AT AMBIENT = LESS THAN 1 CFM/SQ FT

L-RATING AT 400°F = LESS THAN 1 CFM/SQ FT

WL7155c.022912

1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U400 OR V400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. STEEL STUDS TO BE MINIMUM 3-1/2" WIDE. OPENING TO BE FRAMED OUT WITH STUD MATERIAL.
3. MAXIMUM 100" x 100" RECTANGULAR SHEET METAL DUCT (CONSTRUCTED AND REINFORCED IN ACCORDANCE WITH SMACNA CONSTRUCTION STANDARDS).
4. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT OR HILTI CP 606 FLEXIBLE FIRESTOP SEALANT.
5. [NOT SHOWN] MINIMUM 1/4" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT OR HILTI CP 606 FLEXIBLE FIRESTOP SEALANT APPLIED AT POINT OF CONTACT, PRIOR TO ATTACHMENT OF STEEL ANGLE.
6. STEEL RETAINING ANGLE (SEE NOTE NO. 3 AND TABLE BELOW).

MAXIMUM DUCT DIMENSION	DUCT THICKNESS	ANNULAR SPACE MIN. - MAX.	MINERAL WOOL REQUIRED	RETAINING ANGLE REQUIRED
24 IN.	24 GA. (OR HEAVIER)	1/2" - 1"	MINIMUM 3-3/4" THICKNESS FOR 1-HR. MINIMUM 5" THICKNESS FOR 2-HR.	NO

NOTES : 1. MAXIMUM SIZE OF OPENING = 104" x 102".

2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 2".

3. AFTER SEALING SPACE BETWEEN DUCT AND GYPSUM WALL ASSEMBLY WITH HILTI FIRESTOP SEALANT, FASTEN STEEL ANGLE (MIN. 18 GA. FOR DUCTS 48" x 24" OR SMALLER, OTHERWISE MIN. 16 GA.) TO DUCT WITH MINIMUM NO. 10 SHEET METAL SCREWS (SPACED MAXIMUM 1" FROM EACH END OF STEEL DUCT AND SPACED MAXIMUM 6" C/C). STEEL ANGLE TO OVERLAP DUCT BY MINIMUM 2" AND GYPSUM WALL ASSEMBLY BY MINIMUM 1". ANGLE DOES NOT HAVE TO BE FASTENED TO GYPSUM WALL ASSEMBLY.

4. [OPTIONAL] POLYETHYLENE BACKER ROD, MINERAL WOOL, OR GLASS-FIBER BATT INSULATION MAY BE USED AS BACKING MATERIAL FOR FIRESTOP SEALANT (EXCEPT WHERE REQUIRED IN TABLE ABOVE).



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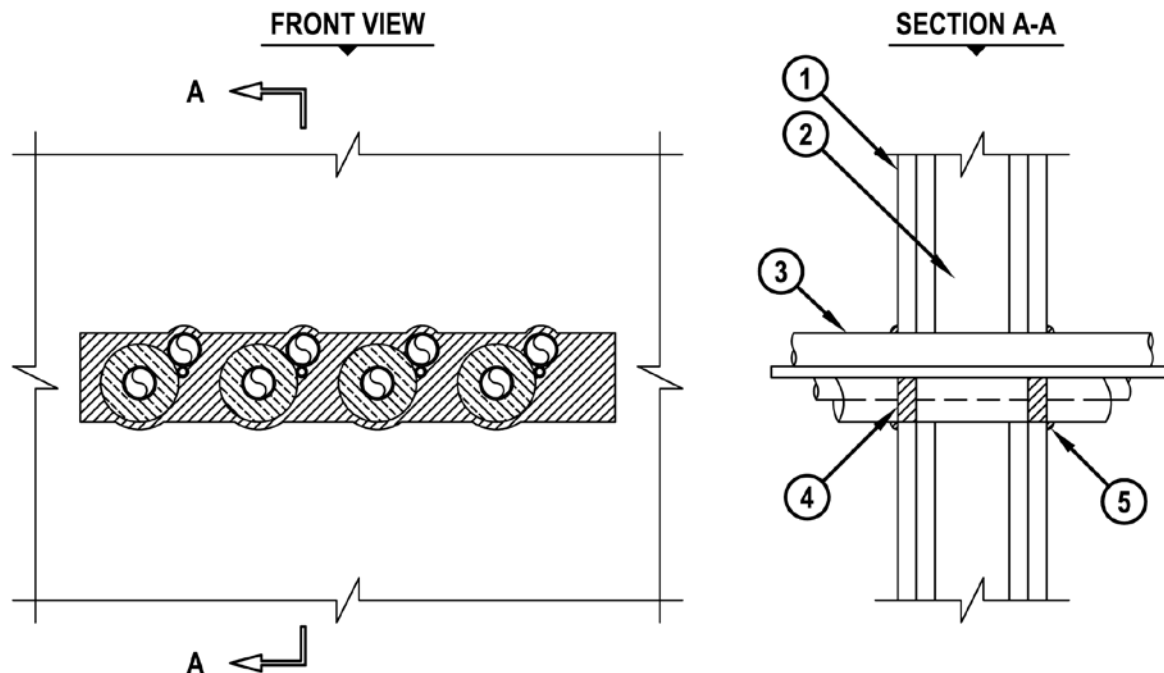
MULTIPLE HVAC LINE SETS THROUGH 1-HR. OR 2-HR. GYPSUM WALL ASSEMBLY

F-RATING = 1-HR. AND 2-HR.

FT, FH, FTH-RATING = 0-HR.



cULWL8001a.111802



1. GYPSUM WALL ASSEMBLY (UL/ULC CLASSIFIED U400 SERIES WALL) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. (NOT SHOWN). STEEL STUDS TO BE MINIMUM 2-1/2" WIDE.
3. ONE OR MORE AC LINE SETS INSTALLED WITHIN OPENING. EACH LINE SET SHALL BE TIGHTLY BUNDLED AND TO CONSIST OF THE FOLLOWING :
 - A. MAXIMUM 1" NOMINAL DIAMETER STEEL OR COPPER PIPE (MAXIMUM QUANTITY = 2).
 - B. MAXIMUM 3/4" THICK AB/PVC PIPE INSULATION MAY BE INSTALLED ON ONE PIPE.
 - C. MAXIMUM 4-PAIR NO. 18 AWG THERMOSTAT CABLE WITH PVC JACKET.
4. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
5. MINIMUM 1/4" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT AT POINT OF CONTACT.

NOTES : 1. MAXIMUM SIZE OF OPENING = 18" x 3".
 2. ANNULAR SPACE BETWEEN AC LINE SETS = MINIMUM 1", MAXIMUM 1-3/8".
 3. ANNULAR SPACE BETWEEN AC LINE SETS AND PERIPHERY OF OPENING = MINIMUM 0", MAXIMUM 4".



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UL/cUL SYSTEM NO. W-L-8013

MULTIPLE PENETRATIONS THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.

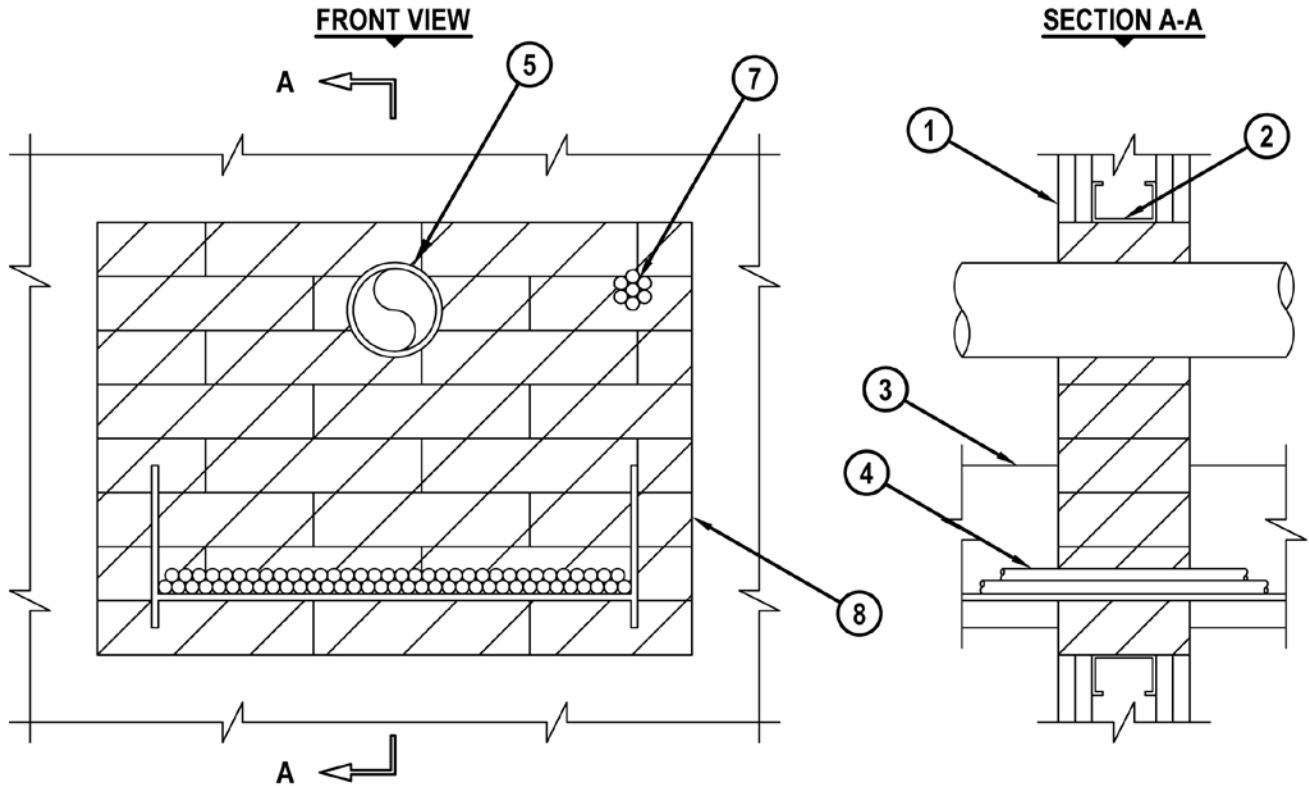
T-RATING = 0-HR.

L-RATING AT AMBIENT = 5 CFM/SQ. FT.

L-RATING AT 400°F = 2 CFM/SQ. FT.

NOTE : TESTED TO A 2.5 Pa PRESSURE DIFFERENTIAL

WL8013h.011212



1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U300, U400, V400, OR W400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. [NOT SHOWN] WOOD STUDS TO CONSIST OF NOMINAL 2" x 4" LUMBER. STEEL STUDS TO BE MINIMUM 2-1/2" WIDE. OPENING TO BE COMPLETELY "FRAMED-OUT".
3. MAXIMUM 18" x 6", ALUMINUM OR STEEL, OPEN LADDER OR SOLID BACK CABLE TRAY.



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MULTIPLE PENETRATIONS THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.

T-RATING = 0-HR.

L-RATING AT AMBIENT = 5 CFM/SQ. FT.

L-RATING AT 400°F = 2 CFM/SQ. FT.

NOTE : TESTED TO A 2.5 Pa PRESSURE DIFFERENTIAL

WL8013h.011212

4. CABLES TO BE ANY COMBINATION OF THE FOLLOWING :
 - A. MAXIMUM 750 KCMIL SINGLE CONDUCTOR POWER CABLE.
 - B. MAXIMUM 7/C NO. 12 AWG COPPER CONDUCTOR CABLE.
 - C. MAXIMUM 100 PAIR NO. 24 AWG TELEPHONE CABLE.
5. ANY COMBINATION OF THE FOLLOWING PENETRANTS MAY BE USED :
 - A. MAXIMUM 3" NOMINAL DIAMETER PVC PLASTIC PIPE (SCHEDULE 40, SOLID CORE) (CLOSED OR VENTED PIPING SYSTEMS).
 - B. MAXIMUM 6" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 40 OR HEAVIER).
 - C. MAXIMUM 4" NOMINAL DIAMETER STEEL CONDUIT.
 - D. MAXIMUM 4" NOMINAL DIAMETER EMT.
 - E. MAXIMUM 4" NOMINAL DIAMETER COPPER PIPE.
6. [NOT SHOWN] NOMINAL 1-1/2" GLASS-FIBER PIPE INSULATION MAY BE USED ON ANY OR ALL METALLIC PIPES.
7. MAXIMUM 1-1/2" DIAMETER CABLE BUNDLE TO CONSIST OF ANY OF THE FOLLOWING :
 - A. FIBER-OPTIC CABLE (24 FIBER).
 - B. RG 59 COAXIAL CABLE.
 - C. MAXIMUM 25 PAIR NO. 24 AWG TELEPHONE CABLE.
 - D. MAXIMUM 7/C NO. 12 AWG COPPER CONDUCTOR.
8. HILTI CFS-BL FIRESTOP BLOCK OR HILTI FS 657 FIRE BLOCKS (2" THICK x 8" WIDE x 5" DEEP, REFERENCE : FRONT VIEW) FIRMLY PACKED AND CENTERED WITHIN OPENING. EITHER ONE OR A COMBINATION OF BOTH BLOCK TYPES MAY BE USED.

ANNULAR SPACE	MINIMUM	MAXIMUM
BETWEEN CABLE TRAY AND PERIPHERY OF OPENING	1"	7"
BETWEEN PIPE (ITEMS) AND PERIPHERY OF OPENING	1-1/2"	9-1/4"
BETWEEN CABLE BUNDLE AND PERIPHERY OF OPENING	1-3/16"	1-1/2"

- NOTES : 1. MAXIMUM AREA OF OPENING = 352 SQ. IN., WITH A MAXIMUM DIMENSION OF 22".
2. FOR WALLS CONSTRUCTED OF STEEL STUDS LARGER THAN 3-5/8", FIRESTOP/FIRE BLOCKS SHOULD BE INSTALLED 8" DEEP, RECESSED UP TO A MAXIMUM 1/2" FROM OUTER WALL SURFACES.
3. CABLES TO FILL MAXIMUM 30% OF CROSS-SECTIONAL AREA OF CABLE TRAY.
4. APPLY HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT, CP 618 FIRESTOP PUTTY STICK, OR CP 620 FIRE FOAM, INTO ANY VOID THAT MAY EXIST (AROUND PENETRANTS, INTO INTERSTICES OF CABLES, BETWEEN CABLES AND CABLE TRAY, OR BETWEEN FIRESTOP/FIRE BLOCKS), TO MAXIMUM EXTENT POSSIBLE.



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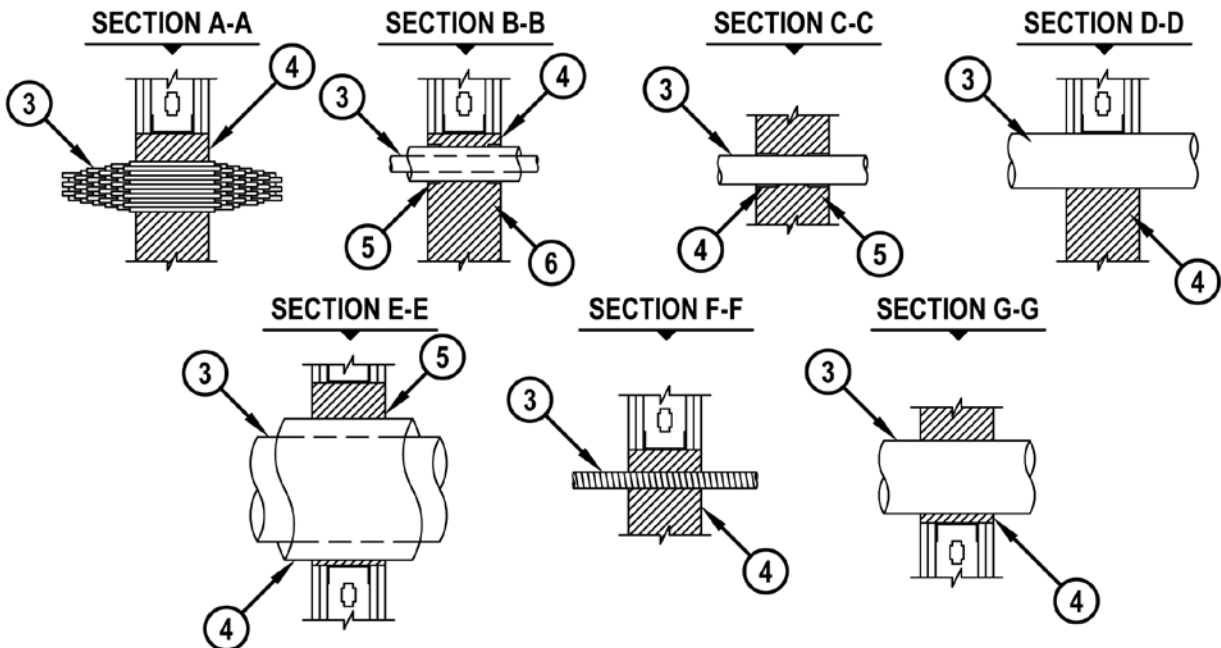
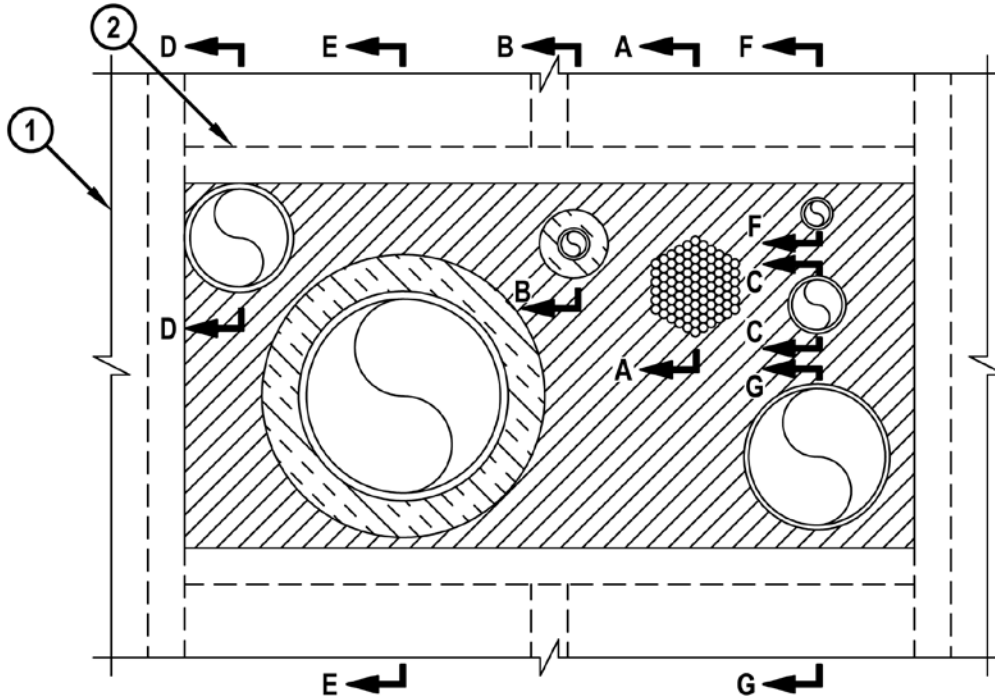
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UL/cUL SYSTEM NO. W-L-8019

MULTIPLE PENETRATING ITEMS THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1 AND 2-HR.

T-RATING = 0, 1/2, 1, 1-1/2 AND 2-HR.



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WL8019c.062105

UL/cUL SYSTEM NO. W-L-8019

MULTIPLE PENETRATING ITEMS THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1 AND 2-HR.

T-RATING = 0, 1/2, 1, 1-1/2 AND 2-HR.

WL8019c.062105

1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U400 SERIES WALL) (1-HR. OR 2-HR. FIRE- RATING) (2-HR. SHOWN).
2. OPENING TO BE "FRAMED OUT" WITH LIGHTGAGE STEEL STUDS (MINIMUM 3-1/2" WIDE).

FIRESTOP CONFIGURATION A

3. MAXIMUM 4" DIAMETER CABLE BUNDLE CONSISTING OF ANY OF THE FOLLOWING CABLES :
 - A. MAXIMUM 25 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
 - B. MAXIMUM RG 59 COAXIAL CABLE WITH PVC JACKET.
 - C. MAXIMUM 7/C NO. 12 AWG POWER CABLE WITH PVC JACKET.
 - D. MAXIMUM 3/8" DIAMETER FIBER-OPTIC CABLE WITH PVC JACKET.
 - E. MAXIMUM 3/C NO. 12 AWG METAL-CLAD CABLE.
 - F. MAXIMUM 3/C NO. 8 (+ GROUND) ROMEX POWER CABLE WITH PVC JACKET.
4. HILTI CP 620 FIRE FOAM INSTALLED FLUSH WITH BOTH SURFACES OF THE WALL :
 - A. MINIMUM 4-3/4" THICKNESS, FOR A 1-HR. FIRE-RATING.
 - B. MINIMUM 6" THICKNESS, FOR A 2-HR. FIRE-RATING.

NOTE : MINIMUM ANNULAR SPACE BETWEEN THE CABLE BUNDLE AND THE PERIPHERY OF THE OPENING AND BETWEEN ADJACENT PENETRANTS = 3/8" AND 4", RESPECTIVELY.

FIRESTOP CONFIGURATION B

3. MAXIMUM 1" NOMINAL DIAMETER COPPER PIPE OR TUBING.
4. NOMINAL 3/4" THICK AB/PVC PIPE INSULATION.
5. HILTI CP 648E WRAP STRIP (NOMINAL 3/16" THICK x 1" WIDE) CONTINUOUSLY WRAPPED AROUND THE OUTER CIRCUMFERENCE OF THE INSULATED PIPE, ONCE, AND HELD IN PLACE WITH TAPE, FLUSH WITH BOTH SURFACES OF WALL.
6. HILTI CP 620 FIRE FOAM INSTALLED FLUSH WITH BOTH SURFACES OF THE WALL :
 - A. MINIMUM 4-3/4" THICKNESS, FOR A 1-HR. FIRE-RATING.
 - B. MINIMUM 6" THICKNESS, FOR A 2-HR. FIRE-RATING.

NOTE : MINIMUM SPACING BETWEEN INSULATED PIPE AND PERIPHERY OF OPENING AND ADJACENT PENETRANTS = 3/8" AND 1-1/2", RESPECTIVELY.

FIRESTOP CONFIGURATION C

3. MAXIMUM 2" NOMINAL DIAMETER PVC PLASTIC PIPE (SCHEDULE 40, SOLID OR CELLULAR CORE) (CLOSED OR VENTED PIPING SYSTEM).
4. HILTI CP 648E WRAP STRIP (NOMINAL 3/16" THICK x 1-3/4" WIDE) CONTINUOUSLY WRAPPED AROUND THE OUTER CIRCUMFERENCE OF THE PLASTIC PIPE, ONCE, AND HELD IN PLACE WITH TAPE, FLUSH WITH BOTH SURFACES OF WALL.
5. HILTI CP 620 FIRE FOAM INSTALLED FLUSH WITH BOTH SURFACES OF THE WALL :
 - A. MINIMUM 4-3/4" THICKNESS, FOR A 1-HR. FIRE-RATING.
 - B. MINIMUM 6" THICKNESS, FOR A 2-HR. FIRE-RATING.



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UL/cUL SYSTEM NO. W-L-8019

MULTIPLE PENETRATING ITEMS THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1 AND 2-HR.

T-RATING = 0, 1/2, 1, 1-1/2 AND 2-HR.

WL8019c.062105

FIRESTOP CONFIGURATION C (continued...)

NOTES : 1. MINIMUM SPACING BETWEEN PVC PIPE AND PERIPHERY OF OPENING = 3/8".
 2. MINIMUM SPACING BETWEEN NONMETALLIC AND METALLIC PENETRANTS = 1" AND 3-1/2", RESPECTIVELY.

FIRESTOP CONFIGURATION D

3. MAXIMUM 4" NOMINAL DIAMETER STEEL PIPE, CAST IRON PIPE, COPPER PIPE, STEEL CONDUIT, OR EMT.
4. HILTI CP 620 FIRE FOAM INSTALLED FLUSH WITH BOTH SURFACES OF THE WALL :
 - A. MINIMUM 4-3/4" THICKNESS, FOR A 1-HR. FIRE-RATING.
 - B. MINIMUM 6" THICKNESS, FOR A 2-HR. FIRE-RATING.

NOTE : MINIMUM SPACING BETWEEN COPPER PIPE AND PERIPHERY OF OPENING AND ADJACENT PENETRANTS = 0" AND 3-1/2", RESPECTIVELY.

FIRESTOP CONFIGURATION E

3. MAXIMUM 8" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 40 OR HEAVIER).
4. NOMINAL 1-1/2" THICK GLASS-FIBER PIPE INSULATION.
5. HILTI CP 620 FIRE FOAM INSTALLED FLUSH WITH BOTH SURFACES OF THE WALL :
 - A. MINIMUM 4-3/4" THICKNESS, FOR A 1-HR. FIRE-RATING.
 - B. MINIMUM 6" THICKNESS, FOR A 2-HR. FIRE-RATING.

NOTE : MINIMUM SPACING BETWEEN INSULATED PIPE AND PERIPHERY OF OPENING AND ADJACENT PENETRANTS = 3/8" AND 2", RESPECTIVELY.

FIRESTOP CONFIGURATION F

3. NOMINAL 1" DIAMETER FLEXIBLE STEEL CONDUIT.
4. HILTI CP 620 FIRE FOAM INSTALLED FLUSH WITH BOTH SURFACES OF THE WALL :
 - A. MINIMUM 4-3/4" THICKNESS, FOR A 1-HR. FIRE-RATING.
 - B. MINIMUM 6" THICKNESS, FOR A 2-HR. FIRE-RATING.

NOTE : MINIMUM SPACING BETWEEN STEEL CONDUIT AND PERIPHERY OF OPENING AND ADJACENT PENETRANTS = 3/8" AND 3-1/2" RESPECTIVELY.

FIRESTOP CONFIGURATION G

3. MAXIMUM 6" NOMINAL DIAMETER SHEET METAL DUCT (MIN. 28 GA.).
4. HILTI CP 620 FIRE FOAM INSTALLED FLUSH WITH BOTH SURFACES OF THE WALL :
 - A. MINIMUM 4-3/4" THICKNESS, FOR A 1-HR. FIRE-RATING.
 - B. MINIMUM 6" THICKNESS, FOR A 2-HR. FIRE-RATING.

NOTE : MINIMUM SPACING BETWEEN SHEET METAL DUCT AND PERIPHERY OF OPENING AND ADJACENT PENETRANTS = 3/8" AND 1-1/2", RESPECTIVELY.

NOTES : 1. MAXIMUM SIZE OF OPENING = 30" x 15".
 2. A MAXIMUM OF SEVEN FIRESTOP CONFIGURATIONS MAY BE INSTALLED WITHIN THE OPENING.

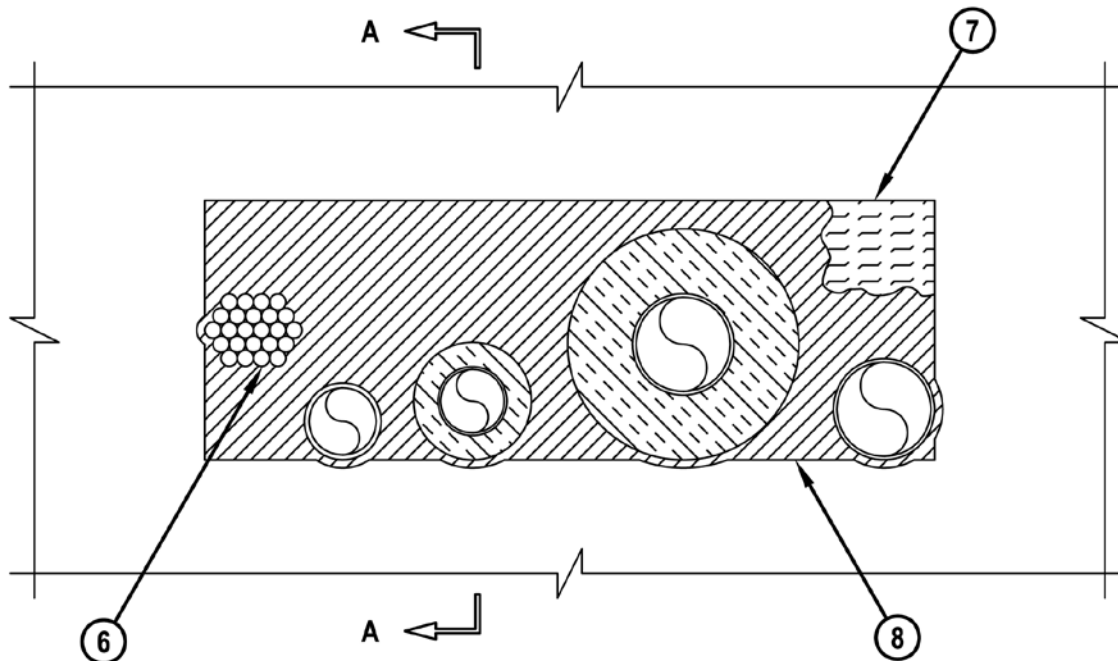
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UL/cUL SYSTEM NO. W-L-8065
MULTIPLE PENETRATING ITEMS THROUGH GYPSUM WALL ASSEMBLY

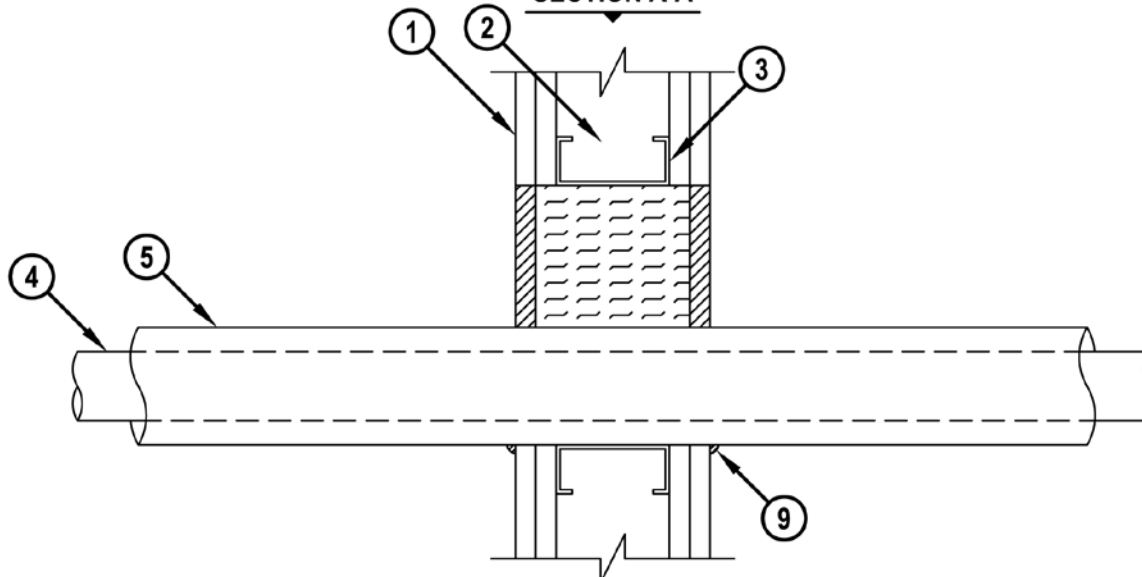
F-RATING = 1-HR. OR 2-HR.

T-RATING = 0-HR.

FRONT VIEW



SECTION A-A



WL8065c.120407



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UL/cUL SYSTEM NO. W-L-8065

MULTIPLE PENETRATING ITEMS THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.

T-RATING = 0-HR.

WL8065c.120407

1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U300, U400, OR V400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
2. [NOT SHOWN] WOOD STUDS TO CONSIST OF NOMINAL 2" x 4" LUMBER. STEEL STUDS TO BE MINIMUM 3-1/2" WIDE.
3. OPENING TO BE "FRAMED-OUT" WITH ADDITIONAL FRAMING MEMBERS.
4. ONE OR MORE OF THE FOLLOWING PIPES, CONDUITS, OR TUBES, AND IN ANY COMBINATION, MAY BE INSTALLED WITHIN THE OPENING :
 - A. MAXIMUM 3" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 10 OR HEAVIER).
 - B. MAXIMUM 3" NOMINAL DIAMETER CAST OR DUCTILE IRON PIPE.
 - C. MAXIMUM 3" NOMINAL DIAMETER COPPER PIPE OR TUBING.
 - D. MAXIMUM 3" NOMINAL DIAMETER STEEL CONDUIT OR EMT.
 - E. MAXIMUM 2" NOMINAL DIAMETER PVC PLASTIC PIPE (SCHEDULE 40) (CLOSED OR VENTED PIPING SYSTEM) (CELLULAR OR SOLID CORE).
 - F. MAXIMUM 2" NOMINAL DIAMETER CPVC PLASTIC PIPE (SDR 13.5) (CLOSED PIPING SYSTEM ONLY)
 - G. MAXIMUM 2" NOMINAL DIAMETER RIGID NON METALLIC CONDUIT (RNC) (SCHEDULE 40).
 - H. MAXIMUM 1" NOMINAL DIAMETER CROSS-LINKED POLYETHYLENE (PEX) TUBING (CLOSED PIPING SYSTEM ONLY).
5. ONE OR MORE METALLIC PENETRANTS OR TUBES MAY BE INSULATED WITH ANY OF THE FOLLOWING TYPES OF INSULATION :
 - A. MINIMUM 1" TO MAXIMUM 2" THICK GLASS-FIBER PIPE INSULATION.
 - B. MINIMUM 1/2" TO MAXIMUM 3/4" THICK AB/PVC PIPE INSULATION.
 - C. MINIMUM 1" TO MAXIMUM 2" THICK MINERAL FIBER PIPE INSULATION SECURED WITH 18 GA. STEEL WIRE SPACED 12" C/C.
6. MAXIMUM 3" DIAMETER CABLE BUNDLE TO CONSIST OF ANY OF THE FOLLOWING :
 - A. MAXIMUM 25 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
 - B. MAXIMUM 7/C NO. 12 AWG COPPER CONDUCTOR WITH PVC JACKET.
 - C. MAXIMUM 1/2" DIAMETER FIBER OPTIC CABLE WITH PVC JACKET.
 - D. MAXIMUM 3/C NO. 8 AWG WITH BARE ALUMINUM GROUND STEEL METAL-CLAD CABLE.
 - E. MAXIMUM 3/C (+GROUND) NO. 12 AWG ROMEX CABLE WITH PVC JACKET.
 - F. RG/U COAXIAL CABLE (MAXIMUM 1/2" DIAMETER) WITH PVC JACKET.
7. MINIMUM 3-1/2" OR 4-3/4" THICKNESS MINERAL WOOL (MINIMUM 4 PCF DENSITY) TIGHTLY PACKED FOR 1-HR. OR 2-HR. FIRE-RATING, RESPECTIVELY.
8. MINIMUM 5/8" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT.
9. MINIMUM 1/4" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT APPLIED AT POINT OF CONTACT.

NOTES : 1. MAXIMUM SIZE OF OPENING TO BE ONE OF THE FOLLOWING:

A. 22-3/4" x 8" IN STEEL STUD WALLS.

B. 14-1/2" x 8" IN WOOD STUD WALLS.

2. ANNULAR SPACE BETWEEN PENETRANTS = MINIMUM 1", MAXIMUM 22".

3. ANNULAR SPACE BETWEEN PENETRANTS AND OPENING = MINIMUM 0", MAXIMUM 22".



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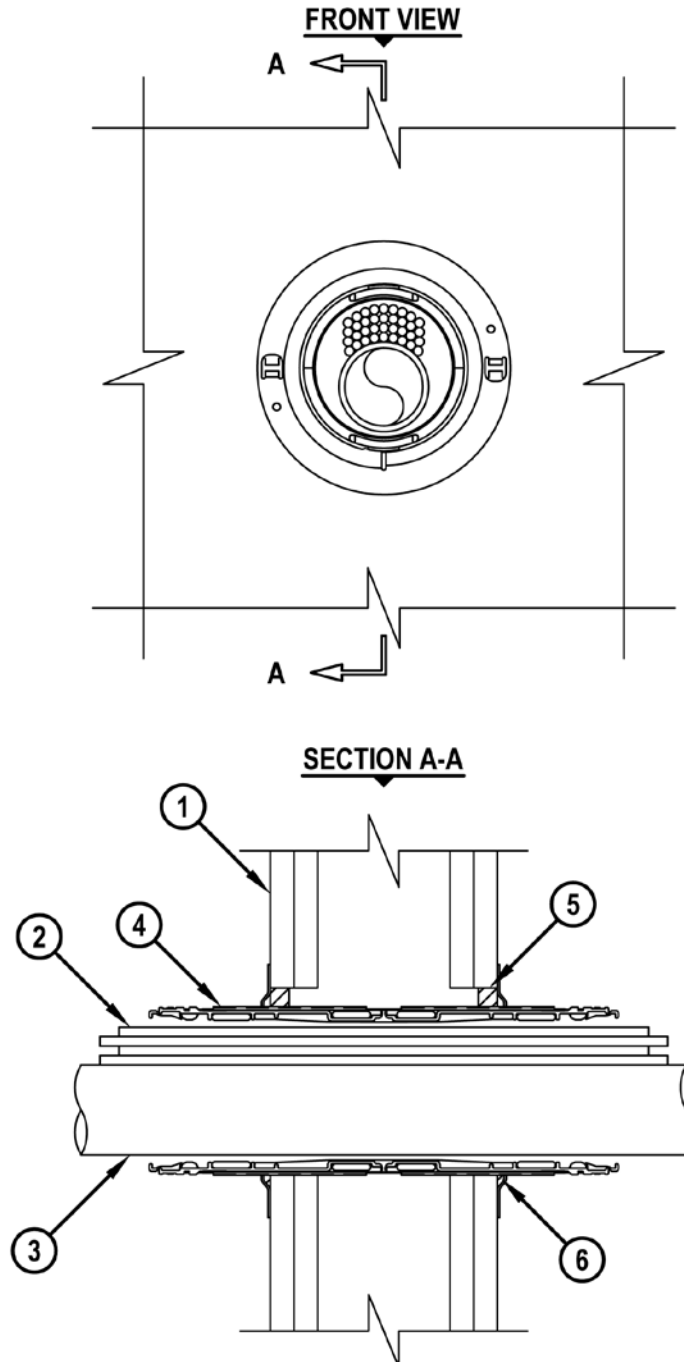
UL/cUL SYSTEM NO. W-L-8086

MULTIPLE PENETRATING ITEMS THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.

T-RATING = 0-HR., 1/2-HR., 3/4-HR., 1-HR., 1 3/4-HR., OR 2-HR.

WL8086a.071309



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UL/cUL SYSTEM NO. W-L-8086

MULTIPLE PENETRATING ITEMS THROUGH GYPSUM WALL ASSEMBLY

F-RATING = 1-HR. OR 2-HR.

T-RATING = 0-HR., 1/2-HR., 3/4-HR., 1-HR., 1 3/4-HR., OR 2-HR.

WL8086a.071309

1. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U300, U400 OR V400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN) TO INCLUDE THE FOLLOWING CONSTRUCTION FEATURES :
 - A. [NOT SHOWN] WOOD STUDS TO CONSIST OF NOMINAL 2" x 4" LUMBER (SPACED MAXIMUM 16" OC). STEEL STUDS TO BE MINIMUM 2-1/2" WIDE (SPACED MAXIMUM 24" OC).
 - B. NOMINAL 5/8" THICK GYPSUM WALLBOARD. TYPE, NUMBER OF LAYERS, AND SHEET ORIENTATION AS SPECIFIED IN THE INDIVIDUAL UL DESIGN.
2. CABLE BUNDLE TO BE A COMBINATION OF ANY OF THE FOLLOWING :
 - A. MAXIMUM 100 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC JACKET.
 - B. MAXIMUM 7/C NO. 12 AWG COPPER CONDUCTOR CONTROL CABLE WITH PVC OR XLPE JACKET AND INSULATION.
 - C. MAXIMUM 4/0 AWG TYPE RHH GROUND CABLE.
 - D. MAXIMUM 4 PAIR NO. 22 AWG CAT 6 COMPUTER CABLE.
 - E. MAXIMUM RG 6/U COAXIAL CABLE.
 - F. MAXIMUM 1/2" DIAMETER FIBER-OPTIC CABLE (24 FIBER) WITH PVC OR PE JACKET AND INSULATION.
 - G. MAXIMUM 2/C NO. 22 AWG SHIELDED PRINTER CABLE WITH PVC JACKET.
 - H. MAXIMUM 2/C NO. 18 AWG POWER OR NON-POWER LIMITED FIRE ALARM CABLE WITH OR WITHOUT METAL JACKET (MANUFACTURED BY AFC CABLE SYSTEMS, INC.).
 - I. MAXIMUM 1/4" DIAMETER S-VIDEO CABLE CONSISTING OF TWO MAXIMUM 24 AWG 75 OHM COAX OR TWISTED PAIR CABLE WITH PE INSULATION AND PVC JACKET.
 - J. MAXIMUM 3/C NO. 12 AWG METAL CLAD CABLE.
 - K. ANY CABLES, METAL-CLAD CABLES, OR ARMORED CABLES CURRENTLY LISTED UNDER THE THROUGH PENETRATING PRODUCTS CATEGORY.
3. ONE OF THE FOLLOWING PENETRATING ITEMS MAY BE INSTALLED :
 - A. MAXIMUM 2" NOMINAL DIAMETER STEEL PIPE (SCHEDULE 5 OR HEAVIER).
 - B. MAXIMUM 2" NOMINAL DIAMETER CAST OR DUCTILE IRON PIPE.
 - C. MAXIMUM 2" NOMINAL DIAMETER COPPER PIPE OR TUBING.
 - D. MAXIMUM 2" NOMINAL DIAMETER STEEL CONDUIT OR EMT.
4. HILTI CP 653 SPEED SLEEVE (2" OR 4") SLID INTO AND CENTERED WITHIN WALL. DEVICE FLANGES SPUN CLOCKWISE ONTO DEVICE THREADS, BUTTING TIGHTLY TO BOTH SIDES OF WALL.
5. MINIMUM 1/2" DEPTH HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT OR CP 606 FLEXIBLE FIRESTOP SEALANT FLUSH WITH BOTH SURFACES OF WALL.
6. MINIMUM 1/4" BEAD HILTI FS-ONE INTUMESCENT FIRESTOP SEALANT OR CP 606 FLEXIBLE FIRESTOP SEALANT APPLIED AROUND PERIPHERY OF DEVICE.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 2-1/2" (FOR 2" DEVICE) OR 4-1/2" (FOR 4" DEVICE).
 2. ANNULAR SPACE BETWEEN DEVICE AND PERIPHERY OF OPENING = MINIMUM 0".
 3. CABLES MAY REPRESENT 0% TO 100% VISUAL FILL OF DEVICE.



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Wall Opening Protective Materials (CLIV, CLIV7)

CP617 / CP617L

CP 617 Firestop Putty Pads, for use with max 4 by 4 by max 2-1/8 in. flush device UL Listed Metallic Outlet Boxes installed with steel cover plates in 1 and 2 hr. fire rated gypsum wallboard wall assemblies framed with min 3-1/2 in. deep wood or steel studs and constructed as specified in the individual U300, U400 or V400 Series Wall and Partition Designs in the Fire Resistance Directory. Min 1/8 in. thick moldable putty pads are to be installed to completely cover the exterior surfaces of the outlet box (except for the side of the outlet box against the stud) and completely seal against the stud within the stud cavity. When moldable putty pad outlet box protective material is used on boxes on both sides of wall as directed, the horizontal separation between outlet boxes on opposite sides of the wall may be less than 24 in. provided that the boxes are not installed back to back.

CP 617 Firestop Putty Pads, for use with max 4-11/16 by 4-11/16 by max 2-1/8 in., or max 4-3/8 by 4-7/8 by max 2-1/8 in., flush device UL Listed Metallic Outlet Boxes installed with steel cover plates for use in 1 hr fire rated V446 gypsum board/steel stud or U341 gypsum board/wood stud Wall and Partition Design No. in the Fire Resistance Directory. When U341 wall design is used, wall shall be sheathed with 5/8 in. gypsum board, and glass or mineral fiber batt insulation shall be installed in stud cavities in accordance with U341 design. Min 1/8 in. thick moldable putty pads are to be installed to completely cover the exterior surfaces of the outlet box (except for the side of the outlet box against the stud) and to completely seal against the box within the stud cavity. When moldable putty pad outlet box protective material is used on boxes on both sides of wall as directed, the horizontal separation between outlet boxes on opposite sides of the wall may be less than 24 in. and the boxes may be installed back-to-back.

CP 617 Firestop Putty Pads, for use with max 4-11/16 by 4-11/16 by max 2-1/8 in. flush device UL Listed Metallic Outlet Boxes installed with steel cover plates for use in 1 and 2 hr fire rated gypsum board wall assemblies framed with min 3-1/2 in. deep wood or steel studs and constructed of the materials and in the manner specified in the individual U300, U400 or V400 Series Wall and Partition Designs in the Fire Resistance Directory. Min 0.8 pcf density fiberglass batt insulation is to be installed within the wall cavity required for 1 hr fire rated gypsum board wall assemblies and optional in 2 hr fire rated gypsum wallboard assemblies. Min 1/8 in. thick moldable putty pads are to be installed to completely cover the exterior surfaces of the outlet box (except for the side of the outlet box against the stud) and to completely seal against the box within the stud cavity. When moldable putty pad outlet box protective material is used on boxes on both sides of wall as directed, the horizontal separation between outlet boxes on opposite sides of the wall may be less than 24 in. provided that the boxes are not installed back-to-back.

CP 617 Firestop Putty Pads, for use with max 4 by 3-3/4 by 3 in. deep UL Listed Nonmetallic Outlet Boxes manufactured by Carlon Electrical Products, made from polyvinyl chloride, and bearing a 2 hr rating under the "Outlet Boxes and Fittings Classification for Fire Resistance" category in the Fire Resistance Directory. Putty pads and boxes for use in 1 and 2 hr fire rated gypsum wallboard assemblies, framed with min 3-1/2 in. deep wood studs and constructed as specified in the individual U300 Series Wall and Partition Designs in the Fire Resistance Directory. Outlet box secured to wood stud by means of two nailing tabs supplied with the outlet box. Min 1/8 in. thick moldable putty pads are to be installed to completely cover the exterior surfaces of the outlet box (except for the side of the outlet box against the stud) including the nailing tab and completely seal against the stud within the stud cavity. Outlet boxes installed with steel or plastic cover plates. When moldable putty pad outlet box protective material is used on boxes on both sides of wall as directed, the horizontal separation between boxes on opposite sides of the wall may be less than 24 in. provided that the boxes are not installed back to back.

CP 617 Firestop Putty Pads, for use with max 4 by 4 by 2-7/8 in. deep UL Listed Nonmetallic Outlet Boxes manufactured by Carlon Electrical Products, made from polyvinyl chloride, and bearing a 2 hr rating under the "Outlet Boxes and Fittings Classification for Fire Resistance" category in the Fire Resistance Directory. Putty pads and boxes for use in the 1 hr fire rated V446 gypsum board/steel stud or U341 gypsum board/wood stud Wall and Partition Design in the Fire Resistance Directory. When U341 wall design is used, wall shall be sheathed with 5/8 in. gypsum board, and glass or mineral fiber batt insulation shall be installed in stud cavities in accordance with U341 design. Outlet box secured to steel stud by means of fastening tab supplied with the outlet box. Min 1/8 in. thick moldable putty pads are to be installed to completely cover the exterior surfaces of the outlet box (except for the side of the outlet box against the stud) including the tab and completely seal against the stud within the stud cavity. Outlet boxes installed with steel or plastic cover plates. When moldable putty pad outlet box protective material is used on boxes on both sides of wall as directed, the horizontal separation between boxes on opposite sides of the wall may be less than 24 in. and the boxes may be installed back to back.



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Wall Opening Protective Materials (CLIV, CLIV7)

CP617 / CP617L

CP 617 Firestop Putty Pads, for use with max 2-1/4 by 3-3/4 by 2-3/4 in. deep UL Listed Nonmetallic Outlet Boxes manufactured by Pass and Seymore, Inc., and bearing a 2 hr rating under the "Outlet Boxes and Fittings Classification for Fire Resistance" category in the Fire Resistance Directory. Putty pads and boxes for use in 1 and 2 hr fire rated gypsum wallboard assemblies, framed with min 3-1/2 in. deep wood studs and constructed as specified in the individual U300 Series Wall and Partition Designs in the Fire Resistance Directory. Outlet box secured to wood stud by means of two nailing tabs supplied with the outlet box. Min 1/8 in. thick moldable putty pads are to be installed to completely cover the exterior surfaces of the outlet box (except for the side of the outlet box against the stud) including the nailing tab and completely seal against the stud within the stud cavity. Outlet boxes installed with steel or plastic cover plates. When moldable putty pad outlet box protective material is used on boxes on both sides of wall as directed, the horizontal separation between boxes on opposite sides of the wall may be less than 24 in. provided that the boxes are not installed back to back.

CP 617 Firestop Putty Pads, for use with max 4 by 3-3/4 by 3 in. deep UL Listed Nonmetallic Outlet Boxes manufactured by Allied Molded Products, Inc., made from fiber reinforced thermoplastic and bearing a 2 hr rating under the "Outlet Boxes and Fittings Classification for Fire Resistance" category in the Fire Resistance Directory. Putty pads and boxes for use in 1 hr fire rated gypsum wallboard assemblies, framed with min 3-1/2 in. deep wood studs and constructed as specified in the individual U300 Series Wall and Partition Designs in the Fire Resistance Directory. Outlet box secured to wood stud by means of two nailing tabs supplied with the outlet box. Min 1/8 in. thick moldable putty pads are to be installed to completely cover the exterior surfaces of the outlet box (except for the side of the outlet box against the stud) including the nailing tab and completely seal against the stud within the stud cavity. Outlet boxes installed with plastic cover plates. When moldable putty pad outlet box protective material is used on boxes on both sides of wall as directed, the horizontal separation between boxes on opposite sides of the wall may be less than 24 in. provided that the boxes are not installed back to back.

CP 617 Firestop Putty Pads, for use with max 4 by 4 in. by 1-1/2 in. deep flush device UL Listed Metallic Outlet Boxes installed with steel cover plates in 1 hr. fire rated gypsum wallboard wall assemblies framed with min 3-1/2 in. deep wood or steel studs and constructed as specified in the individual U300, U400 or V400 Series Wall and Partition Designs in the Fire Resistance Directory. Min 1/8 in. thick moldable putty pads are to be installed to completely cover the exterior surfaces of the outlet box (except for the side of the outlet box against the stud) and completely seal against the stud within the stud cavity. The boxes are installed back to back with 5 in. by 4 in. UL Classified fire block, FS 657 or CP 657 installed in the cavity between the two boxes.

CP 617 Firestop Putty Pads, for use with max 14 by 4 by max 2-1/2 in. flush device UL Listed Metallic Outlet Boxes installed with steel cover plates in 1 and 2 hr. fire rated gypsum board wall assemblies framed with min 5-1/2 in. deep wood or steel studs for 2 hr fire rated walls and min 3-1/2 in. deep wood or steel studs for 1 hr fire rated walls. Walls constructed as specified in the individual U300, U400 or V400 Series Wall and Partition Designs in the Fire Resistance Directory. Stud cavity insulation is required and shall consist of min 5-1/2 in. (2 hr rated walls) or min 3-1/2 in. (1 hr rated walls) thick fiberglass (min 0.8 pcf) or mineral fiber (min 4 pcf). Min 1/8 in. thick moldable putty pads are to be installed to completely cover the exterior surfaces of the outlet box (except for the side of the outlet box against the stud) and conduit fittings at exterior of box and completely seal against the stud within the stud cavity. When boxes are interconnected by means of electrical metallic tube (EMT) or conduit, a ball of putty pad material shall be used to completely plug the open end of each EMT or conduit within the box. When moldable putty pad outlet box protective material is used on boxes on both sides of wall as directed, the horizontal separation between outlet boxes on opposite sides of the wall may be less than 24 in. provided that the boxes are not installed back to back.



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Wall Opening Protective Materials (CLIV)

CP617 / CP617L

CP 617 Firestop Putty Pads, for use with max 4-11/16 by 4-11/16 by max 2-1/8 in. flush device UL Listed Metallic Outlet Boxes installed with steel or plastic cover plates for use in 1 and 2 hr fire rated gypsum board wall assemblies framed with min 5-1/2 in. deep steel studs and constructed of the materials and in the manner specified in the individual U400 or V400 Series Wall and Partition Designs in the Fire Resistance Directory. Min 1/8 in. thick moldable putty pads are to be installed to completely cover the exterior surfaces of the outlet box (except for the side of the outlet box against the stud) and conduit fittings at exterior of box and to completely seal against the stud within the stud cavity. When boxes are interconnected by means of electrical metallic tube (EMT) or conduit, a ball of putty pad material shall be used to completely plug the open end of each EMT or conduit within the outlet boxes. Metallic outlet boxes may be provided with steel attachment brackets which offset box min 1/4 in. from stud. When steel attachment brackets are used, putty pad to be affixed to the back and all four sides of the box. When moldable putty pad outlet box protective material is used on boxes on both sides of wall as directed, the horizontal separation between outlet boxes on opposite sides of the wall may be less than 24 in. provided that the boxes are not installed back-to-back.

CP 617 Firestop Putty Pads and HILTI Firestop Box Inserts for use with maximum 4 by 4 by 1-1/2 in. (102 by 102 by 38 mm) deep flush device UL Listed Metallic Outlet Boxes installed with steel mud rings and with steel or plastic faceplates in 1 or 2 hr fire rated gypsum board wall assemblies constructed with min 3-1/2 in. (89 mm) wide wood or steel studs. When both protective materials are used with outlet boxes on both sides of the wall as directed, the boxes may be installed back-to-back provided that the backs of the boxes are minimum 1/2 in. (13 mm) apart and provided that the boxes are not interconnected. Installation shall comply with the National Electrical Code (NFPA 70). Min 1/8 in. (3.2 mm) thick moldable putty pads are to be installed to completely cover the exterior surfaces of the outlet box (except for the side of the outlet box against the stud) and to completely seal against the stud within the stud cavity. Adjoining pieces of moldable putty pads to be overlapped approx 1/2 in. (13 mm) at the seam. An additional 1/8 in. (3.2 mm) thickness of putty to be formed around the connector securing the end of each Type MC cable, electrical metallic tube (EMT) or conduit to the box. An insert pad shall be installed to completely cover the back inside surface of each outlet box.



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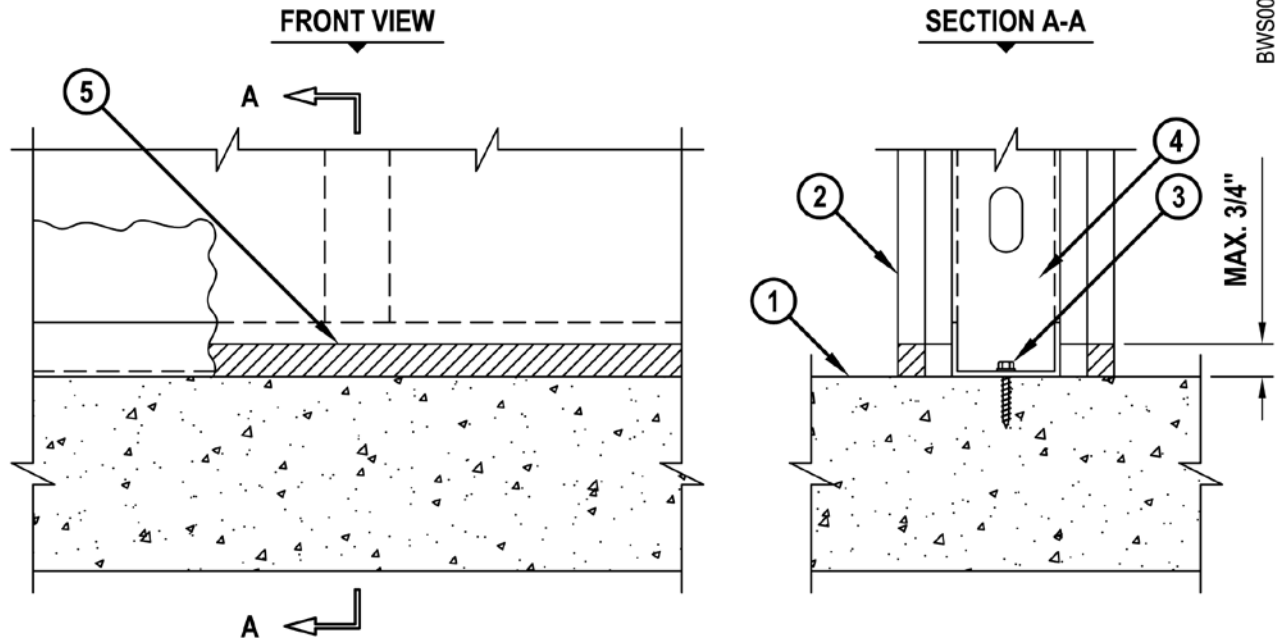
UL/cUL SYSTEM NO. BW-S-0002

BOTTOM OF WALL JOINT : GYPSUM WALL ASSEMBLY

ASSEMBLY RATING = 1-HR. OR 2-HR. (DEPENDING ON RATING OF WALL AND FLOOR ASSEMBLY)

L-RATING AT AMBIENT - LESS THAN 1 CFM/LINEAR FOOT

L-RATING AT 400° F - LESS THAN 1 CFM/LINEAR FOOT



BWS0002c.063003

1. CONCRETE FLOOR ASSEMBLY (1-HR. OR 2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR ASSEMBLY (MIN. 4-1/2" THICK).
 - B. ANY UL/ULC CLASSIFIED PRE-CAST HOLLOW CORE CONCRETE FLOOR ASSEMBLY (MIN. 6" THICK).
2. GYPSUM WALL ASSEMBLY (UL/ULC CLASSIFIED U400 SERIES WALL) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
3. FLOOR RUNNER (MIN. 25 GA., 1-1/4" FLANGES) FASTENED TO TOP SURFACE OF CONCRETE FLOOR.
4. STEEL STUDS (MIN. 3-1/2" WIDE), NESTING IN AND RESTING ON FLOOR RUNNER.
5. MINIMUM 5/8" DEPTH HILTI CP 601S ELASTOMERIC FIRESTOP SEALANT, CP 606 FLEXIBLE FIRESTOP SEALANT, OR FS-ONE INTUMESCENT FIRESTOP SEALANT.



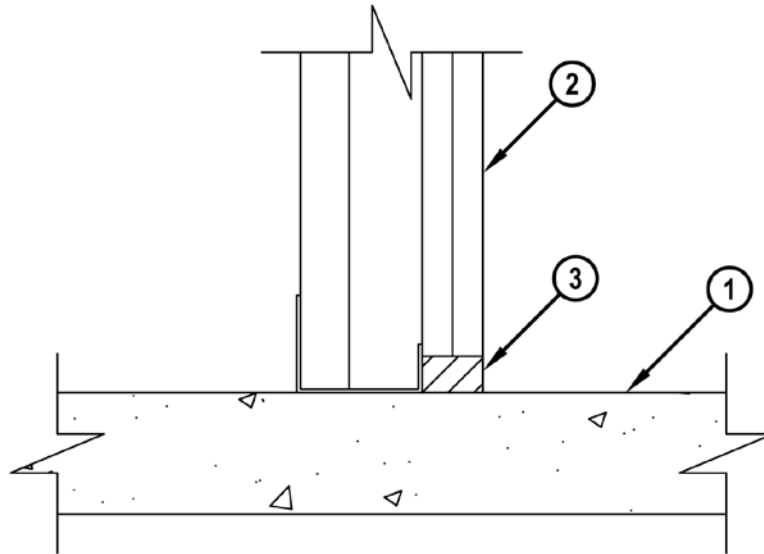
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UL/cUL SYSTEM NO. BW-S-0023
BOTTOM OF WALL JOINT : GYPSUM SHAFT WALL ASSEMBLY
 ASSEMBLY RATING = 1-HR. OR 2-HR.

BWS0023b.040312

CROSS-SECTIONAL VIEW



1. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR ASSEMBLY (MINIMUM 2-1/2" THICK) (1-HR. OR 2-HR. FIRE-RATING).
2. GYPSUM SHAFT WALL ASSEMBLY (UL/cUL CLASSIFIED U400 OR V400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN) TO INCLUDE THE FOLLOWING CONSTRUCTION FEATURES :
 - A. "J" SHAPED CEILING RUNNER, MINIMUM 2-1/2" WIDE WITH LEGS OF 1-1/4" AND 2" (MINIMUM 24 GA.) FASTENED TO TOP SIDE OF CONCRETE FLOOR WITH STEEL FASTENERS AT LOCATION NOT GREATER THAN 2" FROM ENDS AND MAXIMUM 24" O.C.
 - B. "C-H" SHAPED STUDS (MINIMUM 2-1/2" WIDE, MINIMUM 25 GA.) CUT 3/8" TO 1/2" LESS IN LENGTH THAN ASSEMBLY HEIGHT.
 - C. NOMINAL 1" THICK GYPSUM LINER PANEL. TYPE AND SHEET ORIENTATION AS SPECIFIED IN THE INDIVIDUAL UL/cUL DESIGN.
 - D. NOMINAL 1/2" OR 5/8" THICK GYPSUM WALLBOARD. TYPE, NUMBER OF LAYERS, AND SHEET ORIENTATION AS SPECIFIED IN THE INDIVIDUAL UL/cUL DESIGN.
3. HILTI CP 606 FLEXIBLE FIRESTOP SEALANT INSTALLED THE FULL DEPTH OF GYPSUM BOARD AND FLUSH WITH THE FINISH SIDE OF WALL.

NOTE : MAXIMUM WIDTH OF JOINT = 1".



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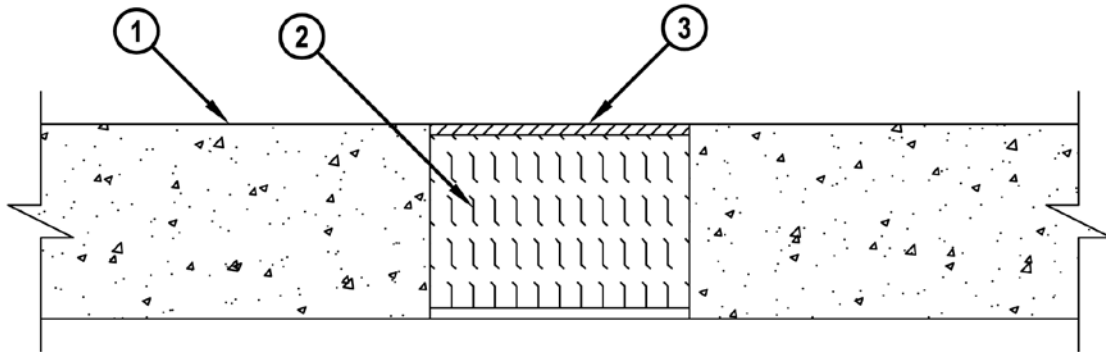
cUL SYSTEM NO. FF-D-1001

FIRE-RATED JOINT THROUGH CONCRETE FLOOR ASSEMBLY

F AND FH-RATING = 2-HR.

FT AND FTH-RATING = 1-3/4 HR.

CLASS II MOVEMENT CAPABILITIES = 10% COMPRESSION OR EXTENSION

CROSS-SECTIONAL VIEW

1. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR ASSEMBLY (MINIMUM 4-1/2" THICK) (2-HR. FIRE-RATING).
2. MINIMUM 4" THICKNESS MINERAL WOOL (MINIMUM 4 PCF DENSITY) COMPRESSED 50% AND RECESSED TO ACCOMMODATE FIRESTOP SEALANT.
3. MINIMUM 1/4" DEPTH HILTI CP 604 SELF-LEVELING FIRESTOP SEALANT.

NOTE : MAXIMUM WIDTH OF JOINT = 6".

cUL FFD1001a.060804

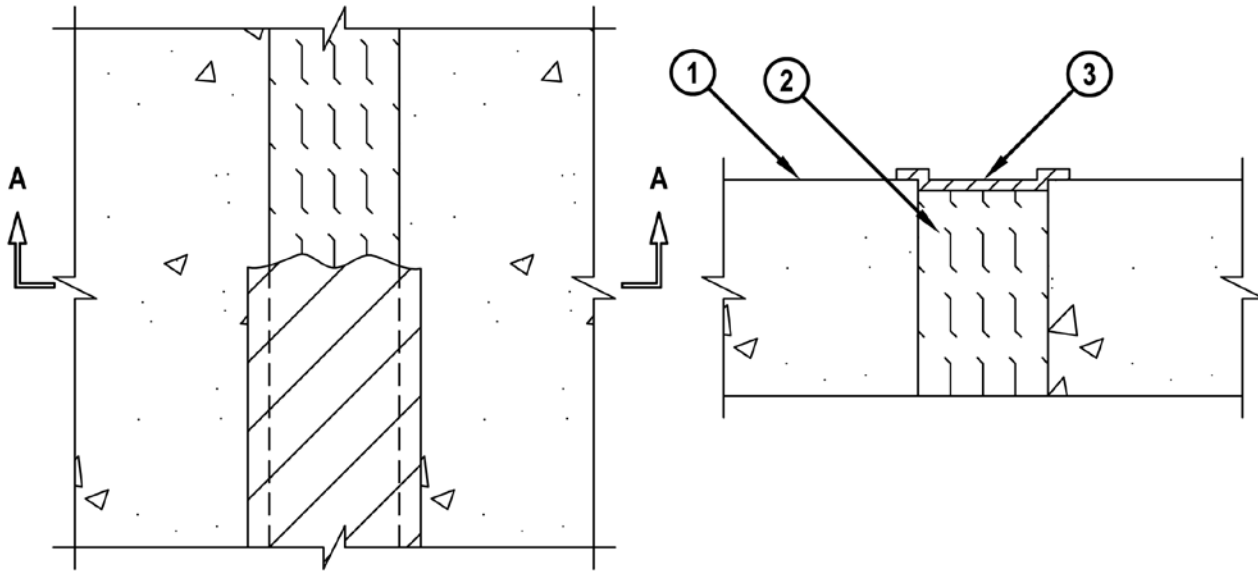
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UL/cUL SYSTEM NO. FF-D-1026

FIRE-RATED JOINT THROUGH CONCRETE FLOOR ASSEMBLY

ASSEMBLY RATING = 3-HR.

CLASS II MOVEMENT CAPABILITIES - 25% COMPRESSION OR EXTENSION

TOP VIEW**SECTION A-A**

FFD1026c.062910

1. CONCRETE FLOOR ASSEMBLY (MINIMUM 5" THICK) (3-HR. FIRE-RATING).
2. MINIMUM 4-3/4" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) COMPRESSED MINIMUM 50%.
3. MINIMUM 1/4" (WET) THICKNESS HILTI CFS-SP WB FIRESTOP JOINT SPRAY OR HILTI CP 672 SPEED SPRAY APPLIED WITHIN THE JOINT, FLUSH WITH TOP SURFACE OF FLOOR AND LAPPING MINIMUM 3/4" ONTO THE TOP SURFACE OF THE FLOOR ON BOTH SIDES OF JOINT.

NOTE : MAXIMUM WIDTH OF JOINT = 3".



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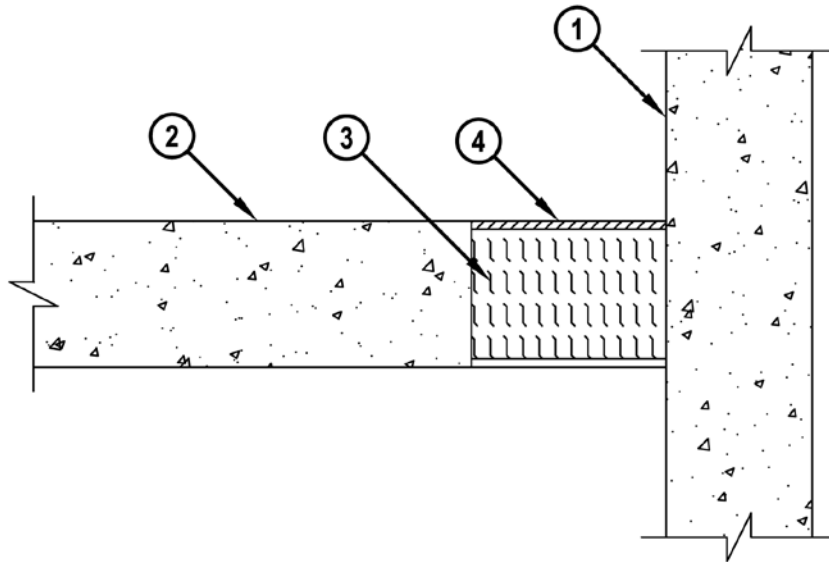
cUL SYSTEM NO. FW-D-1001

**FIRE-RATED JOINT THROUGH CONCRETE FLOOR ASSEMBLY**

F AND FH-RATING = 2-HR.

FT AND FTH-RATING = 1-3/4 HR.

CLASS II MOVEMENT CAPABILITIES - 10% COMPRESSION OR EXTENSION

CROSS-SECTIONAL VIEW

1. CONCRETE WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 4-1/2" THICK).
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 4-1/2" THICK) (2-HR. FIRE-RATING).
3. MINIMUM 4" THICKNESS MINERAL WOOL (MINIMUM 4 PCF DENSITY) COMPRESSED 50% AND RECESSED TO ACCOMMODATE FIRESTOP SEALANT.
4. MINIMUM 1/4" DEPTH HILTI CP 604 SELF-LEVELING FIRESTOP SEALANT.

NOTE : MAXIMUM WIDTH OF JOINT = 6".



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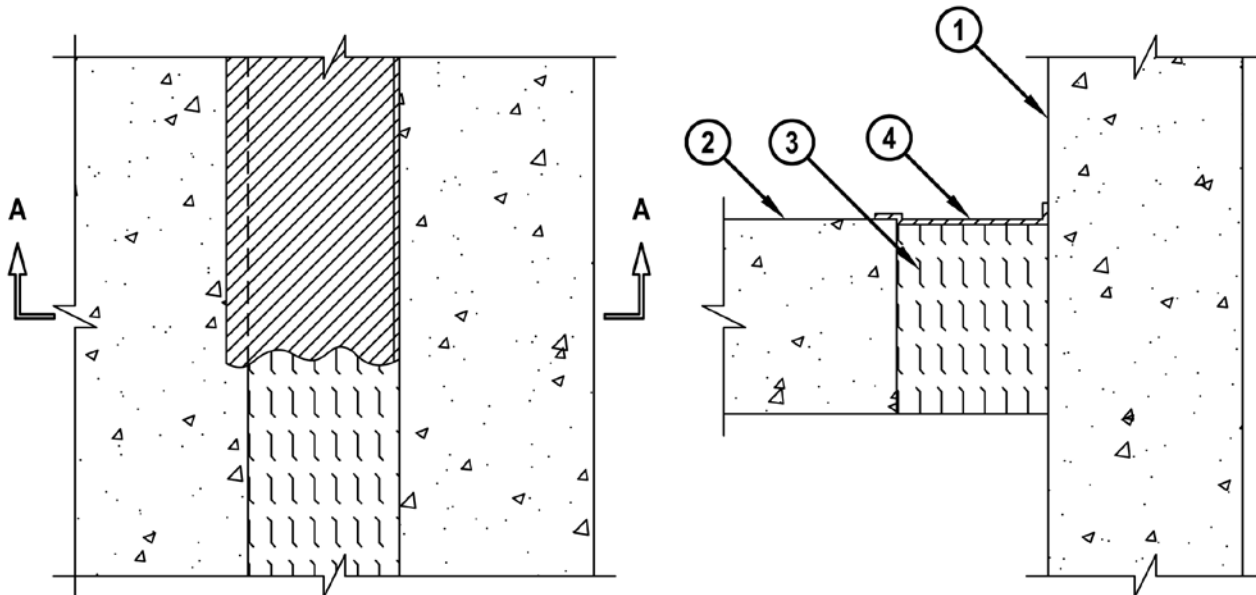
Hilti. Outperform. Outlast.

UL/cUL SYSTEM NO. FW-D-1013

FIRE-RATED JOINT THROUGH CONCRETE FLOOR ASSEMBLY

ASSEMBLY RATING = 2-HR.

CLASS II MOVEMENT CAPABILITIES - 14% COMPRESSION OR EXTENSION

TOP VIEW**SECTION A-A**

FWD1013g.052610

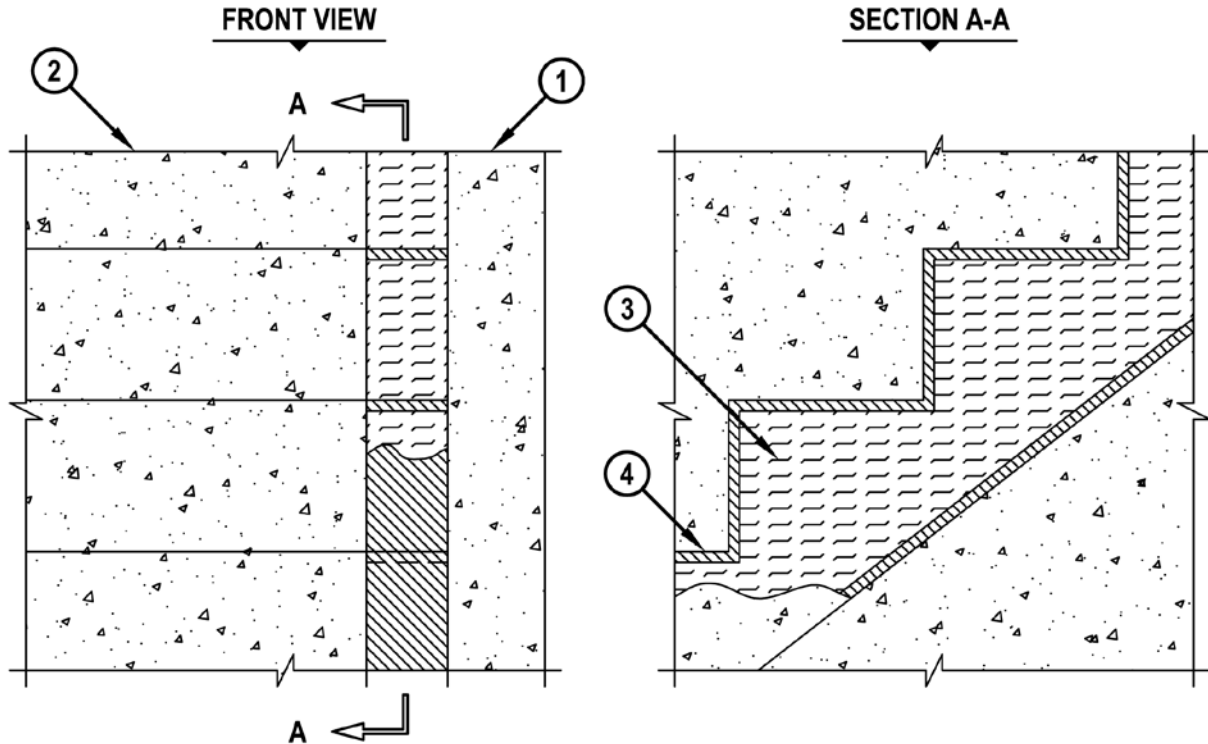
1. CONCRETE WALL ASSEMBLY (2-HR. FIRE-RATING) :**A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MIN. 4-1/2" THICK).****B. ANY UL/ULC CLASSIFIED CONCRETE BLOCK WALL.****2. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MIN. 4-1/2" THICK) (2-HR. FIRE-RATING).****3. MINIMUM 4-3/8" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) COMPRESSED MINIMUM 42%.****4. MINIMUM 1/8" (WET) THICKNESS HILTI CFS-SP WB FIRESTOP JOINT SPRAY OR HILTI CP 672 SPEED SPRAY APPLIED WITHIN THE JOINT, FLUSH WITH TOP SURFACE OF FLOOR AND OVERLAPPING MINIMUM 1/2" ONTO THE TOP SURFACE OF THE FLOOR AND SIDE OF THE WALL.****NOTE : MAXIMUM WIDTH OF JOINT = 3-1/2".**

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UL/cUL SYSTEM NO. FW-D-1043

CONCRETE STAIR ASSEMBLY TO CONCRETE WALL/BLOCK WALL ASSEMBLY

ASSEMBLY RATING = 2-HR.
CLASS II MOVEMENT CAPABILITIES - 7% COMPRESSION OR EXTENSION


1. CONCRETE WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MIN. 4-1/2" THICK).
 - B. ANY UL/ULC CLASSIFIED CONCRETE BLOCK WALL.
2. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE STAIR ASSEMBLY (MIN. 4-1/2" THICK) (2-HR. FIRE-RATING).
3. MINIMUM 3-1/2" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) COMPRESSED MINIMUM 42%.
4. MINIMUM 1/2" DEPTH HILTI CP 606 FLEXIBLE FIRESTOP SEALANT, FLUSH WITH TOP AND BOTTOM SURFACES OF STAIR ASSEMBLY.

NOTE : WIDTH OF JOINT = MINIMUM 1/4", MAXIMUM 3-3/4".



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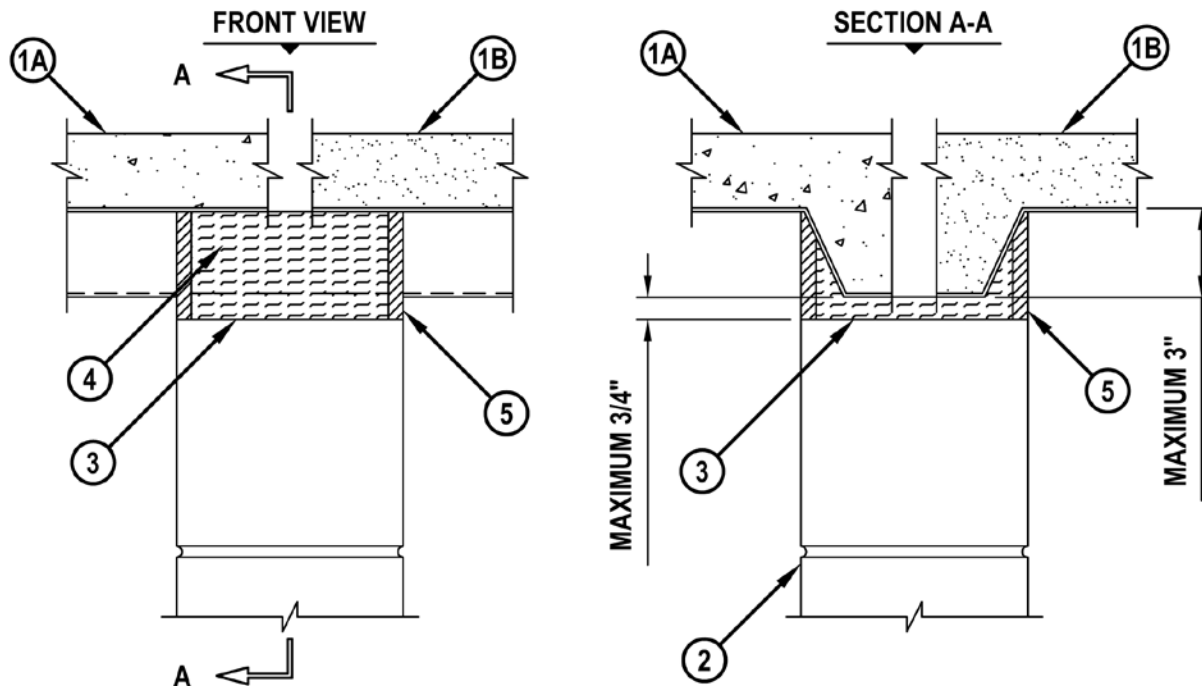
FWD1043b.052402

UL/cUL SYSTEM NO. HW-D-0081

TOP OF WALL JOINT : 2-HR. CONCRETE WALL OR BLOCK WALL ASSEMBLY

ASSEMBLY RATING = 2-HR.

CLASS II MOVEMENT CAPABILITIES - 33% COMPRESSION OR EXTENSION



HWD0081g.060804

1. FLOOR OR ROOF ASSEMBLY (1-HR. OR 2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 2-1/2" THICK) OVER METAL DECKING (UL/cUL CLASSIFIED D700 OR D900 SERIES).
 - B. INSULATING CONCRETE (MINIMUM 2-1/4" THICK) OVER METAL DECKING (UL/cUL CLASSIFIED P900 SERIES).
2. CONCRETE WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 5" THICK).
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
3. MINERAL WOOL (MINIMUM 4 PCF DENSITY) COMPRESSED 50% AND INSERTED INTO JOINT, RECESSED 1/2" ON EACH SIDE OF WALL TO ACCOMMODATE FIRESTOP SEALANT.
4. HILTI CP 777 SPEED PLUGS FRICTION FITTED TO COMPLETELY FILL FLUTE, RECESSED 1/2" ON EACH SIDE OF WALL TO ACCOMMODATE FIRESTOP SEALANT.
5. MINIMUM 1/2" DEPTH HILTI CP 606 FLEXIBLE FIRESTOP SEALANT FLUSH WITH BOTH SIDES OF WALL ASSEMBLY.

NOTE : AS AN ALTERNATE TO HILTI CP 777 SPEED PLUGS, MINERAL WOOL (MINIMUM 4 PCF DENSITY) COMPRESSED 20% MAY BE USED.



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UL/cUL SYSTEM NO. HW-D-0087

TOP OF WALL JOINT : GYPSUM WALL ASSEMBLY

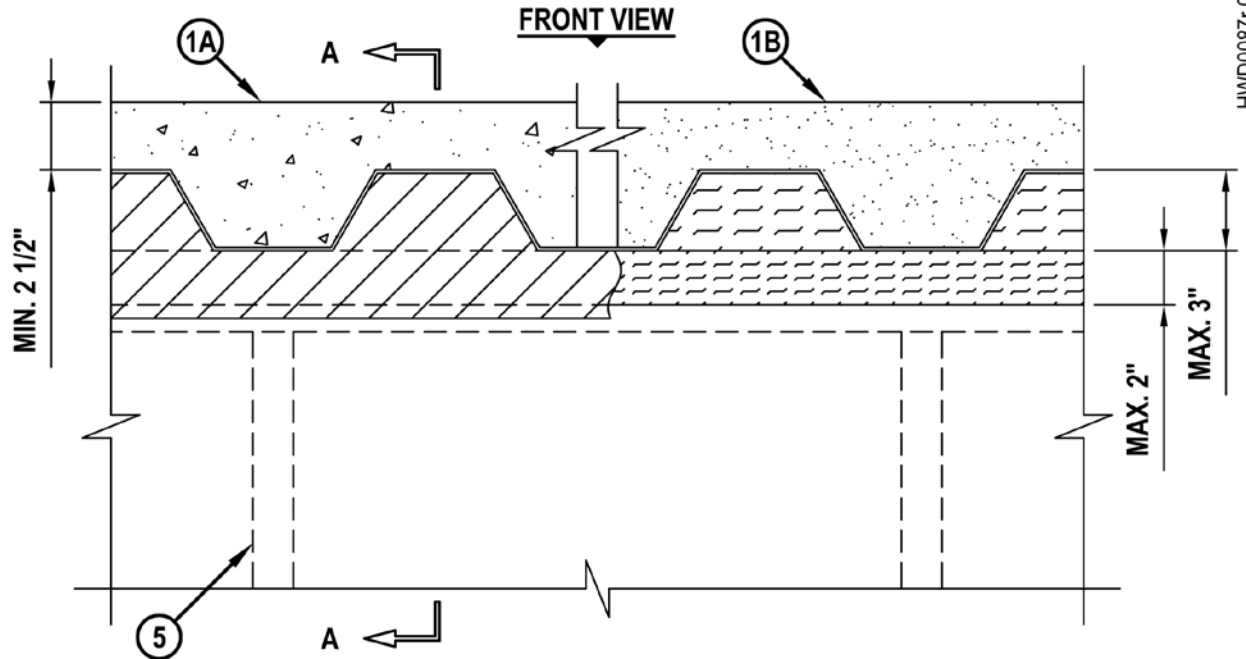
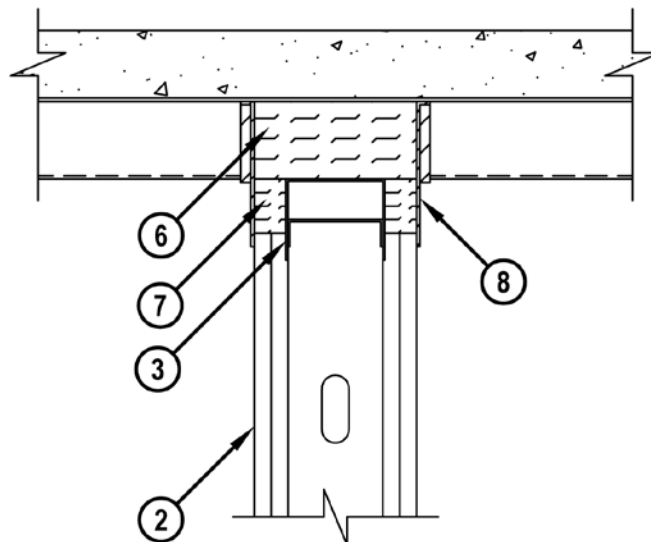
ASSEMBLY RATING = 1-HR. OR 2-HR. (DEPENDING ON RATING OF WALL AND FLOOR ASSEMBLY)

CLASS II AND III MOVEMENT CAPABILITIES - 20% COMPRESSION OR EXTENSION, OR

CLASS II MOVEMENT CAPABILITIES - 20% COMPRESSION OR 12.5% EXTENSION (SEE NOTE NO. 5 BELOW)

L-RATING AT AMBIENT = LESS THAN 1 CFM/LIN FT

L-RATING AT 400°F = LESS THAN 1 CFM/LIN FT

**SECTION A-A**

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UL/cUL SYSTEM NO. HW-D-0087

TOP OF WALL JOINT : GYPSUM WALL ASSEMBLY

ASSEMBLY RATING = 1-HR. OR 2-HR. (DEPENDING ON RATING OF WALL AND FLOOR ASSEMBLY)

CLASS II AND III MOVEMENT CAPABILITIES - 20% COMPRESSION OR EXTENSION, OR

CLASS II MOVEMENT CAPABILITIES - 20% COMPRESSION OR 12.5% EXTENSION (SEE NOTE NO. 5 BELOW)

L-RATING AT AMBIENT = LESS THAN 1 CFM/LIN FT

L-RATING AT 400°F = LESS THAN 1 CFM/LIN FT

1. FLOOR OR ROOF ASSEMBLY (1-HR. OR 2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MIN. 2-1/2" THICK) OVER METAL DECKING (UL/cUL CLASSIFIED D700 OR D900 SERIES).
 - B. INSULATING CONCRETE (MIN. 2-1/4" THICK) OVER METAL DECKING (UL/cUL CLASSIFIED P900 SERIES).
 - C. [NOT SHOWN] FLUTED STEEL ROOF DECK WITH SPRAY-APPLIED FIREPROOFING (UL/cUL CLASSIFIED P700 SERIES).
2. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U400 OR V400 SERIES) (1-HR. OR 2-HR. FIRE-RATING).
3. METAL DEFLECTION TRACK (MIN. 22 GA., 3" FLANGES) FASTENED TO UNDERSIDE OF THE DECK WITH STEEL MASONRY ANCHORS, STEEL FASTENERS, OR WELDS (SPACED MAX. 24" O.C.). CEILING RUNNER (1" FLANGES) INSTALLED WITHIN THE U-SHAPED DEFLECTION CHANNEL WITH A 1-1/2" GAP MAINTAINED BETWEEN THE TOP OF THE CEILING RUNNER AND TOP OF DEFLECTION PLATE (SEE NOTE NO. 3 BELOW).
4. [OPTIONAL - NOT SHOWN] WHEN SPRAY-APPLIED FIREPROOFING IS USED, CEILING RUNNER MAY BE SECURED TO DECK WITH Z-SHAPED CLIPS (MIN. 20 GA.) WITH THE FOLLOWING DIMENSIONS : MINIMUM 1" LONG, BUT NOT EXCEEDING THE WIDTH OF THE WALL, BY 1-1/2" OR 2" LONG UPPER AND LOWER LEGS. SUPPORT CLIPS SPACED MAXIMUM 24" OC.
5. STEEL STUDS (MINIMUM 3-1/2" WIDE), CUT 1/2" TO 3/4" LESS IN LENGTH THAN ASSEMBLY HEIGHT, NESTING IN CEILING RUNNER WITHOUT ATTACHMENT.
6. HILTI CP 777 SPEED PLUGS FRICTION FITTED TO COMPLETELY FILL FLUTE, FLUSH WITH BOTH SIDES OF WALL (SEE NOTE NO. 4 BELOW).
7. HILTI CP 767 SPEED STRIPS COMPRESSED 50% AND INSERTED INTO JOINT, FLUSH WITH BOTH SIDES OF GYPSUM WALL (SEE NOTE NO. 4 BELOW).
8. MINIMUM 1/8" (WET) THICKNESS HILTI CFS-SP WB FIRESTOP JOINT SPRAY OR HILTI CP 672 SPEED SPRAY TO COMPLETELY COVER MINERAL WOOL AND TO OVERLAP A MINIMUM 1/2" ONTO GYPSUM WALL AND METAL DECKING ON BOTH SIDES OF GYPSUM WALL ASSEMBLY.

NOTES : 1. STEEL FLOOR UNITS MAY BE SPRAYED WITH A MIN. 5/16" THICKNESS TO MAX. 1-3/4" THICKNESS OF UL CLASSIFIED MONOKOTE TYPE MK-6/HY (MANUFACTURED BY W.R. GRACE) OR TYPE 300 (MANUFACTURED BY ISOLATEK, INT.) FIREPROOFING PRIOR TO INSTALLATION OF CEILING RUNNERS.

2. WHEN THE STEEL DECK IS COATED WITH FIREPROOFING, HILTI FIRESTOP SPRAY SHALL OVERLAP THE WALL A MIN. 1/2" AND OVERLAP THE FIREPROOFING A MIN. 2" ON BOTH SIDES OF GYPSUM WALL ASSEMBLY.

3. AS AN ALTERNATE TO CEILING RUNNER IN ITEM NO. 3, SLOTTED CEILING RUNNERS MAY BE USED. CONSULT THE UL FIRE RESISTANCE DIRECTORY FOR APPROVED MANUFACTURERS.

4. AS AN ALTERNATE TO HILTI CP 767 SPEED STRIPS, AND/OR CP 777 SPEED PLUGS, MINERAL WOOL (MIN. 4 PCF DENSITY) COMPRESSED 50% MAY BE USED.

5. MOVEMENT CAPABILITIES ARE 20% COMPRESSION AND 12.5% EXTENSION WHEN TYPE 300 FIREPROOFING IS USED.



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HWD0087r.050712

UL/cUL SYSTEM NO. HW-D-0089

TOP OF WALL JOINT : GYPSUM WALL ASSEMBLY

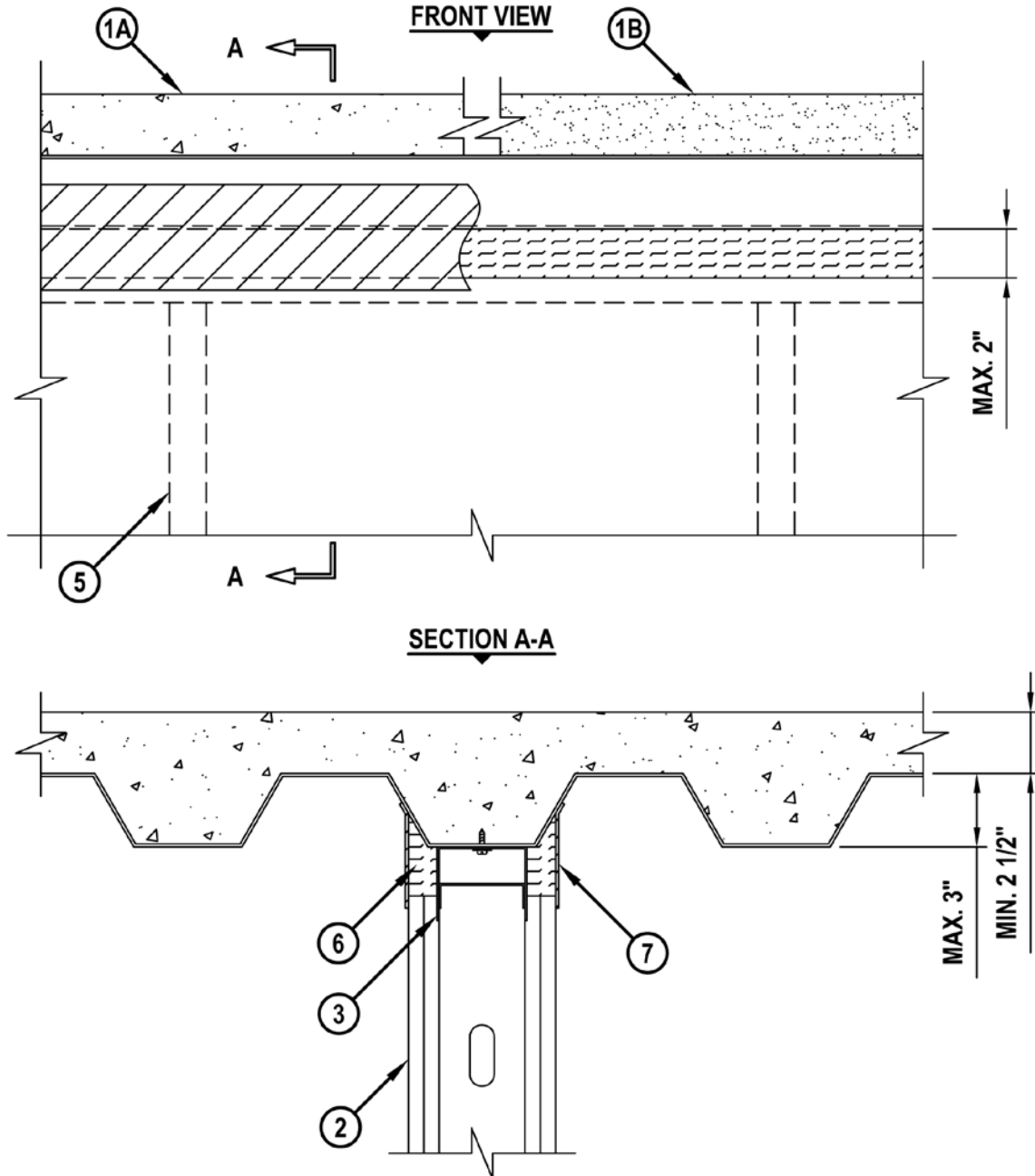
ASSEMBLY RATING = 1-HR. OR 2-HR. (DEPENDING ON RATING OF WALL AND FLOOR ASSEMBLY)

CLASS II AND III MOVEMENT CAPABILITIES - 20% COMPRESSION OR EXTENSION, OR

CLASS II MOVEMENT CAPABILITIES - 20% COMPRESSION OR 12.5% EXTENSION (SEE NOTE NO. 5 BELOW)

L-RATING AT AMBIENT = LESS THAN 1 CFM/LIN FT

L-RATING AT 400°F = LESS THAN 1 CFM/LIN FT



HWD0089r.050712



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UL/cUL SYSTEM NO. HW-D-0089

TOP OF WALL JOINT : GYPSUM WALL ASSEMBLY

ASSEMBLY RATING = 1-HR. OR 2-HR. (DEPENDING ON RATING OF WALL AND FLOOR ASSEMBLY)

CLASS II AND III MOVEMENT CAPABILITIES - 20% COMPRESSION OR EXTENSION, OR

CLASS II MOVEMENT CAPABILITIES - 20% COMPRESSION OR 12.5% EXTENSION (SEE NOTE NO. 5 BELOW)

L-RATING AT AMBIENT = LESS THAN 1 CFM/LIN FT

L-RATING AT 400°F = LESS THAN 1 CFM/LIN FT

HWD0089r.050712

1. FLOOR OR ROOF ASSEMBLY (1-HR. OR 2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MIN. 2-1/2" THICK) OVER METAL DECKING.
 - B. INSULATING CONCRETE (MIN. 2-1/4" THICK) OVER METAL DECKING (UL/cUL CLASSIFIED P900 SERIES).
 - C. [NOT SHOWN] FLUTED STEEL ROOF DECK WITH SPRAY-APPLIED FIREPROOFING (UL/cUL CLASSIFIED P700 SERIES).
2. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U400 OR V400 SERIES) (1-HR. OR 2-HR. FIRE-RATING).
3. METAL DEFLECTION TRACK (MIN. 22 GA., 3" FLANGES) FASTENED TO UNDERSIDE OF THE DECK WITH STEEL MASONRY ANCHORS, STEEL FASTENERS, OR WELDS (SPACED MAX. 24" O.C.). CEILING RUNNER (1" FLANGES) INSTALLED WITHIN THE U-SHAPED DEFLECTION CHANNEL WITH A 1-1/2" GAP MAINTAINED BETWEEN THE TOP OF THE CEILING RUNNER AND TOP OF DEFLECTION PLATE (SEE NOTE NO. 3 BELOW).
4. [OPTIONAL - NOT SHOWN] WHEN SPRAY-APPLIED FIREPROOFING IS USED, CEILING RUNNER MAY BE SECURED TO DECK WITH Z-SHAPED CLIPS (MIN. 20 GA.) WITH THE FOLLOWING DIMENSIONS : MINIMUM 1" LONG, BUT NOT EXCEEDING THE WIDTH OF THE WALL, BY 1-1/2" OR 2" LONG UPPER AND LOWER LEGS. SUPPORT CLIPS SPACED MAXIMUM 24" OC.
5. STEEL STUDS (MINIMUM 3-1/2" WIDE), CUT 1/2" TO 3/4" LESS IN LENGTH THAN ASSEMBLY HEIGHT, NESTING IN CEILING RUNNER WITHOUT ATTACHMENT.
6. HILTI CP 767 SPEED STRIPS COMPRESSED 50% AND INSERTED INTO FLUTES, FLUSH WITH BOTH SIDES OF WALL (SEE NOTE NO. 4 BELOW).
7. MINIMUM 1/8" (WET) THICKNESS HILTI CFS-SP WB FIRESTOP JOINT SPRAY OR HILTI CP 672 SPEED SPRAY TO COMPLETELY COVER MINERAL WOOL AND TO OVERLAP A MINIMUM OF 1/2" ONTO GYPSUM AND METAL DECKING ON BOTH SIDES OF GYPSUM WALL ASSEMBLY.

NOTES : 1. STEEL FLOOR UNITS MAY BE SPRAYED WITH A MIN. 5/16" THICKNESS TO MAX. 1-3/4" THICKNESS OF UL CLASSIFIED MONOKOTE TYPE MK-6/HY (MANUFACTURED BY W.R. GRACE) OR TYPE 300 (MANUFACTURED BY ISOLATEK, INT.) FIREPROOFING PRIOR TO INSTALLATION OF CEILING RUNNERS.

2. WHEN THE STEEL DECK IS COATED WITH FIREPROOFING, HILTI FIRESTOP SPRAY SHALL OVERLAP THE WALL MIN. 1/2" AND OVERLAP THE FIREPROOFING MIN. 2" ON BOTH SIDES OF GYPSUM WALL ASSEMBLY.

3. AS AN ALTERNATE TO CEILING RUNNER IN ITEM NO. 3, SLOTTED CEILING RUNNERS MAY BE USED. CONSULT THE UL FIRE RESISTANCE DIRECTORY FOR APPROVED MANUFACTURERS.

4. AS AN ALTERNATE TO HILTI CP 767 SPEED STRIPS, MINERAL WOOL (MIN. 4 PCF DENSITY) COMPRESSED 50% MAY BE USED.

5. MOVEMENT CAPABILITIES ARE 20% COMPRESSION AND 12.5% EXTENSION WHEN TYPE 300 FIREPROOFING IS USED.



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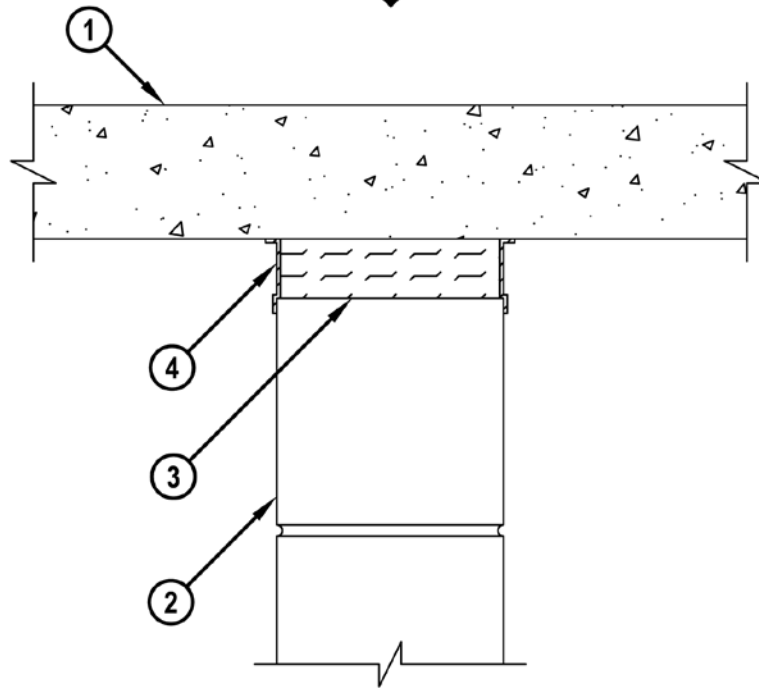
UL/cUL SYSTEM NO. HW-D-0097

FIRE-RATED JOINT THROUGH CONCRETE WALL OR BLOCK WALL ASSEMBLY

ASSEMBLY RATING = 2-HR.

CLASS II MOVEMENT CAPABILITIES - 14% COMPRESSION OR EXTENSION

HWD0097g.062910

CROSS-SECTIONAL VIEW

1. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR ASSEMBLY (MINIMUM 4-1/2" THICK) (2-HR. FIRE-RATING).
2. CONCRETE WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 8" THICK).
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
3. MINIMUM 8" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) COMPRESSED 50%.
4. MINIMUM 1/8" (WET) THICKNESS HILTI CFS-SP WB FIRESTOP JOINT SPRAY OR HILTI CP 672 SPEED SPRAY APPLIED WITHIN THE JOINT, FLUSH WITH EACH SURFACE OF WALL AND OVERLAPPING MINIMUM 1/2" ONTO FLOOR AND WALL ON BOTH SIDES OF JOINT.

NOTE : MAXIMUM WIDTH OF JOINT = 2".



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UL/cUL SYSTEM NO. HW-D-0106

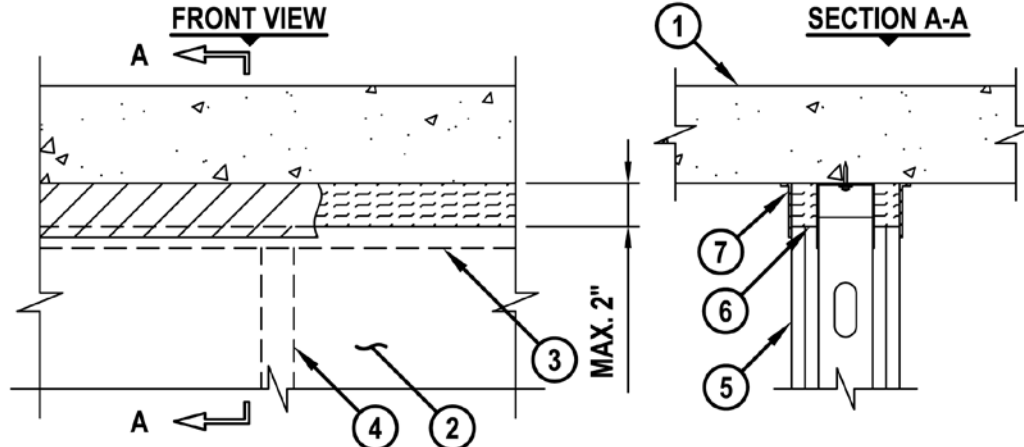
TOP OF WALL JOINT : GYPSUM WALL ASSEMBLY

ASSEMBLY RATING = 1-HR. OR 2-HR.

CLASS II MOVEMENT CAPABILITIES - 20% COMPRESSION OR EXTENSION

L-RATING AT AMBIENT = LESS THAN 1 CFM/LIN FT

L-RATING AT 400°F = LESS THAN 1 CFM/LIN FT



HWD0106k.062910

1. CONCRETE FLOOR ASSEMBLY (1-HR. OR 2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR ASSEMBLY (MINIMUM 4-1/2" THICK).
 - B. ANY UL/cUL CLASSIFIED PRE-CAST HOLLOW CORE CONCRETE FLOOR ASSEMBLY (MIN. 6" THICK).
2. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U400 OR V400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
3. CEILING RUNNER (MIN. 25 GA., FLANGE HEIGHT OF CEILING RUNNER SHALL BE MINIMUM 1/4" GREATER THAN MAXIMUM EXTENDED JOINT WIDTH) FASTENED TO UNDERSIDE OF CONCRETE FLOOR WITH STEEL MASONRY ANCHORS OR STEEL FASTENERS (SPACED MAX. 24" O.C.) (SEE NOTE NO. 1 BELOW).
4. STEEL STUDS (MIN. 2-1/2" WIDE), CUT 1/2" TO 3/4" LESS IN LENGTH THAN ASSEMBLY HEIGHT, NESTING IN CEILING RUNNER WITHOUT ATTACHMENT.
5. 5/8" OR 1-1/4" THICKNESS GYPSUM WALLBOARD AS SPECIFIED IN THE INDIVIDUAL UL DESIGN. TOP ROW OF SCREWS SHALL BE INSTALLED INTO STUDS 3-1/2" TO 4" BELOW THE BOTTOM PLANE OF FLOOR.
6. HILTI CP 767 SPEED STRIPS COMPRESSED 50% AND TIGHTLY PACKED INTO THE JOINT, FLUSH WITH BOTH SIDES OF WALL (SEE NOTE NO. 2 BELOW).
7. MINIMUM 1/8" (WET) THICKNESS HILTI CFS-SP WB FIRESTOP JOINT SPRAY OR HILTI CP 672 SPEED SPRAY TO COMPLETELY COVER MINERAL WOOL AND TO OVERLAP A MINIMUM OF 1/2" ONTO GYPSUM AND CONCRETE FLOOR ON BOTH SIDES OF WALL.

NOTES : 1. AS AN ALTERNATE TO CEILING RUNNER IN ITEM NO. 3, CEILING RUNNERS, MANUFACTURED BY BRADY CONSTRUCTION INNOVATIONS, INC., DBA SLIPTRACK SYSTEMS, METAL-LITE, INC., TOTAL STEEL SOLUTIONS, THE STEEL NETWORK, INC., CEMCO, CLARKWESTERN BUILDING SYSTEM, INC., SCAFCO, TELLING INDUSTRIES LLC, OR OLMAR SUPPLY, INC., MAY BE USED. WHEN ALTERNATE CEILING TRACKS ARE USED, CONSULT THE UL FIRE RESISTANCE DIRECTORY FOR INSTALLATION INSTRUCTIONS.

2. AS AN ALTERNATE TO HILTI CP 767 SPEED STRIPS, MINERAL WOOL (MIN. 4 PCF DENSITY) COMPRESSED 50% MAY BE USED.



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UL/cUL SYSTEM NO. HW-D-0154

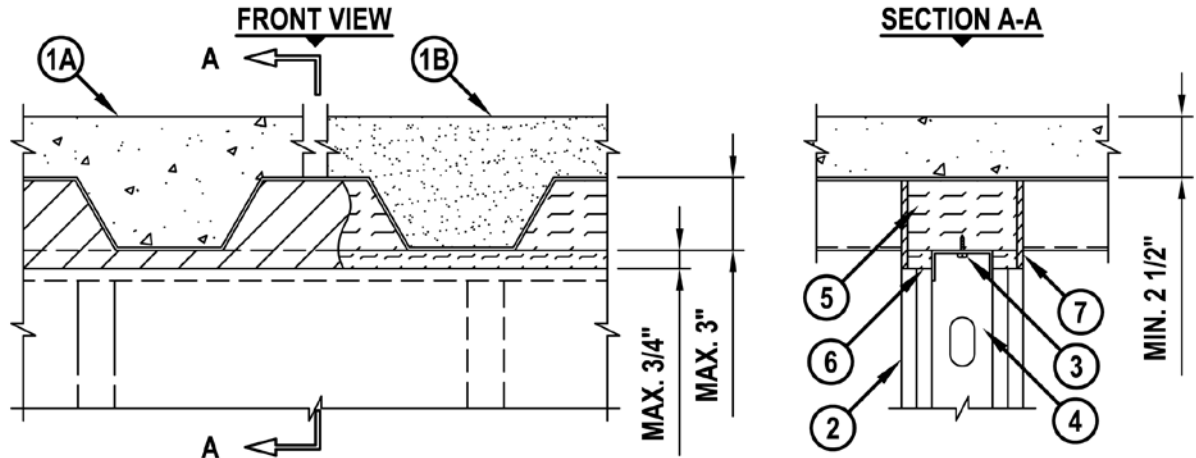
TOP OF WALL JOINT : GYPSUM WALL ASSEMBLY

ASSEMBLY RATING = 1-HR. OR 2-HR. (DEPENDING ON RATING OF WALL AND FLOOR ASSEMBLY)

CLASS II MOVEMENT CAPABILITIES - 17% COMPRESSION OR EXTENSION

L-RATING AT AMBIENT = LESS THAN 1 CFM/LIN FT

L-RATING AT 400°F = LESS THAN 1 CFM/LIN FT



HWD0154h.022610

1. FLOOR OR ROOF ASSEMBLY (1-HR. OR 2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MIN. 2-1/2" THICK) OVER METAL DECKING (UL/cUL CLASSIFIED D900 SERIES).
 - B. INSULATING CONCRETE (MIN. 2-1/4" THICK) OVER METAL DECKING (UL/cUL CLASSIFIED P900 SERIES).
2. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U400 SERIES) (1-HR. OR 2-HR. FIRE-RATING).
3. CEILING RUNNER (MIN. 25 GA., FLANGE HEIGHT OF CEILING RUNNER SHALL BE MINIMUM 1/4" GREATER THAN MAXIMUM EXTENDED JOINT WIDTH) FASTENED TO UNDERSIDE OF DECK WITH STEEL MASONRY ANCHORS, STEEL FASTENERS, OR WELDS (SPACED 24" O.C.) (SEE NOTE NO. 1 BELOW).
4. STEEL STUDS (MIN. 2-1/2" WIDE), CUT 1/2" TO 3/4" LESS IN LENGTH THAN ASSEMBLY HEIGHT, NESTING IN CEILING RUNNER WITHOUT ATTACHMENT.
5. HILTI CP 777 SPEED PLUGS FRICTION FITTED TO COMPLETELY FILL FLUTE, RECESSED 1/4" ON EACH SIDE OF WALL TO ACCOMMODATE FIRESTOP SEALANT. (SEE NOTE NO. 2 BELOW).
6. MINERAL WOOL (MIN. 4 PCF DENSITY) COMPRESSED 50% AND INSERTED INTO JOINT, RECESSED 1/4" ON EACH SIDE OF WALL TO ACCOMMODATE FIRESTOP SEALANT.
7. MINIMUM 1/4" DEPTH HILTI CP 606 FLEXIBLE FIRESTOP SEALANT FLUSH WITH BOTH SIDES OF GYPSUM WALL ASSEMBLY.

NOTES : 1. AS AN ALTERNATE TO CEILING RUNNER IN ITEM NO. 3, CEILING RUNNERS, MANUFACTURED BY BRADY CONSTRUCTION INNOVATIONS, INC., DBA SLIPTRACK SYSTEMS, METAL-LITE, INC., THE STEEL NETWORK, INC., CEMCO, CLARKWESTERN BUILDING SYSTEM, INC., SCAFCO, OR OLMAR SUPPLY, INC., MAY BE USED. WHEN ALTERNATE CEILING TRACKS ARE USED, CONSULT THE UL FIRE RESISTANCE DIRECTORY FOR INSTALLATION INSTRUCTIONS.

2. AS AN ALTERNATE TO HILTI CP 777 SPEED PLUGS, MINERAL WOOL (MIN. 4 PCF DENSITY) COMPRESSED 20% MAY BE USED.



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UL/cUL SYSTEM NO. HW-D-0181

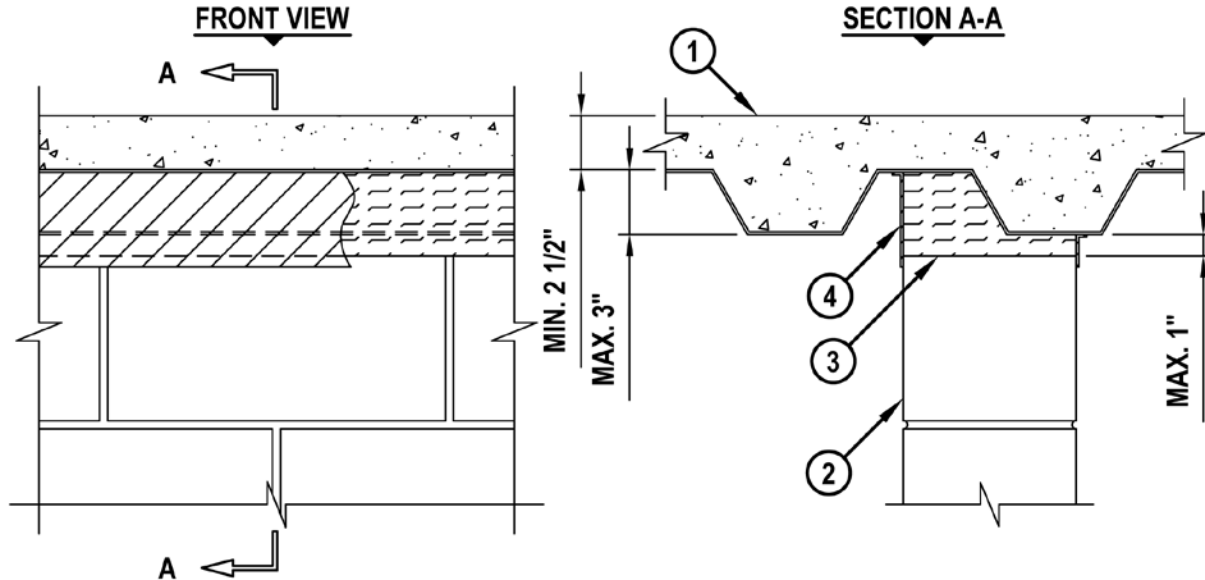
TOP OF WALL JOINT : CONCRETE WALL OR BLOCK WALL ASSEMBLY

ASSEMBLY RATING = 2-HR.

CLASS II AND CLASS III MOVEMENT CAPABILITIES - 12.5% COMPRESSION OR EXTENSION

L-RATING AT AMBIENT = LESS THAN 1 CFM/LIN FT

L-RATING AT 400°F = LESS THAN 1 CFM/LIN FT



HWD0181f.082611

1. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 2-1/2" THICK) OVER METAL DECKING (2-HR. FIRE-RATING).
2. CONCRETE WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 8" THICK).
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
3. MINERAL WOOL (MIN. 4 PCF DENSITY) COMPRESSED 33% AND INSERTED INTO JOINT, FLUSH WITH OUTSIDE WALL SURFACES.
4. MINIMUM 1/8" (WET) THICKNESS HILTI CFS-SP WB FIRESTOP JOINT SPRAY OR HILTI CP 672 SPEED SPRAY TO COMPLETELY COVER MINERAL WOOL AND TO OVERLAP A MINIMUM 1/2" ONTO CONCRETE WALL AND METAL DECKING ON BOTH SIDES OF WALL ASSEMBLY.

NOTES : 1. STEEL FLOOR UNITS MAY BE SPRAYED WITH A MIN. 5/16" THICKNESS TO MAX. 1-3/4" THICKNESS OF UL CLASSIFIED MONOKOTE TYPE MK-6/HY (MANUFACTURED BY W.R. GRACE) OR TYPE 300 (MANUFACTURED BY ISOLATEK, INT.) FIREPROOFING PRIOR TO INSTALLATION OF MINERAL WOOL AND HILTI FIRESTOP SPRAY.

2. WHEN THE STEEL DECK IS COATED WITH FIREPROOFING, HILTI FIRESTOP SPRAY SHALL OVERLAP THE WALL A MINIMUM OF 1/2" AND OVERLAP THE FIREPROOFING A MINIMUM 2" ON BOTH SIDES OF THE WALL.



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UL/cUL SYSTEM NO. HW-D-0184

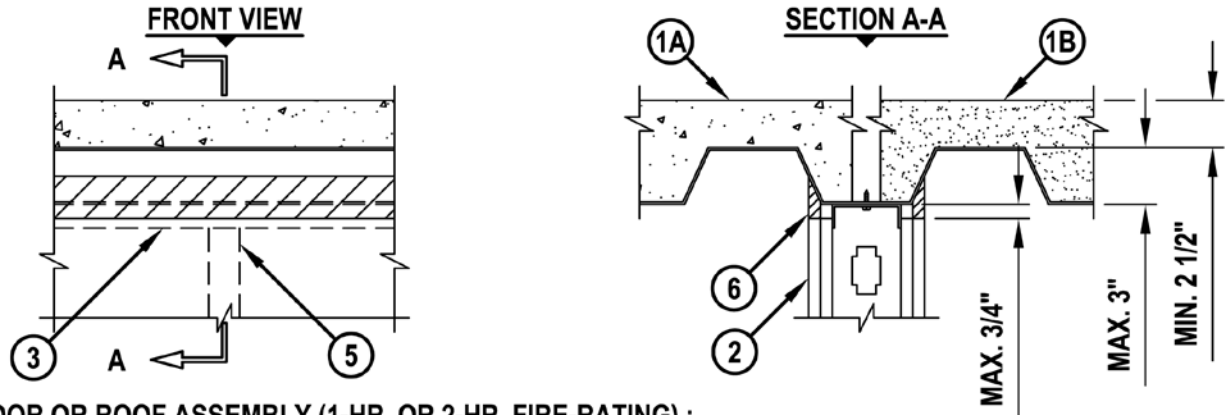
TOP OF WALL JOINT : GYPSUM WALL ASSEMBLY

ASSEMBLY RATING = 1-HR. OR 2-HR. (DEPENDING ON RATING OF WALL AND FLOOR ASSEMBLY)

CLASS II MOVEMENT CAPABILITIES - 17% COMPRESSION OR EXTENSION

L-RATING AT AMBIENT = LESS THAN 1 CFM/LIN FT

L-RATING AT 400°F = LESS THAN 1 CFM/LIN FT



HWD0184h.031212

1. FLOOR OR ROOF ASSEMBLY (1-HR. OR 2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MIN. 2-1/2" THICK) OVER METAL DECKING (UL/cUL CLASSIFIED D700 OR D900 SERIES).
 - B. INSULATING CONCRETE (MIN. 2-1/4" THICK) OVER METAL DECKING (UL/cUL CLASSIFIED P900 SERIES).
 - C. [NOT SHOWN] FLUTED STEEL ROOF DECK WITH SPRAY-APPLIED FIREPROOFING (UL/cUL CLASSIFIED P700 SERIES).
2. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U400 OR V400 SERIES) (1-HR. OR 2-HR. FIRE-RATING).
3. CEILING RUNNER (MIN. 25 GA., FLANGE HEIGHT OF CEILING RUNNER SHALL BE MINIMUM 1/4" GREATER THAN MAXIMUM EXTENDED JOINT WIDTH) FASTENED TO UNDERSIDE OF DECK WITH STEEL MASONRY ANCHORS, STEEL FASTENERS, OR WELDS (SPACED MAX. 24" O.C.) (SEE NOTE NO. 2 BELOW).
4. [OPTIONAL - NOT SHOWN] WHEN SPRAY APPLIED FIREPROOFING IS USED CEILING RUNNER MAY BE SECURED TO DECK WITH Z-SHAPED CLIPS (MIN. 20 GA.) MINIMUM 1" LONG, BUT NOT EXCEEDING THE WIDTH OF THE WALL. CLIPS TO BE SIZED TO EXTEND THROUGH THE THICKNESS OF THE FIREPROOFING WITH 1-1/2" OR 2" LONG UPPER AND LOWER LEGS. SUPPORT CLIPS TO BE SPACED 24" O/C.
5. STEEL STUDS (MIN. 3-5/8" WIDE), CUT 1/2" TO 3/4" LESS IN LENGTH THAN ASSEMBLY HEIGHT, NESTING IN CEILING RUNNER WITHOUT ATTACHMENT.
6. MINIMUM 5/8" DEPTH HILTI CP 601S ELASTOMERIC FIRESTOP SEALANT OR CP 606 FLEXIBLE FIRESTOP SEALANT.

- NOTES :**
1. STEEL FLOOR UNITS MAY BE SPRAYED WITH A MINIMUM 5/16" THICKNESS TO MAXIMUM 11/16" THICKNESS OF UL CLASSIFIED MONOKOTE TYPE MK-6/HY FIREPROOFING MANUFACTURED BY W.R. GRACE & CO. PRIOR TO OR AFTER INSTALLATION OF CEILING RUNNERS.
 2. AS AN ALTERNATE TO CEILING RUNNER IN ITEM NO. 3, SLOTTED CEILING RUNNERS MAY BE USED. WHEN ALTERNATE CEILING TRACKS ARE USED, CONSULT THE UL FIRE RESISTANCE DIRECTORY FOR APPROVED MANUFACTURERS.
 3. [OPTIONAL, NOT SHOWN] MINERAL WOOL, FIBERGLASS, OR POLYURETHANE/POLYETHYLENE FOAM BACKER ROD MAY BE USED AS A BACKER.



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UL/cUL SYSTEM NO. HW-D-0209

TOP OF WALL JOINT : GYPSUM WALL ASSEMBLY

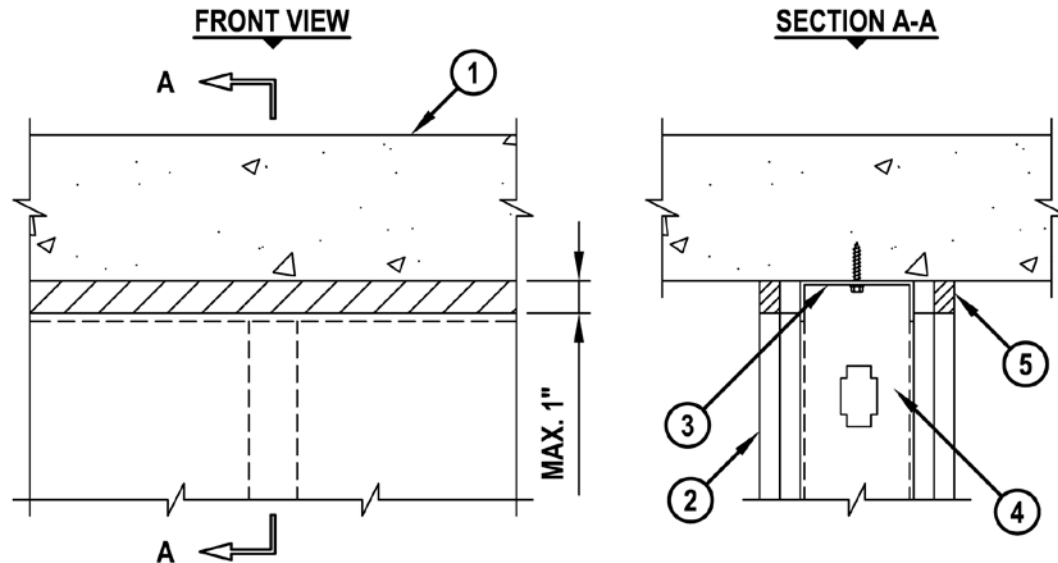
ASSEMBLY RATING = 1-HR. OR 2-HR. (DEPENDING ON RATING OF WALL AND FLOOR ASSEMBLY)

CLASS II MOVEMENT CAPABILITIES - 19% COMPRESSION OR EXTENSION

L-RATING AT AMBIENT = LESS THAN 1 CFM/LIN FT (SEE NOTE NO. 2 BELOW)

L-RATING AT 400°F = LESS THAN 1 CFM/LIN FT (SEE NOTE NO. 2 BELOW)

HWD0209h.030312

**1. CONCRETE FLOOR ASSEMBLY (1-HR. OR 2-HR. FIRE-RATING) :**

A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR ASSEMBLY (MIN. 4-1/2" THICK).

B. ANY UL/cUL CLASSIFIED PRE-CAST HOLLOW CORE CONCRETE FLOOR ASSEMBLY (MIN. 6" THICK).

2. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U400, V400, OR W400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).**3. CEILING RUNNER (MIN. 25 GA., FLANGE HEIGHT OF CEILING RUNNER SHALL BE MINIMUM 1/4" GREATER THAN MAXIMUM EXTENDED JOINT WIDTH) FASTENED TO UNDERSIDE OF CONCRETE FLOOR WITH STEEL MASONRY ANCHORS OR STEEL FASTENERS (SPACED MAX. 24" O.C.) (SEE NOTE BELOW).****4. STEEL STUDS (MIN. 3-1/2" WIDE), CUT 1/2" TO 3/4" LESS IN LENGTH THAN ASSEMBLY HEIGHT, NESTING IN CEILING RUNNER WITHOUT ATTACHMENT.****5. MINIMUM 5/8" DEPTH HILTI CP 601S ELASTOMERIC FIRESTOP SEALANT OR CP 606 FLEXIBLE FIRESTOP SEALANT.****NOTES : 1. AS AN ALTERNATE TO CEILING RUNNER IN ITEM NO. 3, SLOTTED CEILING RUNNERS MAY BE USED. CONSULT THE UL FIRE RESISTANCE DIRECTORY FOR APPROVED MANUFACTURERS.****2. L-RATINGS ONLY APPLIES WHEN HILTI CP 606 FIRESTOP SEALANT IS USED.****3. [OPTIONAL, NOT SHOWN] MINERAL WOOL, FIBERGLASS, OR POLYURETHANE/POLYETHYLENE FOAM BACKER ROD MAY BE USED AS A BACKER IN 2-HR. WALLS.**Classified by
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UL/cUL SYSTEM NO. HW-D-0218

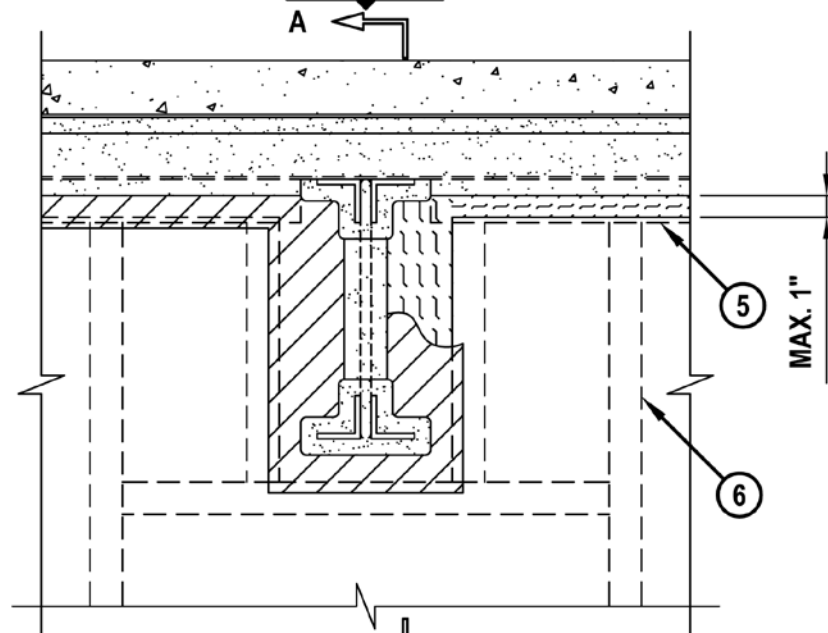
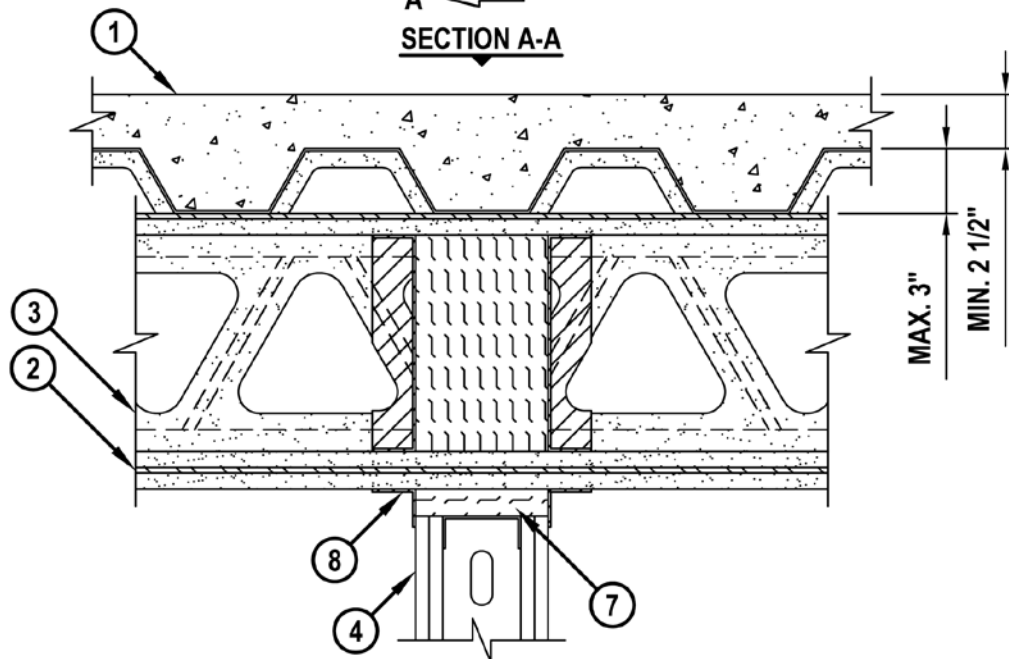
TOP OF WALL JOINT : GYPSUM WALL ASSEMBLY

ASSEMBLY RATING = 1-HR. OR 2-HR. (DEPENDING ON RATING OF WALL AND FLOOR ASSEMBLY)

CLASS II MOVEMENT CAPABILITIES - 25% COMPRESSION OR EXTENSION

L-RATING AT AMBIENT = LESS THAN 1 CFM/LIN FT

L-RATING AT 400°F = LESS THAN 1 CFM/LIN FT

FRONT VIEW**SECTION A-A**

HWD0218h.061412



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UL/cUL SYSTEM NO. HW-D-0218

TOP OF WALL JOINT : GYPSUM WALL ASSEMBLY

ASSEMBLY RATING = 1-HR. OR 2-HR. (DEPENDING ON RATING OF WALL AND FLOOR ASSEMBLY)

CLASS II MOVEMENT CAPABILITIES - 25% COMPRESSION OR EXTENSION

L-RATING AT AMBIENT = LESS THAN 1 CFM/LIN FT

L-RATING AT 400°F = LESS THAN 1 CFM/LIN FT

HWD0218h.061412

1. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MIN. 2-1/2" THICK) OVER METAL DECKING (UL/cUL CLASSIFIED D700 OR D900 SERIES) (1-HR. OR 2-HR. FIRE-RATING).
2. [OPTIONAL] STEEL BEAM OR OPEN WEB STEEL JOIST, ORIENTED PERPENDICULAR TO WALL ASSEMBLY (SEE NOTE NO. 1 BELOW).
3. UL CLASSIFIED MONOKOTE TYPE MK-6/HY (MANUFACTURED BY W.R. GRACE) OR TYPE 300 (MANUFACTURED BY ISOLATEK, INT.) FIREPROOFING SPRAYED TO THE THICKNESS SPECIFIED IN THE INDIVIDUAL D700 SERIES DESIGN (SEE NOTE NO. 2 BELOW).
4. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U400 OR V400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
5. CEILING RUNNER (MIN. 25 GA., FLANGE HEIGHT OF CEILING RUNNER SHALL BE MINIMUM 1/4" GREATER THAN MAXIMUM EXTENDED JOINT WIDTH) FASTENED TO UNDERSIDE OF DECK WITH STEEL MASONRY ANCHORS, STEEL FASTENERS, OR WELDS (SPACED MAX. 24" O.C.), PRIOR TO APPLYING FIREPROOFING (SEE NOTE NO. 4 BELOW).
6. STEEL STUDS (MINIMUM 3-5/8" WIDE), CUT 1/2" TO 3/4" LESS IN LENGTH THAN ASSEMBLY HEIGHT, NESTING IN CEILING RUNNER WITHOUT ATTACHMENT.
7. MINERAL WOOL SAFING (MIN. 4 PCF DENSITY) COMPRESSED 50% AND INSERTED INTO JOINT AND AROUND BEAM, FLUSH WITH WALL SURFACES. MINERAL WOOL INSTALLED WITH FIBERS VERTICAL ALONG THE SIDES OF THE BEAM AND HORIZONTAL AT THE BOTTOM OF THE BEAM.
8. MINIMUM 1/8" (WET) THICKNESS HILTI CFS-SP WB FIRESTOP JOINT SPRAY OR HILTI CP 672 SPEED SPRAY TO COMPLETELY COVER MINERAL WOOL AND TO OVERLAP MINIMUM 1/2" ONTO GYPSUM WALL, AND MINIMUM 2" ONTO FIREPROOFING, ON BOTH SIDES OF WALL ASSEMBLY.

NOTES : 1. WHERE OPEN-WEB STEEL JOISTS PASS THROUGH THE WALL, 3/8" DIAMOND MESH EXPANDED STEEL LATH (NOMINAL WEIGHT = 1.7 TO 3.4 LB. PER YARD) SHALL BE SECURED TO ONE SIDE OF EACH JOIST WITH STEEL TIE WIRE.

2. FIREPROOFING MATERIAL TO BE EXCLUDED FROM METAL DECK DIRECTLY ABOVE THE GYPSUM BOARD AND FROM THE FLANGES OF THE CEILING RUNNER.

3. FRAMED OPENING SHALL BE CONSTRUCTED AROUND EACH STRUCTURAL STEEL MEMBER. MINIMUM CLEARANCE OF 1" TO MAXIMUM OF 4" SHALL BE MAINTAINED BETWEEN FRAMING AND FIREPROOFING ON THE TWO SIDES OF MEMBER. MAXIMUM CLEARANCE OF 2" SHALL BE MAINTAINED ON THE BOTTOM OF THE STEEL SUPPORT MEMBER.

4. AS AN ALTERNATE TO CEILING RUNNER IN ITEM NO. 5, CEILING RUNNERS, MANUFACTURED BY BRADY CONSTRUCTION INNOVATIONS, INC., DBA SLIPTRACK SYSTEMS, THE STEEL NETWORK, INC., CEMCO, CLARKWESTERN BUILDING SYSTEMS, INC., SCAFCO, OR OLMAR SUPPLY, INC., MAY BE USED. WHEN ALTERNATE CEILING TRACKS ARE USED, CONSULT THE UL FIRE RESISTANCE DIRECTORY FOR INSTALLATION INSTRUCTIONS.



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UL/cUL SYSTEM NO. HW-D-0258

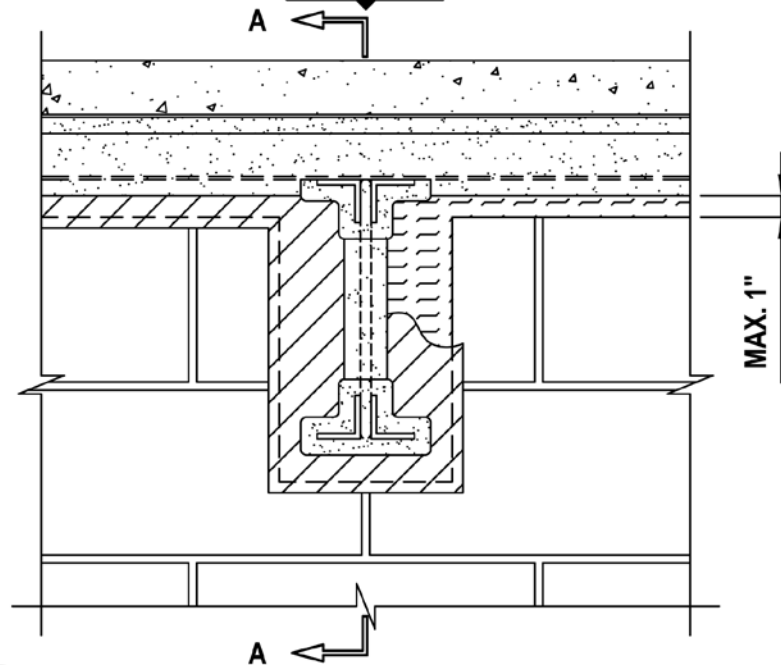
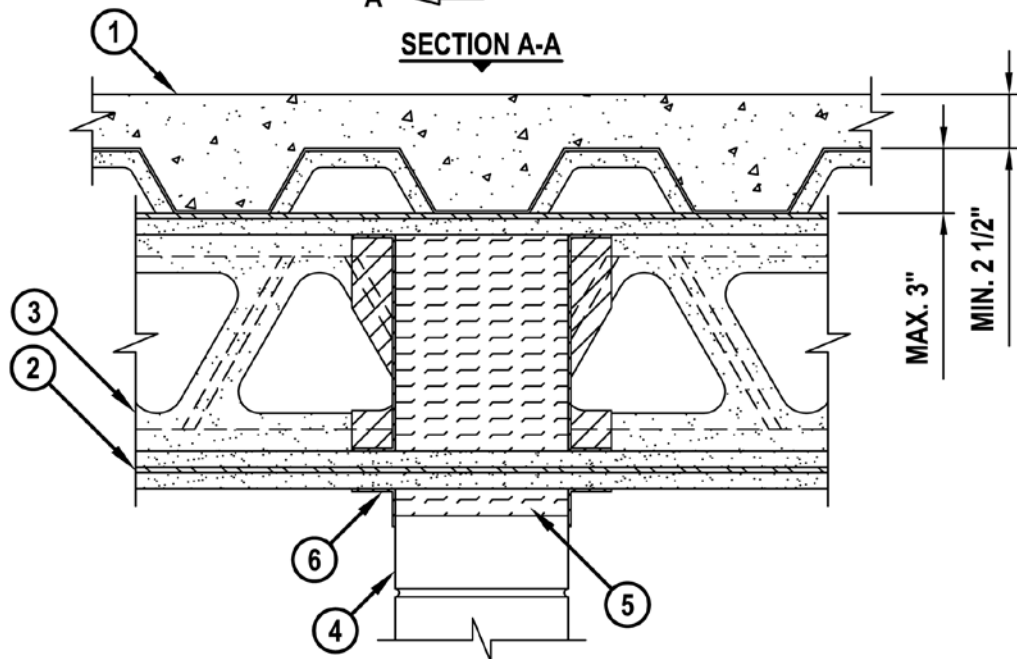
TOP OF WALL JOINT : CONCRETE WALL OR BLOCK WALL ASSEMBLY

ASSEMBLY RATING = 2-HR.

CLASS II MOVEMENT CAPABILITIES - 25% COMPRESSION OR EXTENSION

L-RATING AT AMBIENT = LESS THAN 1 CFM/LIN FT

L-RATING AT 400°F = LESS THAN 1 CFM/LIN FT

FRONT VIEW**SECTION A-A**

HWD0258f.052510



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UL/cUL SYSTEM NO. HW-D-0258

TOP OF WALL JOINT : CONCRETE WALL OR BLOCK WALL ASSEMBLY

ASSEMBLY RATING = 2-HR.

CLASS II MOVEMENT CAPABILITIES - 25% COMPRESSION OR EXTENSION

L-RATING AT AMBIENT = LESS THAN 1 CFM/LIN FT

L-RATING AT 400°F = LESS THAN 1 CFM/LIN FT

HWD0258f.052510

1. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 2-1/2" THICK) OVER METAL DECK ASSEMBLY (2-HR. FIRE-RATING).
2. [OPTIONAL] STEEL BEAM OR OPEN WEB STEEL JOIST, ORIENTED PERPENDICULAR TO WALL ASSEMBLY (SEE NOTE NO. 2 BELOW).
3. UL CLASSIFIED MONOKOTE TYPE MK-6/HY (MANUFACTURED BY W.R. GRACE) OR TYPE 300 (MANUFACTURED BY ISOLATEK, INT.) FIREPROOFING SPRAYED TO THE THICKNESS SPECIFIED IN THE INDIVIDUAL D700 SERIES DESIGN (SEE NOTE NO. 3 BELOW).
4. CONCRETE WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 6" THICK).
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
5. MINERAL WOOL (MINIMUM 4 PCF DENSITY) COMPRESSED 50% AND INSERTED INTO JOINT AND BAR JOIST/STEEL BEAM OPENING, FLUSH WITH WALL SURFACES.
6. MINIMUM 1/8" (WET) THICKNESS HILTI CFS-SP WB FIRESTOP JOINT SPRAY OR HILTI CP 672 SPEED SPRAY TO COMPLETELY COVER MINERAL WOOL AND TO OVERLAP MINIMUM 1/2" ONTO CONCRETE WALL ASSEMBLY, AND MINIMUM 2" ONTO FIREPROOFING, ON BOTH SIDES OF WALL ASSEMBLY.

NOTES : 1. MAXIMUM WIDTH OF JOINT = 1".

2. WHERE OPEN-WEB STEEL JOISTS PASS THROUGH THE WALL, 3/8" DIAMOND MESH EXPANDED STEEL LATH (NOMINAL WEIGHT = 1.7 TO 3.4 LB. PER YARD) SHALL BE SECURED TO ONE SIDE OF EACH JOIST WITH STEEL TIE WIRE.
3. FIREPROOFING MATERIAL TO BE EXCLUDED FROM METAL DECK DIRECTLY ABOVE THE CONCRETE WALL ASSEMBLY.
4. OPENING SHALL BE FORMED AROUND EACH STRUCTURAL STEEL MEMBER. MINIMUM CLEARANCE OF 1", TO MAXIMUM CLEARANCE OF 4", SHALL BE MAINTAINED BETWEEN WALL ASSEMBLY AND FIREPROOFING ON THE TWO SIDES OF MEMBER. MAXIMUM CLEARANCE OF 2" SHALL BE MAINTAINED ON THE BOTTOM OF THE STEEL SUPPORT MEMBER.



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UL/cUL SYSTEM NO. HW-D-0264

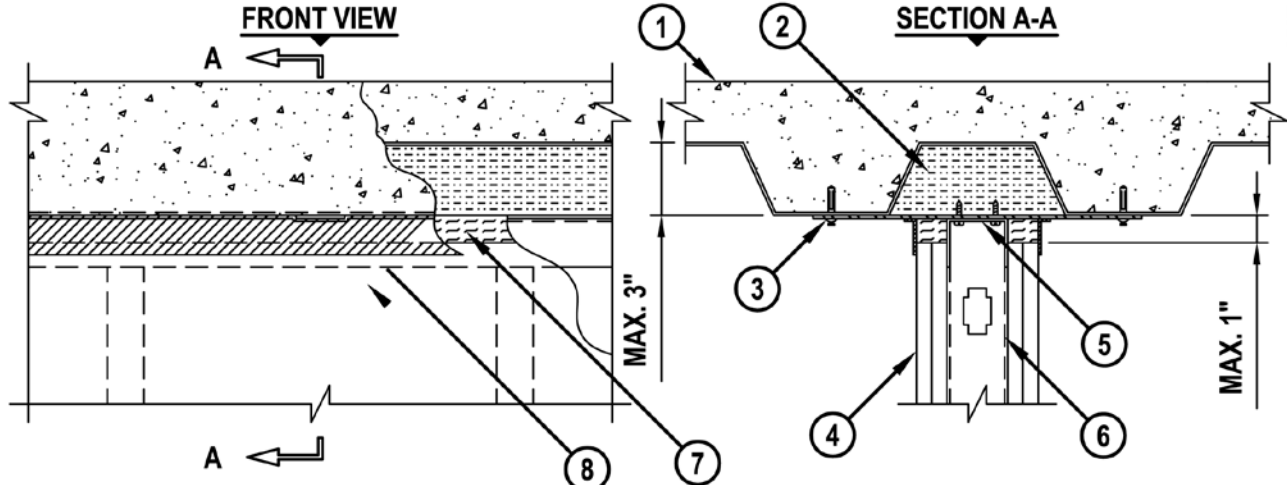
TOP OF WALL JOINT : GYPSUM WALL ASSEMBLY

ASSEMBLY RATING = 1-HR. OR 2-HR. (DEPENDING ON RATING OF WALL AND FLOOR ASSEMBLY)

CLASS II MOVEMENT CAPABILITIES - 18.75% COMPRESSION OR EXTENSION

L-RATING AT AMBIENT = LESS THAN 1 CFM/LIN FT

L-RATING AT 400°F = LESS THAN 1 CFM/LIN FT



1. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 2-1/2" THICK) OVER METAL DECKING (2-HR. FIRE-RATING).
2. HILTI CP 777 SPEED PLUGS FRICTION FITTED TO COMPLETELY FILL FLUTES. ADJACENT LENGTHS OF SPEED PLUGS TO BE TIGHTLY BUTTED WITH SEAMS SPACED MINIMUM 24" APART ALONG LENGTH OF THE PLUGS.
3. MINIMUM 2" WIDE, 16 GA., STEEL STRAPS CUT TO A LENGTH TO SPAN THE FLUTE AND OVERLAP THE ADJACENT VALLEYS BY 1-1/2". STEEL STRAPS SPACED MAXIMUM 24" ON CENTER AND FASTENED TO FLOOR ASSEMBLY WITH APPROPRIATE HILTI ANCHORS (1/4" DIAMETER x 1-1/2" LONG) OR 1" LONG HILTI X-DNI 27 P8S15 POWDER ACTUATED FASTENERS WITH 9/16" DIAMETER STEEL WASHERS.
4. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U400 SERIES) (1-HR. OR 2-HR. FIRE-RATING).
5. CEILING RUNNER (MIN. 25 GA. WITH 2" FLANGES) INSTALLED PARALLEL TO DIRECTION OF STEEL FLOOR UNITS AND SECURED TO STEEL STRAPS WITH TWO NO. 8 SELF-DRILLING, SELF-TAPPING STEEL SCREWS PER STRAP.
6. STEEL STUDS (MIN. 2-1/2" WIDE), CUT 1/2" TO 3/4" LESS IN LENGTH THAN ASSEMBLY HEIGHT, NESTING IN CEILING RUNNER WITHOUT ATTACHMENT.
7. HILTI CP 767 SPEED STRIPS OR MINERAL WOOL (MIN. 4 PCF DENSITY) COMPRESSED 50% AND INSERTED INTO JOINT, FLUSH WITH BOTH SIDES OF WALL.
8. MINIMUM 1/8" (WET) THICKNESS HILTI CFS-SP WB FIRESTOP JOINT SPRAY OR HILTI CP 672 SPEED SPRAY TO COMPLETELY COVER MINERAL WOOL AND TO OVERLAP A MINIMUM 1/2" ONTO GYPSUM, STEEL STRAPS, AND METAL DECK.

NOTE : AS AN ALTERNATE TO CEILING RUNNER IN ITEM NO. 5, CEILING RUNNERS, MANUFACTURED BY SLIPTRACK SYSTEMS, CEMCO, METAL-LITE, OR DENMAR STEEL, MAY BE USED. WHEN ALTERNATE CEILING TRACKS ARE USED, CONSULT THE UL FIRE RESISTANCE DIRECTORY FOR INSTALLATION INSTRUCTIONS.



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UL/cUL SYSTEM NO. HW-D-0268

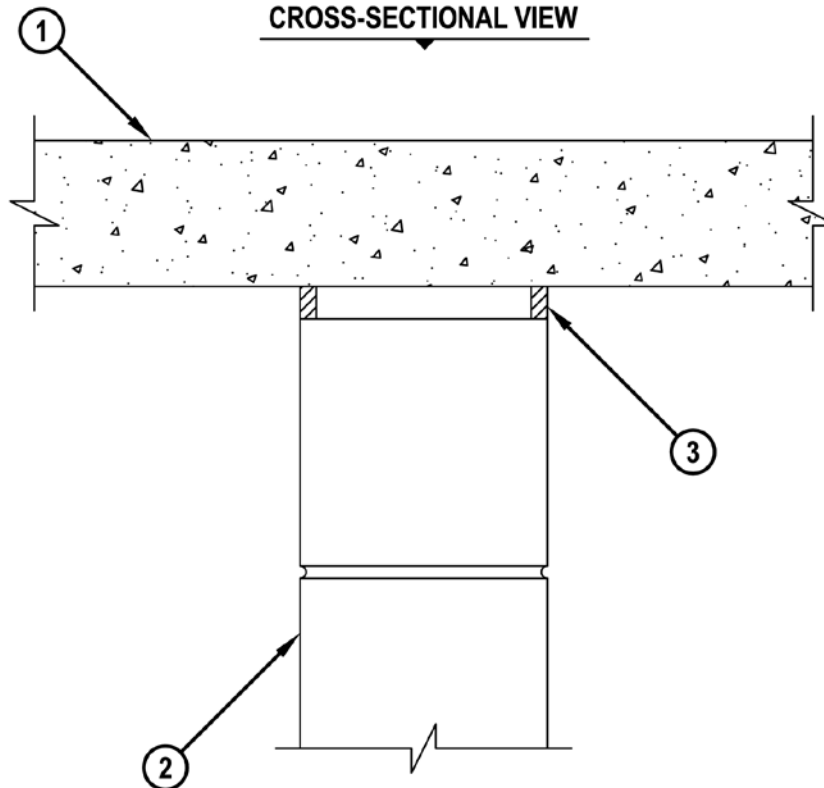
TOP OF WALL JOINT : CONCRETE WALL OR BLOCK WALL ASSEMBLY

ASSEMBLY RATING = 3-HR.

CLASS II MOVEMENT CAPABILITIES - 12.5% COMPRESSION OR EXTENSION

L-RATING AT AMBIENT = LESS THAN 1 CFM/LIN FT

L-RATING AT 400°F = LESS THAN 1 CFM/LIN FT

CROSS-SECTIONAL VIEW

HWD0268d.092608

1. CONCRETE FLOOR ASSEMBLY (3-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR ASSEMBLY (MINIMUM 2-1/2" THICK).
 - B. ANY UL/cUL CLASSIFIED PRECAST HOLLOW CORE FLOOR ASSEMBLY (MINIMUM 6" THICK).
2. CONCRETE WALL ASSEMBLY (3-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 8" THICK).
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
3. MINIMUM 1/2" DEPTH HILTI CP 606 FLEXIBLE FIRESTOP SEALANT.

NOTES : 1. MAXIMUM WIDTH OF JOINT = 1".
 2. [OPTIONAL] [NOT SHOWN] MINERAL WOOL OR POLYURETHANE FOAM
 BACKER ROD MAY BE USED AS A BACKER FOR FIRESTOP SEALANT.



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UL/cUL SYSTEM NO. HW-D-0285

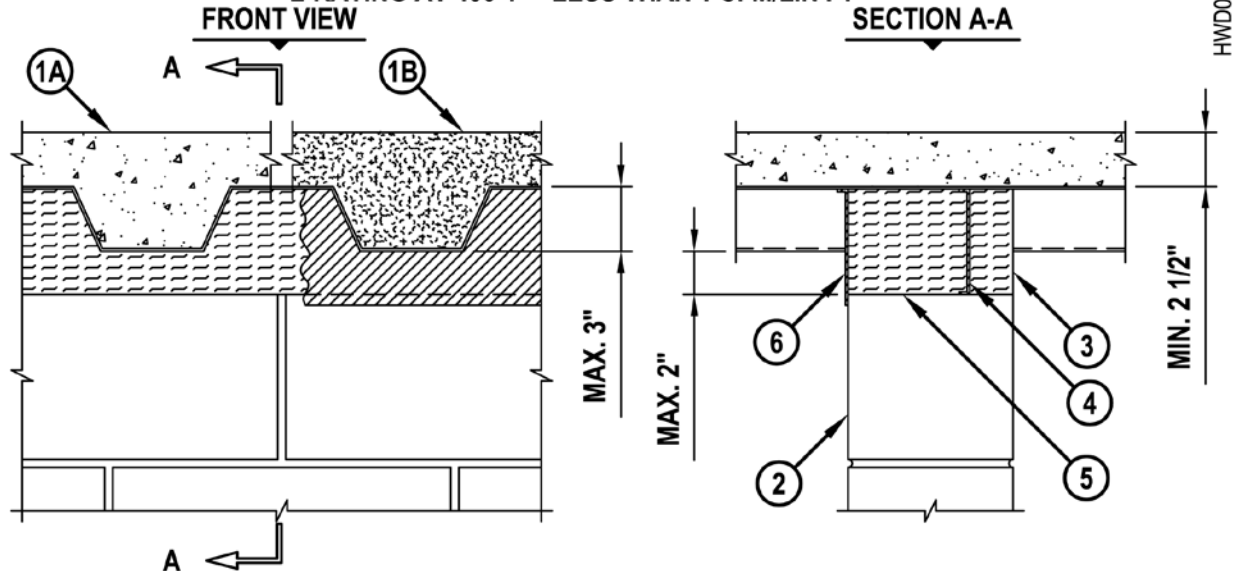
TOP OF WALL JOINT : CONCRETE WALL OR BLOCK WALL ASSEMBLY

ASSEMBLY RATING = 2-HR.

CLASS II MOVEMENT CAPABILITIES - 12.5% COMPRESSION OR EXTENSION

L-RATING AT AMBIENT = LESS THAN 1 CFM/LIN FT

L-RATING AT 400°F = LESS THAN 1 CFM/LIN FT



1. FLOOR OR ROOF ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MIN. 2-1/2" THICK) OVER METAL DECKING (UL/cUL CLASSIFIED D900 SERIES).
 - B. INSULATING CONCRETE (MIN. 2-1/4" THICK) OVER METAL DECKING (UL/cUL CLASSIFIED P900 SERIES).
2. CONCRETE WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 8" THICK).
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
3. MINIMUM 2" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) COMPRESSED 33% TO FILL THE JOINT AND FLUTE ON ONE SIDE OF THE WALL.
4. MINIMUM 1/8" (WET) THICKNESS HILTI CFS-SP WB FIRESTOP JOINT SPRAY OR HILTI CP 672 SPEED SPRAY TO COMPLETELY COVER MINERAL WOOL AND TO OVERLAP MINIMUM 1/2" ONTO CONCRETE WALL OR CONCRETE BLOCK WALL AND METAL DECK.
5. MINIMUM 6" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) COMPRESSED 33% AND FLUSH WITH WALL ASSEMBLY.
6. MINIMUM 1/8" (WET) THICKNESS HILTI CFS-SP WB FIRESTOP JOINT SPRAY OR HILTI CP 672 SPEED SPRAY TO COMPLETELY COVER MINERAL WOOL AND TO OVERLAP MINIMUM 1/2" ONTO CONCRETE WALL OR CONCRETE BLOCK WALL AND METAL DECK.

NOTES : 1. MAXIMUM WIDTH OF JOINT = 2".

2. AS AN ALTERNATE TO THE MINERAL WOOL INSTALLED IN THE FLUTES, HILTI CP 777 SPEED PLUGS MAY BE USED.

3. THIS FIRESTOP SYSTEM WAS DESIGNED AND TESTED FOR APPLICATIONS IN WHICH THERE IS LIMITED OR NO ACCESS AVAILABLE ON ONE SIDE OF THE WALL.

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UL/cUL SYSTEM NO. HW-D-0324

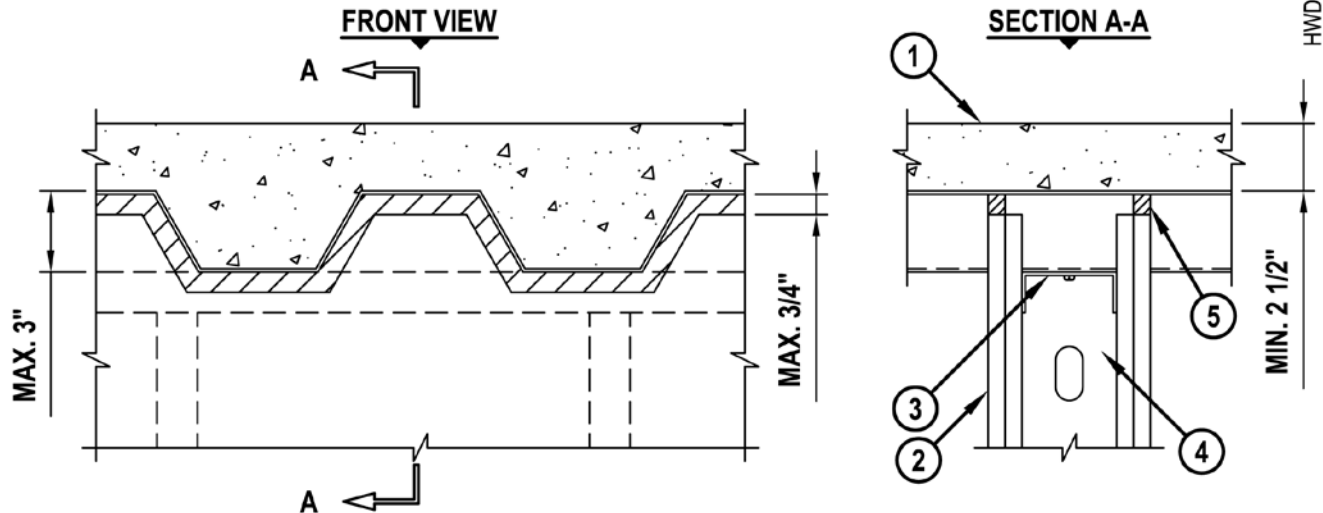
TOP OF WALL JOINT : GYPSUM WALL ASSEMBLY

ASSEMBLY RATING = 1-HR. OR 2-HR.

CLASS II MOVEMENT CAPABILITIES - 17% COMPRESSION OR EXTENSION

L-RATING AT AMBIENT = LESS THAN 1 CFM/LIN FT

L-RATING AT 400°F = LESS THAN 1 CFM/LIN FT



HWD0324d.030312

1. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 2-1/2" THICK) OVER METAL DECKING (UL/cUL CLASSIFIED D700 OR D900 SERIES) (1-HR. OR 2-HR. FIRE-RATING).
2. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U400, V400, OR W400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
3. CEILING RUNNER (MIN. 25 GA., FLANGE HEIGHT OF CEILING RUNNER SHALL BE MINIMUM 1/4" GREATER THAN MAXIMUM EXTENDED JOINT WIDTH) FASTENED TO UNDERSIDE OF DECK WITH STEEL FASTENERS OR WELDS (SPACED MAX. 24" O.C.) (SEE NOTE NO. 2 BELOW).
4. STEEL STUDS (MIN. 3-1/2" WIDE), CUT 1/2" TO 3/4" LESS IN LENGTH THAN ASSEMBLY HEIGHT, NESTING IN CEILING RUNNER WITHOUT ATTACHMENT.
5. MINIMUM 5/8" DEPTH HILTI CP 606 FLEXIBLE FIRESTOP SEALANT.

NOTES : 1. STEEL FLOOR UNITS MAY BE SPRAYED WITH A UL CLASSIFIED MONOKOTE TYPE MK-6/HY FIREPROOFING MANUFACTURED BY W.R. GRACE & CO. PRIOR TO THE INSTALLATION OF CEILING RUNNERS.

2. AS AN ALTERNATE TO CEILING RUNNER IN ITEM NO. 3, SLOTTED CEILING RUNNERS MAY BE USED. CONSULT THE UL FIRE RESISTANCE DIRECTORY FOR APPROVED MANUFACTURERS.

3. [OPTIONAL, NOT SHOWN] MINERAL WOOL, FIBERGLASS, OR POLYURETHANE/POLYETHYLENE FOAM BACKER ROD MAY BE USED AS A BACKER IN 2-HR. WALLS.



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UL/cUL SYSTEM NO. HW-D-0342

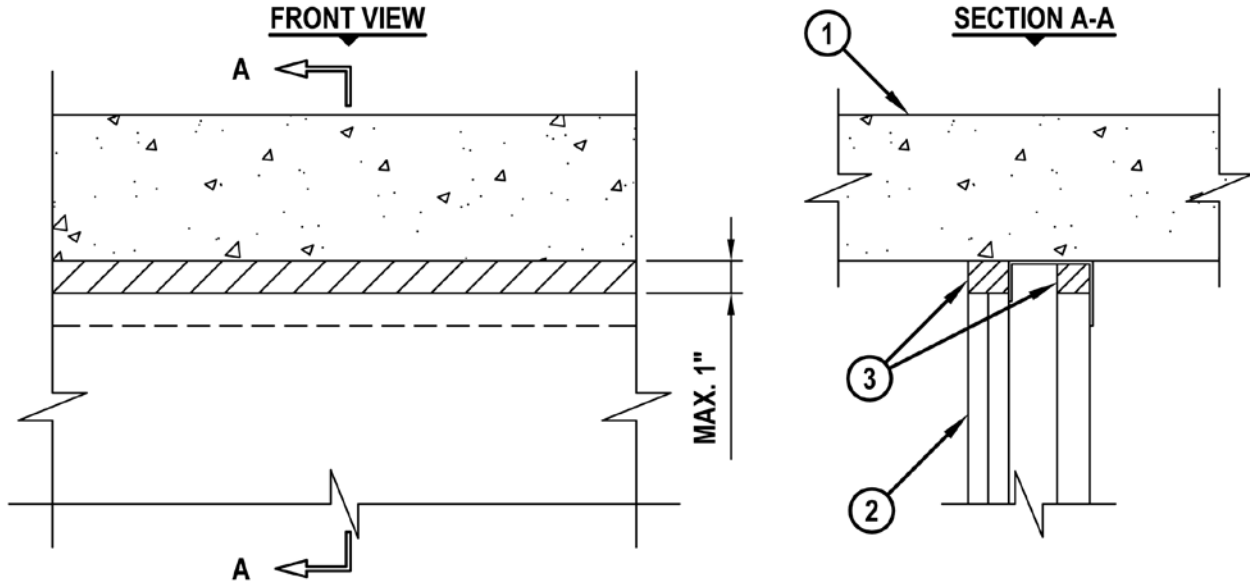
TOP OF WALL JOINT : GYPSUM SHAFT WALL ASSEMBLY

ASSEMBLY RATING = 2-HR.

CLASS II MOVEMENT CAPABILITIES - 8% COMPRESSION OR EXTENSION

L-RATING AT AMBIENT = LESS THAN 1 CFM/LIN FT

L-RATING AT 400°F = LESS THAN 1 CFM/LIN FT



1. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR ASSEMBLY (MINIMUM 4-1/2" THICK) (2-HR. FIRE-RATING).
2. GYPSUM SHAFT WALL ASSEMBLY (UL/cUL CLASSIFIED U400 OR V400 SERIES) (2-HR. FIRE-RATING) TO INCLUDE THE FOLLOWING CONSTRUCTION FEATURES :
 - A. "J" SHAPED CEILING RUNNER, MINIMUM 2-1/2" WIDE WITH LEGS OF 1-1/4" AND 2" (MINIMUM 24 GA.) FASTENED TO UNDERSIDE OF CONCRETE FLOOR WITH STEEL FASTENERS AT LOCATION NOT GREATER THAN 2" FROM ENDS AND MAXIMUM 24" O.C.
 - B. "C-H" SHAPED STUDS (MINIMUM 2-1/2" WIDE, MINIMUM 25 GA.) CUT 3/8" TO 1/2" LESS IN LENGTH THAN ASSEMBLY HEIGHT, NESTING IN CEILING RUNNER WITHOUT ATTACHMENT.
 - C. NOMINAL 1" THICK GYPSUM LINER PANEL. TYPE AND SHEET ORIENTATION AS SPECIFIED IN THE INDIVIDUAL UL DESIGN.
 - D. NOMINAL 1/2" OR 5/8" THICK GYPSUM WALLBOARD. TYPE, NUMBER OF LAYERS, AND SHEET ORIENTATION AS SPECIFIED IN THE INDIVIDUAL UL DESIGN.
3. MINIMUM 1" DEPTH HILTI CP 606 FLEXIBLE FIRESTOP SEALANT.

NOTES : 1. AS AN ALTERNATE TO CEILING RUNNER IN ITEM 3, CEILING RUNNERS, MANUFACTURED BY BRADY CONSTRUCTION INNOVATIONS, INC., DBA SLIPTRACK SYSTEMS, CEMCO, OR THE STEEL NETWORK, INC., MAY BE USED. CONSULT THE UL FIRE RESISTANCE DIRECTORY FOR INSTALLATION INSTRUCTIONS.

2. AS AN OPTION, THE STEEL STUDS MAY INCORPORATE VERTICAL DEFLECTION CLIPS (SLD 150, MANUFACTURED BY THE STEEL NETWORK, INC.) FOR ATTACHMENT TO THE CEILING RUNNER. CONSULT THE UL FIRE RESISTANCE DIRECTORY FOR INSTALLATION INSTRUCTIONS.



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HWD0342g.020210

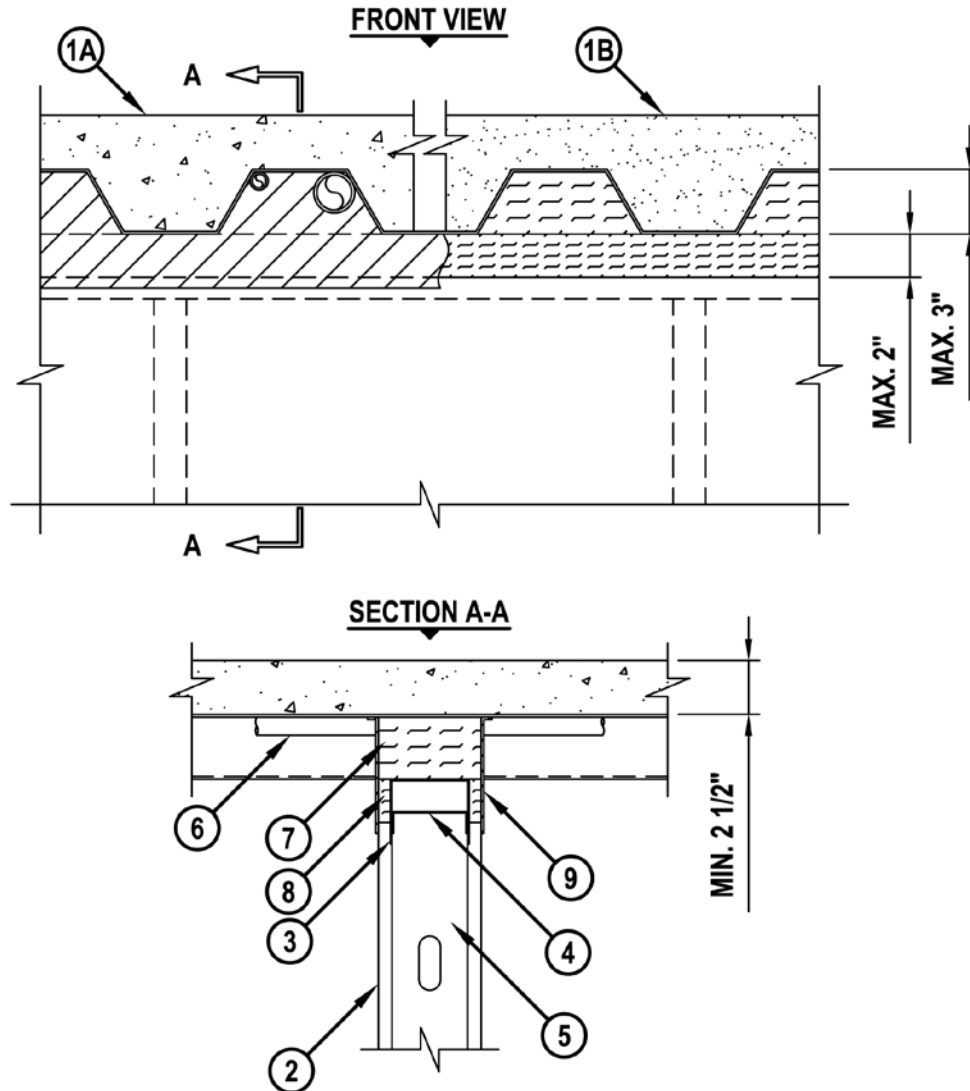
UL/cUL SYSTEM NO. HW-D-0564

TOP OF WALL JOINT : GYPSUM WALL ASSEMBLY

ASSEMBLY RATING = 1-HR.

CLASS II AND III MOVEMENT CAPABILITIES - 20% COMPRESSION OR EXTENSION, OR

CLASS II MOVEMENT CAPABILITIES - 20% COMPRESSION OR 12.5% EXTENSION (SEE NOTE NO. 5 BELOW)



HWD0564c.063010

1. FLOOR OR ROOF ASSEMBLY (1-HR. FIRE-RATING) :**A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MIN. 2-1/2" THICK) OVER METAL DECKING (UL/cUL CLASSIFIED D700 OR D900 SERIES).****B. INSULATING CONCRETE (MIN. 2-1/4" THICK) OVER METAL DECKING (UL/cUL CLASSIFIED P900 SERIES).****C. [NOT SHOWN] FLUTED STEEL ROOF DECK WITH SPRAY-APPLIED FIREPROOFING (UL/cUL CLASSIFIED P700 SERIES).****2. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U400 OR V400 SERIES) (1-HR. FIRE-RATING).**Classified by
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UL/cUL SYSTEM NO. HW-D-0564

TOP OF WALL JOINT : GYPSUM WALL ASSEMBLY

ASSEMBLY RATING = 1-HR.

CLASS II AND III MOVEMENT CAPABILITIES - 20% COMPRESSION OR EXTENSION, OR
 CLASS II MOVEMENT CAPABILITIES - 20% COMPRESSION OR 12.5% EXTENSION (SEE NOTE NO. 5 BELOW)

3. [OPTIONAL] METAL DEFLECTION TRACK (MIN. 22 GA., 3" FLANGES) FASTENED TO UNDERSIDE OF STEEL DECK WITH STEEL FASTENERS OR WELDS SPACED MAXIMUM 24" O.C.
4. CEILING RUNNER (1" FLANGES) INSTALLED WITHIN THE U-SHAPED DEFLECTION CHANNEL WITH A 1-1/2" GAP MAINTAINED BETWEEN THE TOP OF THE CEILING RUNNER AND TOP OF DEFLECTION PLATE (SEE NOTE NO. 3 BELOW).
5. STEEL STUDS (MINIMUM 3-1/2" WIDE), CUT 1/2" TO 3/4" LESS IN LENGTH THAN ASSEMBLY HEIGHT, NESTING IN CEILING RUNNER WITHOUT ATTACHMENT.
6. ANY COMBINATION OF THE FOLLOWING PENETRATING ITEMS MAY BE INSTALLED PARALLEL WITH AND WITHIN THE FLUTES OF THE STEEL FLOOR OR ROOF DECK (MAX. QTY. = 2) (SEE NOTE NO. 4 BELOW) :
 - A. MAXIMUM 1-1/2" NOMINAL DIAMETER PVC PLASTIC PIPE OR CONDUIT (RNC) (SCH 40) (SOLID CORE) (CLOSED PIPING SYSTEM) (SEE NOTE NO. 6 BELOW).
 - B. MAXIMUM 1/2" NOMINAL DIAMETER STEEL CONDUIT OR EMT.
7. HILTI CP 777 SPEED PLUGS FRICTION FITTED TO COMPLETELY FILL FLUTE, FLUSH WITH BOTH SIDES OF WALL (SEE NOTE NO. 4 BELOW).
8. HILTI CP 767 SPEED STRIPS COMPRESSED 50% AND INSERTED INTO JOINT, FLUSH WITH BOTH SIDES OF GYPSUM WALL (SEE NOTE NO. 4 BELOW).
9. MINIMUM 1/8" (WET) THICKNESS HILTI CFS-SP WB FIRESTOP JOINT SPRAY OR HILTI CP 672 SPEED SPRAY TO COMPLETELY COVER MINERAL WOOL AND TO OVERLAP A MINIMUM 1/2" ONTO GYPSUM WALL, PENETRATING ITEMS, AND METAL DECKING ON BOTH SIDES OF GYPSUM WALL ASSEMBLY.

- NOTES :**
1. STEEL FLOOR UNITS MAY BE SPRAYED WITH A MIN. 5/16" THICKNESS TO MAX. 1-3/4" THICKNESS OF UL CLASSIFIED MONOKOTE TYPE MK-6/HY (MANUFACTURED BY W.R. GRACE) OR TYPE 300 (MANUFACTURED BY ISOLATEK, INT.) FIREPROOFING PRIOR TO INSTALLATION OF CEILING RUNNERS.
 2. WHEN THE STEEL DECK IS COATED WITH FIREPROOFING, HILTI FIRESTOP SPRAY SHALL OVERLAP THE WALL A MIN. 1/2" AND OVERLAP THE FIREPROOFING A MIN. 2" ON BOTH SIDES OF GYPSUM WALL ASSEMBLY.
 3. AS AN ALTERNATE TO CEILING RUNNER IN ITEM NO. 4, CEILING RUNNERS, MANUFACTURED BY BRADY CONSTRUCTION INNOVATIONS, INC., DBA SLIPTRACK SYSTEMS, INC., CEMCO, CLARK WESTERN BUILDING, METAL-LITE, INC., SCAFCO STEEL STUD MANUFACTURING, CO., THE STEEL NETWORK, TOTAL STEEL SOLUTIONS, TELLING INDUSTRIES LLC, OR OLMAR SUPPLY STEEL, INC. MAY BE USED. WHEN ALTERNATE CEILING TRACKS ARE USED, CONSULT THE UL FIRE RESISTANCE DIRECTORY FOR INSTALLATION INSTRUCTIONS.
 4. AS AN ALTERNATE TO HILTI CP 767 SPEED STRIPS, AND/OR CP 777 SPEED PLUGS, MINERAL WOOL (MIN. 4 PCF DENSITY) COMPRESSED 50% MAY BE USED.
 5. MOVEMENT CAPABILITIES ARE 20% COMPRESSION AND 12.5% EXTENSION WHEN TYPE 300 FIREPROOFING IS USED.
 6. USE OF PVC PLASTIC PIPE OR RNC CONDUIT (ITEM 6A) IS NOT APPLICABLE IN CANADA.

HWD0564c.063010



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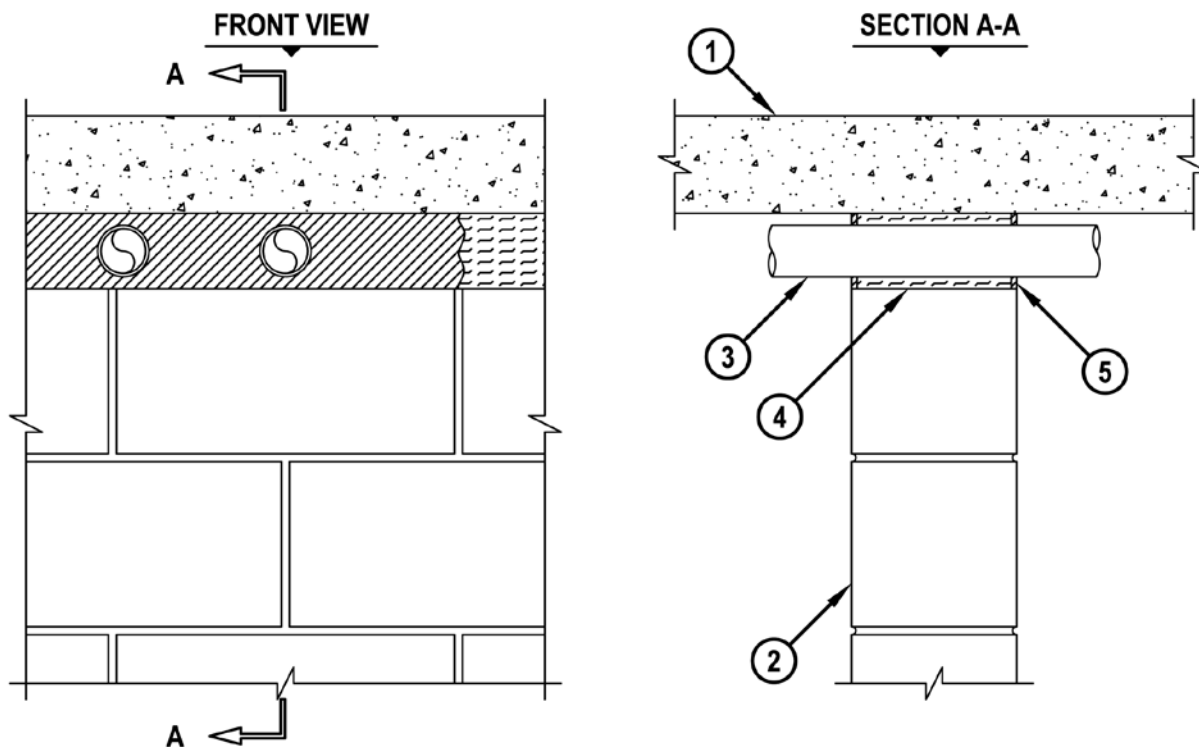
cUL SYSTEM NO. HW-D-1003

**FIRE-RATED JOINT THROUGH CONCRETE WALL OR BLOCK WALL ASSEMBLY**

F-RATING = 3-HR.

FT, FH AND FTH-RATINGS = 0-HR.

CLASS II MOVEMENT CAPABILITIES - 7% COMPRESSION OR EXTENSION



cUL HWD1003a.070704

1. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR ASSEMBLY (MINIMUM 5" THICK) (3-HR. FIRE-RATING).
2. CONCRETE WALL ASSEMBLY (3-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 5" THICK).
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
3. MULTIPLE METALLIC PIPES TO CONSIST OF THE FOLLOWING :
 - A. MAXIMUM 2" NOMINAL DIAMETER STEEL PIPE SCHEDULE 5 OR HEAVIER).
 - B. MAXIMUM 2" NOMINAL DIAMETER CAST OR DUCTILE IRON PIPE.
 - C. MAXIMUM 2" NOMINAL DIAMETER STEEL CONDUIT.
 - D. MAXIMUM 2" NOMINAL DIAMETER EMT.
4. MINIMUM 4-1/2" THICKNESS MINERAL WOOL (MINIMUM 4 PCF DENSITY) COMPRESSED 50% AND RECESSED TO ACCOMMODATE FIRESTOP SEALANT.
5. MINIMUM 1/4" DEPTH HILTI CP 606 FLEXIBLE FIRESTOP SEALANT.

NOTES : 1. MAXIMUM WIDTH OF JOINT = 3-1/2".
 2. ANNULAR SPACE BETWEEN PIPE AND BOTTOM OF FLOOR OR TOP OF WALL = MINIMUM 1/2", MAXIMUM 1".
 3. ANNULAR SPACE BETWEEN PIPES = MINIMUM 1".



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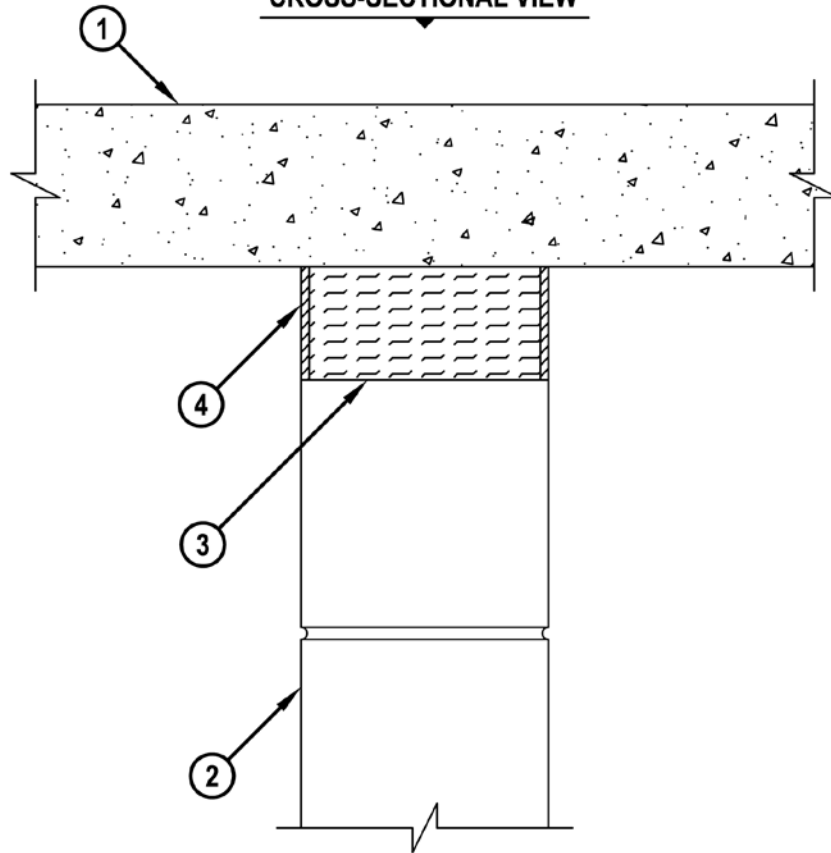
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UL/cUL SYSTEM NO. HW-D-1008

FIRE-RATED JOINT THROUGH CONCRETE WALL OR BLOCK WALL ASSEMBLY

ASSEMBLY RATING = 3-HR.

CLASS II MOVEMENT CAPABILITIES - 14% COMPRESSION OR EXTENSION

CROSS-SECTIONAL VIEW

HWD1008g.102908

1. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR ASSEMBLY (MINIMUM 4-1/2" THICK) (3-HR. FIRE-RATING).
2. CONCRETE WALL ASSEMBLY (3-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 4-3/4" THICK).
 - B. ANY UL CLASSIFIED CONCRETE BLOCK WALL.
3. MINIMUM 4-1/4" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) COMPRESSED MINIMUM 42%.
4. MINIMUM 1/4" DEPTH HILTI CP 601S ELASTOMERIC FIRESTOP SEALANT.

NOTE : MAXIMUM WIDTH OF JOINT = 3-1/2".



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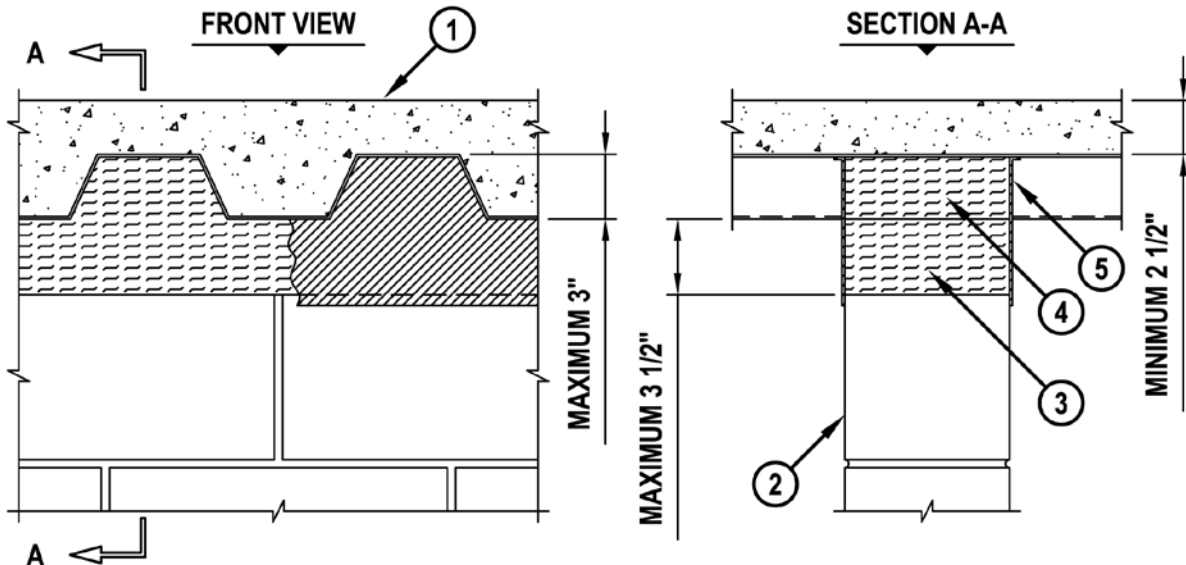
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UL/cUL SYSTEM NO. HW-D-1037

TOP OF WALL JOINT : CONCRETE WALL OR BLOCK WALL ASSEMBLY

ASSEMBLY RATING = 2-HR.

CLASS II MOVEMENT CAPABILITIES - 14% COMPRESSION OR EXTENSION



HWD1037d.052510

1. FLOOR OR ROOF ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHT WEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MIN. 2-1/2" THICK) OVER METAL DECKING (UL/ULC CLASSIFIED D700 OR D900 SERIES).
 - B. (NOT SHOWN). FLUTED STEEL ROOF DECK WITH SPRAY-APPLIED FIREPROOFING (UL/ULC CLASSIFIED P700 SERIES).
2. CONCRETE WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MIN. 8" THICK).
 - B. ANY UL/ULC CLASSIFIED CONCRETE BLOCK WALL.
3. MINERAL WOOL (MINIMUM 4 PCF DENSITY) COMPRESSED 50% AND INSERTED INTO JOINT, FLUSH WITH BOTH SIDES OF WALL ASSEMBLY.
4. HILTI CP 777 SPEED PLUGS FRICTION FITTED TO COMPLETELY FILL FLUTE, FLUSH WITH BOTH SIDES OF WALL. (SEE NOTE NO. 3 BELOW).
5. MINIMUM 1/8" (WET) THICKNESS HILTI CFS-SP WB FIRESTOP JOINT SPRAY OR HILTI CP 672 SPEED SPRAY TO COMPLETELY COVER MINERAL WOOL AND TO OVERLAP MINIMUM 1/2" ONTO CONCRETE WALL OR CONCRETE BLOCK WALL AND METAL DECK ON BOTH SIDES OF WALL ASSEMBLY.

NOTES : 1. STEEL FLOOR UNITS MAY BE SPRAYED WITH A MINIMUM 5/16" THICKNESS TO MAXIMUM 1-3/4" THICKNESS OF UL CLASSIFIED MONOKOTE TYPE MK-6/HY FIREPROOFING MANUFACTURED BY W.R. GRACE & CO.

2. WHEN THE STEEL DECK IS COATED WITH FIREPROOFING, HILTI FIRESTOP SPRAY SHALL OVERLAP THE WALL MINIMUM 1/2" AND OVERLAP THE FIRE- PROOFING MINIMUM 2", ON BOTH SIDES OF THE WALL.

3. AS AN ALTERNATE TO HILTI CP 777 SPEED PLUGS, MINERAL WOOL (MIN. 4 PCF DENSITY) COMPRESSED 50% MAY BE USED.



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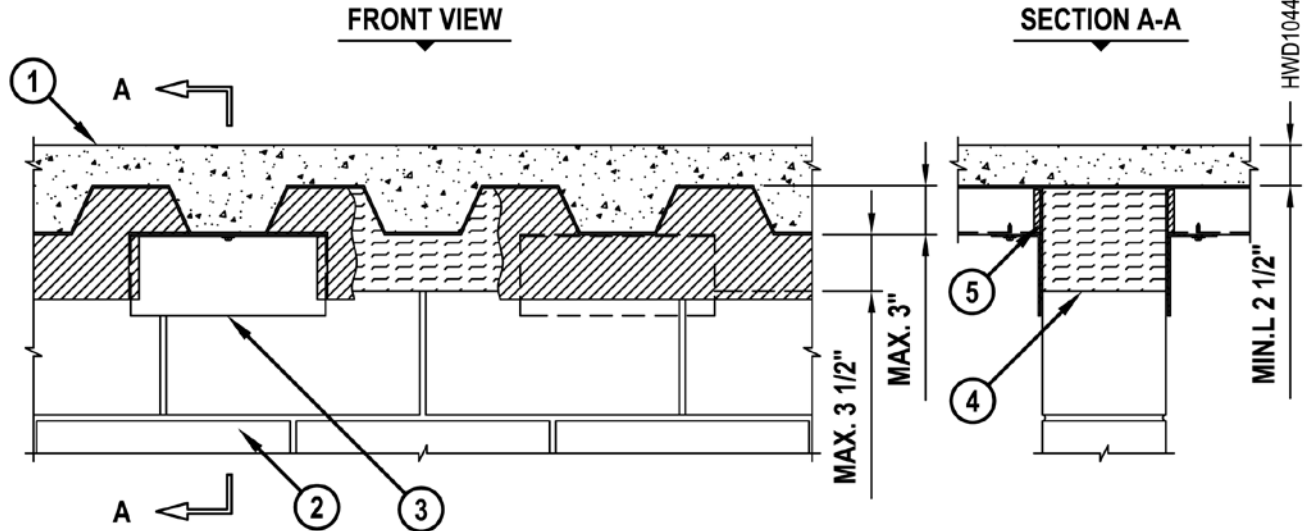
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UL/cUL SYSTEM NO. HW-D-1044

TOP OF WALL JOINT : CONCRETE BLOCK WALL ASSEMBLY

ASSEMBLY RATING = 2-HR.

CLASS II MOVEMENT CAPABILITIES - 14% COMPRESSION OR EXTENSION

**1. FLOOR OR ROOF ASSEMBLY (2-HR. FIRE-RATING) :**

A. LIGHT WEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MIN. 2-1/2" THICK) OVER METAL DECKING (UL/cUL CLASSIFIED D700 OR D900 SERIES).

B. [NOT SHOWN] FLUTED STEEL ROOF DECK WITH SPRAY-APPLIED FIREPROOFING (UL/cUL CLASSIFIED P700 SERIES).

2. CONCRETE BLOCK WALL ASSEMBLY (2-HR. FIRE-RATING).

3. STEEL ANGLES (MAXIMUM SIZE : 5" x 3" x 12 GA., OR THICKER) CUT MAXIMUM 12" LONG AND FASTENED TO METAL DECK AT MINIMUM 24" C/C. STEEL ANGLES TO BE STAGGERED ON OPPOSITE SIDE OF WALL.

4. MINERAL WOOL (MIN. 4 PCF DENSITY) COMPRESSED 50% AND INSERTED INTO JOINT, BEHIND STEEL ANGLES AND INTO FLUTE.

5. MINIMUM 1/8" (WET) THICKNESS HILTI CFS-SP WB FIRESTOP JOINT SPRAY OR HILTI CP 672 SPEED SPRAY TO COMPLETELY COVER MINERAL WOOL AND TO OVERLAP MINIMUM 1/2" ONTO BLOCK WALL, STEEL ANGLES, AND METAL DECK ON BOTH SIDES OF WALL ASSEMBLY.

NOTES : 1. MAXIMUM WIDTH OF JOINT = 3-1/2".

2. STEEL FLOOR UNITS MAY BE SPRAYED WITH A MINIMUM 5/16" THICKNESS TO MAXIMUM 1-3/4" THICKNESS OF UL CLASSIFIED MONOKOTE TYPE MK-6/HY FIREPROOFING MANUFACTURED BY W.R. GRACE & CO.

3. WHEN THE STEEL DECK IS COATED WITH FIREPROOFING, HILTI FIRESTOP SPRAY SHALL OVERLAP THE WALL MIN. 1/2" AND OVERLAP THE FIREPROOFING MINIMUM 2", ON BOTH SIDES OF THE WALL.



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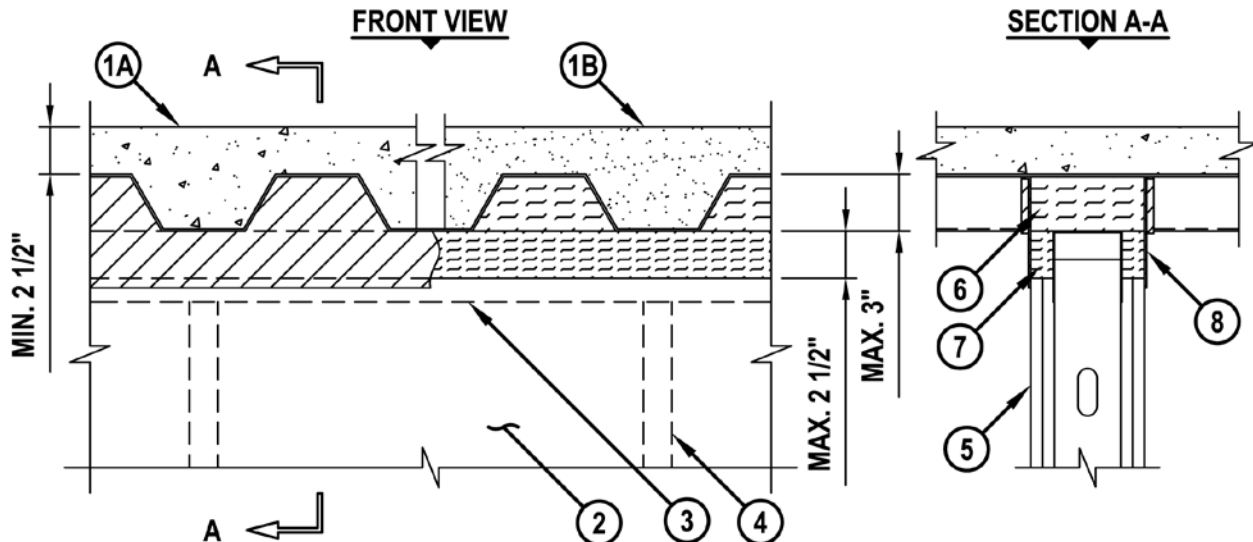
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UL/cUL SYSTEM NO. HW-D-1066

TOP OF WALL JOINT : GYPSUM WALL ASSEMBLY

ASSEMBLY RATING = 1-HR. OR 2-HR.

CLASS II MOVEMENT CAPABILITIES - 40% COMPRESSION OR EXTENSION



HWD1006c.052510

1. FLOOR OR ROOF ASSEMBLY (1-HR. OR 2-HR. FIRE-RATING) :

A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MIN. 2-1/2" THICK) OVER METAL DECKING (UL/cUL CLASSIFIED D900 SERIES).

B. INSULATING CONCRETE (MIN. 2-1/4" THICK) OVER METAL DECKING (UL/cUL CLASSIFIED P900 SERIES).

2. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U400 OR V400 SERIES) (1-HR. OR 2-HR. FIRE-RATING).**3. CEILING RUNNER (MIN. 25 GA., FLANGE HEIGHT OF CEILING RUNNER SHALL BE MINIMUM 1/4" GREATER THAN MAXIMUM EXTENDED JOINT WIDTH) FASTENED TO UNDERSIDE OF DECK WITH STEEL MASONRY ANCHORS, STEEL FASTENERS, OR WELDS (SPACED MAX. 24" O.C.).****4. STEEL STUDS (MINIMUM 3-1/2" WIDE), CUT 1-1/4" TO 1-1/2" LESS IN LENGTH THAN ASSEMBLY HEIGHT, NESTING IN CEILING RUNNER WITHOUT ATTACHMENT.****5. 5/8" OR 1-1/4" THICKNESS GYPSUM WALLBOARD AS SPECIFIED IN THE INDIVIDUAL UL DESIGN. TOP ROW OF SCREWS SHALL BE INSTALLED INTO STUDS 5" BELOW THE BOTTOM PLANE OF FLOOR/ROOF.****6. HILTI CP 777 SPEED PLUGS FRICTION FITTED TO COMPLETELY FILL FLUTE, FLUSH WITH BOTH SIDES OF WALL (SEE NOTE BELOW).****7. HILTI CP 767 SPEED STRIPS COMPRESSED 50% AND INSERTED INTO JOINT, FLUSH WITH BOTH SIDES OF GYPSUM WALL (SEE NOTE BELOW).****8. MINIMUM 1/8" (WET) THICKNESS HILTI CFS-SP WB FIRESTOP JOINT SPRAY OR HILTI CP 672 SPEED SPRAY TO COMPLETELY COVER MINERAL WOOL AND TO OVERLAP A MINIMUM 1/2" ONTO GYPSUM WALL AND METAL DECKING ON BOTH SIDES OF GYPSUM WALL ASSEMBLY.**

NOTE : AS AN ALTERNATE TO HILTI CP 767 SPEED STRIPS, AND/OR CP 777 SPEED PLUGS, MINERAL WOOL (MIN. 4 PCF DENSITY) COMPRESSED 50% MAY BE USED.



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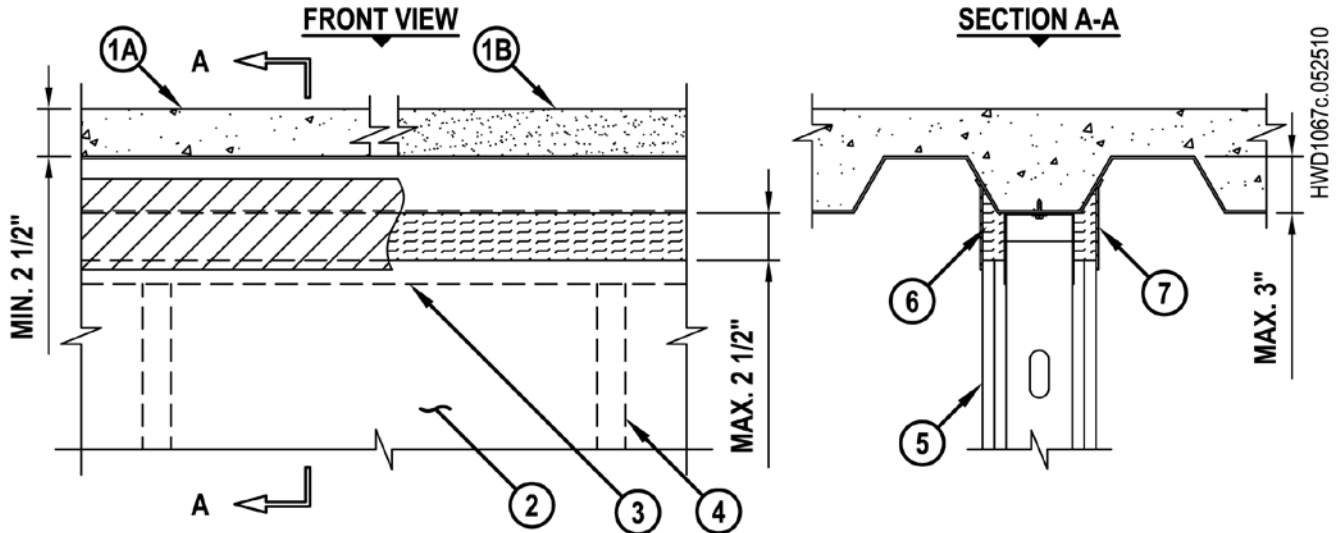
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UL/cUL SYSTEM NO. HW-D-1067

TOP OF WALL JOINT : GYPSUM WALL ASSEMBLY

ASSEMBLY RATING = 1-HR. OR 2-HR.

CLASS II MOVEMENT CAPABILITIES - 40% COMPRESSION OR EXTENSION



1. FLOOR OR ROOF ASSEMBLY (1-HR. OR 2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MIN. 2-1/2" THICK) OVER METAL DECKING (UL/cUL CLASSIFIED D900 SERIES).
 - B. INSULATING CONCRETE (MIN. 2-1/4" THICK) OVER METAL DECKING (UL/cUL CLASSIFIED P900 SERIES).
2. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U400 OR V400 SERIES) (1-HR. OR 2-HR. FIRE-RATING).
3. CEILING RUNNER (MIN. 25 GA., FLANGE HEIGHT OF CEILING RUNNER SHALL BE MINIMUM 1/4" GREATER THAN MAXIMUM EXTENDED JOINT WIDTH) FASTENED TO UNDERSIDE OF DECK WITH STEEL MASONRY ANCHORS, STEEL FASTENERS, OR WELDS (SPACED MAX. 24" O.C.).
4. STEEL STUDS (MINIMUM 3-1/2" WIDE), CUT 1-1/4" TO 1-1/2" LESS IN LENGTH THAN ASSEMBLY HEIGHT, NESTING IN CEILING RUNNER WITHOUT ATTACHMENT.
5. 5/8" OR 1-1/4" THICKNESS GYPSUM WALLBOARD AS SPECIFIED IN THE INDIVIDUAL UL DESIGN. TOP ROW OF SCREWS SHALL BE INSTALLED INTO STUDS 5" BELOW THE BOTTOM PLANE OF FLOOR/ROOF.
6. HILTI CP 767 SPEED STRIPS COMPRESSED 50% AND INSERTED INTO FLUTES, FLUSH WITH BOTH SIDES OF WALL (SEE NOTE BELOW).
7. MINIMUM 1/8" (WET) THICKNESS HILTI CFS-SP WB FIRESTOP JOINT SPRAY OR HILTI CP 672 SPEED SPRAY TO COMPLETELY COVER MINERAL WOOL AND TO OVERLAP A MINIMUM OF 1/2" ONTO GYPSUM AND METAL DECKING ON BOTH SIDES OF GYPSUM WALL ASSEMBLY.

NOTE : AS AN ALTERNATE TO HILTI CP 767 SPEED STRIPS, MINERAL WOOL (MIN. 4 PCF DENSITY) COMPRESSED 50% MAY BE USED.



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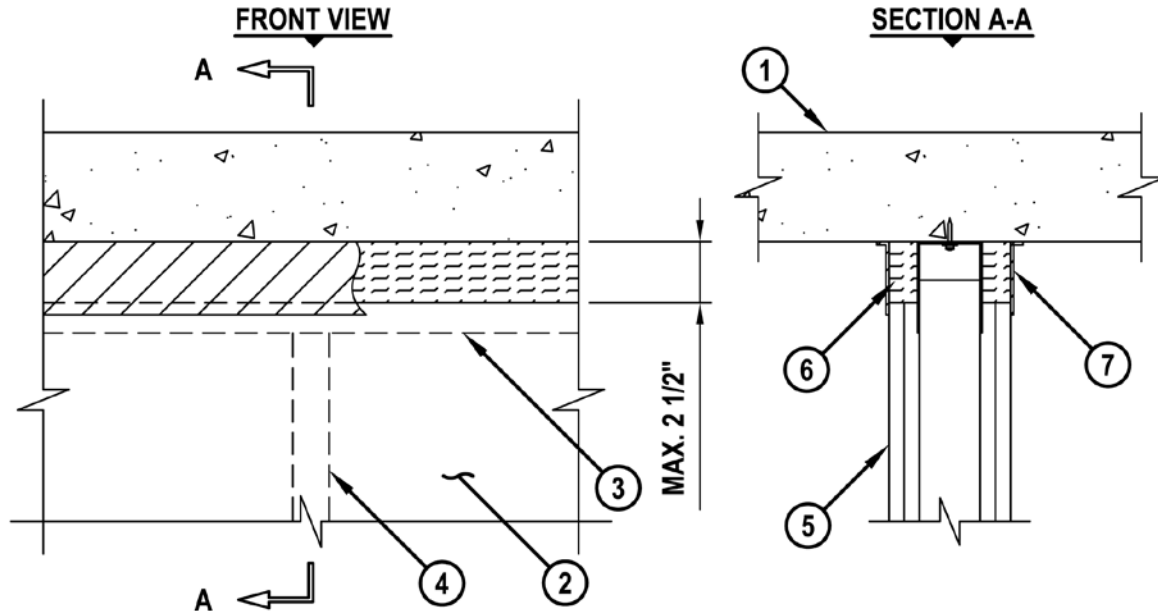
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UL/cUL SYSTEM NO. HW-D-1068

TOP OF WALL JOINT : GYPSUM WALL ASSEMBLY

ASSEMBLY RATING = 1-HR. OR 2-HR.

CLASS II MOVEMENT CAPABILITIES - 40% COMPRESSION OR EXTENSION



HWD1068c.052510

1. CONCRETE FLOOR ASSEMBLY (1-HR. OR 2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR ASSEMBLY (MIN. 4-1/2" THICK).
 - B. ANY UL/cUL CLASSIFIED PRE-CAST HOLLOW CORE CONCRETE FLOOR ASSEMBLY (MIN. 6" THICK).
2. GYPSUM WALL ASSEMBLY (UL/cUL CLASSIFIED U400 OR V400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
3. CEILING RUNNER (MIN. 25 GA., FLANGE HEIGHT OF CEILING RUNNER SHALL BE MINIMUM 1/4" GREATER THAN MAXIMUM EXTENDED JOINT WIDTH) FASTENED TO UNDERSIDE OF CONCRETE FLOOR WITH STEEL MASONRY ANCHORS OR STEEL FASTENERS (SPACED 24" O.C.).
4. STEEL STUDS (MIN. 2-1/2" WIDE), CUT 1-1/4" TO 1-1/2" LESS IN LENGTH THAN ASSEMBLY HEIGHT, NESTING IN CEILING RUNNER WITHOUT ATTACHMENT.
5. 5/8" OR 1-1/4" THICKNESS GYPSUM WALLBOARD AS SPECIFIED IN THE INDIVIDUAL UL DESIGN. TOP ROW OF SCREWS SHALL BE INSTALLED INTO STUDS 5" BELOW THE BOTTOM PLANE OF FLOOR.
6. HILTI CP 767 SPEED STRIPS COMPRESSED 50% AND TIGHTLY PACKED INTO THE JOINT, FLUSH WITH BOTH SIDES OF WALL (SEE NOTE BELOW).
7. MINIMUM 1/8" (WET) THICKNESS HILTI CFS-SP WB FIRESTOP JOINT SPRAY OR HILTI CP 672 SPEED SPRAY TO COMPLETELY COVER MINERAL WOOL AND TO OVERLAP A MINIMUM OF 1/2" ONTO GYPSUM AND CONCRETE FLOOR ON BOTH SIDES OF WALL.

NOTE : AS AN ALTERNATE TO HILTI CP 767 SPEED STRIPS, MINERAL WOOL (MIN. 4 PCF DENSITY) COMPRESSED 50% MAY BE USED.



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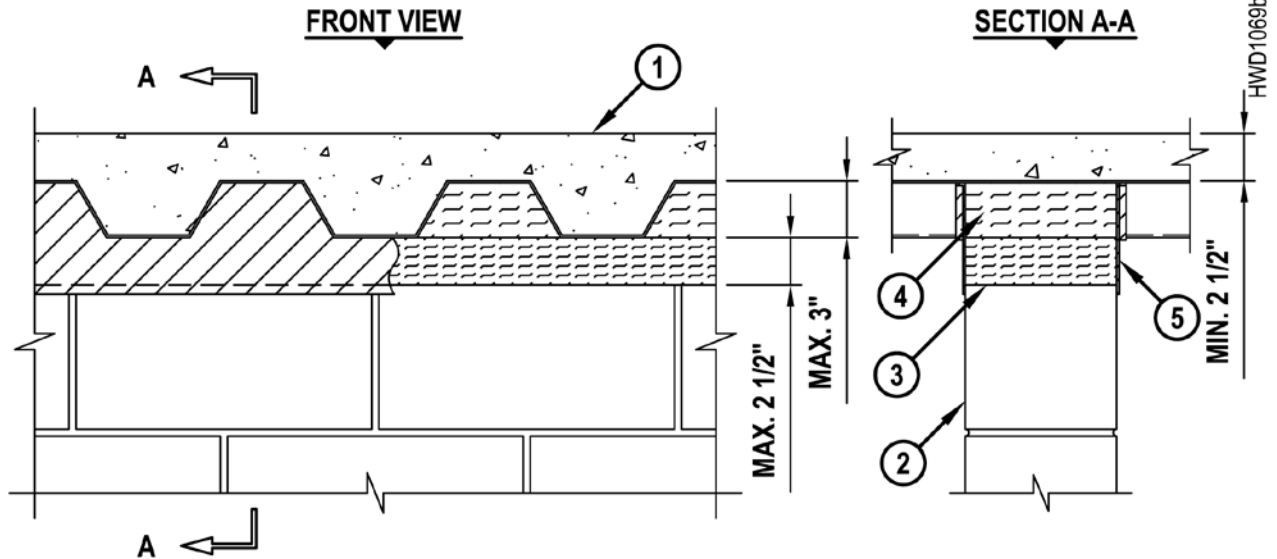
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UL/cUL SYSTEM NO. HW-D-1069

TOP OF WALL JOINT : CONCRETE WALL OR BLOCK WALL ASSEMBLY

ASSEMBLY RATING = 2-HR.

CLASS II MOVEMENT CAPABILITIES - 40% COMPRESSION OR EXTENSION



1. FLOOR OR ROOF ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MIN. 2-1/2" THICK) OVER METAL DECKING (UL/cUL CLASSIFIED D900 SERIES).
 - B. INSULATING CONCRETE (MIN. 2-1/4" THICK) OVER METAL DECKING (UL/cUL CLASSIFIED P900 SERIES).
2. CONCRETE WALL ASSEMBLY CONSTRUCTED PERPENDICULAR OR PARALLEL TO FLUTES (PERPENDICULAR SHOWN) (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 6" THICK).
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
3. MINERAL WOOL (MINIMUM 4 PCF DENSITY) COMPRESSED 50% AND INSERTED INTO JOINT, FLUSH WITH BOTH SIDES OF WALL ASSEMBLY.
4. HILTI CP 777 SPEED PLUGS FRICTION FITTED TO COMPLETELY FILL FLUTE, FLUSH WITH BOTH SIDES OF WALL (WHEN PERPENDICULAR TO FLUTES) (SEE NOTE BELOW).
5. MINIMUM 1/8" (WET) THICKNESS HILTI CFS-SP WB FIRESTOP JOINT SPRAY OR HILTI CP 672 SPEED SPRAY TO COMPLETELY COVER MINERAL WOOL AND TO OVERLAP MINIMUM 1/2" ONTO CONCRETE WALL OR CONCRETE BLOCK WALL AND METAL DECK ON BOTH SIDES OF WALL ASSEMBLY.

NOTE : AS AN ALTERNATE TO HILTI CP 777 SPEED PLUGS, MINERAL WOOL (MIN. 4 PCF DENSITY) COMPRESSED 50% MAY BE USED.



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UL/cUL SYSTEM NO. WW-D-0032

WALL TO WALL JOINT : CONCRETE WALL OR BLOCK WALL ASSEMBLY

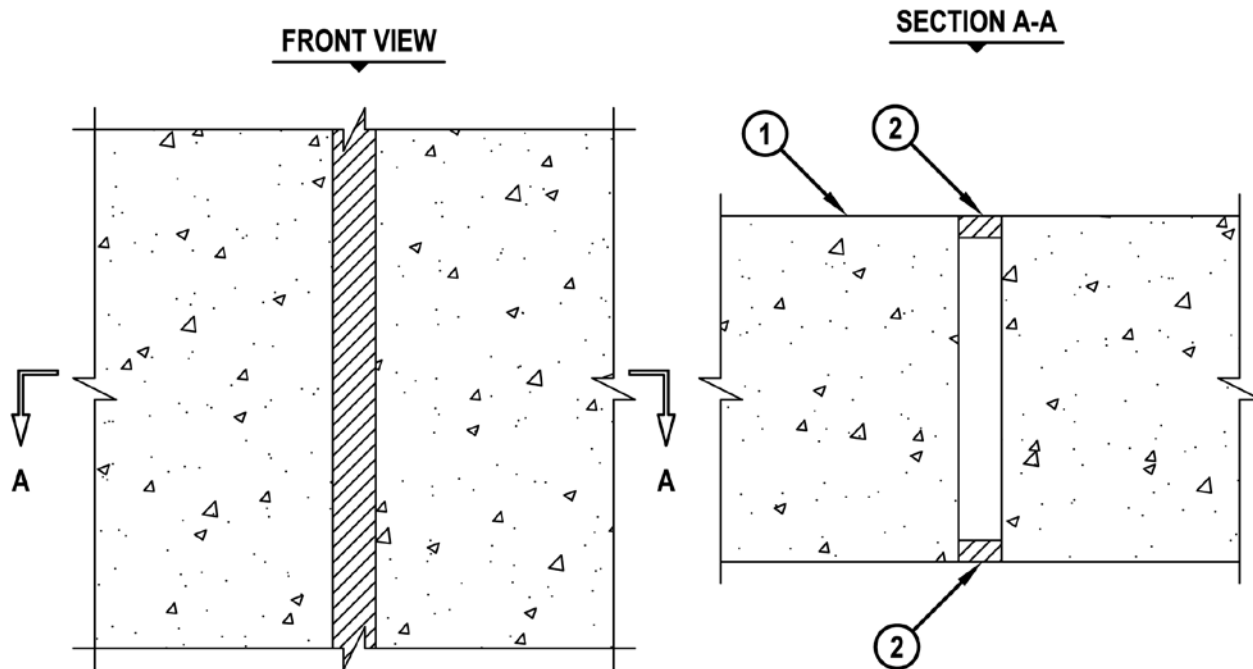
ASSEMBLY RATING = 3-HR.

CLASS II MOVEMENT CAPABILITIES - 12.5% COMPRESSION OR EXTENSION

L-RATING AT AMBIENT = LESS THAN 1 CFM/LIN FT

L-RATING AT 400°F = LESS THAN 1 CFM/LIN FT

WWD0032d.092608



1. CONCRETE WALL ASSEMBLY (3-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 8" THICK).
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. MINIMUM 1/2" DEPTH HILTI CP 606 FLEXIBLE FIRESTOP SEALANT.

NOTES : 1. MAXIMUM WIDTH OF JOINT = 1".
 2. [OPTIONAL] [NOT SHOWN] MINERAL WOOL OR POLYURETHANE FOAM BACKER ROD MAY BE USED AS A BACKER FOR FIRESTOP SEALANT.



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UL/cUL SYSTEM NO. WW-D-0040

WALL TO WALL JOINT : GYPSUM WALL TO CONCRETE OR BLOCK WALL ASSEMBLY

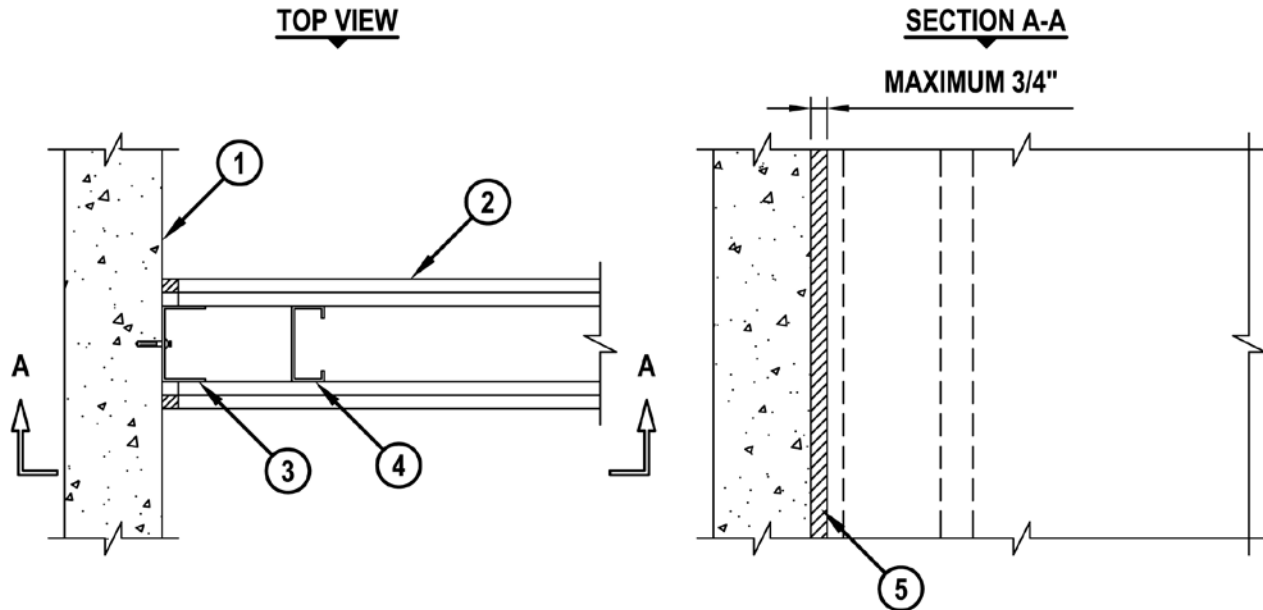
ASSEMBLY RATING = 1-HR. OR 2-HR.

CLASS II MOVEMENT CAPABILITY - 17% COMPRESSION OR EXTENSION

L-RATING AT AMBIENT = LESS THAN 1 CFM/LIN FT

L-RATING AT 400°F = LESS THAN 1 CFM/LIN FT

WW/D0040d.022912



1. CONCRETE WALL ASSEMBLY (1-HR. OR 2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 4-1/2" THICK).
 - B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. GYPSUM WALL ASSEMBLY (UL CLASSIFIED U400, V400, OR W400 SERIES) (1-HR. OR 2-HR. FIRE-RATING) (2-HR. SHOWN).
3. WALL RUNNER (MINIMUM 25 GA.) SECURED TO WALL ASSEMBLY WITH STEEL CONCRETE FASTENERS (SPACED 12" O.C.).
4. STEEL STUDS (MINIMUM 3-1/2" WIDE), CUT 1/2" TO 3/4" LESS IN LENGTH THAN ASSEMBLY HEIGHT, NESTING IN CEILING RUNNER WITHOUT ATTACHMENT. FIRST STUD ADJACENT TO CONCRETE WALL SHALL NOT EXCEED 4" FROM WALL FACE.
5. MINIMUM 5/8" DEPTH HILTI CP 601S ELASTOMERIC FIRESTOP SEALANT OR CP 606 FLEXIBLE FIRESTOP SEALANT.

NOTES : 1. [OPTIONAL, NOT SHOWN] MINERAL WOOL, FIBERGLASS, OR POLYURETHANE/POLYETHYLENE FOAM BACKER ROD MAY BE USED AS A BACKER IN 2-HR. WALLS.

2. L-RATINGS APPLY ONLY WHEN HILTI CP 606 FLEXIBLE FIRESTOP SEALANT IS USED.



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UL/cUL SYSTEM NO. WW-D-1011

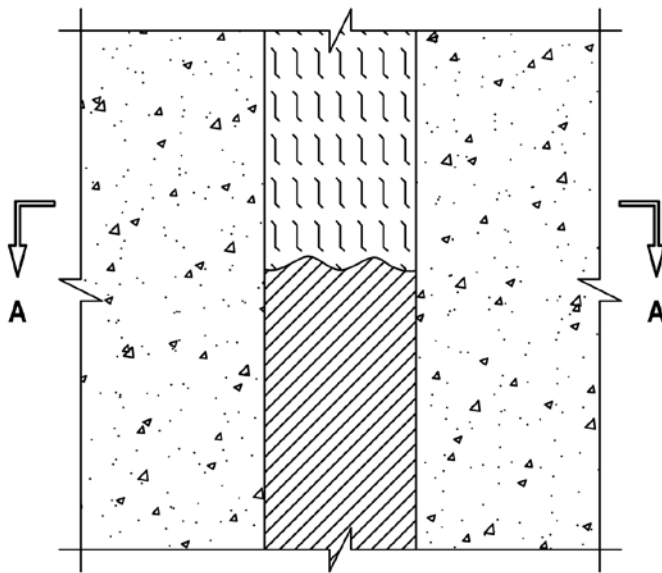
FIRE-RATED JOINT THROUGH CONCRETE WALL ASSEMBLY

ASSEMBLY RATING = 3-HR.

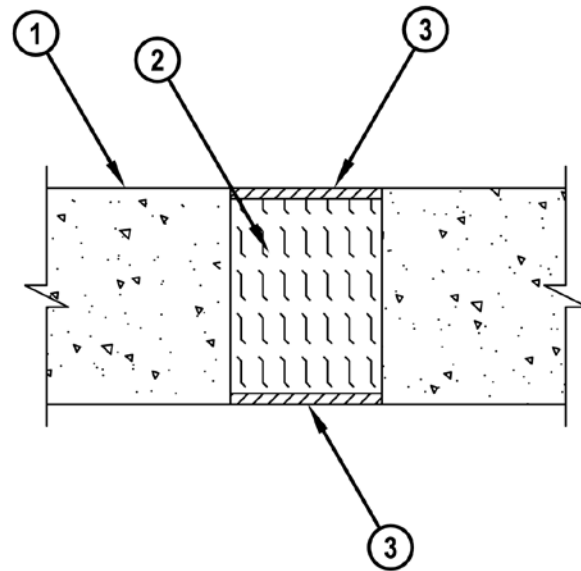
CLASS II MOVEMENT CAPABILITIES - 14% COMPRESSION OR EXTENSION

WWD1011e.071102

FRONT VIEW



SECTION A-A



1. CONCRETE WALL ASSEMBLY (3-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MIN. 5" THICK).
 - B. ANY UL/ULC CLASSIFIED CONCRETE BLOCK WALL.
2. MINIMUM 4-1/2" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) COMPRESSED MINIMUM 42%.
3. MINIMUM 1/4" DEPTH HILTI CP 601S ELASTOMERIC FIRESTOP SEALANT.

NOTE : MAXIMUM WIDTH OF JOINT = 3-1/2".



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FIRE-RATED JOINT THROUGH CONCRETE WALL ASSEMBLY

ASSEMBLY RATING = 2-HR.

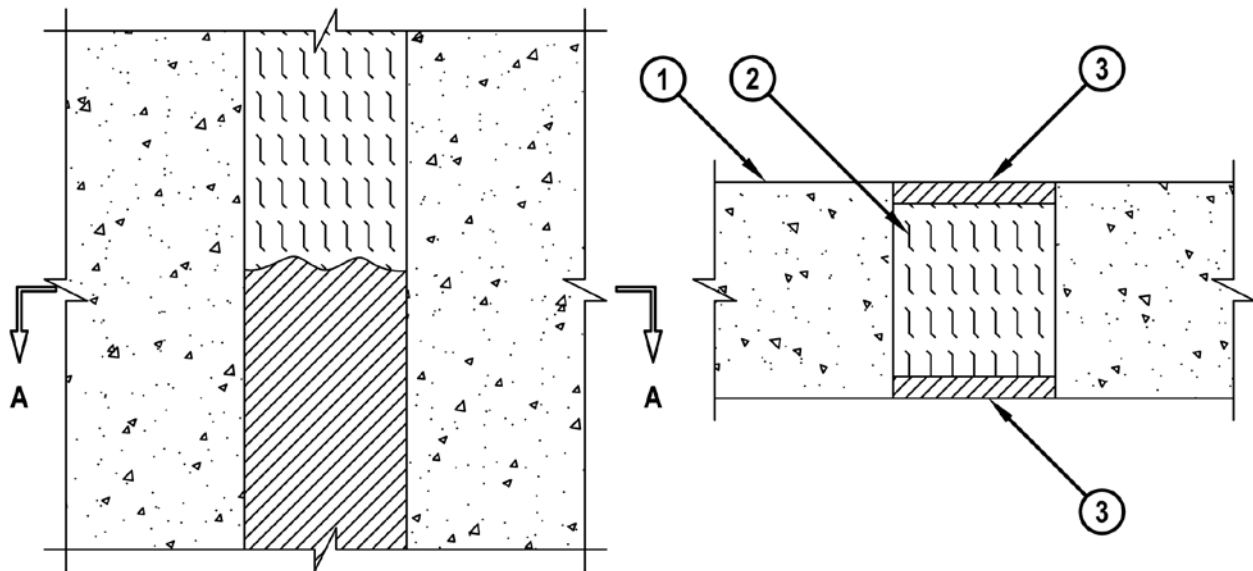
CLASS II MOVEMENT CAPABILITIES - 7% COMPRESSION OR EXTENSION

L-RATING AT AMBIENT - LESS THAN 1 CFM/LINEAR FOOT

L-RATING AT 400° F - LESS THAN 1 CFM/LINEAR FOOT

FRONT VIEW

SECTION A-A



WWID1012f.063003

1. CONCRETE WALL ASSEMBLY (2-HR. FIRE-RATING) :
 - A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MIN. 5" THICK).
 - B. ANY UL/ULC CLASSIFIED CONCRETE BLOCK WALL.
2. MINIMUM 4" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) COMPRESSED MINIMUM 42%.
3. MINIMUM 1/2" DEPTH HILTI CP 606 FLEXIBLE FIRESTOP SEALANT.

NOTE : MAXIMUM WIDTH OF JOINT = 3-3/4".



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Packaging coverage chart

Product name	Description	Packaging	Contents (in³)
FS-ONE	High Performance Intumescent Firestop Sealant	10.1 fl. oz tube	18.2
		5.0 gal pail	1155
		600 mL foil	36.4
Retaining Collar (for use with FS-ONE)		1 roll/box	25 ft. (300 in.)
CFS-BL	Firestop Block	single blocks (2" X 5" X 8")	80
CP 601S	Elastomeric Firestop Sealant	10.5 fl. oz tube	18.9
		600 mL foil	36.4
		5.0 gal pail	1155
CP 604	Self-Leveling Firestop Sealant	600 mL foil	36.4
		4.0 gal pail	924
CP 606	Flexible Firestop Sealant	10.5 fl. oz tube	18.9
		580 mL foil	35.3
		5.0 gal pail	1155
CP 617	Firestop Putty Pad	1/8" x 6" x 7"	5.25
CP 617L	Firestop Putty Pad	1/8" x 7" x 7"	6.125
CP 617XL	Firestop Putty Pad	1/8" x 9" x 9"	10.125
CP 618	Firestop Putty Stick	1-1/4" x 1-1/2" x 10"	18
CP 620	Fire Foam	10.2 fl. oz tube	90-110
CP 637	Firestop Mortar	30 lb pail	900-1000
CP 675T	Firestop Board	Small Board (26" x 28")	
		Large Board (26" x 39")	
CFS-SP WB	Firestop Joint Spray	5.0 gal pail	1155
Mineral Wool		1 box – 4 pcs (48" x 24" x 4")	17,664
CP 506	Smoke and Acoustic Sealant	600 mL foil	36.4
		5.0 gal pail	1155
CP 572	Smoke and Acoustic Spray	5.0 gal pail	1155



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Estimating tables for through-penetrations

TABLE 1

Calculation chart for pipe areas

Nominal pipe size	Pipe O.D.	Area (sq. in.)
1/2"	0.84	0.55
1"	1.3	1.33
1-1/2"	1.9	2.83
2"	2.4	4.52
3"	3.5	9.62
4"	4.5	15.9
6"	6.6	34.19
8"	8.6	58.06
10"	10.8	91.56
12"	12.75	127.61

Pipe O.D. based on schedule 40 steel pipe and plastic pipe

TABLE 2

General estimation table for CP 648-E
(Length of Wrap Strip required for different pipe diameters)

Nominal Pipe Size	Length of CP 648-E Wrap Strips (3/16" thick) Required* (Number of layers of Wrap Strips)			
	1	2	3	4
1-1/2"	8"	16"	26"	37"
2"	9"	20"	31"	43"
3"	12"	27"	41"	58"
4"	-	30"	50"	70"
6"	-	-	71"	97"
8"	-	-	-	122"
10"	-	-	-	142"
12"	-	-	-	167"

Estimations based upon Schedule 40 PVC Plastic Pipe.
* Estimated quantities are approximate. No allowance has been made for waste.

TABLE 3

Estimation chart: volume of firestop at 1/2" depth (in³), per penetration

Actual pipe diameter (in.)												
O.D.*	0.84	1.05	1.3	1.9	2.4	3.5	4.5	5.6	6.6	8.6	10.8	12.8
Nominal pipe size												
I.D.	1/2	3/4	1	1-1/2	2	3	4	5	6	8	10	12
1	0.12											
1-1/2	0.60	0.46	0.22									
2	1.30	1.14	0.90	0.16								
2-1/2	2.18	2.02	1.78	1.04	0.20							
3	3.26	3.10	2.86	2.12	1.28							
3-1/2	4.54	4.38	4.14	3.40	2.54							
4	6.00	5.84	5.62	4.86	4.02	1.48						
5	9.54	9.38	9.14	8.40	7.56	5.00	1.86					
6	13.86	13.70	13.46	12.72	11.86	9.32	6.18	1.82				
7	18.96	18.80	18.56	17.82	16.98	14.42	11.28	6.92	2.14			
8	24.84	24.68	24.46	23.70	22.86	20.32	17.18	12.82	8.02			
9	31.52	31.36	31.12	30.38	29.54	26.98	23.84	19.48	14.70	2.76		
10	38.98	38.82	38.58	37.84	36.98	34.44	31.30	26.94	22.16	10.22		
12	56.24	56.08	55.86	55.10	54.26	51.72	48.58	44.22	39.42	27.50	10.74	
14	76.66	76.50	76.26	75.52	74.66	72.12	68.98	64.62	59.84	47.90	31.14	13.12
16	100.20	100.10	99.82	99.06	98.22	95.68	92.54	88.18	83.38	71.46	54.70	36.68

Coverages are based on the outside diameter of schedule 40 steel pipe. * For insulated pipes, use the outside diameter of the insulation.

- For 1/4" depth, divide above number by 2.
- For 1" depth, multiply above number by 2.
- For 5/8" depth, multiply above number by 1.25.
- For 1-1/4" depth, multiply above number by 2.5.
- For 3/4" depth, multiply above number by 1.50.




Note: Walls require firestop on both sides; multiply above number again by 2.
Estimate only. Assumes no waste.



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How to estimate amount of Firestop needed for pipe penetrations

		
<p>Single pipe, circular opening</p> <p>Use the Estimation Chart (Table 3) found on page 403. Find the pipe size across the top of the table and match it with the hole diameter found along the side of the chart. The value from the table represents the volume of annular space to be filled per penetration.</p>	<p>Single pipe, rectangular opening</p> <ol style="list-style-type: none"> 1. Calculate the area of the pipe. For schedule 40 steel pipe, use the Calculation Chart For Pipe Areas (Table 1) found on page 403. Find the pipe size that is used and note the Area located in the far right column OR calculate the total cross-sectional area of the penetration using the following formula (note: all values should be in units of inches): $A_p = (r_p^2) \times 3.14$ $A_p = \text{total area of penetrating pipe}$ $r_p = \text{outside radius of penetrating pipe} = \frac{\text{diameter}}{2}$ 2. Calculate the area of the opening (all values in units of inches): $A_o = \text{length} \times \text{width}$ $A_o = \text{area of opening}$ 3. Subtract the area of the penetrating pipe from the area of the opening and multiply by the depth of the firestop required: $\text{Total firestop required} = (A_o - A_p) \times F_D$ $F_D = \text{firestop depth}$ <p>Total annular space to be filled per penetration. For wall systems requiring firestopping on both sides, multiply by 2.</p> 	<p>For multiple pipes in an opening</p> <p>Use the methods stated previously, but add all of the penetration areas (A_p) together before subtracting from the total area of the opening (A_o).</p>

Sample Problem

APPLICATION: 3-hour fire rated concrete floor. Opening size is 8" dia. with nominal 6" dia. steel pipe. Use UL System C-AJ-1226 (1/4" depth FS-ONE)

$$\begin{array}{rcl}
 A_o = 8" \text{ diameter} & 50.24 \text{ in}^2 & \\
 A_p = 6" \text{ diameter} & - 34.19 \text{ in}^2 & \\
 & 16.05 \text{ in}^2 \times 1/4" & = 4.0 \text{ in}^3 \text{ of FS-ONE}
 \end{array}$$



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Estimating tables for joints

TABLE 1

Top of wall joint estimation table for CP 601S, CP 606 and CP 506 (Fluted deck only — deck ribs perpendicular to wall)

Joint Width	Size of Metal Flute		
	1-1/2"	2"	3"
1/2"	1.2 lineal feet/10.5 oz. tube	1.1 lineal feet/10.5 oz. tube	0.82 lineal feet/10.5 oz. tube
	2.2 lineal feet/600 ml foil pack	2.1 lineal feet/600 ml foil pack	1.5 lineal feet/600 ml foil pack
	14.1 lineal feet/gallon	13.5 lineal feet/gallon	10.0 lineal feet/gallon

Estimations based upon 1/2" product depth on both sides of the wall. For 1/4" depth, multiply values by 2. Estimates may vary depending on deck type. All estimates are approximate, and assume no waste.

TABLE 2

Top of wall joint estimation table for CP 601S, CP 606 and CP 506 (Fluted deck only, gypsum cut to fit deck profile — deck ribs perpendicular to wall)

Joint Width	Size of Metal Flute		
	1-1/2"	2"	3"
1/2"	1.9 lineal feet/10.5 oz. tube	2.1 lineal feet/10.5 oz. tube	1.9 lineal feet/10.5 oz. tube
	3.5 lineal feet/600 ml foil pack	4.0 lineal feet/600 ml foil pack	3.6 lineal feet/600 ml foil pack
	23.2 lineal feet/gallon	26.1 lineal feet/gallon	23.6 lineal feet/gallon

Estimations based upon 5/8" product depth on both sides of the wall. For 1-1/4" depth, divide values by 2. Estimates may vary depending on deck type. All estimates are approximate, and assume no waste.

TABLE 3

General joint estimation table for CP 601S, CP 604, CP 606 and CP 506 (floor to floor, floor to wall, wall to wall, top of wall)

Joint Width	Lineal Feet/10.5 oz. Tube				Lineal Feet/600 ml Foil Pack				Lineal Feet/Gallon			
	Sealant Depth (in.)				Sealant Depth (in.)				Sealant Depth (in.)			
	1/4	1/2	5/8	1-1/4	1/4	1/2	5/8	1-1/4	1/4	1/2	5/8	1-1/4
1/4"	25.2	12.6	10.08	5.04	48.0	24.0	19.2	9.6	308	154	123	61
1/2"	12.6	6.3	5.04	2.52	24.0	12.0	9.6	4.8	154	77	61	30
3/4"	8.4	4.2	3.36	1.68	16.0	8.0	6.4	3.2	102	51	41	20
1"	6.3	3.15	2.52	1.26	12.0	6.0	4.8	2.4	76	38	30	15
1-1/4"	5.04	2.52	*	*	9.6	4.8	*	*	60	30	*	*
1-1/2"	4.2	2.1	*	*	8.0	4.0	*	*	50	25	*	*
2"	3.14	1.57	*	*	6.0	3.0	*	*	38	19	*	*
2-1/2"	2.52	1.26	*	*	4.8	2.4	*	*	30	15	*	*
3"	2.1	1.05	*	*	4.0	2.0	*	*	24	12	*	*
3-1/2"	1.8	0.9	*	*	3.5	1.7	*	*	22	11	*	*
6"	1.0	0.52	*	*	2.0	1.0	*	*	12	6	*	*
7"	0.9	0.45	*	*	1.7	0.87	*	*	11	5.5	*	*
8"	0.78	0.39	*	*	1.5	0.76	*	*	9.6	4.8	*	*

For wall to wall and top of wall joints, one side of the wall only, divide values by 2 to estimate for both sides of wall. Estimates may vary depending on deck type.

TABLE 4

Top of wall joint estimation table for CFS-SP WB Firestop Joint Spray and CP 572 (Top of wall with fluted deck)

Joint Width	Size of Metal Flute		
	1-1/2"	2"	3"
1/4"	38.5 lineal feet/gallon	34.2 lineal feet/gallon	28.0 lineal feet/gallon
1/2"	34.2 lineal feet/gallon	30.8 lineal feet/gallon	25.6 lineal feet/gallon
3/4"	30.8 lineal feet/gallon	28.0 lineal feet/gallon	23.6 lineal feet/gallon
1"	28.0 lineal feet/gallon	25.6 lineal feet/gallon	22.0 lineal feet/gallon
1-1/2"	23.6 lineal feet/gallon	22.0 lineal feet/gallon	19.2 lineal feet/gallon
2"	20.5 lineal feet/gallon	19.3 lineal feet/gallon	17.1 lineal feet/gallon
2-1/2"	18.1 lineal feet/gallon	17.1 lineal feet/gallon	15.4 lineal feet/gallon
3"	16.2 lineal feet/gallon	15.4 lineal feet/gallon	14.0 lineal feet/gallon
3-1/2"	14.6 lineal feet/gallon	14.0 lineal feet/gallon	12.8 lineal feet/gallon

Estimations based upon 1/8" product depth with 1/2" overlap and installation on both sides of the wall. For 1/4" depth, divide values by 2. (Note: Quantities may change when used in conjunction with fireproofing material. Refer to specific firestop system for details.) Estimates may vary depending on deck type. All estimates are approximate, and assume no waste.

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Estimating tables for joints

TABLE 5

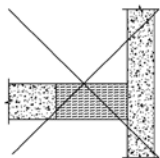
General joint estimation table for CFS-SP WB Firestop Joint Spray, CP 672 FC and CP 572 (floor to floor, floor to wall, wall to wall, top of wall, curtain wall)

Joint Width	Joint Width plus overlap	Lineal Feet/Gallon
1/2"	1-1/2"	102
3/4"	1-3/4"	88
1"	2"	77
1-1/2"	2-1/2"	61
2"	3"	51
3"	4"	38
4"	5"	30
5"	6"	26
6"	7"	22
8"	9"	17

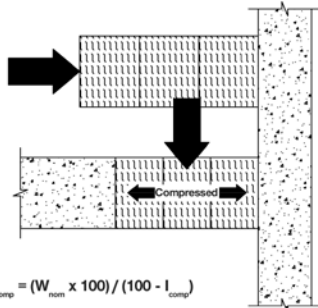
Estimations based upon 1/8" product depth, with 1/2" overlap. For 1/4" depth, divide values by 2. For wall to wall and top of wall joints, divide values by 2 to estimate for both sides of wall.
All estimates are approximate and assume no waste.

TABLE 7

Mineral wool estimation



Orientation of Mineral Wool as seen above will NOT provide the proper compression as per UL and/or INTERTEK assemblies



$$T_{uncomp} = (W_{nom} \times 100) / (100 - I_{comp})$$

Where:

T_{uncomp} = Uncompressed thickness necessary, in.

W_{nom} = Nominal (installed) joint width, in.

I_{comp} = Insulation compression percentage specified in system

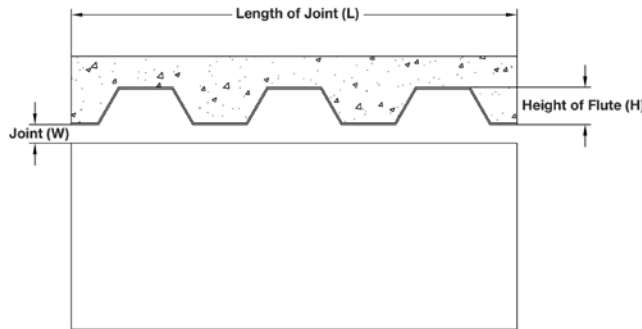
Example: $(8 \times 100) / (100 - 33) = 800 / 67 = 11.94$

Requires three 4" wide pieces of Mineral Wool

All estimates are approximate and assume no waste.

TABLE 6

CFS-SP WB Firestop Joint Spray, CP 672 FC and CP 572 estimation for fluted deck



L = Length of Joint (ft)
W = Width of Joint (in)
H = Height of Flute (in)
Area of Flutes (sq. in.) = $(L \times 12 \times H) / 2$
Area of joint (sq. in.) = $L \times 12 \times W$
Area of Overspray (sq. in.) = $L \times 12$
Volume (cu. in.) =
(Area of Flute + Area of Joint + Area of Overspray) $\times 0.125^*$
Multiply by 2 for both sides of the wall.

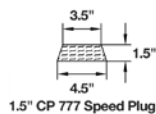
One 5-gallon pail of Hilti CFS-SP WB Firestop Joint Spray, CP 672 FC and CP 572 contains 1,155 cubic inches.

*Based on 1/8" (0.125") wet coating thickness

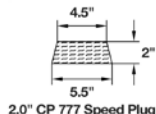
All estimates are approximate and assume no waste.

TABLE 8

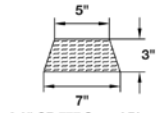
Speed Plug and Strip estimation guide



1.5" CP 777 Speed Plug

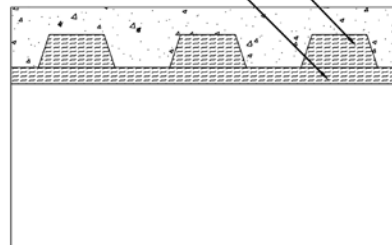


2.0" CP 777 Speed Plug



3.0" CP 777 Speed Plug

CP 777 Friction Fit
CP 767 to be compressed as per UL listing (See table below)



CP 767 Speed Strips
(2" x 5/8" x 36") — 1-HR. Wall
(2" x 1-1/4" x 36") — 2-HR. Wall

CP 767 Speed Strips
(4" x 5/8" x 36") — 1-HR. Wall
(4" x 1-1/4" x 36") — 2-HR. Wall

For CFS-SP WB Firestop Joint Spray and CP 572 Applications:

Multiply the number of open flutes X the width of the wall; then divide by 36 (Speed Plug length in inches) to determine number of Speed Plugs required.
(Divide the total number of Speed Plugs required by 18 to determine Master Carton quantity)

*Each flute should be filled with one Speed Plug equal to wall width.
Open Flutes x Wall Width / 36 = Speed Plug quantity

For CP 606, CP 601S and CP 506 Applications:

Reduce width of plug to accommodate for sealant depth (i.e. 1/4" or 1/2").

All estimates are approximate and assume no waste.

CP 767 Speed Strip Selection Table

Joint Width	Compression	Strips Required
1"	50%	2" Strips
1"	33%	2" Strips
2"	50%	4" Strips
2"	33%	4" Strips



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50 Pa Pressure Differential Test A Canadian criteria for testing combustible penetrations used in drain, waste and venting applications.

Active Fire Protection A system or device that is designed to alert occupants, aid in extinguishment, or limit the spread of fire (e.g. sprinkler system or alarm system).

Annular Space (Annulus) The region, measured in a straight line, between penetrants, or between the outer most portion of the penetrants and the inside periphery of a circular opening or the sides of a rectangular opening.

Assembly Rating The combination of the T and F rating. In a joint assembly, T equals F.

ASTM E-814 "Standard Method of Fire Tests of Through-Penetration Firestops"

Authority Having Jurisdiction The organization, office, or individual responsible for approving equipment, an installation, or procedure.

Backing Material (Forming Material, Packing Material) Material used in firestop systems (e.g. mineral wool, backer rod, CF 128 foam) to set the depth and provide support for the fill, void cavity material.

CAN/ULC-S115 "Standard Method of Fire Tests for Firestop Systems" - Canadian test standard used to evaluate firestopping systems.

Closed Piping System Piping system which is completely enclosed, usually carrying fluids under pressure. Examples: hot/cold water distribution, sprinkler piping, chilled water supply and return.

Combustible Capable of undergoing combustion.

cULus Mark An Underwriters' Laboratories certification mark that indicates compliance with both Canadian and U.S. requirements.

Draftstopping Building materials installed to prevent the movement of air, smoke, gases and flame to other areas of the building through large concealed passages, such as attic spaces and floor assemblies with suspended ceilings or open web trusses.

Endothermic Reaction Absorption of energy during a chemical reaction. Thus feeling cool to the touch.

Exothermic Reaction The production of energy during a chemical reaction. Thus feeling warm to the touch.

F Rating The time a firestop system prevents the passage of flame through an opening and successfully passes the hose stream test as determined by ASTM E-814 and UL 1479.

Fill, Void or Cavity Material A firestop material (e.g. sealant, putty, mastic, etc.)

Fire Barrier A continuous membrane, either vertical or horizontal, such as a wall or floor assembly that is designed and constructed with a specified fire resistance rating to limit the spread of fire and restrict the movement of smoke.

Fire Blocking Building materials installed to resist the free passage of flame to other areas of the building through concealed spaces.

Fire Compartment A space, within a building, that is enclosed by fire barriers on all sides, including the top and bottom.

Fire Damper A damper arranged to seal off airflow automatically through part of an air duct system, so as to restrict the passage of heat.

Fire Partition A vertical assembly of materials, having protected openings, designed to restrict the spread of fire.

Fire Resistance Rating The period of time a building or buildings component maintains the ability to confine a fire or continues to perform a structural function or both. This is usually determined or measured by ASTM E-119 test standard.

Fire Resistive Joint System A system consisting of specified materials designed and tested to resist the passage of flame and hot gases sufficient to ignite cotton waste for a prescribed period of time in accordance with UL 2079 or CAN/ULC-S115.

Fire Wall A fire resistance rated wall, having protected openings, that restricts the spread of fire and extends continuously from the foundation to or through the roof, with sufficient structural stability under fire conditions to allow collapse of construction on either side without collapse of the wall.

Firestop System A specific construction consisting of a fire-rated wall or floor assembly, a penetrating item or items passing through an opening in the assembly, and the materials designed to help prevent the spread of fire through the openings.

FM Global Commercial and industrial property insurance and risk management organization specializing in property protection.

Hose Stream Test This portion of CAN/ULC-S115, ASTM E-814 (UL 1479) is done to represent the structural integrity of the firestop system after it is exposed to heat.

Intumescent A term describing materials which are designed to expand significantly (typically 2 to 10 times original volume) and when exposed to sufficient heat. Intumescent materials are often used as firestops, particularly around combustible penetrants.

Joint System A joint system is a specific construction consisting of adjacent wall and/or floor assemblies and the materials designed to help prevent the spread of fire through a linear opening between the wall and/or floor assemblies.

L Rating An optional measurement of the rate of air leakage through test samples resulting from a specified air pressure difference applied across the surface of the test samples.

Membrane Penetration An opening made through one side (wall, floor or ceiling membrane) of an assembly.



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Membrane Penetration Firestop A material, device or construction installed to resist, for a prescribed period of time when tested in accordance with appropriate test standard. The passage of flame and heat through openings in a protective membrane in order to accommodate cables, cable trays, conduit, tubing, pipes or similar items.

Noncombustible A material that, in the form in which it is used and under the conditions anticipated, will not aid combustion or add appreciable heat to an ambient fire.

Non-Rated System An assembly that has not been tested, or assigned an hourly rating in accordance with ASTM E-119.

Passive Fire Protection A device or system designed to confine fire and smoke in zones (e.g. compartmentalization).

Penetrant (Penetrating Item) Any item passing completely through a wall or floor, such as pipes, conduits, cables, etc.

Percent Fill The cross-sectional area of an opening that is occupied by a penetrating item(s). Typically found in UL Systems containing cables. Percent fill may be calculated with the following formulas:

$$\text{Percent Fill (\%)} = (A_w/A_o) \times 100 \quad N = \text{number of wires}$$

$$\text{Area of Wire (A}_w\text{)} = [3.14 \times (r_c^2)] \times N \quad r_c = \text{radius of wire}$$

$$\text{Area of Opening (A}_o\text{)} = 3.14 \times (r_o^2) \quad r_o = \text{radius of opening}$$

Point of Contact (Penetrating Item) When listed UL system drawing allows penetrating item to “touch” edge of opening.

Shop Drawings Construction drawings generated by contractors, sub-contractors, or suppliers to communicate what they plan to furnish on a project to meet the terms of their contract. They differ from the contract drawings in that contract drawings are generated by the design firm and provided to the contractors and suppliers. Shop drawings are often marked-up contract drawings, but the supplier or contractor can also generate them from scratch. Shop drawings are part of the submittals, which are prepared so that the contractor can gain approval to proceed. They are reviewed and approved by the appropriate design professional. Areas where shop drawings are used include structural steel, miscellaneous metals, pre-cast concrete, and in some cases firestop.

Smoke Barrier A continuous membrane, either vertical or horizontal, such as a wall, floor, or ceiling assembly, that is designed and constructed to restrict the movement of smoke. A smoke barrier might or might not have a fire resistance rating. Such barriers might have protected openings.

Smoke Compartment A space within a building enclosed by smoke barriers on all sides, including the top and bottom.

Smoke Damper A listed device installed in ducts and air transfer openings that is designed to resist the passage of air and smoke. The device is installed to operate automatically, controlled by a smoke detection system, and where required is capable of being positioned manually from a remote command station.

T Rating The time for the temperature of the unexposed surface of the firestop system or any penetrating item to rise 325°F above its initial temperature as determined by CAN/ULC-S115, ASTM E-814 and UL 1479.

Through Penetration Penetrating items passing entirely through both protective membranes of bearing walls required to have a fire-resistance rating and wall requiring protected openings.

Type I Construction Construction in which the structural members are noncombustible (formerly referred to as fire resistive).

Type II Construction Construction in which the structural elements are entirely of noncombustible or limited combustible materials permitted by the code and protected to have some degree of fire resistance (formerly referred to as noncombustible).

Type III Construction Construction which all or part of the interior structural elements may be of combustible materials or any other material permitted by the particular building code being applied (formerly referred to as exterior protected combustible or ordinary construction).

Type IV Construction Construction in which structural members i.e. columns, beams, arches, floors, and roofs, are basically of unprotected wood (solid or laminated) with large cross-sectional areas (formerly referred to as heavy timber).

Type V Construction Construction which the structural members are entirely of wood or any other material permitted by the code being applied (formerly referred to as wood frame).

UL UL is an abbreviation for Underwriters Laboratories Inc., a not for profit independent organization testing for public safety.

ULC ULC is an abbreviation for Underwriters Laboratories of Canada, a not-for-profit safety certification, testing, quality registration and standards development organization dedicated entirely to the protection of life and property.

CAN/ULC-S115 "Standard Method of Fire Tests for Firestop Systems" - Canadian test standard used to evaluate firestopping systems.

UL 1479 “Fire Tests of Through-Penetration Firestops” (equivalent to ASTM E-814).

UL 2079 “Tests for Fire Resistance of Building Joint Systems.”

UL Fire Resistance Directory UL publication which contains descriptions and ratings of firestop systems.

Vented (Open) Piping System Piping system which is atmospherically vented by design to prevent backflow or vacuum. Examples: DWV piping (drain, waste or vent).

W-rating An optional rating for through penetrations Firestop systems (UL 1479). Determines the effectiveness of a firestop system to restrict the flow of water. Class 1-rated firestops have been shown to resist up to 3 feet of water column for 72 hours.



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The UL Fire Resistance Directory utilizes an alpha-numeric numbering system: Basic number system = ALPHA-ALPHA-NUMERIC

Through – Penetrations

The first letter represents what is being penetrated:	The second letter(s) provide more information about the floor or wall:	The four digit number describes the penetrating item(s):	EXAMPLE: CAJ1150
F = FLOOR W = WALLS C = FLOORS OR WALLS (COMBINED)	A = CONCRETE FLOORS WITH A MINIMUM THICKNESS LESS THAN OR EQUAL TO 5 IN. B = CONCRETE FLOORS WITH A MINIMUM THICKNESS GREATER THAN 5 IN. C = FRAMED FLOORS D = STEEL DECKS IN MARINE VESSELS E = FOR-CEILING ASSEMBLIES CONSISTING OF CONCRETE WITH MEMBRANE PROTECTION F THRU I = NOT USED AT PRESENT TIME J = CONCRETE OR MASONRY WALLS WITH A MINIMUM THICKNESS LESS THAN OR EQUAL TO 8 IN. K = CONCRETE OR MASONRY WALLS WITH A MINIMUM THICKNESS GREATER THAN 8 IN. L = FRAMED WALLS M = BULKHEADS IN MARINE VESSELS N = COMPOSITE PANEL WALLS O THRU Z = NOT USED AT PRESENT TIME	0000 – 0999 BLANK OPENINGS 1000 – 1999 METAL PIPE, CONDUIT OR TUBING 2000 – 2999 NONMETALLIC PIPE CONDUIT OR TUBING 3000 – 3999 CABLES 4000 – 4999 CABLE TRAYS 5000 – 5999 INSULATED PIPES 6000 – 6999 MISCELLANEOUS ELECTRICAL (BUSWAY) 7000 – 7999 MISCELLANEOUS MECHANICAL 8000 – 8999 MIXED PENETRATING ITEMS 9000 – 9999 RESERVED FOR FUTURE USE	C = FLOOR OR WALL PENETRATION A = CONCRETE FLOOR 5" OR LESS J = CONCRETE OR MASONRY WALLS 8" OR LESS 1150 = METAL PIPE, CONDUIT OR TUBING

Joint Systems

The first letters identify the type of joint:	The third letter signifies the movement capabilities of the joint system:	The four digit number describes the nominal joint width:	EXAMPLE: HWD0042
CJ = CONTINUITY HEAD OF WALL FF = FLOOR-TO-FLOOR WW = WALL-TO-WALL FW = FLOOR-TO-WALL HW = HEAD-TO-WALL CG = WALL-TO WALL JOINTS INTENDED AS CORNER GUARDS BW = BOTTOM OF WALL	S = NO MOVEMENT (STATIC) D = ALLOWS MOVEMENT (DYNAMIC)	0000 – 0999 LESS THAN OR EQUAL TO 2" 1000 – 1999 GREATER THAN 2" AND LESS THAN OR EQUAL TO 6" 2000 – 2999 GREATER THAN 6" AND LESS THAN OR EQUAL TO 12" 3000 – 3999 GREATER THAN 12" AND LESS THAN OR EQUAL TO 24" 4000 – 4999 GREATER THAN 24"	HW = HEAD-OF-WALL D = ALLOWS MOVEMENT (DYNAMIC) 0042 = LESS THAN OR EQUAL TO 2"

The ULC Firestop Systems and Components Directory utilizes an alpha-numeric numbering system utilizing letters for the type of service penetration or joint and numbers to identify a specific system detail and Firestop System components.

Through Penetrations	Joint Systems
SP = Service Penetration Firestop Systems SPC = Service Penetration for Combustible Systems	HW = Head-of-Wall Joint Firestop Systems JF = Joint Firestop Systems PF = Perimeter Joint Firestop Systems



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MSDS No.: 326C
Revision No.: 002
Revision Date: 05/23/12
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Product identifier: CP 506 Smoke and Acoustic Sealant
Product use: Smoke/Acoustic Acrylic Based Sealant for Non Fire Rated Assemblies
Supplier: Hilti (Canada) Corporation, 2360 Meadowpine Blvd., Mississauga, Ontario L5N 6S2
Originator: Hilti, Inc., P. O. Box 21148, Tulsa, Oklahoma, USA 74121
Emergency number: Chem-Trec: 1 800 424 9300

INGREDIENTS INFORMATION

Ingredients:	CAS Number:	% (wt.)	LC ₅₀ (rat)	LD ₅₀ (rat)	TLV:	STEL:
Ethylene glycol	00107-21-1	01 - 05	N/Av	5500 mg/kg (mouse)	NE	C: 100 mg/m ³ (A)
Titanium dioxide	13463-67-7	01-05	N/Av	N/Av	10 mg/m ³	NE

PHYSICAL PROPERTIES

Appearance / Physical state:	White paste.	Odour:	Mild odour.
Specific gravity (at 20°C):	1.50	VOC Content:	57.0 g/l
Vapour pressure (at 20°C):	Not applicable.	Vapour density:	Not applicable.
Evaporation rate:	Not determined.	Boiling point:	Not determined.
Freezing point:	Not determined.	pH:	9.2
Coefficient of H₂O / oil distrib:	Not determined.	Solubility in water:	Miscible.

FIRE AND EXPLOSION DATA

Flash point / Method:	Non-flammable.	Flammable Limits:	Not applicable.
Conditions of flammability:	Not applicable.	Auto-ignition temperature:	Not applicable.
Means of extinction:	Not applicable. As appropriate for surrounding fire (e.g. Water, CO ₂ , Dry Chemical, Foam).		
Special fire fighting procedures:	None known. A NIOSH-approved self-contained breathing apparatus (SCBA) should be worn when fighting fires involving chemicals.		
Hazardous combustion products:	Thermal decomposition products such as oxides of carbon and nitrogen can be produced under fire conditions.		
Sensitivity to mechanical impact / static discharge:	Not susceptible to mechanical impact or to a static discharge.		

REACTIVITY DATA

Stability:	Stable.	Incompatible materials:	Strong oxidizing agents.
Conditions of reactivity:	None known.		
Hazardous decomposition products:	Thermal decomposition can yield oxides of carbon and nitrogen.		

TOXICOLOGICAL PROPERTIES

Routes of exposure:	<input checked="" type="checkbox"/> Skin contact <input type="checkbox"/> Skin absorption <input checked="" type="checkbox"/> Eye contact <input checked="" type="checkbox"/> Inhalation <input checked="" type="checkbox"/> Ingestion			
Exposure limits:	See "Ingredients" section above.			
Acute effects of exposure:	Eyes — Slightly alkaline material; can cause irritation but injury is unlikely. Skin — Can cause irritation with some individuals. Inhalation — No effects expected. Ingestion — Not a likely route of exposure. Effects of ingestion have not been determined.			
Chronic effects of exposure:	None known.			
Synergistic materials:	None known.			



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FIRST AID MEASURES

Eyes:	Flush immediately with plenty of water. Call a physician if symptoms occur.
Skin:	Wash with soap and water. Seek medical attention if any effects persist.
Inhalation:	No ill effects expected. Should discomfort occur, move to fresh air.
Ingestion:	Do not induce vomiting unless directed by a physician. Contact a physician immediately.
Other:	Referral to a physician is recommended if there is any question about the seriousness of the injury/exposure

PREVENTIVE MEASURES

Engineering controls:	General (natural or mechanically induced fresh air movements).
Eye protection:	Safety glasses with side shields recommended.
Skin protection:	Impermeable gloves recommended.
Respiratory protection:	None normally required.
Other:	No additional measures are normally required.
Handling procedures and equipment:	For industrial use only. Keep container sealed when not in use to prevent curing of the product. Avoid contact with the eyes and skin. Practice good hygiene; i.e. wash after using and before eating or smoking.
Storage requirements:	Keep out of reach of children. Store in a cool dry area. Keep from freezing. Shelf life is one year from date of manufacture if stored between 40° and 77° F (5 - 25° C).
Spill, leak or release:	Immediately wipe away spilled material before it hardens. Place in a container for proper disposal in accordance with all applicable local, state, or federal requirements.
Waste disposal:	Consult with regulatory agencies or your corporate personnel for disposal methods that comply with local, provincial, and federal safety, health and environmental regulations.
Special shipping instructions:	Avoid temperature extremes. Keep from freezing.

REGULATORY INFORMATION

WHMIS classification:	D2B
HMIS codes:	Health 0, Flammability 0, Reactivity 0, PPE B (glasses, gloves)
TDG shipping name:	Not regulated.

PREPARATION INFORMATION / CONTACTS

Prepared by:	Hilti, Inc., Tulsa, OK USA	Date of Preparation:	May 23, 2012	Emergency phone number:	1 800 424 9300
Customer Service:	Hilti (Canada) Corporation, Mississauga, Ontario; 1 800 363 4458				
Health / Safety contacts:	Hilti, Inc., Tulsa, OK USA; 1 800 879 6000, Jerry Metcalf (x6704)				
Abbreviations used:	N/E = None Established. N/Av = Not Available. HMIS = Hazardous Materials Identification System. TLV = ACGIH Threshold Limit Value. STEL = Short Term Exposure Limit. R = Respirable Dust. A = Aerosol				

The information and recommendations contained herein are based upon data believed to be correct; however, no guarantee or warranty of any kind expressed or implied is made with respect to the information provided.

MSDS No.: 327C
Revision No.: 002
Revision Date: 05/23/12
Page: 1 of 2

Product identifier: CP 572 Smoke and Acoustic Spray
Product description / use: Smoke/Acoustic Acrylic Based Spray for Non Fire Rated Assemblies.
Supplier: Hilti (Canada) Corporation, 2360 Meadowpine Blvd., Mississauga, Ontario L5N 6S2
Originator: Hilti, Inc., P. O. Box 21148, Tulsa, Oklahoma, USA 74121
Emergency number: Chem-Trec: 1 800 424 9300

INGREDIENTS INFORMATION

Ingredients:	CAS Number:	% (wt.)	LC ₅₀ (rat)	LD ₅₀ (rat)	TLV:	STEL:
Ethylene glycol	107-21-1	01-05	>200 mg/m ³ /4H	4700 mg/kg	100 mg/m ³	n. av.
Titanium dioxide	13463-67-7	01-05	n. av.	n. av.	5 mg/m ³	n. av.

PHYSICAL PROPERTIES

Appearance / Physical state:	White sprayable paste.	Odour:	Mild odour.
Specific gravity (at 20°C):	1.5	VOC Content:	91.0 g/l
Vapour pressure (at 20°C):	Not available	Vapour density:	Not applicable.
Evaporation rate:	Not available	Boiling point:	Not available
Freezing point:	Not available	pH:	9.0
Coefficient of H₂O / oil distrib:	Not available	Solubility in water:	Soluble.

FIRE AND EXPLOSION DATA

Flash point / Method:	Non-flammable.	Flammable Limits:	Not applicable.
Conditions of flammability:	Not applicable.	Auto-ignition temperature:	Not applicable.
Means of extinction:	As appropriate for surrounding fire (e.g. Water, CO ₂ , Dry Chemical, Foam).		
Special fire fighting procedures:	None known. A NIOSH-approved self-contained breathing apparatus (SCBA) should be worn when fighting fires involving chemicals.		
Hazardous combustion products:	Thermal decomposition products such as oxides of carbon and nitrogen can be produced under fire conditions.		
Sensitivity to mechanical impact / static discharge:	Not susceptible to mechanical impact or to a static discharge.		

REACTIVITY DATA

Stability:	Stable.	Conditions of reactivity:	None known.
Incompatible materials:	Metal salts.		
Hazardous decomposition products:	Thermal decomposition can yield oxides of carbon and nitrogen.		

TOXICOLOGICAL PROPERTIES

Routes of exposure:	<input type="checkbox"/> N/Ap <input checked="" type="checkbox"/> Skin contact <input type="checkbox"/> Skin absorption <input checked="" type="checkbox"/> Eye contact <input type="checkbox"/> Inhalation <input type="checkbox"/> Ingestion		
Exposure limits:	None established.		
Acute effects of exposure:	Eyes — Can cause irritation or watering but injury is unlikely. Skin — No effects expected. Irritation is possible with some individuals. Inhalation — No effects expected. Ingestion — Not considered a route of exposure. Effects of ingestion have not been determined. Considered to have a low acute oral toxicity.		



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Chronic effects of exposure: None known.

Synergistic materials: None known.

FIRST AID MEASURES

Eyes: Flush immediately with plenty of water. Call a physician if symptoms occur.

Skin: Wash with soap and water. Seek medical attention if any effects persist.

Inhalation: No ill effects expected. Should discomfort occur, move to fresh air.

Ingestion: Do not induce vomiting unless directed by a physician. Contact a physician immediately.

Other: Referral to a physician is recommended if there is any question about the seriousness of the injury/exposure

PREVENTIVE MEASURES

Engineering controls: General (natural or mechanically induced fresh air movements).

Eye protection: While spraying, chemical goggles recommended. As a minimum, wear safety glasses with side shields. Wear other protective clothing as required to prevent contact with skin.

Skin protection: Impermeable gloves recommended.

Respiratory protection: None normally required.

Other: No additional measures are normally required.

Handling procedures and equipment: For industrial use only. Keep out of reach of children. Keep container closed when not in use. Do not get into the eyes. Avoid prolonged or repeated contact with the skin. Practice good hygiene; i.e., wash after using and before eating or smoking.

Storage requirements: Store in a cool dry area. Keep from freezing. Store between 5° and 25° C (41° and 77° F).

Spill, leak or release: Immediately wipe away spilled material before it hardens. Place in a container for proper disposal in accordance with all applicable local, state, or federal requirements.

Waste disposal: Consult with regulatory agencies or your corporate personnel for disposal methods that comply with local, provincial, and federal safety, health and environmental regulations.

Special shipping instructions: Avoid temperature extremes. Keep from freezing.

REGULATORY INFORMATION

WHMIS classification: D2A

HMIS codes: Health 1, Flammability 0, Reactivity 0, PPE B

TDG shipping name: Not regulated.

PREPARATION INFORMATION / CONTACTS

Prepared by: Hilti, Inc., Tulsa, OK USA
Date of Preparation: May 23, 2012
Emergency phone number: 1 800 424 9300

Customer Service: Hilti (Canada) Corporation, Mississauga, Ontario; 1 800 363 4458

Health / Safety contacts: Hilti, Inc., Tulsa, OK USA; 1 800 879 6000, Jerry Metcalf (x6704)

Abbreviations used: N/E = Not Available. H = Hours. HMIS = Hazardous Materials Identification System.
T = Total dust. R = Respirable dust.

The information and recommendations contained herein are based upon data believed to be correct; however, no guarantee or warranty of any kind expressed or implied is made with respect to the information provided.

MSDS No.: 266C
Revision No.: 007
Revision Date: 05/23/12
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Product identifier: CP 601S Elastomeric Firestop Sealant
Product use: Fire resistant silicone based sealant for use in fire rated joint applications
Supplier: Hilti (Canada) Corporation, 2360 Meadowpine Blvd., Mississauga, Ontario L5N 6S2
Originator: Hilti, Inc., P. O. Box 21148, Tulsa, Oklahoma, USA 74121
Emergency number: Chem-Trec: 1 800 424 9300

INGREDIENTS INFORMATION

Ingredients:	CAS Number:	% (wt.)	LC ₅₀ (rat)	LD ₅₀ (rat)	TLV:	STEL:
Calcium carbonate	000471-34-1	45 - 55	N/Av	N/Av	N/A	N/E
Polydimethylsiloxanes	068037-58-1	25 - 35	N/Av	N/Av	N/E	N/E
Siloxanes and silicones, di-Me	063148-62-9	20 - 40	N/Av	> 24,000 mg/kg	N/E	N/E
Fumed silica	112945-52-5	03 - 09	N/Av	N/Av	N/A	N/E
Methyltrimethoxysilane	001185-55-3	01 - 05	N/Av	N/Av	N/E	N/E
Hydrogenated castor oil	008001-78-3	< 1	N/Av	> 10,000 mg/kg	N/E	N/E

PHYSICAL PROPERTIES

Appearance / Physical state:	Red paste.	Odour:	Negligible odour.
Specific gravity (at 20°C):	1.3 – 1.4	VOC Content:	3.0 g/L
Vapour pressure (at 20°C):	23 mbar	Vapour density:	Not applicable.
Evaporation rate:	Not determined.	Boiling point:	Not determined.
Freezing point:	Not determined.	pH:	Not determined.
Coefficient of H₂O / oil distrib:	Not determined.	Solubility in water:	Negligible.

FIRE AND EXPLOSION DATA

Flash point / Method:	Non-flammable.	Flammable Limits:	Not applicable.
Conditions of flammability:	> 300° F / 150° C	Auto-ignition temperature:	Not applicable.
Means of extinction:	As appropriate for surrounding fire (e.g. Water, CO ₂ , Dry Chemical, Foam).		
Special fire fighting procedures:	None known. A NIOSH-approved self-contained breathing apparatus (SCBA) should be worn when fighting fires involving chemicals.		
Hazardous combustion products:	None known. Thermal decomposition products such as oxides of carbon, carbon fluoride and formaldehyde may be evolved at temperatures >150° C/300° F. The chemical nature and quantity of decomposition byproducts will vary widely depending on the conditions of combustion.		
Sensitivity to mechanical impact / static discharge:	Not susceptible to mechanical impact or to a static discharge.		

REACTIVITY DATA

Stability:	Stable.	Conditions of reactivity:	None known.
Incompatible materials:	Strong acids, peroxides and amines.		
Hazardous decomposition products:	Thermal decomposition can yield oxides of carbon, carbon fluoride and formaldehyde may be evolved at temperatures >150° C/300° F.		



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MSDS No.: 266C
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TOXICOLOGICAL PROPERTIES

Routes of exposure: ☒ Skin contact ☐ Skin absorption ☒ Eye contact ☐ Inhalation ☐ Ingestion

Exposure limits: See "Ingredients" section above.

Acute effects of exposure: **Eyes** — Can cause irritation but injury is unlikely. **Skin** — No effects expected. Irritation is possible with some individuals. **Inhalation** — No effects expected. **Ingestion** — Not considered a route of exposure. Effects of ingestion have not been determined. Considered to have a low acute oral toxicity.

Chronic effects of exposure: None known.

Synergistic materials: None known.

FIRST AID MEASURES

Eyes: Flush with plenty of water. Call a physician if symptoms occur.

Skin: Wash with soap and water. Seek medical attention if any effects persist.

Inhalation: No ill effects expected. Should discomfort occur, move to fresh air.

Ingestion: Do not induce vomiting unless directed by a physician. Contact a physician immediately.

Other: Referral to a physician is recommended if there is any question about the seriousness of the injury/exposure

PREVENTIVE MEASURES

Engineering controls: General (natural or mechanically induced fresh air movements).

Eye protection: Safety glasses with side shields recommended.

Skin protection: Impermeable gloves recommended.

Respiratory protection: None normally required.

Other: No additional measures are normally required.

Handling procedures and equipment: For industrial use only. Keep out of reach of children. Use with adequate ventilation. Keep container closed when not in use. Do not get into the eyes. Avoid prolonged or repeated contact with the skin. Practice good hygiene; i.e., wash after using and before eating or smoking.

Storage requirements: Store in a cool dry area. Keep from freezing. Store between 5° and 25° C.

Spill, leak or release: Immediately wipe away spilled material before it hardens. Place in a container for proper disposal.

Waste disposal: Consult with regulatory agencies or your corporate personnel for disposal methods that comply with local, provincial, and federal safety, health and environmental regulations.

Special shipping instructions: Avoid temperature extremes. Keep from freezing.

REGULATORY INFORMATION

WHMIS classification: D2B

HMIS codes: Health 1, Flammability 1, Reactivity 0, PPE B (glasses, gloves)

TDG shipping name: Not regulated.

PREPARATION INFORMATION / CONTACTS

Prepared by: Hilti, Inc., Tulsa, OK USA **Date of Preparation:** May 23, 2012 **Emergency phone number:** 1 800 424 9300

Customer Service: Hilti (Canada) Corporation, Mississauga, Ontario; 1 800 363 4458

Health / Safety contacts: Hilti, Inc., Tulsa, OK USA; 1 800 879 6000, Jerry Metcalf (x6704)

Abbreviations used: **N/E** = None Established. **N/A** = Not Applicable. **N/Av** = Not Available.
HMIS = Hazardous Materials Identification System

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MSDS No.: 283C
 Revision No.: 006
 Revision Date: 05/23/12
 Page: 1 of 2

Product identifier: CP 604 Self-Leveling Firestop Sealant
Product use: A self-leveling flexible sealant for firestopping construction joints and metal pipes
Supplier: Hilti (Canada) Corporation, 2360 Meadowpine Blvd., Mississauga, Ontario L5N 6S2
Originator: Hilti, Inc., P. O. Box 21148, Tulsa, Oklahoma, USA 74121
Emergency number: Chem-Trec: 1 800 424 9300

INGREDIENTS INFORMATION

Ingredients:	CAS Number:	% (wt.)	LC ₅₀ (rat)	LD ₅₀ (rat)	TLV:	STEL:
Polydimethylsiloxane diol	70131-67-8	35 – 45	N/Av	N/Av > 64 ml/kg	N/A (10 mg/m ³)	N/E
Calcium carbonate	01317-65-3	35 – 45	N/Av	N/Av	N/A (10 mg/m ³)	N/E
Polydimethylsiloxane	63148-62-9	10 – 15	N/Av	N/Av	N/E	N/E
Methyl oximino silane	22984-54-9	0.1 – 05	N/Av	N/Av	N/E	N/E
Vinyl oximino silane	02224-33-1	0.1 – 05	N/Av	N/Av	N/E	N/E
Fumed silica	68611-44-9	0.1 – 05	N/Av	N/Av	N/A (10 mg/m ³)	N/E
Titanium dioxide	13463-67-7	0.1 – 05	N/Av	N/Av	N/A (10 mg/m ³)	N/E
Ferric oxide	01309-37-1	0.1 – 05	N/Av	N/Av	N/E	N/E

PHYSICAL PROPERTIES

Appearance / Physical state:	Grey paste	Odour:	Mild odour.
Specific gravity (at 20°C):	1.3 – 1.4	VOC Content:	53.0 g/L.
Vapour pressure (at 20°C):	Not applicable.	Vapour density:	Not applicable.
Evaporation rate:	Not determined.	Boiling point:	Not determined.
Freezing point:	Not determined.	pH:	Not determined.
Coefficient of H₂O / oil distrib:	Not determined.	Solubility in water:	Not easily mixed.

FIRE AND EXPLOSION DATA

Flash point / Method:	Not applicable.	Flammable Limits:	Not applicable.
Conditions of flammability:	Not determined.	Auto-ignition temperature:	Not applicable.
Means of extinction:	As appropriate for surrounding fire (e.g. Water, CO ₂ , Dry Chemical, Foam).		
Special fire fighting procedures:	None known. A NIOSH-approved self-contained breathing apparatus (SCBA) should be worn when fighting fires involving chemicals.		
Hazardous combustion products:	None known. Thermal decomposition products can be formed; e.g. CO and CO ₂ .		
Sensitivity to mechanical impact / static discharge:	Not susceptible to mechanical impact or to a static discharge.		

REACTIVITY DATA

Stability:	Stable.	Conditions of reactivity:	None known.
Incompatible materials:	None known.		
Hazardous decomposition products:	Thermal decomposition products can be formed; e.g. CO and CO ₂ .		

TOXICOLOGICAL PROPERTIES

Routes of exposure:	<input type="checkbox"/> None known <input checked="" type="checkbox"/> Skin contact <input type="checkbox"/> Skin absorption <input type="checkbox"/> Eye contact <input checked="" type="checkbox"/> Inhalation		
Exposure limits:	See "Ingredients" section above.		

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Chronic effects of exposure:	None known.
Synergistic materials:	None known.
Acute effects of exposure:	Eyes — No effects expected. Skin — Prolonged and repeated contact can cause skin sensitization with some individuals (e.g. rash, itching, reddening). Inhalation — No ill effects expected. Ingestion — Effects of ingestion have not been determined. No ill effects expected. NOTE: Reaction with air and moisture during the curing process can release trace amounts of methyl ethyl ketoxime (MEKO). MEKO can be irritating to the eyes, skin and respiratory tract. The body easily metabolizes MEKO; therefore, no lasting or adverse effects are expected.

FIRST AID MEASURES

Eyes:	Flush with plenty of water. Call a physician if symptoms occur.
Skin:	Wash with soap and water. Seek medical attention if any effects persist.
Inhalation:	No ill effects expected. Should discomfort occur, move to fresh air.
Ingestion:	Do not induce vomiting unless directed to by a physician. Contact a Physician immediately.
Other:	Referral to a physician is recommended if there is any question about the seriousness of the injury/exposure

PREVENTIVE MEASURES

Engineering controls:	General (natural or mechanically induced fresh air movements).
Eye protection:	Safety glasses with side shields recommended.
Skin protection:	Impermeable gloves recommended.
Respiratory protection:	None normally required.
Other:	No additional measures are normally required.
Handling procedures and equipment:	For industrial use only. Use with adequate ventilation. Keep container closed when not in use. Avoid prolonged or repeated contact with the skin. Practice good hygiene; i.e., wash after using and before eating or smoking.
Storage requirements:	Keep out of reach of children. Store in a cool dry area. Keep from freezing. Store between 5° and 25° C.
Spill, leak or release:	Wear appropriate personal protective equipment. Allow to cure, scrape up and place in a salvage container for proper disposal. See disposal guidelines below.
Waste disposal:	No known restrictions. Consult with regulatory agencies or your corporate personnel for disposal methods that comply with local, provincial, and federal safety, health and environmental regulations.
Special shipping instructions:	Avoid temperature extremes. Keep from freezing.

REGULATORY INFORMATION

WHMIS classification:	D2B
HMIS codes:	Health 1, Flammability 0, Reactivity 0, PPE B (glasses, gloves)
TDG shipping name:	Not regulated.

PREPARATION INFORMATION / CONTACTS

Prepared by:	Hilti, Inc., Tulsa, OK USA	Date of Preparation:	May 23, 2012	Emergency phone number:	1 800 424 9300
Customer Service:	Hilti (Canada) Corporation, Mississauga, Ontario; 1 800 363 4458				
Health / Safety contacts:	Hilti, Inc., Tulsa, OK USA; 1 800 879 6000, Jerry Metcalf (x6704)				
Abbreviations used:	N/E = None Established. N/Ap = Not Applicable. N/Av = Not Available. HMIS = Hazardous Materials Identification System				

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MSDS No.: 267C
Revision No.: 007
Revision Date: 05/23/12
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Product identifier: CP 606 Flexible Firestop Sealant
Product use: Fire resistant acrylic based sealant for use in fire rated joint applications
Supplier: Hilti (Canada) Corporation, 2360 Meadowpine Blvd., Mississauga, Ontario L5N 6S2
Originator: Hilti, Inc., P. O. Box 21148, Tulsa, Oklahoma, USA 74121
Emergency number: Chem-Trec: 1 800 424 9300

INGREDIENTS INFORMATION

Ingredients:	CAS Number:	% (wt.)	LC ₅₀ (rat)	LD ₅₀ (rat)	TLV:	STEL:
Calcium carbonate	01317-65-3	50 - 55	N/Av	N/Av	N/E	N/E
Water	07732-18-5	15 - 20	N/Av	N/Av	N/E	N/E
Isononyl phthalate	28553-12-0	10 - 15	N/Av	N/Av	N/E	N/E
Polybutene	09003-29-6	01 - 05	N/Av	N/Av	N/E	N/E
Ethylene glycol	00107-21-1	01 - 05	N/Av	5500 mg/kg (mouse)	N/E	C:100 mg/m ³ (A)
Pigments:						
• Titanium dioxide	13463-67-11	01-05	N/Av	N/Av	10 mg/m ³	N/E
• Red iron oxide	1309-37-12	01-05	N/Av	N/Av	5 mg/m ³ (R)	N/E
• Black iron oxide	28553-12-03	01-05	N/Av	N/Av	N/E	N/E

PHYSICAL PROPERTIES

Appearance / Physical state:	White, red, or grey paste.	Odour:	Mild odour.
Specific gravity (at 20°C):	1.55	VOC Content:	71.0 g/L
Vapour pressure (at 20°C):	Not applicable.	Vapour density:	Not applicable.
Evaporation rate:	Not determined.	Boiling point:	Not determined.
Freezing point:	Not determined.	pH:	Not determined.
Coefficient of H₂O / oil distrib:	Not determined.	Solubility in water:	Miscible.

FIRE AND EXPLOSION DATA

Flash point / Method:	Non-flammable.	Flammable Limits:	Not applicable.
Conditions of flammability:	Not applicable.	Auto-ignition temperature:	Not applicable.
Means of extinction:	Not applicable. As appropriate for surrounding fire (e.g. Water, CO ₂ , Dry Chemical, Foam).		
Special fire fighting procedures:	None known. A NIOSH-approved self-contained breathing apparatus (SCBA) should be worn when fighting fires involving chemicals.		
Hazardous combustion products:	Not determined.		
Sensitivity to mechanical impact / static discharge:	Not susceptible to mechanical impact or to a static discharge.		

REACTIVITY DATA

Stability:	Stable.	Incompatible materials:	Strong oxidizing agents.
Conditions of reactivity:	None known.		
Hazardous decomposition products:	Not determined.		



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TOXICOLOGICAL PROPERTIES

Routes of exposure: ☒ Skin contact ☐ Skin absorption ☒ Eye contact ☐ Inhalation ☐ Ingestion

Exposure limits: See "Ingredients" section above.

Acute effects of exposure: **Eyes** — Slightly alkaline material; can cause irritation but injury is unlikely. **Skin** — Can cause irritation with some individuals. **Inhalation** — No effects expected. **Ingestion** — Not a likely route of exposure. Effects of ingestion have not been determined.

Chronic effects of exposure: None known.

Synergistic materials: None known.

FIRST AID MEASURES

Eyes: Flush immediately with plenty of water. Call a physician if symptoms occur.

Skin: Wash with soap and water. Seek medical attention if any effects persist.

Inhalation: No ill effects expected. Should discomfort occur, move to fresh air.

Ingestion: Do not induce vomiting unless directed by a Physician. Contact a Physician immediately.

Other: Referral to a physician is recommended if there is any question about the seriousness of the injury/exposure

PREVENTIVE MEASURES

Engineering controls: General (natural or mechanically induced fresh air movements).

Eye protection: Safety glasses with side shields recommended.

Skin protection: Impermeable gloves recommended.

Respiratory protection: None normally required.

Other: No additional measures are normally required.

Handling procedures and equipment: For industrial use only. Keep container sealed when not in use to prevent curing of the product. Avoid contact with the eyes and skin. Practice good hygiene; i.e. wash after using and before eating or smoking.

Storage requirements: Keep out of reach of children. Store in a cool dry area. Keep from freezing. Shelf life is one year from date of manufacture if stored between 40° and 77° F (5 - 25° C).

Spill, leak or release: Immediately wipe away spilled material before it hardens. Place in a container for proper disposal in accordance with all applicable local, state, or federal requirements.

Waste disposal: Consult with regulatory agencies or your corporate personnel for disposal methods that comply with local, provincial, and federal safety, health and environmental regulations.

Special shipping instructions: Avoid temperature extremes. Keep from freezing.

REGULATORY INFORMATION

WHMIS classification: D2B

HMIS codes: Health 0, Flammability 0, Reactivity 0, PPE B (glasses, gloves)

TDG shipping name: Not regulated.

PREPARATION INFORMATION / CONTACTS

Prepared by: Hilti, Inc., Tulsa, OK USA **Date of Preparation:** May 23, 2012 **Emergency phone number:** 1 800 424 9300

Customer Service: Hilti (Canada) Corporation, Mississauga, Ontario; 1 800 363 4458

Health / Safety contacts: Hilti, Inc., Tulsa, OK USA; 1 800 879 6000, Jerry Metcalf (x6704)

Abbreviations used: **N/E** = None Established. **N/Av** = Not Available. **HMIS** = Hazardous Materials Identification System. **TLV** = ACGIH Threshold Limit Value. **STEL** = Short Term Exposure Limit. **R** = Respirable Dust. **A** = Aerosol

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MSDS No.: 320C
Revision No.: 004
Revision Date: 05/23/12
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Product identifier: CP 617 Firestop Putty Pad; CP 618 Firestop Putty Stick; CP 619T Firestop Putty Roll
Product use: Firestopping putty
Supplier: Hilti (Canada) Corporation, 2360 Meadowpine Blvd., Mississauga, Ontario L5N 6S2
Originator: Hilti, Inc., P. O. Box 21148, Tulsa, Oklahoma, USA 74121
Emergency number: Chem-Trec: 1 800 424 9300

INGREDIENTS INFORMATION

Ingredients:	CAS Number:	% (wt.)	LC ₅₀ (rat)	LD ₅₀ (rat)	TLV:	STEL:
Talc	14807-96-6	05-10	N/Av	N/Av	2 mg/m ³ (R)	NE
Silica	14808-60-7	05-10	N/Av	N/Av	0.025 mg/m ³ (R)	NE
Boron oxide	1303-86-2	03-07	N/Av	3150 mg/kg	10 mg/m ³	NE
Fiberglass	65997-17-3	03-07	N/Av	N/Av	NE	NE
Iron oxide	1309-37-1	03-07	N/Av	N/Av	NE	NE

PHYSICAL PROPERTIES

Appearance / Physical state:	Red coloured putty.	Odour:	Negligible odour.
Specific gravity (at 20°C):	1.45	VOC Content:	CP 617 = 4.35 g/l CP 618 = 31.5 g/l CP 619T = 4.5 g/l
Vapour pressure (at 20°C):	Not applicable.	Vapour density:	Not applicable.
Evaporation rate:	Not applicable.	Boiling point:	Not applicable.
Freezing point:	Not applicable.	pH:	Not determined.
Coefficient of H₂O / oil distrib:	Not applicable.	Solubility in water:	Not soluble.

FIRE AND EXPLOSION DATA

Flash point / Method:	Not applicable	Flammable Limits:	Not applicable
Conditions of flammability:	Not applicable	Auto-ignition temperature:	Not applicable
Means of extinction:	As appropriate for surrounding fire (e.g. Water, CO ₂ , Dry Chemical, Foam).		
Special fire fighting procedures:	None known. A NIOSH-approved self-contained breathing apparatus (SCBA) should be worn when fighting fires involving chemicals.		
Hazardous combustion products:	None known. Thermal decomposition products such as oxides of carbon and nitrogen can be produced under fire conditions. See below.		
Sensitivity to mechanical impact / static discharge:	Not susceptible to mechanical impact or to a static discharge.		

REACTIVITY DATA

Stability:	Stable.	Conditions of reactivity:	None known.
Incompatible materials:	Strong acids, bases and oxidizing agents.		
Hazardous decomposition products:	Thermal decomposition can yield oxides of carbon and nitrogen.		



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MSDS No.: 320C
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TOXICOLOGICAL PROPERTIES

Routes of exposure:	<input type="checkbox"/> None known <input checked="" type="checkbox"/> Skin contact <input type="checkbox"/> Skin absorption <input type="checkbox"/> Eye contact <input type="checkbox"/> Inhalation
Exposure limits:	None established.
Acute effects of exposure:	Eyes — Irritation or watering may occur but injury is unlikely. Skin — No effects expected. Irritation is possible with some individuals. Inhalation — No effects expected. Ingestion — Not considered a route of exposure. Effects of ingestion have not been determined. Considered to have a low acute oral toxicity.
Chronic effects of exposure:	None known.
Synergistic materials:	None known.

FIRST AID MEASURES

Eyes:	Flush with plenty of water. Call a physician if symptoms occur.
Skin:	Practice good hygiene; wash before eating or smoking.
Inhalation:	No effects expected.
Ingestion:	Not a likely route of exposure.
Other:	Other: Referral to a physician is recommended if there is any question about the seriousness of the injury/exposure

PREVENTIVE MEASURES

Engineering controls:	General (natural or mechanically induced fresh air movements).
Eye protection:	Eye protection: Safety glasses with side shields are recommended.
Skin protection:	Skin protection: Impermeable gloves recommended.
Respiratory protection:	Respiratory protection: None normally required.
Other:	No additional measures are normally required.
Handling procedures and equipment:	For industrial use only. Do not get into eyes. Avoid prolonged or repeated contact with skin. Practice good hygiene practices; i.e., wash after using and before eating or smoking.
Storage requirements:	Keep out of reach of children. Store between 5° and 25° C.
Spill, leak or release:	Not applicable.
Waste disposal:	Consult with regulatory agencies or your corporate personnel for disposal methods that comply with local, provincial, and federal safety, health and environmental regulations.
Special shipping instructions:	None known.

REGULATORY INFORMATION

WHMIS classification:	None.
HMIS codes:	Health 0, Flammability 0, Reactivity 0, PPE A
IATA/ICAO shipping name:	Not regulated.
TDG shipping name:	Not regulated.

PREPARATION INFORMATION / CONTACTS

Prepared by:	Hilti, Inc., Tulsa, OK USA	Date of Preparation:	May 23, 2012	Emergency phone number:	1 800 424 9300
Customer Service:	Hilti (Canada) Corporation, Mississauga, Ontario; 1 800 363 4458				
Health / Safety contacts:	Hilti, Inc., Tulsa, OK USA; 1 800 879 6000, Jerry Metcalf (x6704)				
Abbreviations used:	N/E = None Established. N/Av = Not Available. R = Respirable dust.				

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MSDS No.: 272C
Revision No.: 006
Revision Date: 05/23/12
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Product identifier: CP 620 Fire Foam

Product description / use: Polyurethane foam for firestopping fire compartments, cables, cable trays and Non-flammable pipes

Supplier: Hilti (Canada) Corporation, 2360 Meadowpine Blvd., Mississauga, Ontario L5N 6S2

Originator: Hilti, Inc., P. O. Box 21148, Tulsa, Oklahoma, USA 74121

Emergency number: Chem-Trec: 1 800 424 9300

INGREDIENTS INFORMATION

Ingredients:	CAS Number:	% (wt.)	LC ₅₀ (rat)	LD ₅₀ (rat)	TLV:	STEL:
Part A:						
Amino, polyester, propoxylated polyols	N/E; Mixture	30 - 40	N/Av	N/Av	N/E	N/E
Graphite, expanded	012777-87-6	10 - 20	N/Av	N/Av	N/E	N/E
Polyester polyol	025038-59-9	10 - 20	N/Av	N/Av	N/E	N/E
Ammonium polyphosphate	068333-79-9	10 - 20	N/Av	N/Av	N/E	N/E
Bromated polyester polyols	N/E; Mixture	05 - 10	N/Av	N/Av	N/E	N/E
Zinc borate	1332-07-6	01 - 05	N/Av	N/Av	N/E	N/E
Ethoxylated polyol	083016-70-0	01 - 05	N/Av	N/Av	N/E	N/E
Iron oxide pigment	001309-37-1	01 - 05	N/Av	N/Av	5 mg/m ³	N/E
Part B:						
Polymeric diphenylmethane diisocyanate	009016-87-9	85 - 95	490 mg/m ³ /4H	49000 mg/kg	N/E	N/E
Tris (2-chloroisopropyl) phosphate	013674-84-5	05 - 15	N/Av	1500 mg/kg	N/E	N/E

PHYSICAL PROPERTIES

Appearance / Physical state:	Reddish liquid / foam.	Odour:	Not determined.
Specific gravity (at 20°C):	1.2 - 1.4	VOC Content:	15.0 g/L
Vapour pressure (at 20°C):	Not determined.	Vapour density:	Not determined.
Evaporation rate:	Not determined.	Boiling point:	Not determined.
Freezing point:	Not determined.	pH:	Not determined.
Coefficient of H₂O / oil distrib:	Not determined.	Solubility in water:	Insoluble.

FIRE AND EXPLOSION DATA

Flash point / Method:	Not applicable.	Flammable Limits:	Not applicable.
Conditions of flammability:	Fire retardant foam; will ignite at temperatures exceeding 400° C.		
Auto-ignition temperature:	Not determined.		
Means of extinction:	Carbon Dioxide, Dry Chemical, Foam.		
Special fire fighting procedures:	Isocyanates react with water to release CO ₂ .		
Hazardous combustion products:	Thermal decomposition can yield CO, CO ₂ , HCl, HBr, HCN, and NO _x .		
Sensitivity to mechanical impact / static discharge:	Not susceptible to mechanical impact or to a static discharge.		

REACTIVITY DATA

Stability:	Reacts (i.e. expands at a ratio of > 7:1 to form a polyurethane foam) upon contact with air. Contact with moisture or water will also cause material to polymerize (non-violently).
Conditions of reactivity:	Reacts with water or moisture.
Incompatible materials:	Alcohols, strong bases, alkali metal compounds. Reacts with water (nonviolently).
Hazardous decomposition products:	Not determined.

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TOXICOLOGICAL PROPERTIES

Routes of exposure:	<input checked="" type="checkbox"/> Skin contact <input type="checkbox"/> Skin absorption <input checked="" type="checkbox"/> Eye contact <input type="checkbox"/> Inhalation <input type="checkbox"/> Ingestion
Exposure limits:	See "Ingredients" section above.
Acute effects of exposure:	Eyes — Can adhere to cornea. Skin — Can adhere to the skin. Can cause irritation and possibly sensitization; e.g. itching, swelling, rashes, etc. Inhalation — Vapor generated when heated to temperatures > 100° F can cause irritation of the breathing tract. Ingestion — Effects of ingestion have not been determined. Not a likely route of exposure. No ill effects expected.
Chronic effects of exposure:	Some individuals can develop an allergic (asthmatic-like) response. Should this occur, immediately move to fresh air and avoid future use of this product.
Synergistic materials:	None known.

FIRST AID MEASURES

Eyes:	Flush with plenty of water. Call a Physician if symptoms occur.
Skin:	Cured material is difficult to remove. Remove immediately with soap and warm water. Seek medical attention if any symptoms persist.
Inhalation:	Move victim to fresh air. Call a physician if symptoms persist.
Ingestion:	Do not induce vomiting unless directed by a Physician. Contact a physician immediately.
Other:	Referral to a physician is recommended if there is any question about the seriousness of the injury/exposure

PREVENTIVE MEASURES

Engineering controls:	General (natural or mechanically induced fresh air movements).
Eye protection:	Goggles recommended; safety glasses with side shields as a minimum.
Skin protection:	Impermeable gloves recommended.
Respiratory protection:	None normally required. If MDI concentrations exceed recommended levels, a supplied air respirator is required.
Other:	No additional measures are normally required.
Handling procedures and equipment:	For industrial use only. Use with adequate ventilation. Avoid contact. Material will adhere to eyes and skin. Always wash thoroughly after handling chemical products. Follow label / use instructions.
Storage requirements:	Keep out of reach of children. Keep dry. Do not store in direct sunlight. Keep from freezing. Store between 10° and 32° C.
Spill, leak or release:	Product will adhere to most surfaces. Immediately clean up spilled material before it hardens. Place in a container for proper disposal.
Waste disposal:	Consult with regulatory agencies or your corporate personnel for disposal methods that comply with local, provincial, and federal safety, health and environmental regulations.
Special shipping instructions:	Avoid temperature extremes. Keep from freezing.

REGULATORY INFORMATION

WHMIS classification:	D2A, D2B
HMIS codes:	Health 2, Flammability 0, Reactivity 1, PPE B (Goggles, Gloves)
TDG shipping name:	Not regulated

PREPARATION INFORMATION / CONTACTS

Prepared by:	Hilti, Inc., Tulsa, OK USA	Date of Preparation:	Emergency phone number:	1 800 424 9300
Customer Service:	Hilti (Canada) Corporation, Mississauga, Ontario; 1 800 363 4458			
Health / Safety contacts:	Hilti, Inc., Tulsa, OK USA; 1 800 879 6000, Jerry Metcalf (x6704)			
Abbreviations used:	N/E = None Established. N/Av = Not Available. H = Hours. HMIS = Hazardous Materials Identification System			

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MSDS No.: 284C
Revision No.: 006
Revision Date: 05/23/12
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Product identifier: CP 637 Firestop Mortar
Product use: Fire resistant plaster for sealing penetrations in concrete and masonry
Supplier: Hilti (Canada) Corporation, 2360 Meadowpine Blvd., Mississauga, Ontario L5N 6S2
Originator: Hilti, Inc., P. O. Box 21148, Tulsa, Oklahoma, USA 74121
Emergency number: Chem-Trec: 1 800 424 9300

INGREDIENTS INFORMATION

Ingredients:	CAS Number:	% (wt.)	LC ₅₀ (rat)	LD ₅₀ (rat)	TLV:	STEL:
Calcium sulphate hemihydrate	10034-76-1	> 90	N/Av	N/Av	10 mg/m ³	N/E
Perlite	93763-70-3	< 10	N/Av	12960 mg/kg (mouse)	N/E	N/E

PHYSICAL PROPERTIES

Appearance / Physical state:	Light red powder	Odour:	No odour.
Specific gravity (at 20°C):	650 kg/m ³	VOC Content:	<1% w/w
Vapour pressure (at 20°C):	Not applicable.	Vapour density:	Not applicable.
Evaporation rate:	Not applicable.	Boiling point:	Not applicable.
Freezing point:	Not applicable.	pH:	Not determined.
Coefficient of H₂O / oil distrib:	Not determined.	Solubility in water:	Soluble.

FIRE AND EXPLOSION DATA

Flash point / Method:	Non-flammable.	Flammable Limits:	Not applicable
Conditions of flammability:	Not applicable.	Auto-ignition temperature:	Not applicable
Means of extinction:	As appropriate for the surrounding fire (e.g. Water, CO ₂ , Dry Chemical, Foam).		
Special fire fighting procedures:	None known. A NIOSH-approved self-contained breathing apparatus (SCBA) should be worn when fighting fires involving chemicals.		
Hazardous combustion products:	Not applicable.		
Sensitivity to mechanical impact / static discharge:	Not susceptible to mechanical impact or to a static discharge.		

REACTIVITY DATA

Stability:	Stable.	Conditions of reactivity:	None known.
Incompatible materials:	Phosphorous and diazomethane.		
Hazardous decomposition products:	None known.		

TOXICOLOGICAL PROPERTIES

Routes of exposure:	<input type="checkbox"/> None known <input checked="" type="checkbox"/> Skin contact <input type="checkbox"/> Skin absorption <input checked="" type="checkbox"/> Eye contact <input checked="" type="checkbox"/> Inhalation		
Exposure limits:	See "Ingredients" section above.		
Acute effects of exposure:	Eyes — Can cause irritation, inflammation and conjunctivitis. Skin — Contact with moist skin or prolonged and repeated contact can cause irritation. Inhalation — No effects expected. Ingestion — Not considered a route of exposure. Effects of ingestion have not been determined. Considered to have a low acute oral toxicity.		



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Chronic effects of exposure: None known.

Synergistic materials: None known.

FIRST AID MEASURES

Eyes: Flush with plenty of water. Call a physician if symptoms occur.

Skin: Wash with soap and water. Seek medical attention if any effects persist.

Inhalation: No ill effects expected. Should discomfort occur, move to fresh air.

Ingestion: Not a likely route of exposure. No effects expected.

Other: Referral to a physician is recommended if there is any question about the seriousness of the injury/exposure

PREVENTIVE MEASURES

Engineering controls: General (natural or mechanically induced fresh air movements).

Eye protection: Safety glasses (with side-shields) should be worn while mixing and applying product.

Skin protection: Skin protection: Impermeable gloves recommended.

Respiratory protection: None normally required.

Other: No additional measures are normally required.

Handling procedures and equipment: For industrial use only. Avoid generating dusts. Use with adequate ventilation. Do not get into the eyes. Avoid prolonged or repeated contact with the skin. Practice good hygiene; i.e., wash after using and before eating or smoking.

Storage requirements: Keep out of reach of children. Keep dry.

Spill, leak or release: Spill, leak or release: Sweep up and place in a container for proper disposal.

Waste disposal: No known restrictions. Consult with regulatory agencies or your corporate personnel for disposal methods that comply with local, provincial, and federal safety, health and environmental regulations.

Special shipping instructions: Keep dry.

REGULATORY INFORMATION

WHMIS classification: D2B

HMIS codes: Health 1, Flammability 0, Reactivity 0, PPE A

TDG shipping name: Not regulated.

PREPARATION INFORMATION / CONTACTS

Prepared by: Hilti, Inc., Tulsa, OK USA **Date of Preparation:** May 23, 2012 **Emergency phone number:** 1 800 424 9300

Customer Service: Hilti (Canada) Corporation, Mississauga, Ontario; 1 800 363 4458

Health / Safety contacts: Hilti, Inc., Tulsa, OK USA; 1 800 879 6000, Jerry Metcalf (x6704)

Abbreviations used: **N/E** = None Established. **N/A** = Not Applicable. **N/Av** = Not Available.
HMIS = Hazardous Materials Identification System

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MSDS No.: 301C
Revision No.: 004
Revision Date: 05/24/12
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Product identifier: CP 643N Firestop Collar

Product use: Galvanized metal housing containing black polymer-bonded intumescent firestop material for use around plastic pipes.

Supplier: Hilti (Canada) Corporation, 2360 Meadowpine Blvd., Mississauga, Ontario L5N 6S2

Originator: Hilti, Inc., P. O. Box 21148, Tulsa, Oklahoma, USA 74121

Emergency number: Chem-Trec: 1 800 424 9300

INGREDIENTS INFORMATION

Not a hazardous chemical as defined by the Controlled Products Regulations SOR/88-66; considered to be a manufactured "article".

PHYSICAL PROPERTIES

Appearance / Physical state:	Galvanized metal collar/black firestop material	Odour:	No odour.
Specific gravity (at 20°C):	Not applicable.	Odour threshold:	Not available.
Vapour pressure (at 20°C):	Not applicable.	VOC Content:	7.6 g/l.
Evaporation rate:	Not applicable.	Boiling point:	Not applicable.
Freezing point:	Not applicable.	pH:	Not applicable.
Coefficient of H₂O / oil distrib:	Not applicable.	Solubility in water:	Not available.

FIRE AND EXPLOSION DATA

Flash point / Method:	Not applicable.	Flammable Limits:	Not applicable
Conditions of flammability:	Non-flammable	Auto-ignition temperature:	Not available.
Means of extinction:	Not applicable; as appropriate for surrounding fire.		
Special fire fighting procedures:	None known. Product serves as a Firestop; intumescent material inside the collar expands when exposed to temperatures > 160° C (320° F).		
Hazardous combustion products:	Refer to "Hazardous decomposition products" (next section).		
Sensitivity to mechanical impact / static discharge:	Not susceptible to mechanical impact or static discharge.		

REACTIVITY DATA

Stability:	Stable. Hazardous polymerization will not occur.
Conditions of reactivity:	None known.
Incompatible materials:	None known.
Hazardous decomposition products:	None known.

TOXICOLOGICAL PROPERTIES

Routes of exposure:	<input checked="" type="checkbox"/> N/A <input type="checkbox"/> Skin contact <input type="checkbox"/> Skin absorption <input type="checkbox"/> Eye contact <input type="checkbox"/> Inhalation <input type="checkbox"/> Ingestion
Exposure limits:	None established.
Acute effects of exposure:	Not applicable.
Chronic effects of exposure:	Not applicable.
Synergistic materials:	None known.



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FIRST AID MEASURES

Eyes:	Flush with water if dust, debris, etc. from work over head gets into the eyes. Do not rub the eyes as this can cause corneal abrasion. Call a physician if irritation continues, or if redness, swelling, or similar symptoms occur.
Skin:	Practice good hygiene; i.e., wash hands during breaks, before eating or smoking and after work.
Inhalation:	No first aid should be needed. If ill effects occur, move to fresh air. If symptoms persist, seek medical attention.
Ingestion:	Not a likely route of exposure.
Other:	Referral to a physician is recommended if there is any question about the seriousness of the injury/exposure.

PREVENTIVE MEASURES

Engineering controls:	General (natural or mechanically induced fresh air movements).
Eye protection:	Safety glasses are recommended for most industrial settings.
Skin protection:	None required; however (cotton) gloves are recommended.
Respiratory protection:	None normally required.
Other:	No additional measures are normally required.
Handling procedures and equipment:	No special requirements.
Storage requirements:	Store in a cool dry place.
Spill, leak or release:	No special requirements.
Waste disposal:	Consult federal, provincial and local regulations for allowed means of disposal.
Special shipping instructions:	None known.

REGULATORY INFORMATION

WHMIS classification:	None (exempt / manufactured article)
HMIS codes:	Health 0, Flammability 0, Reactivity 0, PPE A
IATA/ICAO shipping name:	Not regulated.
TDG shipping name:	Not regulated.

PREPARATION INFORMATION / CONTACTS

Prepared by:	Hilti, Inc., Tulsa, OK USA	Date of Preparation:	May 24, 2012	Emergency phone number:	1 800 424 9300
Customer Service:	Hilti (Canada) Corporation, Mississauga, Ontario; 1 800 363 4458				
Health / Safety contacts:	Hilti, Inc., Tulsa, OK USA; 1 800 879 6000, Jerry Metcalf (x6704)				
Abbreviations used:	N/E = None Established. N/A = Not Applicable. N/Av = Not Available. H = Hours. HMIS = Hazardous Materials Identification System				

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MSDS No.: 302C
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Product identifier: CP 648-S and CP 648-E Firestop Wrap Strip
Product description: 1" or 1 3/4" wide intumescent wrap for plastic or insulated pipe
Supplier: Hilti (Canada) Corporation, 2360 Meadowpine Blvd., Mississauga, Ontario L5N 6S2
Originator: Hilti, Inc., P. O. Box 21148, Tulsa, Oklahoma, USA 74121
Emergency number: Chem-Trec: 1 800 424 9300

INGREDIENTS INFORMATION

Not a hazardous chemical as defined by the Controlled Products Regulations SOR/88-66; classified as a manufactured "article".

PHYSICAL PROPERTIES

Appearance / Physical state:	Dark gray colored putty strips	Odour:	Mild odour.
Specific gravity (at 20°C):	1.3-1.4 g/cm ³ .	Odour threshold:	Not applicable.
Vapour pressure (at 20°C):	Not applicable.	VOC content:	7.6 g/l
Evaporation rate:	Not applicable.	Boiling point:	Not applicable.
Freezing point:	Not applicable.	pH:	Not determined.
Coefficient of H₂O / oil distrib:	Not applicable.	Solubility in water:	Insoluble.

FIRE AND EXPLOSION DATA

Flash point / Method:	Not applicable.	Flammable Limits:	Not applicable
Conditions of flammability:	Not applicable	Auto-ignition temperature:	Not available.
Means of extinction:	As appropriate for surrounding fire (e.g. Water, CO ₂ , Dry Chemical, Foam).		
Special fire fighting procedures:	None known. Product serves as a Firestop; intumescent material begins to expand when exposed to temperatures > 160° C (320° F).		
Hazardous combustion products:	None known.		
Sensitivity to mechanical impact / static discharge:	Not susceptible to mechanical impact or to a static discharge.		

REACTIVITY DATA

Stability:	Stable. Hazardous polymerization will not occur.
Incompatible materials:	None identified.
Conditions of reactivity:	None known.
Hazardous decomposition products:	None known.

TOXICOLOGICAL PROPERTIES

Routes of exposure:	<input checked="" type="checkbox"/> N/A <input type="checkbox"/> Skin contact <input type="checkbox"/> Skin absorption <input type="checkbox"/> Eye contact <input type="checkbox"/> Inhalation <input type="checkbox"/> Ingestion
Exposure limits:	Not available
Acute effects of exposure:	None known.
Chronic effects of exposure:	None known.
Synergistic materials:	None known.



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FIRST AID MEASURES

Eyes:	Flush with water if dust, debris, etc. from work overhead gets into eyes. Do not rub eyes as this can cause corneal abrasion. Call a physician if irritation continues, or if redness, swelling, or similar symptoms occur.
Skin:	Practice good hygiene; i.e., wash hands during breaks, before eating or smoking and after work.
Inhalation:	No first aid should be needed. If ill effects occur, move to fresh air. If symptoms persist, seek medical attention.
Ingestion:	Not a likely route of exposure.
Other:	Referral to a physician is recommended if there is any question about the seriousness of the injury/exposure.

PREVENTIVE MEASURES

Engineering controls:	General (natural or mechanically induced fresh air movements).
Eye protection:	Safety glasses are recommended for most industrial settings.
Skin protection:	None required; however (cotton) gloves are recommended.
Respiratory protection:	None normally required.
Other:	No additional measures are normally required.
Handling procedures and equipment:	No special requirements. Follow installation instructions.
Storage requirements:	Store in a cool dry place.
Spill, leak or release:	No special requirements.
Waste disposal:	Consult federal, provincial and local regulations for allowed means of disposal.
Special shipping instructions:	None known.

REGULATORY INFORMATION

WHMIS classification:	None (exempt / manufactured article)
HMIS codes:	Health 0, Flammability 0, Reactivity 0, PPE A
IATA/ICAO shipping name:	Not regulated.
TDG shipping name:	Not regulated.

PREPARATION INFORMATION / CONTACTS

Prepared by:	Hilti, Inc., Tulsa, OK USA	Date of Preparation:	May 24, 2012	Emergency phone number:	1 800 424 9300
Customer Service:	Hilti (Canada) Corporation, Mississauga, Ontario; 1 800 363 4458				
Health / Safety contacts:	Hilti, Inc., Tulsa, OK USA; 1 800 879 6000, Jerry Metcalf (x6704)				
Abbreviations used:	N/E = None Established. N/Ap = Not Applicable. N/Av = Not Available. HMIS = Hazardous Materials Identification System				

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MSDS No.: 321C
Revision No.: 002
Revision Date: 05/24/12
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Product identifier: CP 653 Speed Sleeve
Product description: Reusable Firestop Insert containing a black intumescent material
Supplier: Hilti (Canada) Corporation, 2360 Meadowpine Blvd., Mississauga, Ontario L5N 6S2
Originator: Hilti, Inc., P. O. Box 21148, Tulsa, Oklahoma, USA 74121
Emergency number: Chem-Trec: 1 800 424 9300

INGREDIENTS INFORMATION

Not a hazardous chemical as defined by the Controlled Products Regulations SOR/88-66; classified as a manufactured "article".

PHYSICAL PROPERTIES

Appearance / Physical state:	Galvanized metal sleeve with red plastic ends	Odour:	No odor
Specific gravity (at 20°C):	Not applicable.	VOC content:	7.6 g/l
Vapour pressure (at 20°C):	Not applicable.	Vapor density:	Not applicable.
Evaporation rate:	Not applicable.	Boiling point:	Not applicable.
Freezing point:	Not applicable.	pH:	Not applicable.
Coefficient of H₂O / oil distrib:	Not applicable.	Solubility in water:	Not available.

FIRE AND EXPLOSION DATA

Flash point / Method:	Not applicable.	Flammable Limits:	Not applicable
Conditions of flammability:	Non-flammable.	Auto-ignition temperature:	Not available.
Means of extinction:	Not applicable. As appropriate for surrounding fire (e.g. Water, CO ₂ , Dry Chemical, Foam).		
Special fire fighting procedures:	None known. Product serves as a Firestop; intumescent material inside the collar expands when exposed to temperatures > 160° C (320° F).		
Hazardous combustion products:	None known.		
Sensitivity to mechanical impact / static discharge:	Not susceptible to mechanical impact or to a static discharge.		

REACTIVITY DATA

Stability:	Stable. Hazardous polymerization will not occur.
Incompatible materials:	None identified.
Conditions of reactivity:	None known.
Hazardous decomposition products:	None known.

TOXICOLOGICAL PROPERTIES

Routes of exposure:	<input checked="" type="checkbox"/> N/A <input type="checkbox"/> Skin contact <input type="checkbox"/> Skin absorption <input type="checkbox"/> Eye contact <input type="checkbox"/> Inhalation <input type="checkbox"/> Ingestion
Exposure limits:	Not available
Acute effects of exposure:	None known.
Chronic effects of exposure:	None known.
Synergistic materials:	None known.



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FIRST AID MEASURES

Eyes:	Flush with water if dust, debris, etc. from work overhead gets into eyes. Do not rub eyes as this can cause corneal abrasion. Call a physician if irritation continues, or if redness, swelling, or similar symptoms occur.
Skin:	Practice good hygiene; i.e., wash hands during breaks, before eating or smoking and after work.
Inhalation:	No first aid should be needed. If ill effects occur, move to fresh air. If symptoms persist, seek medical attention.
Ingestion:	Not a likely route of exposure.
Other:	Referral to a physician is recommended if there is any question about the seriousness of the injury/exposure.

PREVENTIVE MEASURES

Engineering controls:	General (natural or mechanically induced fresh air movements).
Eye protection:	Safety glasses are recommended for most industrial settings.
Skin protection:	None required; however (cotton) gloves are recommended.
Respiratory protection:	None normally required.
Other:	No additional measures are normally required.
Handling procedures and equipment:	For industrial use only. Keep out of reach of children. Follow installation instructions.
Storage requirements:	Store in a cool dry place.
Spill, leak or release:	No special requirements.
Waste disposal:	Consult federal, provincial and local regulations for allowed means of disposal.
Special shipping instructions:	None known.

REGULATORY INFORMATION

WHMIS classification:	None (exempt / manufactured article)
HMIS codes:	Health 0, Flammability 0, Reactivity 0, PPE A
IATA/ICAO shipping name:	Not regulated.
TDG shipping name:	Not regulated.

PREPARATION INFORMATION / CONTACTS

Prepared by:	Hilti, Inc., Tulsa, OK USA	Date of Preparation:	May 24, 2012	Emergency phone number:	1 800 424 9300
Customer Service:	Hilti (Canada) Corporation, Mississauga, Ontario; 1 800 363 4458				
Health / Safety contacts:	Hilti, Inc., Tulsa, OK USA; 1 800 879 6000, Jerry Metcalf (x6704)				
Abbreviations used:	N/E = None Established. N/Ap = Not Applicable. N/Av = Not Available. HMIS = Hazardous Materials Identification System				

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MSDS No.: 335C
Revision No.: 000
Revision Date: 04/25/11
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Product identifier: CFS-DID Drop-in Device
Product description: Metal Firestop Drop in Device containing a black in a black intumescent material
Supplier: Hilti (Canada) Corporation, 2360 Meadowpine Blvd., Mississauga, Ontario L5N 6S2
Originator: Hilti, Inc., P. O. Box 21148, Tulsa, Oklahoma, USA 74121
Emergency number: Chem-Trec: 1 800 424 9300

INGREDIENTS INFORMATION

Not a hazardous chemical as defined by the Controlled Products Regulations SOR/88-66; classified as a manufactured "article".

PHYSICAL PROPERTIES

Appearance / Physical state:	Galvanized metal sleeve with red plastic ends	Odour:	No odor
Specific gravity (at 20°C):	Not applicable.	VOC content:	0.19 g/l
Vapour pressure (at 20°C):	Not applicable.	Vapor density:	Not applicable.
Evaporation rate:	Not applicable.	Boiling point:	Not applicable.
Freezing point:	Not applicable.	pH:	Not applicable.
Coefficient of H₂O / oil distrib:	Not applicable.	Solubility in water:	Not available.

FIRE AND EXPLOSION DATA

Flash point / Method:	Not applicable.	Flammable Limits:	Not applicable
Conditions of flammability:	Non-flammable.	Auto-ignition temperature:	Not available.
Means of extinction:	Not applicable. As appropriate for surrounding fire (e.g. Water, CO ₂ , Dry Chemical, Foam).		
Special fire fighting procedures:	None known. Product serves as a Firestop; intumescent material inside the collar expands when exposed to temperatures > 160° C (320° F).		
Hazardous combustion products:	None known.		
Sensitivity to mechanical impact / static discharge:	Not susceptible to mechanical impact or to a static discharge.		

REACTIVITY DATA

Stability:	Stable. Hazardous polymerization will not occur.
Incompatible materials:	None identified.
Conditions of reactivity:	None known.
Hazardous decomposition products:	None known.

TOXICOLOGICAL PROPERTIES

Routes of exposure:	<input checked="" type="checkbox"/> N/A <input type="checkbox"/> Skin contact <input type="checkbox"/> Skin absorption <input type="checkbox"/> Eye contact <input type="checkbox"/> Inhalation <input type="checkbox"/> Ingestion
Exposure limits:	Not available
Acute effects of exposure:	None known.
Chronic effects of exposure:	None known.
Synergistic materials:	None known.



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FIRST AID MEASURES

Eyes:	Flush with water if dust, debris, etc. from work overhead gets into eyes. Do not rub eyes as this can cause corneal abrasion. Call a physician if irritation continues, or if redness, swelling, or similar symptoms occur.
Skin:	Practice good hygiene; i.e., wash hands during breaks, before eating or smoking and after work.
Inhalation:	No first aid should be needed. If ill effects occur, move to fresh air. If symptoms persist, seek medical attention.
Ingestion:	Not a likely route of exposure.
Other:	Referral to a physician is recommended if there is any question about the seriousness of the injury/exposure.

PREVENTIVE MEASURES

Engineering controls:	General (natural or mechanically induced fresh air movements).
Eye protection:	Safety glasses are recommended for most industrial settings.
Skin protection:	None required; however (cotton) gloves are recommended.
Respiratory protection:	None normally required.
Other:	No additional measures are normally required.
Handling procedures and equipment:	For industrial use only. Keep out of reach of children. Follow installation instructions.
Storage requirements:	Store in a cool dry place.
Spill, leak or release:	No special requirements.
Waste disposal:	Consult federal, provincial and local regulations for allowed means of disposal.
Special shipping instructions:	None known.

REGULATORY INFORMATION

WHMIS classification:	None (exempt / manufactured article)
HMIS codes:	Health 0, Flammability 0, Reactivity 0, PPE A
IATA/ICAO shipping name:	Not regulated.
TDG shipping name:	Not regulated.

PREPARATION INFORMATION / CONTACTS

Prepared by:	Hilti, Inc., Tulsa, OK USA	Date of Preparation:	April 18, 2011	Emergency phone number:	1 800 424 9300
Customer Service:	Hilti (Canada) Corporation, Mississauga, Ontario; 1 800 363 4458				
Health / Safety contacts:	Hilti, Inc., Tulsa, OK USA; 1 800 879 6000, Jerry Metcalf (x6704)				
Abbreviations used:	N/E = None Established. N/Ap = Not Applicable. N/Av = Not Available. HMIS = Hazardous Materials Identification System				

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MSDS No.: 331C
Revision No.: 001
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Product identifier: CFS-SP WB Firestop Joint Spray
Product description / use: Fire rated acrylic-based mastic for construction joints.
Supplier: Hilti (Canada) Corporation, 2360 Meadowpine Blvd., Mississauga, Ontario L5N 6S2
Originator: Hilti, Inc., P. O. Box 21148, Tulsa, Oklahoma, USA 74121
Emergency number: Chem-Trec: 1 800 424 9300

INGREDIENTS INFORMATION

Not a hazardous chemical as defined by the Controlled Products Regulations SOR/88-66.

PHYSICAL PROPERTIES

Appearance / Physical state:	Red, grey or white sprayable paste.	Odour:	Mild odour.
Specific gravity (at 20°C):	1.3	VOC content:	60 g/L
Vapour pressure (at 20°C):	Not applicable.	Vapor density:	Not applicable.
Evaporation rate:	Not applicable.	Boiling point:	Not applicable.
Freezing point:	Approximately 0° C / 32° F	pH:	8.0-9.0
Coefficient of H₂O / oil distrib:	Not applicable.	Solubility in water:	Soluble.

FIRE AND EXPLOSION DATA

Flash point / Method:	Non-flammable.	Flammable Limits:	Not applicable
Conditions of flammability:	Not applicable.	Auto-ignition temperature:	Not applicable.
Means of extinction:	As appropriate for surrounding fire (e.g. Water, CO ₂ , Dry Chemical, Foam).		
Special fire fighting procedures:	None known. A NIOSH-approved self-contained breathing apparatus (SCBA) should be worn when fighting fires involving chemicals.		
Hazardous combustion products:	Thermal decomposition products such as carbon monoxide and carbon dioxide can be produced under fire conditions.		
Sensitivity to mechanical impact / static discharge:	Not susceptible to mechanical impact or to a static discharge.		

REACTIVITY DATA

Stability:	Stable.
Incompatible materials:	None known.
Conditions of reactivity:	None known.
Hazardous decomposition products:	Thermal decomposition can yield carbon monoxide and carbon dioxide.

TOXICOLOGICAL PROPERTIES

Routes of exposure:	<input type="checkbox"/> N/Ap <input checked="" type="checkbox"/> Skin contact <input type="checkbox"/> Skin absorption <input checked="" type="checkbox"/> Eye contact <input type="checkbox"/> Inhalation <input type="checkbox"/> Ingestion
Exposure limits:	None established.
Acute effects of exposure:	Eyes — Can cause irritation or watering but injury is unlikely. Skin — No effects expected. Irritation is possible with some individuals. Inhalation — No effects expected. Ingestion — Not considered a route of exposure. Effects of ingestion have not been determined. Considered to have a low acute oral toxicity.
Chronic effects of exposure:	None known.
Synergistic materials:	None known.



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FIRST AID MEASURES

Eyes:	Flush with plenty of water. Call a physician if symptoms occur.
Skin:	Wash with soap and water. Seek medical attention if any effects persist.
Inhalation:	No ill effects expected. Should discomfort occur, move to fresh air.
Ingestion:	Do not induce vomiting unless directed by a physician. Contact a physician immediately.
Other:	Referral to a physician is recommended if there is any question about the seriousness of the injury/exposure.

PREVENTIVE MEASURES

Engineering controls:	General (natural or mechanically induced fresh air movements).
Eye protection:	While spraying, chemical goggles recommended. As a minimum, wear safety glasses with side shields.
Skin protection:	Impermeable gloves recommended. Use other protective as required to prevent skin contact when spraying product.
Respiratory protection:	None normally required.
Other:	No additional measures are normally required.
Handling procedures and equipment:	For industrial use only. Keep out of reach of children. Keep container closed when not in use. Do not get into the eyes. Avoid prolonged or repeated contact with the skin. Practice good hygiene; i.e., wash after using and before eating or smoking.
Storage requirements:	Store in a cool dry area. Keep from freezing. Store between 5° and 25° C (41° and 77° F).
Spill, leak or release:	Immediately wipe away spilled material before it hardens. Place in a container for proper disposal in accordance with all applicable local, state, or federal requirements.
Waste disposal:	Consult with regulatory agencies or your corporate personnel for disposal methods that comply with local, provincial, and federal safety, health and environmental regulations.
Special shipping instructions:	Avoid temperature extremes. Keep from freezing.

REGULATORY INFORMATION

WHMIS classification:	D2A
HMIS codes:	Health 1, Flammability 0, Reactivity 0, PPE B
TDG shipping name:	Not regulated.

PREPARATION INFORMATION / CONTACTS

Prepared by:	Hilti, Inc., Tulsa, OK USA	Date of Preparation:	August 24, 2011	Emergency phone number:	1 800 424 9300
Customer Service:	Hilti (Canada) Corporation, Mississauga, Ontario; 1 800 363 4458				
Health / Safety contacts:	Hilti, Inc., Tulsa, OK USA; 1 800 879 6000, Jerry Metcalf (x6704)				
Abbreviations used:	N/Av = Not Available. H = Hours. T = Total dust. R = Respirable dust. HMIS = Hazardous Materials Identification System				

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Product identifier: CP 675T Firestop Board
Product description: Rigid polyurethane firestop board
Supplier: Hilti (Canada) Corporation, 2360 Meadowpine Blvd., Mississauga, Ontario L5N 6S2
Originator: Hilti, Inc., P. O. Box 21148, Tulsa, Oklahoma, USA 74121
Emergency number: Chem-Trec: 1 800 424 9300

INGREDIENTS INFORMATION

Not a hazardous chemical as defined by the Controlled Products Regulations SOR/88-66; considered to be a manufactured "article".

PHYSICAL PROPERTIES

Appearance / Physical state:	Dark red, rigid polyurethane board	Odour:	None
Density:	320 kg/m ³ / 20 lb/ft ³	Odour threshold:	Not available.
Vapour pressure (at 20°C):	Not applicable.	Vapor density:	Not applicable.
Evaporation rate:	Not applicable.	Boiling point:	Not applicable.
Freezing point:	Not applicable.	pH:	Not applicable.
Coefficient of H₂O / oil distrib:	Not applicable.	Solubility in water:	Insoluble.

FIRE AND EXPLOSION DATA

Flash point / Method:	Not applicable.	Flammable Limits:	Not applicable.
Conditions of flammability:	Non-flammable.	Auto-ignition temperature:	Not available.
Means of extinction:	Not applicable. As appropriate for surrounding fire (e.g. Water, CO ₂ , Dry Chemical, Foam).		
Special fire fighting procedures:	None known.		
Hazardous combustion products:	CO _x , NO _x , and HCN		
Sensitivity to mechanical impact / static discharge:	Not susceptible to mechanical impact or to a static discharge.		

REACTIVITY DATA

Stability:	Stable. Hazardous polymerization will not occur.
Incompatible materials:	None identified.
Conditions of reactivity:	None known.
Hazardous decomposition products:	If heated to decomposition (>250° C / 482° F), can yield CO _x , NO _x , and HCN.

TOXICOLOGICAL PROPERTIES

Routes of exposure:	<input checked="" type="checkbox"/> N/A <input type="checkbox"/> Skin contact <input type="checkbox"/> Skin absorption <input type="checkbox"/> Eye contact <input type="checkbox"/> Inhalation <input type="checkbox"/> Ingestion
Exposure limits:	Not available.
Acute effects of exposure:	None known.
Chronic effects of exposure:	None known.
Synergistic materials:	None known.



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FIRST AID MEASURES

Eyes:	Flush with water if dust, debris, etc. from work overhead gets into eyes. Call a physician if symptoms occur.
Skin:	Wash with soap and water. Seek medical attention if any effects persist.
Inhalation:	Move victim to fresh air. Call a physician if symptoms persist.
Ingestion:	Not a likely route of exposure.
Other:	Referral to a physician is recommended if there is any question about the seriousness of the injury/exposure.

PREVENTIVE MEASURES

Engineering controls:	General (natural or mechanically induced fresh air movements).
Eye protection:	Safety glasses with side shields are recommended.
Skin protection:	None required; however (cotton) gloves are recommended.
Respiratory protection:	None normally required.
Other:	No additional measures are normally required.
Handling procedures and equipment:	For industrial use only. Do not get into eyes. Avoid prolonged or repeated contact with skin. Practice good hygiene; i.e., wash after using and before eating or smoking.
Storage requirements:	Keep out of reach of children. Store between -30° C and 80° C (-22° F to 176° F)
Spill, leak or release:	No special requirements.
Waste disposal:	Consult federal, provincial, and local regulations for allowed means of disposal.
Special shipping instructions:	None known.

REGULATORY INFORMATION

WHMIS classification:	None (exempt/manufactured article)
HMIS codes:	Health 0, Flammability 0, Reactivity 0, PPE A
TDG shipping name:	Not regulated.

PREPARATION INFORMATION / CONTACTS

Prepared by:	Hilti, Inc., Tulsa, OK USA	Date of Preparation:	May 22, 2012	Emergency phone number:	1 800 424 9300
Customer Service:	Hilti (Canada) Corporation, Mississauga, Ontario; 1 800 363 4458				
Health / Safety contacts:	Hilti, Inc., Tulsa, OK USA; 1 800 879 6000, Jerry Metcalf (x6704)				
Abbreviations used:	N/E = None Established. N/Ap = Not Applicable. N/Av = Not Available. HMIS = Hazardous Materials Identification System				

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MSDS No.: 315C
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Product identifier: CP 680-P / CP 680-M Cast-in Firestop Devices

Product description: CP 680-P — Black intumescent material enclosed in a red plastic housing
CP 680-M — Black intumescent material enclosed in a black plastic housing

Supplier: Hilti (Canada) Corporation, 2360 Meadowpine Blvd., Mississauga, Ontario L5N 6S2

Originator: Hilti, Inc., P. O. Box 21148, Tulsa, Oklahoma, USA 74121

Emergency number: Chem-Trec: 1 800 424 9300

INGREDIENTS INFORMATION

Not a hazardous chemical as defined by the Controlled Products Regulations SOR/88-66; considered to be a manufactured “article”.

PHYSICAL PROPERTIES

Appearance / Physical state:	Red plastic sleeve (CP 680-P) Black plastic sleeve (CP 680-M)	Odour:	No odour
Specific gravity (at 20°C):	Not applicable.	VOC content:	7.6 g/l
Vapour pressure (at 20°C):	Not applicable.	Vapor density:	Not applicable.
Evaporation rate:	Not applicable.	Boiling point:	Not applicable.
Freezing point:	Not applicable.	pH:	Not applicable.
Coefficient of H₂O / oil distrib:	Not applicable.	Solubility in water:	Not available.

FIRE AND EXPLOSION DATA

Flash point / Method:	Not applicable.	Flammable Limits:	Not applicable.
Conditions of flammability:	Non-flammable.	Auto-ignition temperature:	Not available.
Means of extinction:	Not applicable. As appropriate for surrounding fire (e.g. Water, CO ₂ , Dry Chemical, Foam).		
Special fire fighting procedures:	None known. Product serves as a Firestop; intumescent material inside the collar expands when exposed to temperatures > 160° C (320° F).		
Hazardous combustion products:	None known.		
Sensitivity to mechanical impact / static discharge:	Not susceptible to mechanical impact or to a static discharge.		

REACTIVITY DATA

Stability:	Stable.
Incompatible materials:	None identified.
Conditions of reactivity:	None known.
Hazardous decomposition products:	Unknown.

TOXICOLOGICAL PROPERTIES

Routes of exposure:	<input checked="" type="checkbox"/> N/A <input type="checkbox"/> Skin contact <input type="checkbox"/> Skin absorption <input type="checkbox"/> Eye contact <input type="checkbox"/> Inhalation <input type="checkbox"/> Ingestion
Exposure limits:	Not available.
Acute effects of exposure:	None known.
Chronic effects of exposure:	None known.
Synergistic materials:	None known.



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FIRST AID MEASURES

Eyes:	Flush with water if dust, debris, etc. from work overhead gets into eyes. Do not rub eyes. Call a physician if irritation, redness, or similar symptoms occur.
Skin:	Practice good hygiene; i.e. wash hands during breaks, before eating or smoking and after work.
Inhalation:	No first aid should be needed. If ill effects occur, move to fresh air. If symptoms persist, seek medical attention.
Ingestion:	Not a likely route of exposure.
Other:	Referral to a physician is recommended if there is any question about the seriousness of the injury/exposure.

PREVENTIVE MEASURES

Engineering controls:	General (natural or mechanically induced fresh air movements).
Eye protection:	Safety glasses with side shields.
Skin protection:	Cotton gloves are suitable.
Respiratory protection:	None normally required.
Other:	No additional measures are normally required.
Handling procedures and equipment:	No special requirements. Follow installation instructions.
Storage requirements:	Store in a cool dry area.
Spill, leak or release:	No special requirements.
Waste disposal:	Consult federal, provincial, and local regulations for allowed means of disposal.
Special shipping instructions:	None known.

REGULATORY INFORMATION

WHMIS classification:	None (exempt/manufactured article)
HMIS codes:	Health 0, Flammability 0, Reactivity 0, PPE A
IATA/ICAO shipping name:	Not regulated.
TDG shipping name:	Not regulated.

PREPARATION INFORMATION / CONTACTS

Prepared by:	Hilti, Inc., Tulsa, OK USA	Date of Preparation:	May 24, 2012	Emergency phone number:	1 800 424 9300
Customer Service:	Hilti (Canada) Corporation, Mississauga, Ontario; 1 800 363 4458				
Health / Safety contacts:	Hilti, Inc., Tulsa, OK USA; 1 800 879 6000, Jerry Metcalf (x6704)				
Abbreviations used:	N/E = None Established. N/Ap = Not Applicable. N/Av = Not Available. HMIS = Hazardous Materials Identification System				

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MSDS No.: 295C
Revision No.: 005
Revision Date: 05/24/12
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Product identifier: CP 681 Tub Box Kit
Product description: Tub sleeve flange contains CP 645 Wrap Strip (an intumescent firestop material)
Supplier: Hilti (Canada) Corporation, 2360 Meadowpine Blvd., Mississauga, Ontario L5N 6S2
Originator: Hilti, Inc., P. O. Box 21148, Tulsa, Oklahoma, USA 74121
Emergency number: Chem-Trec: 1 800 424 9300

INGREDIENTS INFORMATION

Not applicable; considered to be a manufactured "article" as defined by the Controlled Products Regulations SOR/88-66.

PHYSICAL PROPERTIES

Appearance / Physical state:	Rust colored putty-like strip.	Odour:	None.
Specific gravity (at 20°C):	Not applicable.	VOC content:	7.6 g/l
Vapour pressure (at 20°C):	Not applicable.	Vapor density:	Not applicable.
Evaporation rate:	Not applicable.	Boiling point:	Not applicable.
Freezing point:	Not applicable.	pH:	Not applicable.
Coefficient of H₂O / oil distrib:	Not applicable.	Solubility in water:	Not applicable.

FIRE AND EXPLOSION DATA

Flash point / Method:	Not applicable.	Flammable Limits:	Not applicable.
Conditions of flammability:	Not applicable.	Auto-ignition temperature:	Not applicable.
Means of extinction:	Not applicable. As appropriate for surrounding fire (e.g. Water, CO ₂ , Dry Chemical, Foam).		
Special fire fighting procedures:	None known. A NIOSH-approved self-contained breathing apparatus (SCBA) should be worn when fighting fires involving chemicals.		
Hazardous combustion products:	None known.		
Sensitivity to mechanical impact / static discharge:	Not susceptible to mechanical impact or to a static discharge.		

REACTIVITY DATA

Stability:	Stable.
Incompatible materials:	None identified.
Conditions of reactivity:	None known.
Hazardous decomposition products:	Unknown.

TOXICOLOGICAL PROPERTIES

Routes of exposure:	<input checked="" type="checkbox"/> N/A <input type="checkbox"/> Skin contact <input type="checkbox"/> Skin absorption <input type="checkbox"/> Eye contact <input type="checkbox"/> Inhalation <input type="checkbox"/> Ingestion
Exposure limits:	Not applicable.
Acute effects of exposure:	None known or expected.
Chronic effects of exposure:	None known.
Synergistic materials:	None known.



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FIRST AID MEASURES

Eyes: Not applicable.
Skin: Not applicable.
Inhalation: Not applicable.
Ingestion: Not applicable.
Other: Not applicable.

PREVENTIVE MEASURES

Engineering controls: General (natural or mechanically induced fresh air movements).
Eye protection: As appropriate for the work area.
Skin protection: Cloth gloves are suitable.
Respiratory protection: Not applicable.
Other: Practice good hygiene; i.e., wash after using and before eating or smoking.
Handling procedures and equipment: No special requirements. Follow installation instructions.
Storage requirements: Store in a cool dry area.
Spill, leak or release: Not applicable.
Waste disposal: No special requirements.
Special shipping instructions: None known.

REGULATORY INFORMATION

WHMIS classification: None. (Product is classified as a "manufactured article".)
HMIS codes: Health 0, Flammability 0, Reactivity 0, PPE A
TDG shipping name: Not regulated.

PREPARATION INFORMATION / CONTACTS

Prepared by: Hilti, Inc., Tulsa, OK USA **Date of Preparation:** May 24, 2012 **Emergency phone number:** 1 800 424 9300
Customer Service: Hilti (Canada) Corporation, Mississauga, Ontario; 1 800 363 4458
Health / Safety contacts: Hilti, Inc., Tulsa, OK USA; 1 800 879 6000, Jerry Metcalf (x6704)
Abbreviations used: **N/E** = None Established. **N/Ap** = Not Applicable. **N/Av** = Not Available.
HMIS = Hazardous Materials Identification System

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MSDS No.: 291C
Revision No.: 005
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Product identifier: CP 767 Speed Strips
Product use: 2" or 4" x 36" mineral wool strips for firestopping joints below metal decking
Supplier: Hilti (Canada) Corporation, 2360 Meadowpine Blvd., Mississauga, Ontario L5N 6S2
Originator: Hilti, Inc., P. O. Box 21148, Tulsa, Oklahoma, USA 74121
Emergency number: Chem-Trec: 1 800 424 9300

INGREDIENTS INFORMATION

Ingredients	CAS Number:	% (wt.)	LC ₅₀ (rat)	LD ₅₀ (rat)	TLV	STEL
Synthetic vitreousfiber	N/E	92 - 97	N/Av	N/Av	1 fiber / cc	N/E
Phenolic resin	25104-55-6	02 - 05	N/Av	7000 mg/kg	N/E	N/E
Lubricant	08012-95-1	01 - 03	N/Av	22 gm/kg (mouse)	5 mg/m ³	10 mg/m ³

PHYSICAL PROPERTIES

Appearance / Physical state:	Yellow preformed strips	Odour:	None.
Specific gravity (at 20°C):	Not applicable.	VOC Content:	<1% w/w
Vapour pressure (at 20°C):	Not applicable.	Vapour density:	Not applicable.
Evaporation rate:	Not applicable.	Boiling point:	Not applicable.
Freezing point:	Not applicable.	pH:	Not applicable.
Coefficient of H₂O / oil distrib:	Not applicable.	Solubility in water:	Insoluble.

FIRE AND EXPLOSION DATA

Flash point / Method:	Non-flammable.	Flammable Limits:	Not applicable
Conditions of flammability:	Not applicable.	Auto-ignition temperature:	Not applicable
Means of extinction:	As appropriate for surrounding fire (e.g. Water, CO ₂ , Dry Chemical, Foam).		
Special fire fighting procedures:	None known. A NIOSH-approved self-contained breathing apparatus (SCBA) should be worn when fighting fires involving chemicals.		
Hazardous combustion products:	Thermal decomposition products can be formed at temperatures exceeding 1100° C. Normal products of decomposition are expected; e.g. CO and CO ₂ .		
Sensitivity to mechanical impact / static discharge:	Not susceptible to mechanical impact or to a static discharge.		

REACTIVITY DATA

Stability:	Stable.	Conditions of reactivity:	None known.
Incompatible materials:	Strong acids.		
Hazardous decomposition products:	None known.		

TOXICOLOGICAL PROPERTIES

Routes of exposure:	<input type="checkbox"/> None known <input checked="" type="checkbox"/> Skin contact <input type="checkbox"/> Skin absorption <input checked="" type="checkbox"/> Eye contact <input checked="" type="checkbox"/> Inhalation <input type="checkbox"/> Ingestion		
Exposure limits:	See "Ingredients" section above.		
Acute effects of exposure:	Eyes — Can cause irritation by mechanical means. Skin — Itching and irritation. Inhalation — Nose, throat and upper respiratory tract irritation. Ingestion — Not a likely route of exposure.		



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Chronic effects of exposure: Rock wool and slag wool are classified by the IARC as Group 2B (animal) carcinogens. Studies of workers at slag wool plants were inconclusive. Recent animal studies show that any changes associated with long-term inhalation of high concentrations of slag wool are reversible (i.e. noncarcinogenic).

Synergistic materials: None known.

FIRST AID MEASURES

Eyes: Flush with plenty of water while holding the eyelids apart. Avoid rubbing the eyes as mechanical abrasions can occur. Contact a physician if symptoms persist.

Skin: Wash with soap and water. Launder contaminated clothing before reuse.

Inhalation: No ill effects expected. Should discomfort occur, move to fresh air.

Ingestion: No ill effects expected.

Other: Referral to a physician is recommended if there is any question about the seriousness of the injury/exposure

PREVENTIVE MEASURES

Engineering controls: General (natural or mechanically induced fresh air movements).

Eye protection: Safety goggles or safety glasses with side-shields to prevent airborne fibers from getting into the eyes.

Skin protection: Cloth gloves are suitable.

Respiratory protection: None normally required.

Other: No additional measures are normally required.

Handling procedures and equipment: For industrial use only. Use with adequate ventilation. Do not get into the eyes. Avoid contact with the skin. Cut with a sharp knife or blade to avoid generating dusts and fibers. Practice good hygiene; i.e., wash after using and before eating or smoking.

Storage requirements: Keep out of reach of children. Keep dry.

Spill, leak or release: Not applicable.

Waste disposal: No known restrictions. Consult with regulatory agencies or your corporate personnel for disposal methods that comply with local, provincial, and federal safety, health and environmental regulations.

Special shipping instructions: Keep dry.

REGULATORY INFORMATION

WHMIS classification: D2A, D2B

HMIS codes: Health 1, Flammability 0, Reactivity 0, PPE B

TDG shipping name: Not regulated.

PREPARATION INFORMATION / CONTACTS

Prepared by: Hilti, Inc., Tulsa, OK USA
Date of Preparation: May 24, 2012
Emergency phone number: 1 800 424 9300

Customer Service: Hilti (Canada) Corporation, Mississauga, Ontario; 1 800 363 4458

Health / Safety contacts: Hilti, Inc., Tulsa, OK USA; 1 800 879 6000, Jerry Metcalf (x6704)

Abbreviations used: N/E = None Established. N/Ap = Not Applicable. N/Av = Not Available. H = Hours.
IARC = International Agency for Research on Cancer. HMIS = Hazardous Materials Identification System

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MSDS No.: 285C
Revision No.: 007
Revision Date: 05/24/12
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Product identifier: CP 777 Speed Plugs
Product use: 1.5", 2" or 3" x 36" mineral wool plugs for top of wall firestopping
Supplier: Hilti (Canada) Corporation, 2360 Meadowpine Blvd., Mississauga, Ontario L5N 6S2
Originator: Hilti, Inc., P. O. Box 21148, Tulsa, Oklahoma, USA 74121
Emergency number: Chem-Trec: 1 800 424 9300

INGREDIENTS INFORMATION

Ingredients	CAS Number:	% (wt.)	LC ₅₀ (rat)	LD ₅₀ (rat)	TLV	STEL
Synthetic vitreousfiber	N/E	92 - 97	N/Av	N/Av	1 fiber / cc	N/E
Phenolic resin	25104-55-6	02 - 05	N/Av	7000 mg/kg	N/E	N/E
Lubricant	08012-95-1	01 - 03	N/Av	22 gm/kg (mouse)	5 mg/m ³	10 mg/m ³

PHYSICAL PROPERTIES

Appearance / Physical state:	Yellow formed plugs	Odour:	None.
Specific gravity (at 20°C):	Not applicable.	VOC Content:	<1% w/w
Vapour pressure (at 20°C):	Not applicable.	Vapour density:	Not applicable.
Evaporation rate:	Not applicable.	Boiling point:	Not applicable.
Freezing point:	Not applicable.	pH:	Not applicable.
Coefficient of H₂O / oil distrib:	Not applicable.	Solubility in water:	Insoluble.

FIRE AND EXPLOSION DATA

Flash point / Method:	Non-flammable.	Flammable Limits:	Not applicable
Conditions of flammability:	Not applicable.	Auto-ignition temperature:	Not applicable
Means of extinction:	As appropriate for surrounding fire (e.g. Water, CO ₂ , Dry Chemical, Foam).		
Special fire fighting procedures:	None known. A NIOSH-approved self-contained breathing apparatus (SCBA) should be worn when fighting fires involving chemicals.		
Hazardous combustion products:	Thermal decomposition products can be formed at temperatures exceeding 1100° C. Normal products of decomposition are expected; e.g. CO and CO ₂ .		
Sensitivity to mechanical impact / static discharge:	Not susceptible to mechanical impact or to a static discharge.		

REACTIVITY DATA

Stability:	Stable.	Conditions of reactivity:	None known.
Incompatible materials:	Strong acids.		
Hazardous decomposition products:	None known.		

TOXICOLOGICAL PROPERTIES

Routes of exposure:	<input type="checkbox"/> None known <input checked="" type="checkbox"/> Skin contact <input type="checkbox"/> Skin absorption <input checked="" type="checkbox"/> Eye contact <input checked="" type="checkbox"/> Inhalation <input type="checkbox"/> Ingestion		
Exposure limits:	See "Ingredients" section above.		
Acute effects of exposure:	Eyes — Can cause irritation by mechanical means. Skin — Itching and irritation. Inhalation — Nose, throat and upper respiratory tract irritation. Ingestion — Not a likely route of exposure.		



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Chronic effects of exposure: Rock wool and slag wool are classified by the IARC as Group 2B (animal) carcinogens. Studies of workers at slag wool plants were inconclusive. Recent animal studies show that any changes associated with long-term inhalation of high concentrations of slag wool are reversible (i.e. noncarcinogenic).

Synergistic materials: None known.

FIRST AID MEASURES

Eyes: Flush with plenty of water while holding the eyelids apart. Avoid rubbing the eyes as mechanical abrasions can occur. Contact a physician if symptoms persist.

Skin: Wash with soap and water. Launder contaminated clothing before reuse.

Inhalation: No ill effects expected. Should discomfort occur, move to fresh air.

Ingestion: No ill effects expected.

Other: Referral to a physician is recommended if there is any question about the seriousness of the injury/exposure

PREVENTIVE MEASURES

Engineering controls: General (natural or mechanically induced fresh air movements).

Eye protection: Safety goggles or safety glasses with side-shields to prevent airborne fibers from getting into the eyes.

Skin protection: Cloth gloves are suitable.

Respiratory protection: None normally required.

Other: No additional measures are normally required.

Handling procedures and equipment: For industrial use only. Use with adequate ventilation. Do not get into the eyes. Avoid contact with the skin. Cut with a sharp knife or blade to avoid generating dusts and fibers. Practice good hygiene; i.e., wash after using and before eating or smoking.

Storage requirements: Keep out of reach of children. Keep dry.

Spill, leak or release: Not applicable.

Waste disposal: No known restrictions. Consult with regulatory agencies or your corporate personnel for disposal methods that comply with local, provincial, and federal safety, health and environmental regulations.

Special shipping instructions: Keep dry.

REGULATORY INFORMATION

WHMIS classification: D2A, D2B

HMIS codes: Health 1, Flammability 0, Reactivity 0, PPE B

TDG shipping name: Not regulated.

PREPARATION INFORMATION / CONTACTS

Prepared by: Hilti, Inc., Tulsa, OK USA
Date of Preparation: May 24, 2012
Emergency phone number: 1 800 424 9300

Customer Service: Hilti (Canada) Corporation, Mississauga, Ontario; 1 800 363 4458

Health / Safety contacts: Hilti, Inc., Tulsa, OK USA; 1 800 879 6000, Jerry Metcalf (x6704)

Abbreviations used: N/E = None Established. N/Ap = Not Applicable. N/Av = Not Available. H = Hours.
IARC = International Agency for Research on Cancer. HMIS = Hazardous Materials Identification System

The information and recommendations contained herein are based upon data believed to be correct; however, no guarantee or warranty of any kind expressed or implied is made with respect to the information provided.



Hilti. Outperform. Outlast.

MSDS No.: 336C
Revision No.: 000
Revision Date: 10/16/11
Page: 1 of 2

Product identifier: CFS-BL Firestop Block and CFS-PL Firestop Plug
Product description: Intumescent polyurethane foam block for fire stopping openings in walls and floors
Supplier: Hilti (Canada) Corporation, 2360 Meadowpine Blvd., Mississauga, Ontario L5N 6S2
Originator: Hilti, Inc., P. O. Box 21148, Tulsa, Oklahoma, USA 74121
Emergency number: Chem-Trec: 1 800 424 9300

INGREDIENTS INFORMATION

Not a hazardous chemical as defined by the Controlled Products Regulations SOR/88-66; classified as a manufactured "article".

PHYSICAL PROPERTIES

Appearance / Physical state:	Red (rust) colored foam block.	Odour:	None.
Specific gravity (at 20°C):	0.24 – 0.30 gm/cm ³	VOC content:	CFS-BL = 5.4g/l CFS-PL = 4.9 g/l
Vapour pressure (at 20°C):	Not applicable.	Vapor density:	Not applicable.
Evaporation rate:	Not applicable.	Boiling point:	Not applicable.
Freezing point:	Not applicable.	pH:	Not applicable.
Coefficient of H₂O / oil distrib:	Not applicable.	Solubility in water:	Not Soluble.

FIRE AND EXPLOSION DATA

Flash point / Method:	Not applicable.	Flammable Limits:	Not applicable.
Conditions of flammability:	Not flammable.	Auto-ignition temperature:	Not applicable.
Means of extinction:	Not applicable.		
Special fire fighting procedures:	Not applicable.		
Hazardous combustion products:	Refer to "Hazardous decomposition products" (next section).		
Sensitivity to mechanical impact / static discharge:	Not susceptible to mechanical impact or static discharge.		

REACTIVITY DATA

Stability:	Stable. Hazardous polymerization will not occur.
Incompatible materials:	None known. See special handling and storage instructions.
Conditions of reactivity:	None known.
Hazardous decomposition products:	If heated to decomposition, can yield CO _x , NO _x , HCN, HCl and/or HF.

TOXICOLOGICAL PROPERTIES

Routes of exposure:	<input checked="" type="checkbox"/> None known <input type="checkbox"/> Skin contact <input type="checkbox"/> Skin absorption <input type="checkbox"/> Eye contact <input type="checkbox"/> Inhalation <input type="checkbox"/> Ingestion
Exposure limits:	None established.
Acute effects of exposure:	Not applicable.
Chronic effects of exposure:	None known.
Synergistic materials:	None known.



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MSDS No.: 336C
Revision No.: 000
Revision Date: 10/16/11
Page: 2 of 2

FIRST AID MEASURES

Eyes:	No effects expected.
Skin:	No effects expected. Practice good hygiene; i.e., wash hands during breaks, before eating or smoking, and after work.
Inhalation:	Not a route of exposure.
Ingestion:	Not a likely route of exposure.
Other:	Referral to a physician is recommended if there is any question about the seriousness of the injury/exposure

PREVENTIVE MEASURES

Engineering controls:	General (natural or mechanically induced fresh air movements).
Eye protection:	As appropriate for the work area or the work being done.
Skin protection:	Cloth gloves are suitable.
Respiratory protection:	None normally required. Never enter a confined space without an appropriate air supplied respirator.
Other:	Depending on exposure and on workplace standards.
Handling procedures and equipment:	For industrial use only. Keep out of reach of children. Observe good hygiene practices; i.e., wash after using and before eating or smoking.
Storage requirements:	Store in a cool dry area out of direct sunlight. Storage above 60 C may degrade product.
Spill, leak or release:	No special requirements.
Waste disposal:	Consult federal, provincial and local regulations for allowed means of disposal.
Special shipping instructions:	None known.

REGULATORY INFORMATION

WHMIS classification:	None / exempt (manufactured article).
HMIS codes:	Health 0, Flammability 0, Reactivity 0, PPE A
IATA/ICAO shipping name:	Not regulated.
TDG shipping name:	Not regulated.

PREPARATION INFORMATION / CONTACTS

Prepared by:	Hilti, Inc., Tulsa, OK USA	Date of Preparation:	October 16, 2011	Emergency phone number:	1 800 424 9300
Customer Service:	Hilti (Canada) Corporation, Mississauga, Ontario; 1 800 363 4458				
Health / Safety contacts:	Hilti, Inc., Tulsa, OK USA; 1 800 879 6000, Jerry Metcalf (x6704)				
Abbreviations used:	N/E = None Established. N/A = Not Applicable. N/Av = Not Available. H = Hours. HMIS = Hazardous Materials Identification System				

The information and recommendations contained herein are based upon data believed to be correct; however, no guarantee or warranty of any kind expressed or implied is made with respect to the information provided.



Hilti Firestop
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through innovation
and education

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MSDS No.: 259C
Revision No.: 009
Revision Date: 03-29-12
Page: 1 of 2

Product identifier: **FS-ONE High Performance Intumescent Firestop Sealant**
Product use: Impedes the passage of fire, smoke and water through fire-rated walls and floors.
Supplier: Hilti (Canada) Corporation, 2360 Meadowpine Blvd., Mississauga, Ontario L5N 6S2
Originator: Hilti, Inc., P. O. Box 21148, Tulsa, Oklahoma, USA 74121
Emergency number: Chem-Trec: 1 800 424 9300

INGREDIENTS INFORMATION

Ingredients	CAS Number:	% (wt.)	LC ₅₀ (rat)	LD ₅₀ (rat)	TLV	STEL
Polyacrylate dispersion	Mixture	30 - 40	N/Av	N/Av	N/Av	N/Av
Calcium carbonate	01317-65-3	15 - 20	N/Av	N/Av	10 mg/m ³	N/Av
Zinc borate	1332-07-6	10 - 15	N/Av	N/Av	N/Av	N/Av
Talc	14807-96-6	05 - 10	N/Av	N/Av	2 mg/m ³	N/Av
Ethylene glycol	00107-21-1	01 - 05	10,876 mg/kg	4,700 mg/kg	100 mg/m ³	N/Av
Ferric oxide	01309-37-1	01 - 05	N/Av	N/Av	5 mg/m ³	N/Av

PHYSICAL PROPERTIES

Appearance / Physical state:	Red paste.	Odour:	Odourless.
Specific gravity (at 20°C):	1.5	VOC Content:	75.0 g/L
Vapour pressure (at 20°C):	23 mbar	Vapour density:	Not applicable.
Evaporation rate:	Not determined.	Boiling point:	Not determined.
Freezing point:	Not determined.	pH:	Not determined.
Coefficient of H₂O / oil distrib:	Not determined.	Solubility in water:	Soluble.

FIRE AND EXPLOSION DATA

Flash point / Method:	Non-flammable.	Flammable Limits:	Not applicable
Conditions of flammability:	Not applicable.	Auto-ignition temperature:	Not applicable
Means of extinction:	As appropriate for surrounding fire (e.g. Water, CO ₂ , Dry Chemical, Foam).		
Special fire fighting procedures:	None known. A NIOSH-approved self-contained breathing apparatus (SCBA) should be worn when fighting fires involving chemicals.		
Hazardous combustion products:	Thermal decomposition products such as oxides of carbon and nitrogen can be produced under fire conditions. See below.		
Sensitivity to mechanical impact / static discharge:	Not susceptible to mechanical impact or to a static discharge.		

REACTIVITY DATA

Stability:	Stable.	Conditions of reactivity:	None known.
Incompatible materials:	Strong acids, peroxides and oxidizing agents.		
Hazardous decomposition products:	None known. Thermal decomposition can yield CO and CO ₂ .		



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MSDS No.: 259C
Revision No.: 009
Revision Date: 03-29-12
Page: 2 of 2

TOXICOLOGICAL PROPERTIES

Routes of exposure:	<input checked="" type="checkbox"/> Skin contact <input type="checkbox"/> Skin absorption <input checked="" type="checkbox"/> Eye contact <input type="checkbox"/> Inhalation <input type="checkbox"/> Ingestion
Acute effects of exposure:	Eyes — Can cause irritation or watering but injury is unlikely. Skin — Prolonged or repeated contact can cause irritation. Inhalation — No effects expected. Ingestion — Not a likely route of exposure. Considered to have a low acute oral toxicity.
Chronic effects of exposure:	None known.
Synergistic materials:	None known.

FIRST AID MEASURES

Eyes:	Flush with plenty of water. Contact a physician if symptoms occur.
Skin:	Wash with soap and water. Seek medical attention if any effects persist.
Inhalation:	No ill effects expected. Should discomfort occur, move to fresh air.
Ingestion:	Do not induce vomiting unless directed by a Physician. Contact a physician immediately.
Other:	Referral to a physician is recommended if there is any question about the seriousness of the injury/exposure

PREVENTIVE MEASURES

Engineering controls:	General (natural or mechanically induced fresh air movements).
Eye protection:	Safety glasses with side shields are recommended.
Skin protection:	Impermeable gloves recommended.
Respiratory protection:	None normally required.
Other:	No additional measures are normally required.
Handling procedures and equipment:	For industrial use only. Keep out of reach of children. Keep container closed when not in use. Do not get into the eyes. Avoid prolonged or repeated contact with the skin. Practice good hygiene; i.e., wash after using and before eating or smoking.
Storage requirements:	Store in a cool dry area. Keep from freezing. Store between 5° and 25° C.
Spill, leak or release:	Immediately wipe away spilled material before it hardens. Place in a container for proper disposal in accordance with all applicable local, state, or federal requirements.
Waste disposal:	Consult with regulatory agencies or your corporate personnel for disposal methods that comply with local, provincial, and federal safety, health and environmental regulations.
Special shipping instructions:	Avoid temperature extremes. Keep from freezing.

REGULATORY INFORMATION

WHMIS classification:	D2A, D2B
HMIS codes:	Health 1, Flammability 0, Reactivity 0, PPE A
TDG shipping name:	Not regulated.

PREPARATION INFORMATION / CONTACTS

Prepared by:	Hilti, Inc., Tulsa, OK USA	Date of Preparation:	March 29, 2012	Emergency phone number:	1 800 424 9300
Customer Service:	Hilti (Canada) Corporation, Mississauga, Ontario; 1 800 363 4458				
Health / Safety contacts:	Hilti, Inc., Tulsa, OK USA; 1 800 879 6000, Jerry Metcalf (x6704)				
Abbreviations used:	N/E = None Established. N/A = Not Applicable. N/Av = Not Available. R = as "respirable fraction". IARC = International Agency for Research on Cancer. HMIS = Hazardous Materials Identification System				

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Engineering Judgment Process

Hilti has performed extensive testing in both through-penetration and construction joint applications. However, due to variations in construction throughout the phases of a project, it is not possible to test every application that may be encountered.

For these situations, Hilti has developed a process for creating custom drawings to accommodate particular applications. Hilti custom drawings, or Engineering Judgments, are developed through the careful and restricted application of accepted fire protection engineering principles and guidelines set forth by the IFC. Test data of like systems are analyzed and applied toward similar applications that do not exactly meet the criteria of a current UL Listed System.

If the systems listed in this guide do not accommodate a particular application, please photocopy, complete, and submit the form(s) [on the following page] to request an Engineering Judgment. Once received, the information will be evaluated and an Engineering Judgment will be created, if possible.

Completed form(s) can be faxed to 918-254-1679.

Additional forms can be requested by calling 1-800-363-4458 or by visiting www.hilti.ca/firestop.





Custom Firestop Detail Request

☐ **TP** Through Penetration OR ☐ **J** Joint

Date submitted (MM/DD/YY)

Initiator's Name

DDAATT or Phone

Fax

Project Name

Contractor

Contact

Phone

Fax

TP Through Penetration

1. Type and thickness of wall or floor penetrated:

2. Type and size of penetrating item(s):

3. Size and shape of opening:

If sleeved, specify type and size:

4. Annular space (min. and max.):

5. Fire rating (hrs.):

J Joint

1. Type and thickness of wall or curtain wall

(include stud size for gyp):

2. Type and thickness of floor or floor/ceiling assembly (include
flute size):

3. Orientation of wall to floor/ceiling assembly (check one):

☐ Perpendicular ☐ Parallel

4. Type of joint system (check one):

☐ Floor-to-floor ☐ Floor-to-wall ☐ Top-of-wall
☐ Wall-to-wall ☐ Curtain wall

5. Maximum width of joint:

6. Fire rating (hrs.):

Comments (state product preference):

**Fax completed form to Hilti Fire Protection Engineering Team
for processing : 918-254-1679**

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Hilti (Canada) Corp. 1-800-363-4458 • www.hilti.ca • Hilti Firestop Systems Guide — Canada

Firestop Specialty Contractor Program

Through the **Firestop Specialty Contractor Program**, Hilti trains professional contractors in fire protection systems installation procedures of Hilti products that meet all current standards and codes. For Architects and Specifiers this is great news. By using a Hilti Accredited Firestop Specialty Contractor (HAFSC) you get factory-trained professionals who are knowledgeable about firestopping methods and quality installations.

Selecting a HAFSC has the following benefits:

- Allows tradespeople to focus on their area of expertise, leaving passive firestopping to fire protection specialists
- Provide single contractor accountability for all firestop applications
- Promote hassle-free inspection by officials who know and trust professional firestop installers
- Increase your confidence that all firestopping is completed correctly the first time

* Hilti Accredited Firestop Specialty Contractors are independent companies who have had employees participate in the Hilti firestop training program.

A **Hilti Accredited Firestop Specialty Contractor (HAFSC)** is an independent professional firestop installer who has been provided specialized training by Hilti; and who has committed to provide building owners, general contractors, and subcontractors with a full service solution for all their firestopping needs. When you choose to use a Hilti Accredited FSC, you are selecting a **trained firestop installation specialist** committed to applying proven Hilti firestopping technology and innovation in your building to minimize the risk of loss due to fire, smoke, and toxic gases.

Hilti Accredited FSCs use Hilti firestop products, which eliminates the confusion caused by numerous subcontractors installing different firestop products on the same job. This also provides continuity throughout the job, which helps **reduce your liability exposure**. Their professional expertise in installing the appropriate Hilti firestop system can provide significant savings potential in time and cost to the general contractor and building owner.

During firestop inspections, Hilti Accredited FSCs can offer documented, step-by-step accountability. Their firestop expertise helps assure building officials that the proper installation techniques have been applied and that all installed systems **comply with local and national codes**.

www.hiltifsc.com

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Terms and Conditions of Sale (Canada)

Payment Terms:	Net 30 days from date of invoice. Customer agrees to pay all costs incurred by Hilti in collecting any delinquent amounts, if any, including reasonable attorney's fees.
Freight:	Sales are F.O.B. Destination Point with transportation allowed via Hilti designated mode. Additional charges may apply for expedited delivery, special handling requirements, and orders under certain dollar limits. Fuel surcharges may apply depending on market conditions.
Credit:	All orders sold on credit are subject to Credit Department approval, and Customer agreement to these Terms and Conditions of Sale.
Return Policy:	Products must be in saleable condition to qualify for return. Saleable condition is defined as unused items in original undamaged packaging and unbroken quantities and in as-new condition. All returns are subject to Hilti inspection and acceptance, and a \$150 restocking charge if returned more than 90 days after invoice date. Proof of purchase is required for all returned materials.
Ineligible Returns:	Special order products and discontinued items are not eligible for return or credit. Dated materials are only returnable in case quantity and within 14 days after invoice date. In no event shall any product be returnable or qualify for credit after 1 year from invoice date.
Warranty:	<p>Hilti warrants that for a period of 12 months from the date it sells a product it will, at its sole option and discretion, refund the purchase price, repair, or replace such product if it contains a defect in material or workmanship. Absence of Hilti's receipt of notification of any such defect within this 12-month period shall constitute a waiver of all claims with regard to such product.</p> <p>THE FOREGOING WARRANTY IS IN LIEU OF AND CUSTOMER WAIVES ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND THE SALE OF GOODS ACT AND ANY SIMILAR STATUTE OF ANY PROVINCE.</p>
Title to Product:	Title to product remains with Hilti until the total invoiced price of product is paid.
Prices:	Customer agrees to Pay Hilti the prices set out on Hilti's invoice. Customer agrees to pay taxes as indicated on the invoice unless Customer provides acceptable exemption certificates.
Indemnification:	Customer agrees to use product at its own risk and to indemnify Hilti against all liabilities, including legal fees, to third parties arising out of the use, inability to use, or possession thereof. Hilti shall in no event be liable for special, incidental, consequential, or any other damages, regardless of fault.
Changes:	Only Hilti legal department personnel are authorized to modify these Terms and Conditions of Sale or modify credit terms. Terms are subject to change by Hilti without notice.
Cash Sales:	Payment in full is due prior to goods being released.
Quotations:	These Terms and Conditions of Sale apply once Customer agrees to purchase product. Quotations on special promotion products are only valid until end of promotion period. Quotations are based on purchasing all items listed — pricing for individual products may vary for purchases of different quantities or item combinations.
Convert check to ETF:	When Customer provides a check as payment, it authorizes Hilti to use information from its check to make a one-time electronic fund transfer from Customer's checking account or to process the payment as a check transaction. When Hilti uses information from the check to make an electronic fund transfer, funds may be withdrawn from Customer's account as soon as the same day Hilti receives the check and Customer will not receive its check back from the financial institution.

Through-Penetration

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C-AJ-2035	86	C-AJ-8143	136	F-A-5017	186	F-C-5065	234	W-J-6003	282	W-L-5028	334
C-AJ-2036	88	C-AJ-8166	139	F-A-5018	187	F-C-5066	235	W-J-8007	283	W-L-5029	335
C-AJ-2042	89	C-AJ-8177	140	F-A-5019	188	F-C-7013	236	W-J-8017	285	W-L-5096	336
C-AJ-2053	90	C-BJ-5015	143	F-A-5021	189	F-C-7025	237	W-L-0003	288	W-L-5144	337
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In Canada:

Hilti (Canada) Corporation
2360 Meadowpine Blvd.
Mississauga, Ontario, L5N 6S2
Customer Service: 1-800-363-4458
Fax: 1-800-363-4459

www.hilti.ca

In the US:

P.O. Box 21148 Tulsa, OK 74121
Customer Service: 1-800-879-8000
en español: 1-800-879-5000
Fax: 1-800-879-7000

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