Open Path Devices
Latex Intumescent Firestop Sealants

Fouad Hajj

Regional Manager (GCC & South Asia)

Specified Technologies Inc. (STI)

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Firestop Contractors International Association

FCIA Virtual 'DIIM' Firestop & Effective Compartmentation in Existing Buildings Symposium Middle East

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Today we will cover…

1. Open Path Devices
   - Product Description
   - UL system documentation
   - Installation & Repair Instructions
   - Advantages & Disadvantages / Limitation of use
   - Acceptable / not acceptable installation.

2. Latex Intumescent Firestop Sealant
   - Product Description
   - UL system documentation
   - Installation & Repair Instructions
   - Advantages & Disadvantages / Limitation of use
   - Acceptable / not acceptable installation.

3. Q&A

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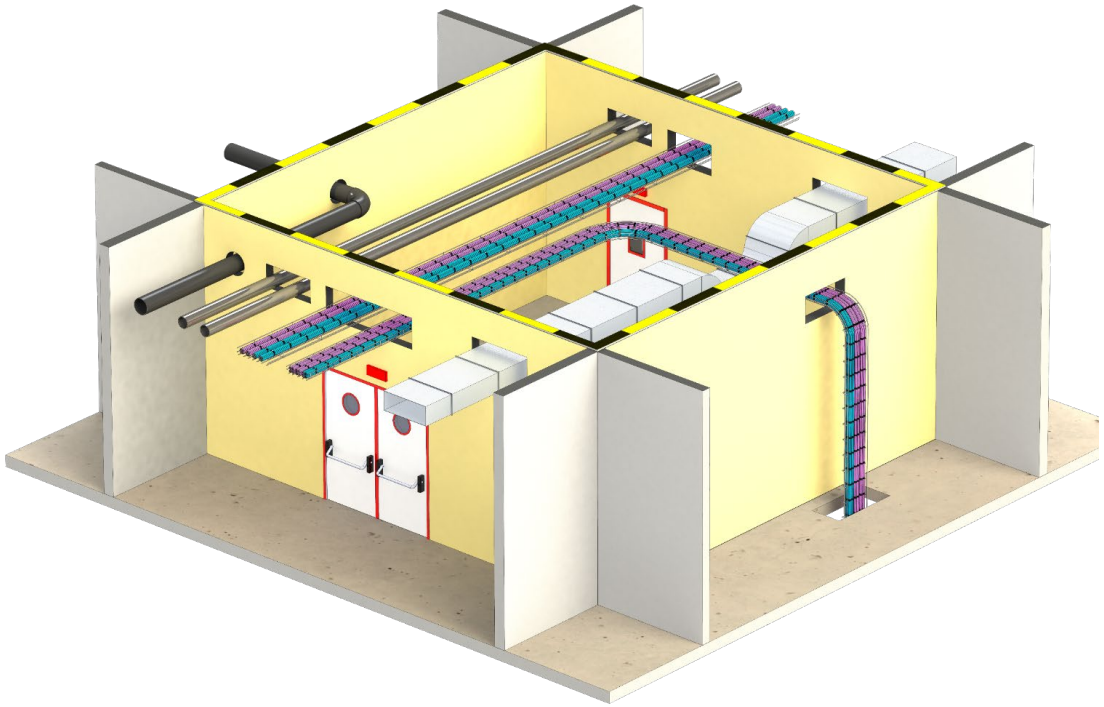
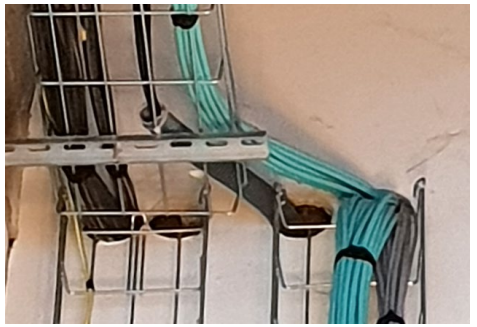
CONTAINMENT

PASSIVE FIRE PROTECTION

Openings are created in fire rated walls and floors to accomodate for cables, pipes, air ducts,……





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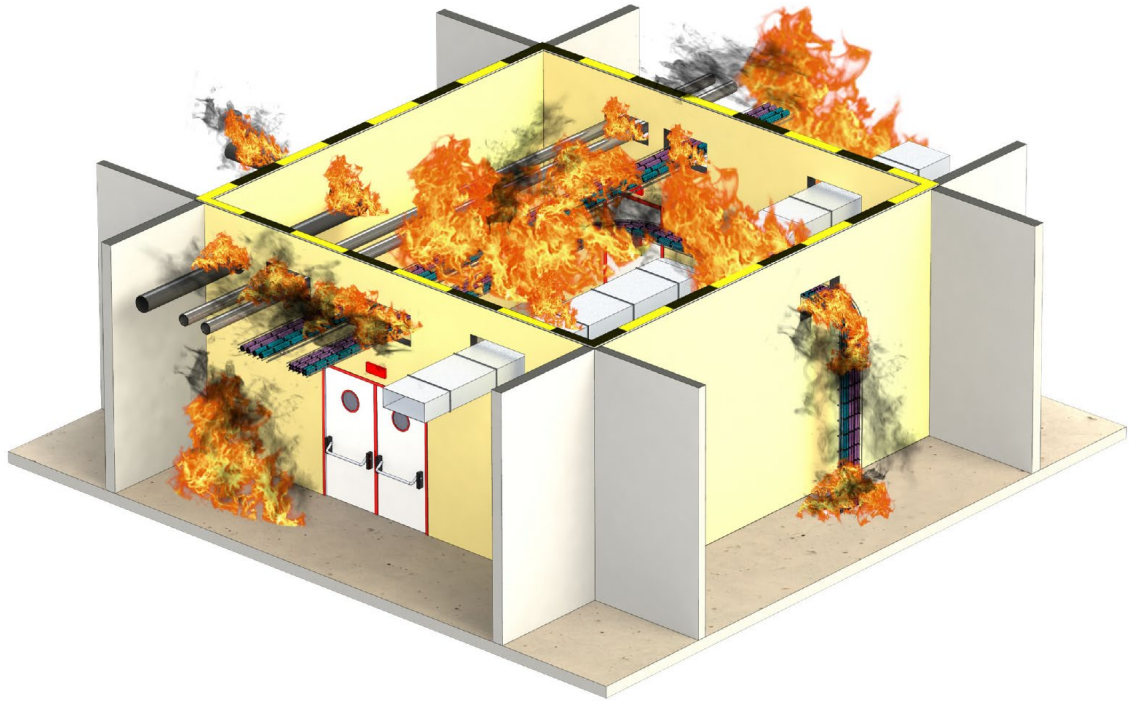
PASSIVE FIRE PROTECTION

Smokes and flames spread through the openings.

Passive Fire Protection is not provided anymore



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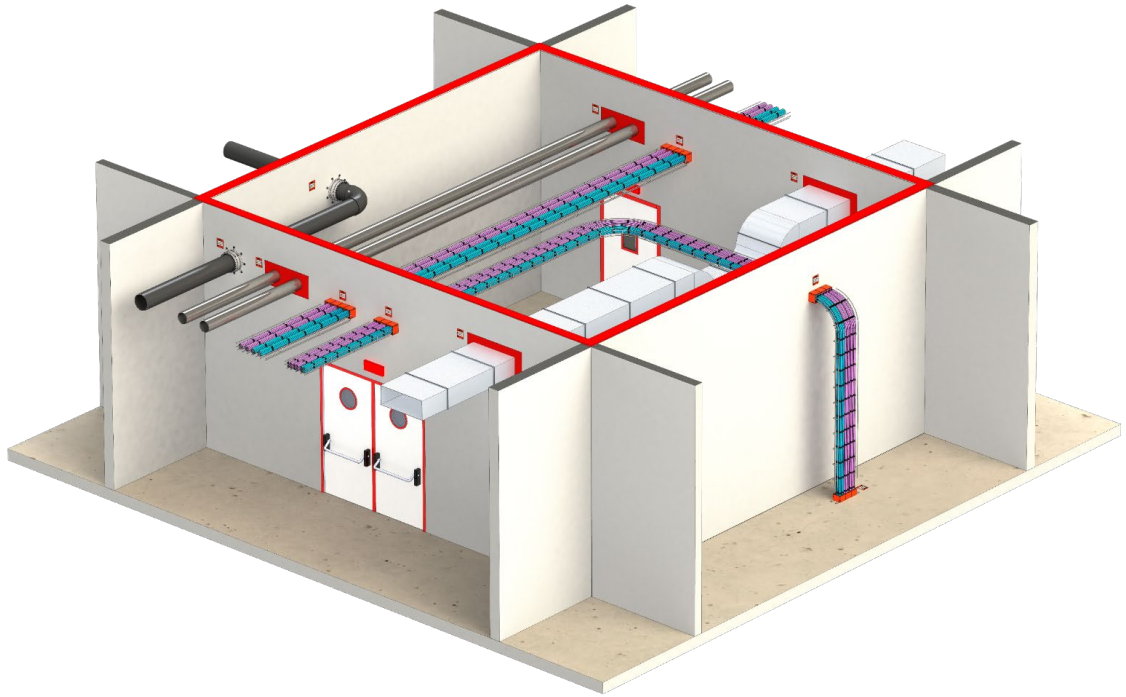
PASSIVE FIRE PROTECTION

How to restore the fire resistance ?

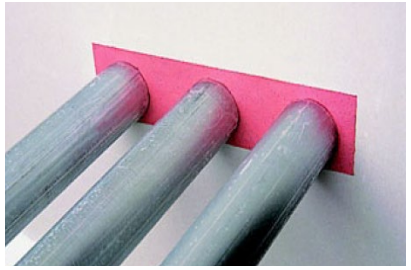
Firestop systems are installed to restore the fire protection of fire rated walls and floors

Firestop systems = Penetration Seals



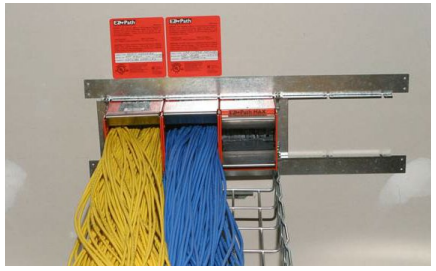
Plastic pipe

(firestop collar)



Metalic pipe

(firestop sealant)



Cables

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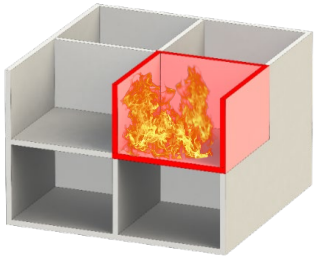
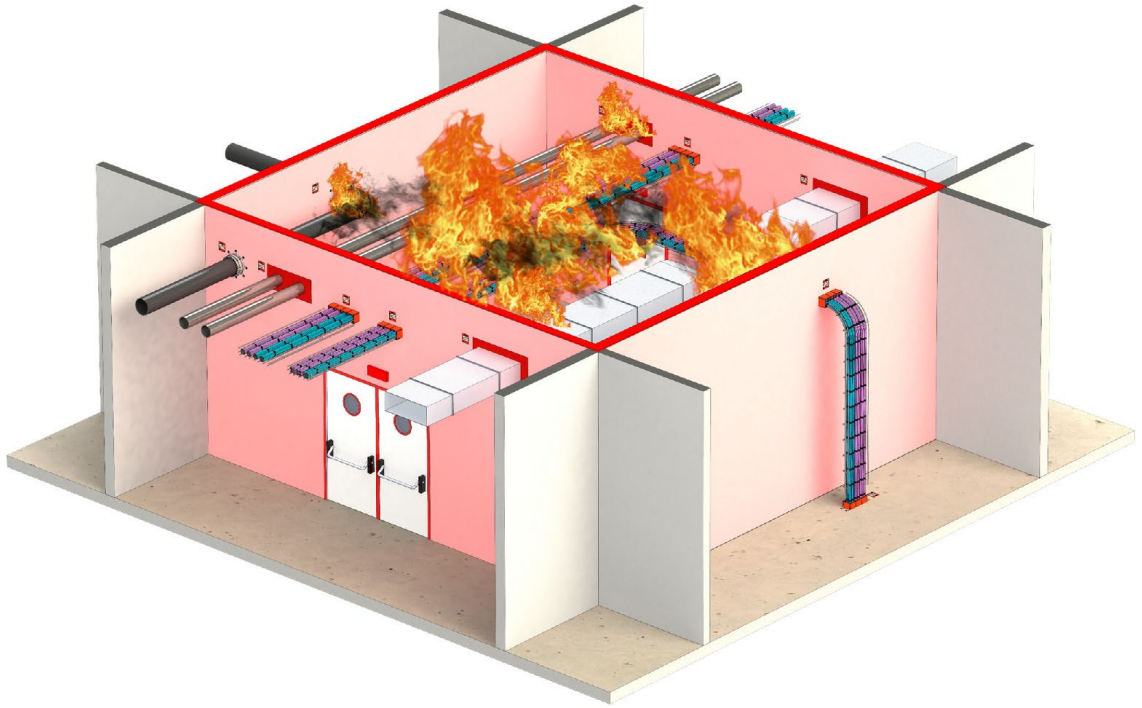
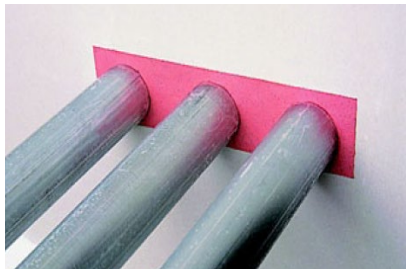
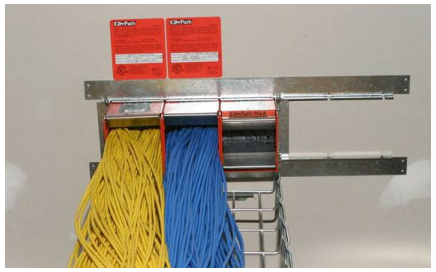
PASSIVE FIRE PROTECTION

The firestop solutions have restored the fire resistance of the fire rated walls and floors. The fire did not spread to other rooms.









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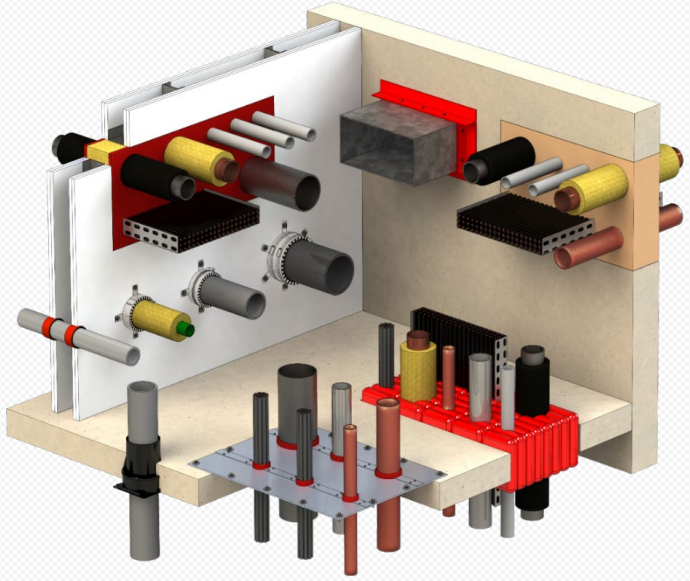
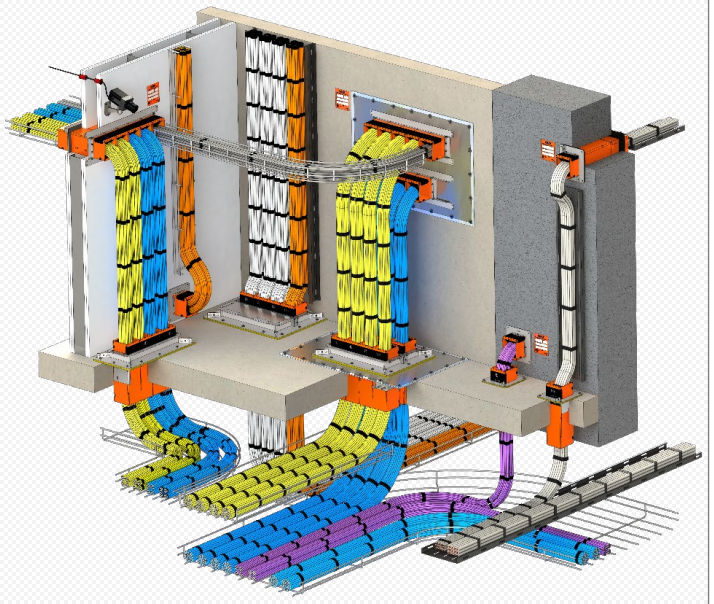
PASSIVE FIRE PROTECTION

Metallic pipes, plastic pipes, cables and air ducts….

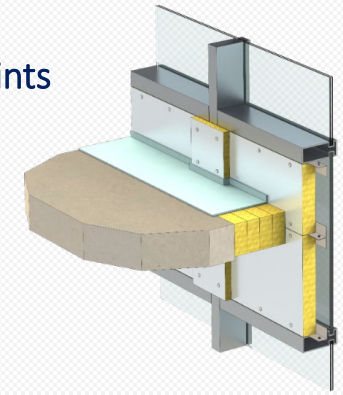


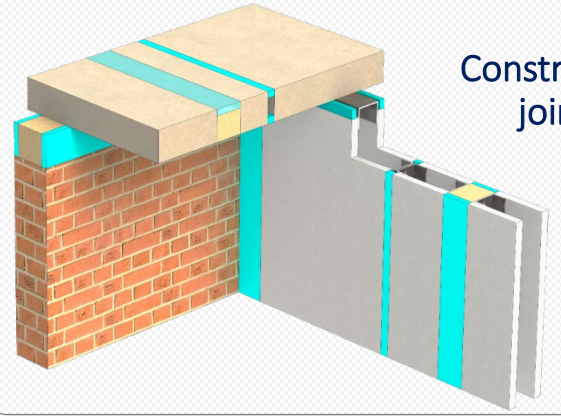
Cables



EZ Path®

Curtain wall joints





Construction joints

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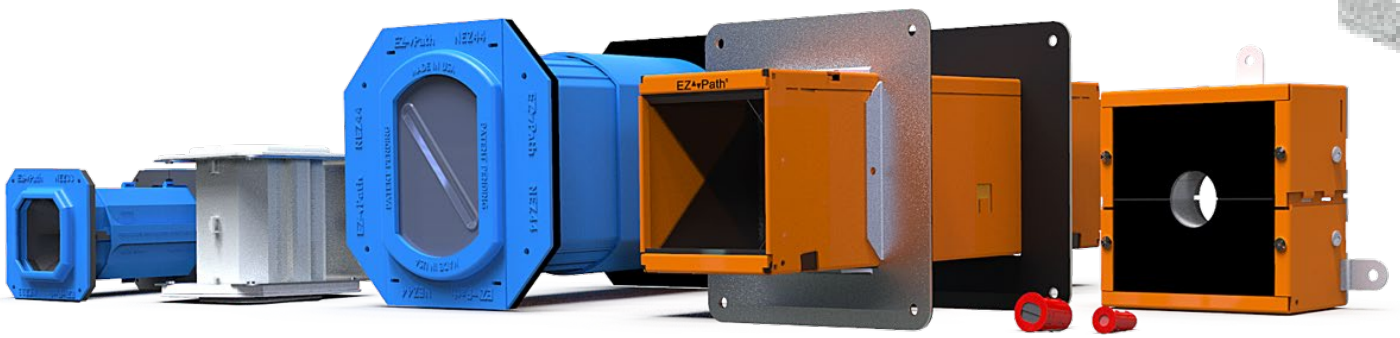
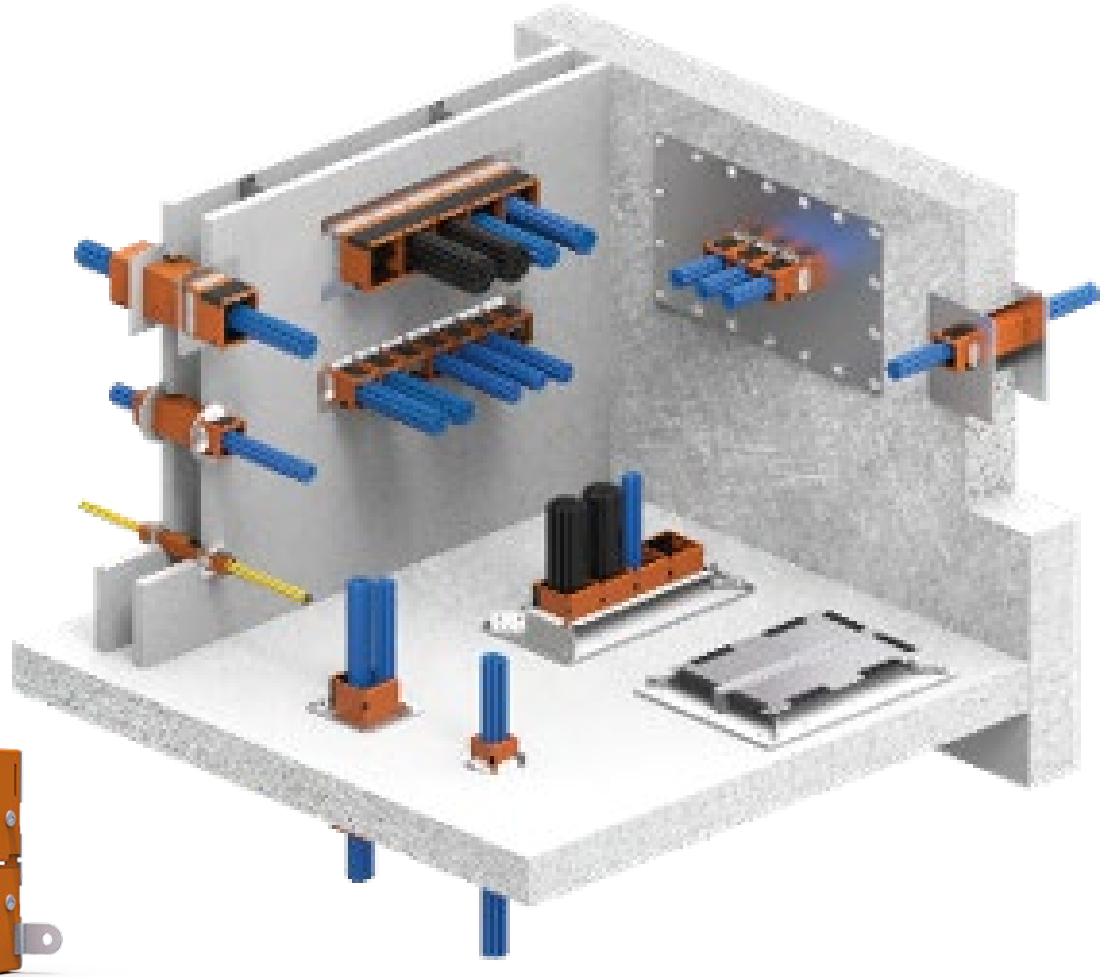
Data Communications

- High Traffic Openings





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Data communications firestop materials

- Sealants
- Putty
- Pillows
- Retrofit Devices
- Cable Devices

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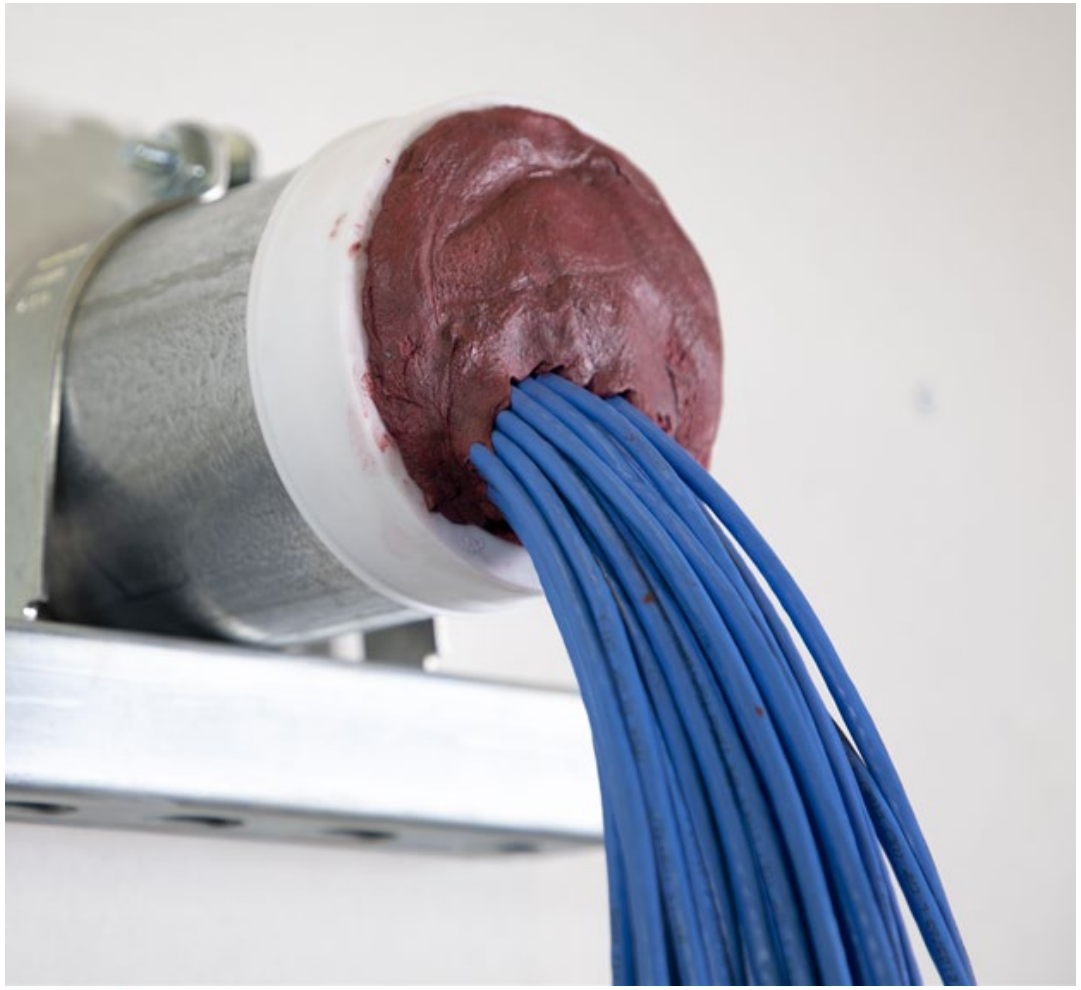
Traditional: Cables and sleeve with putty



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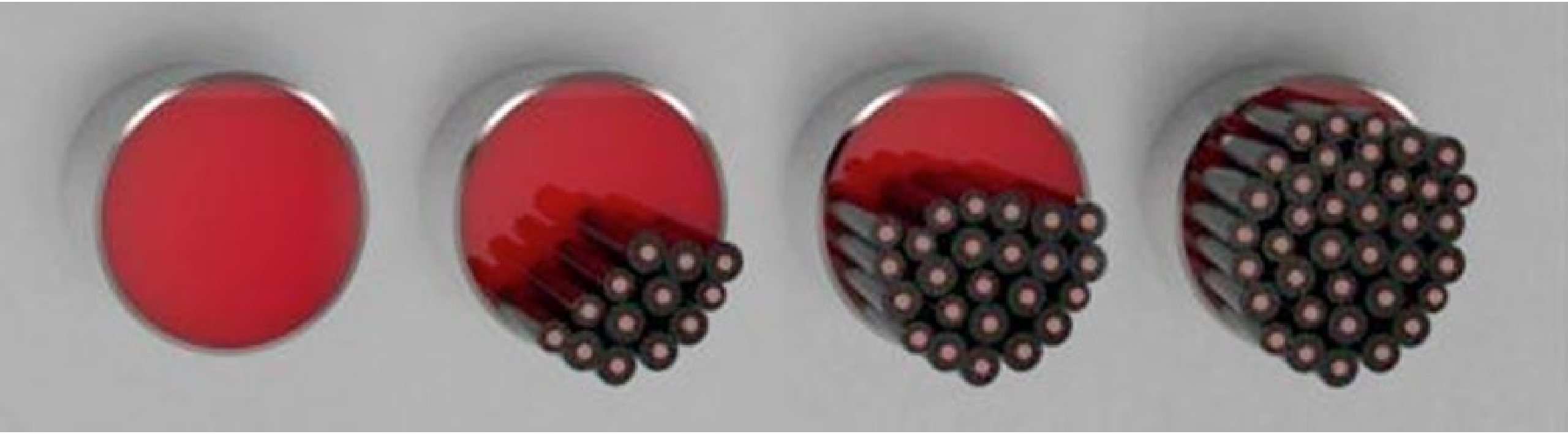
Life-cycle of a typical sleeve



Over time sleeves become overfilled

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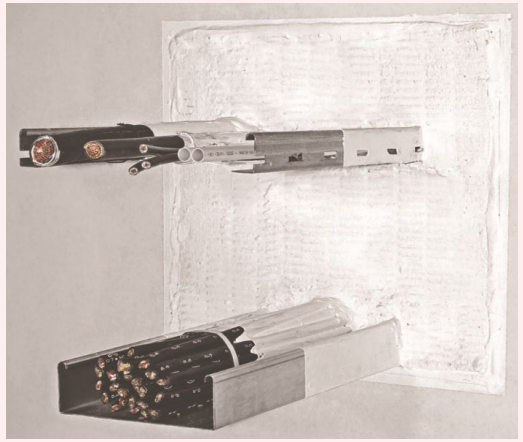
Coated Mineral Wool Batt



Mortar

Pillows

Foam

Bricks

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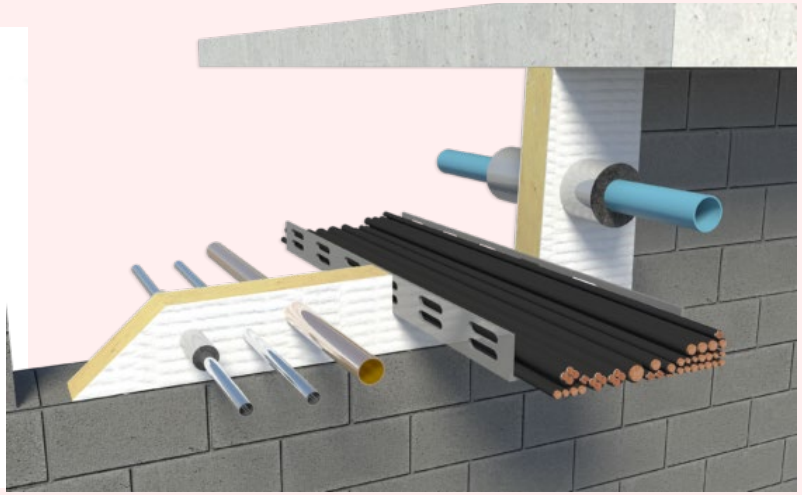
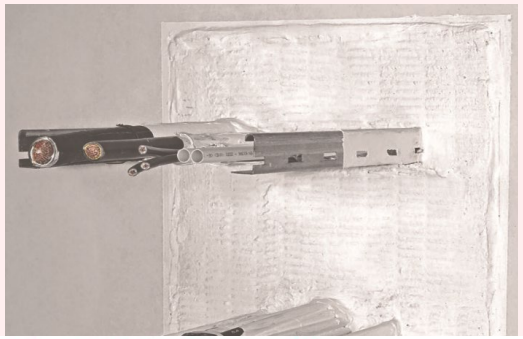
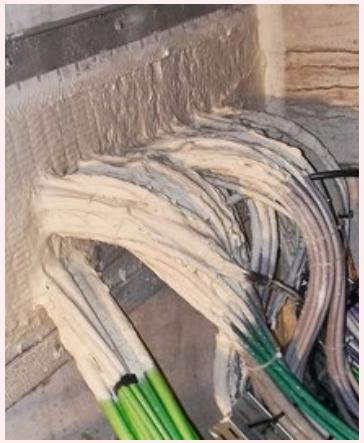
Coated Mineral Wool Batts







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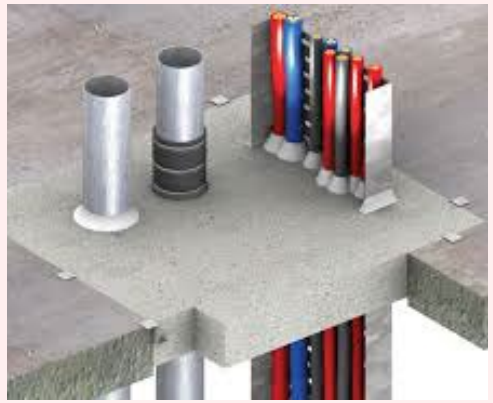
Mortar

Electric power to be shut down



Foam

Bricks

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Risk of damaging

Cables during the changes

No Flexibility

Cables are glued together

Non-Compliance Risk

after cable changes

Installation Method

Shall be implemented by an firestop exper

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Pillows

- Temporary Solution
- Quantity calculation
- Sealant or putty required
- Air Leakage

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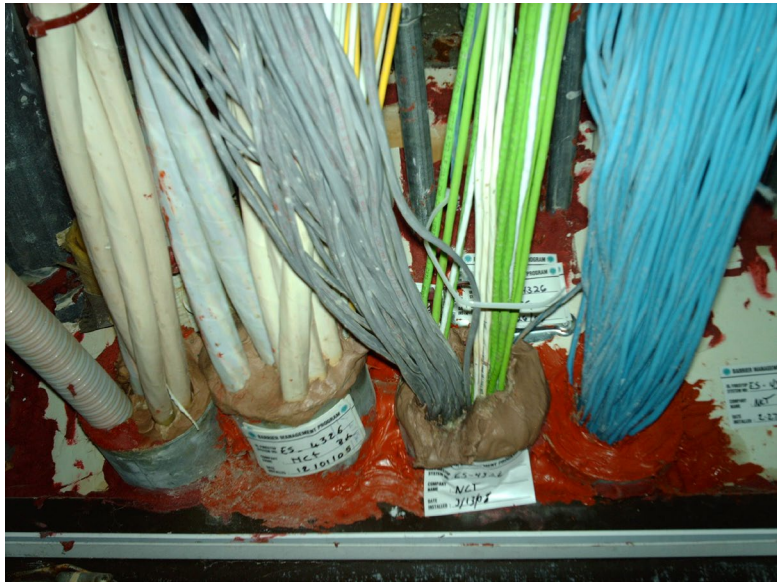
Challenge:



How do we get from here…

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…to manageable compliance?

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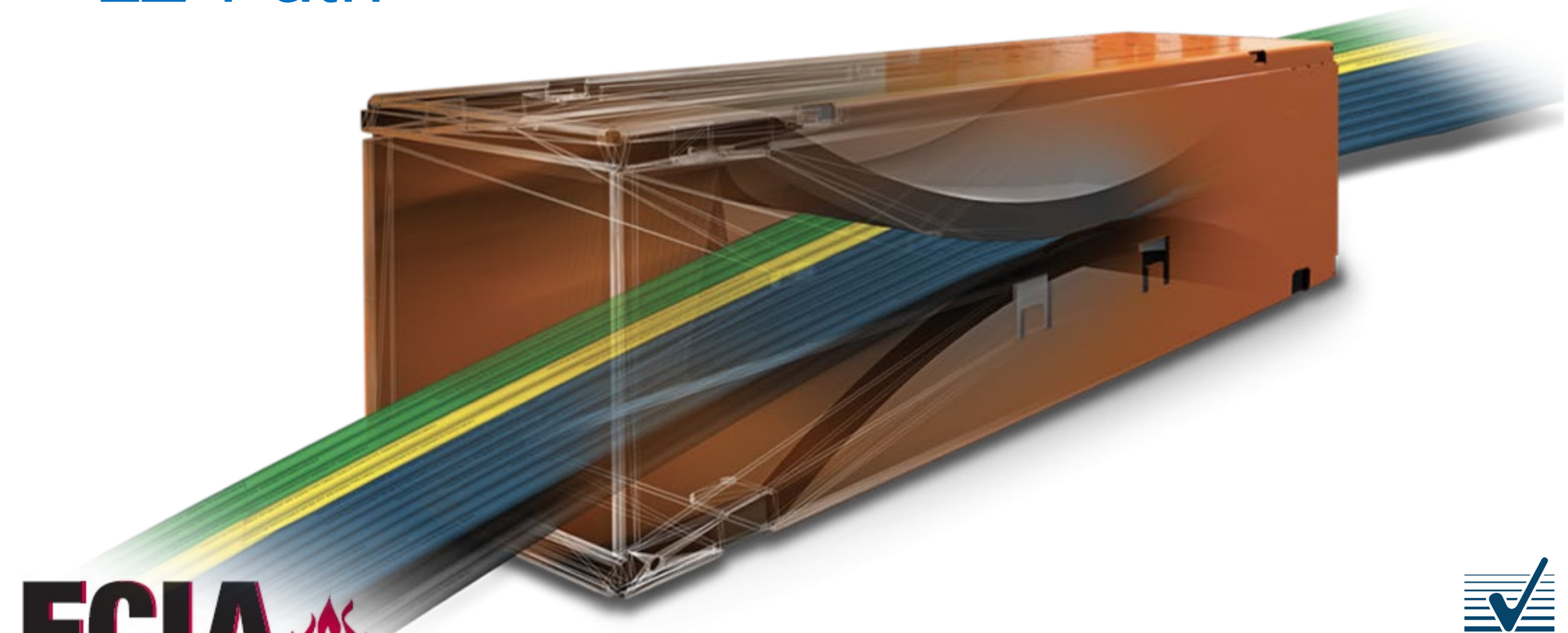
EZ-Path



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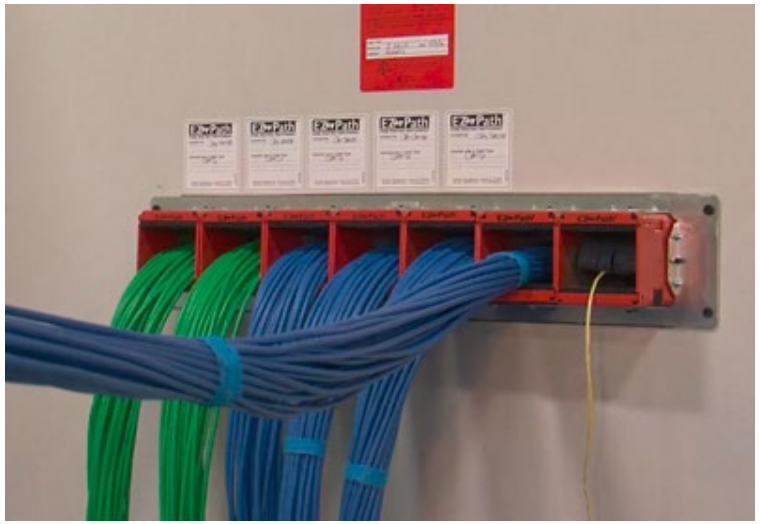
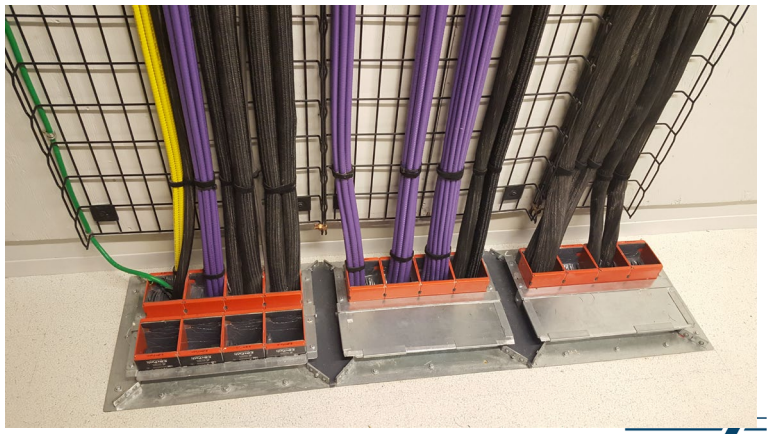
Cable Management

EZ-Path Fire-Rated Pathway

- Internal self-sealing mechanism
- Automatically adjusts to the cable load
- Maintenance-Free
- Manage cable moves, adds & changes
- UL's Evaluation Report
    - 100% code compliant / 100% of the time





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HILTI

Abesco / 3M

Roxtec

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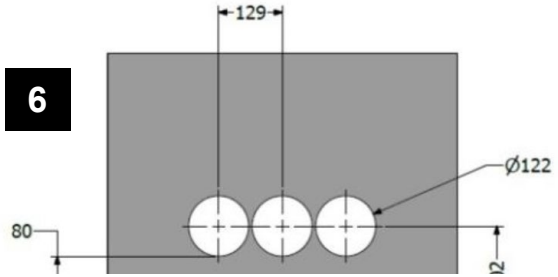

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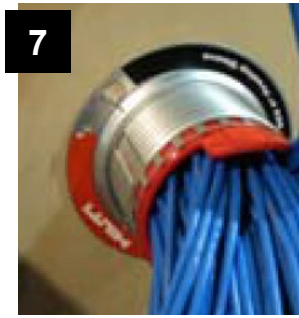

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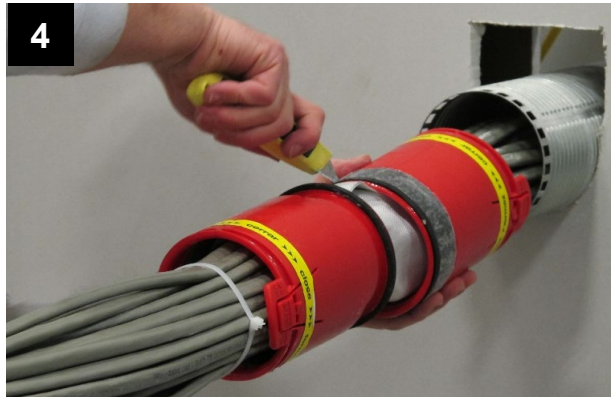

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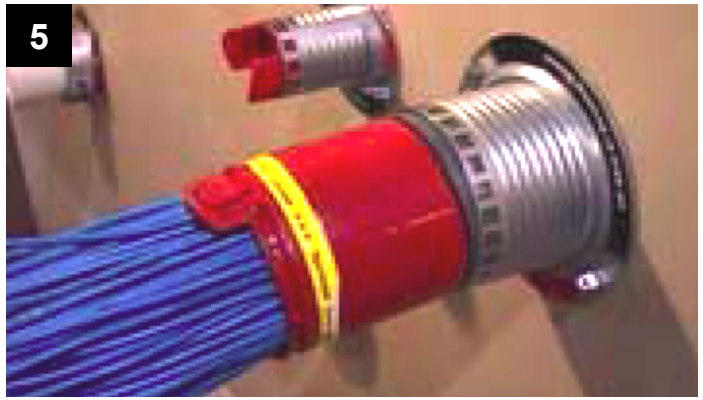

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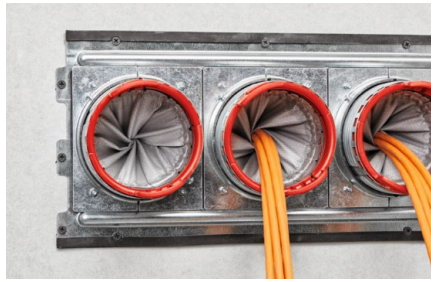

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abesco fire

3M

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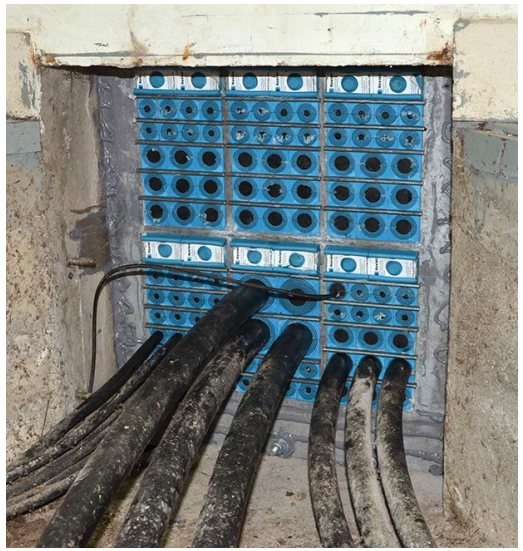
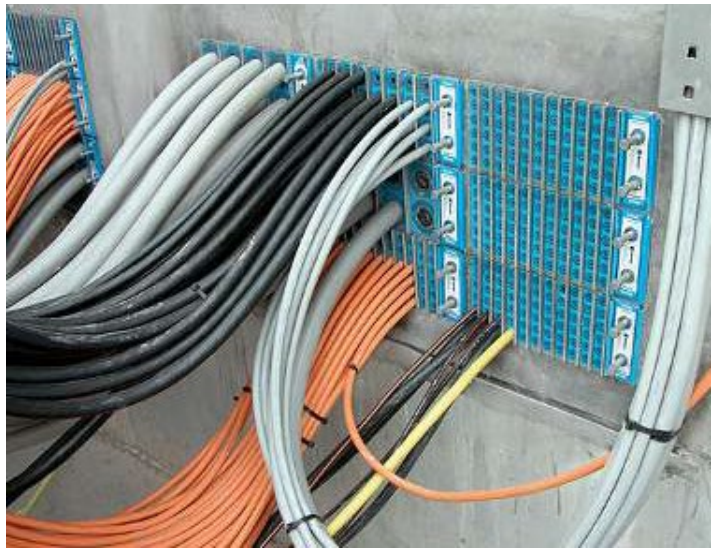
Roxtec





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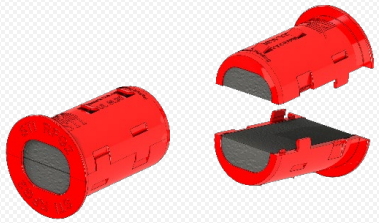
EZ-Firestop®

350 705

GROMMET RFG2



EZ-Path®

250 018

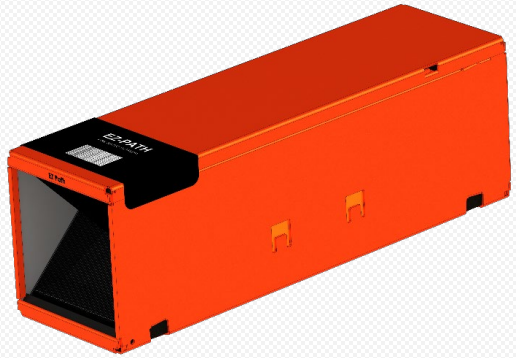
EZD33T Fire-Rated device 33

+ plate kits

EZ-Path®

250 058

EZD44T Fire-Rated device 44+



+ plate kits

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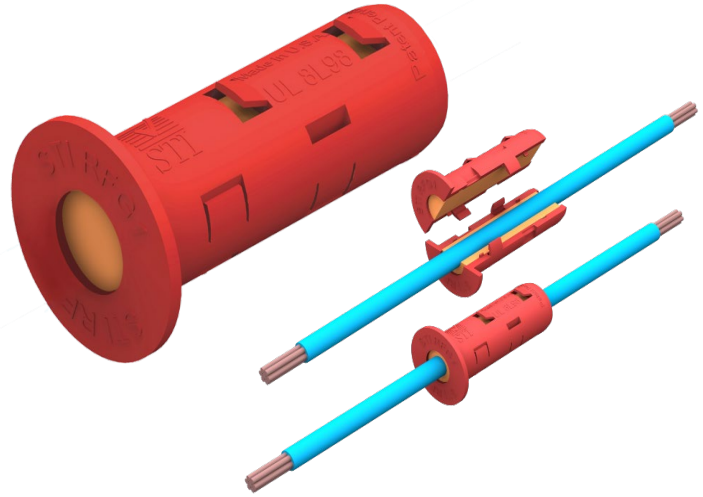
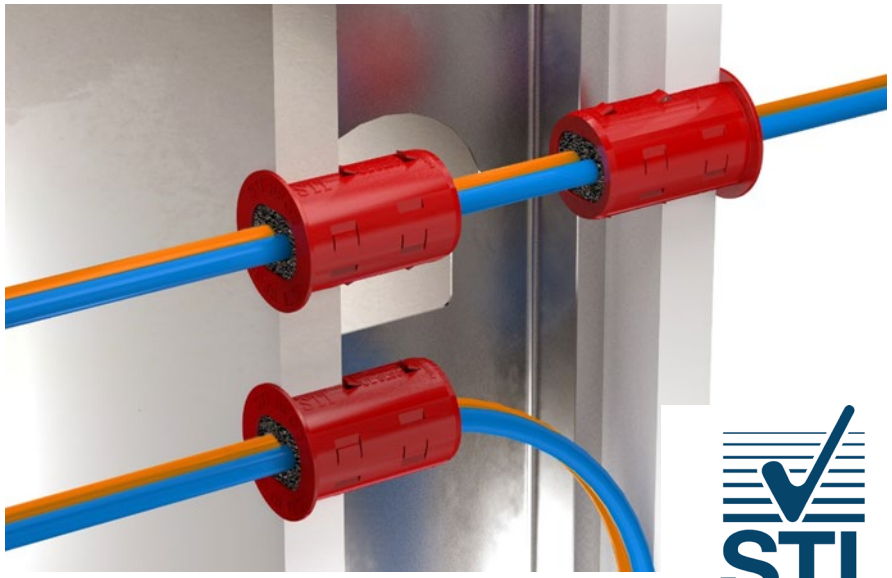
Fire-Rated Cable Grommet

- For single or dual cable penetrations in fire-rated drywall
- Two-piece snap-together firestop device
- Cables up to 0.500” dia.
- Membrane or through penetrations





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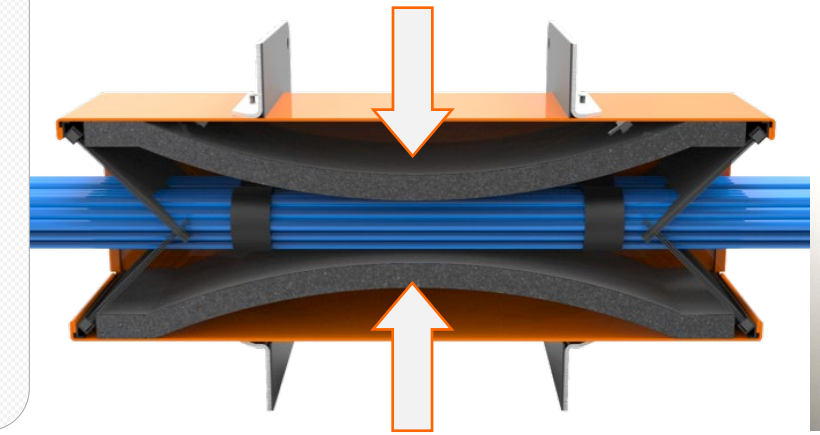
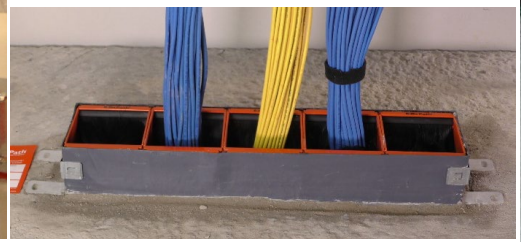
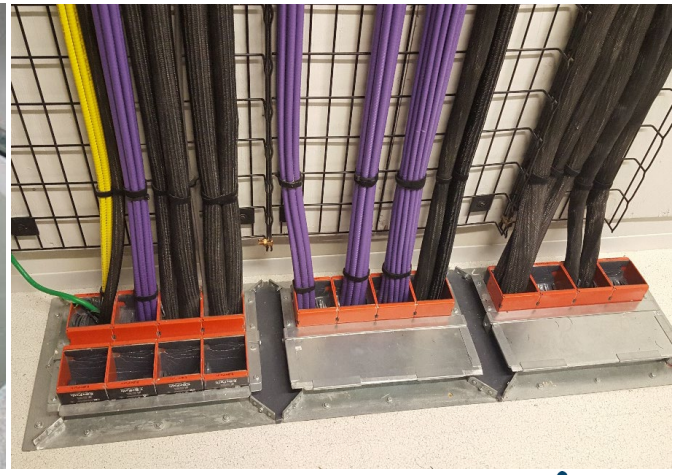
EZ-PATH® HAD BEEN SPECIALLY DESIGNED FOR THE CABLE MANAGEMENT

NO ACTION IS REQUIRED ON EZ-PATH® DURING CABLE CHANGES







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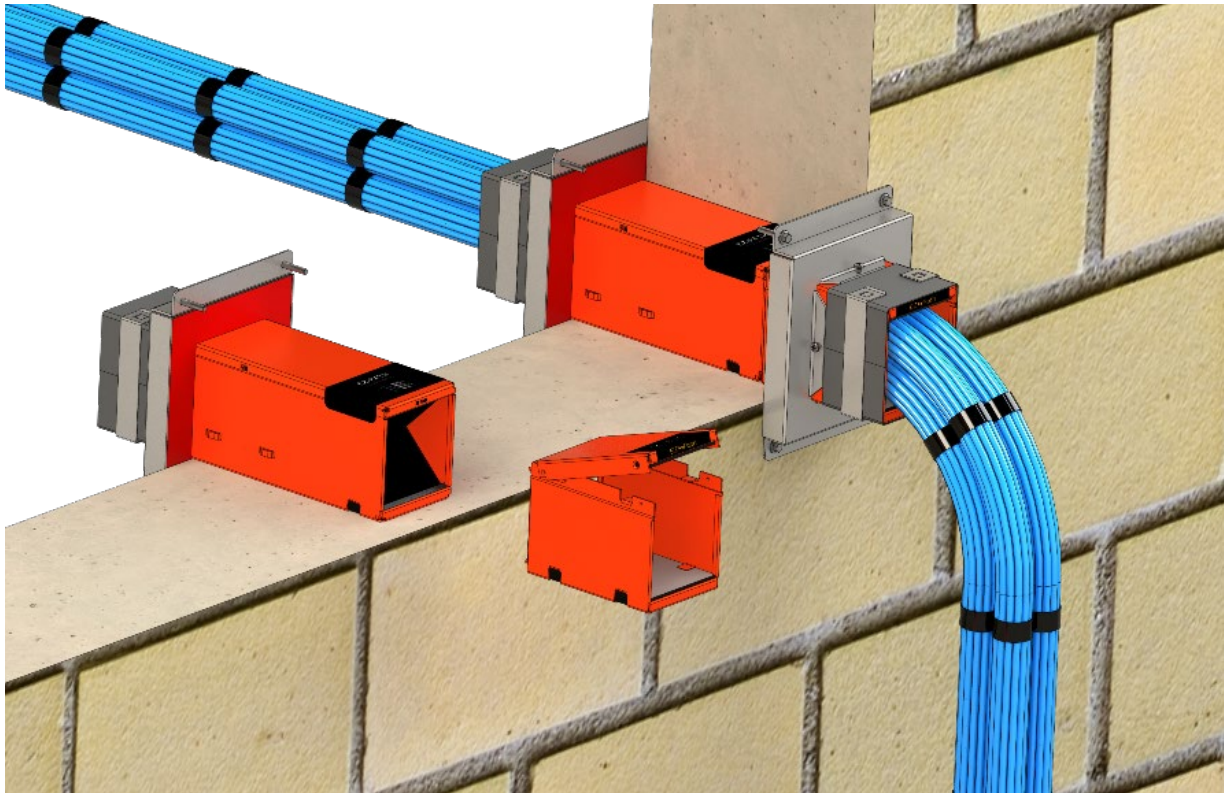

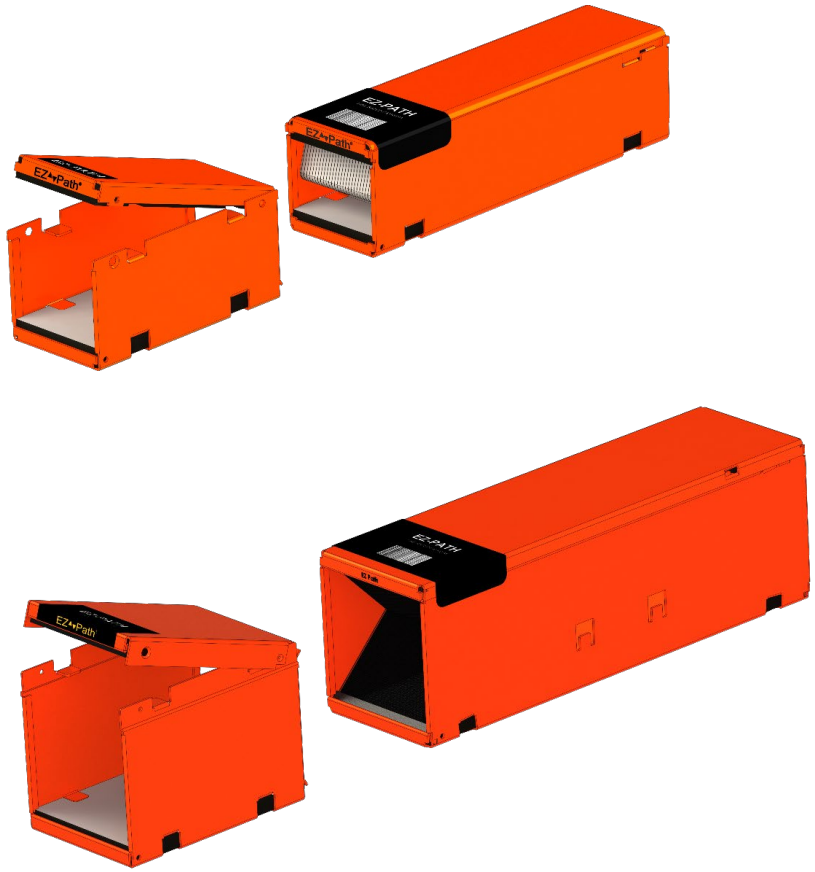

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Installing EZ-Path Retrofit Device

EZ-Path® RETROFIT DEVICE

instant compliance FOR OVERFILLED SLEEVES

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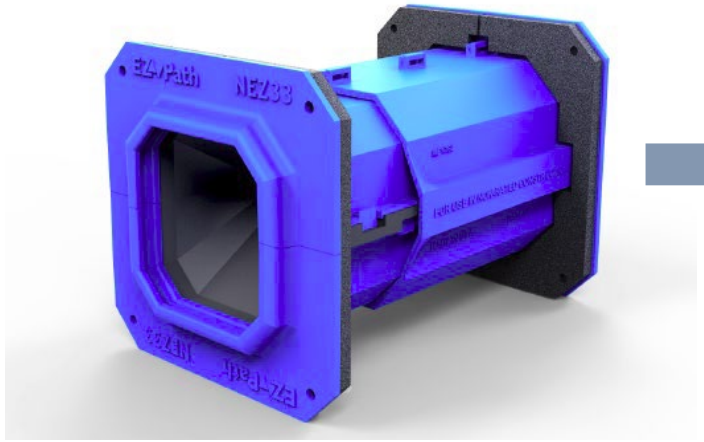
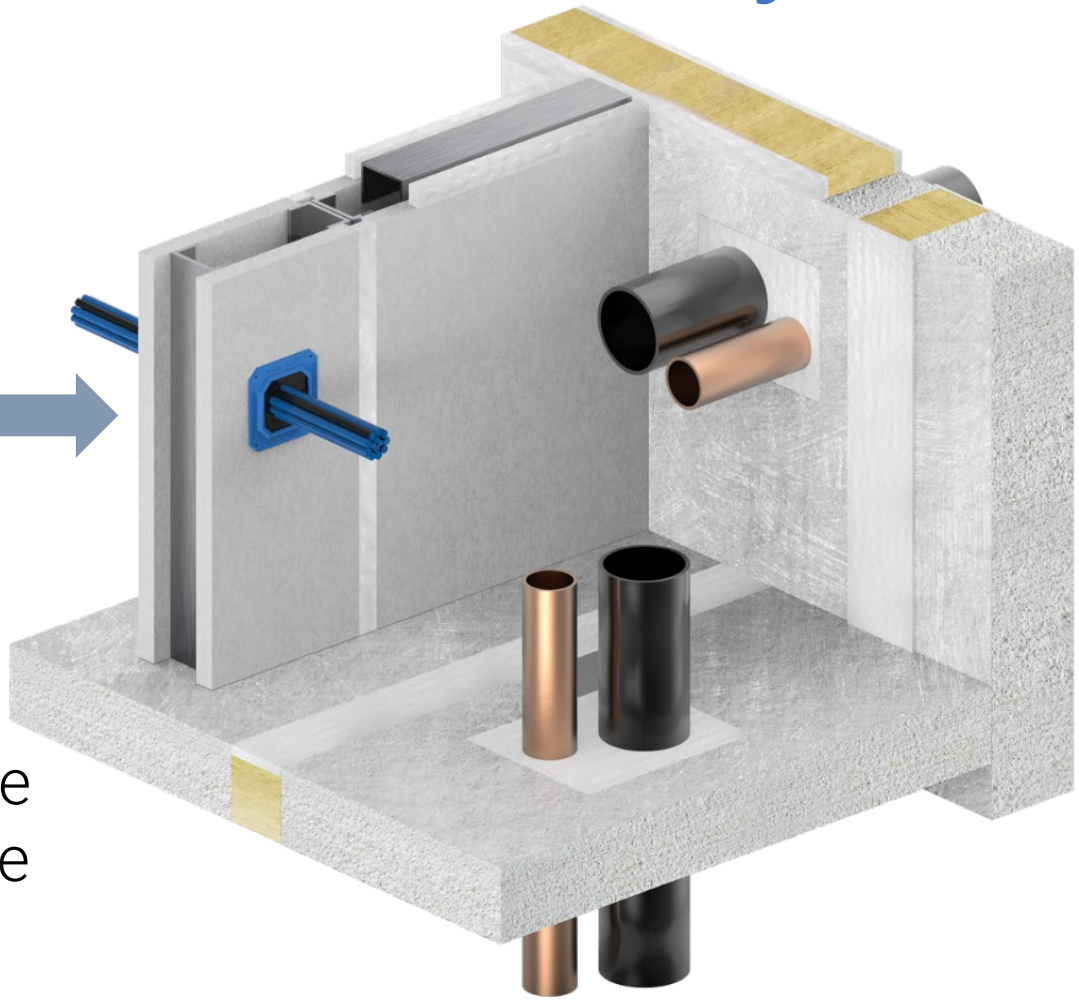
Smoke & Acoustical Pathway





Proven smoke & sound resistance where frequent cable changes are anticipated

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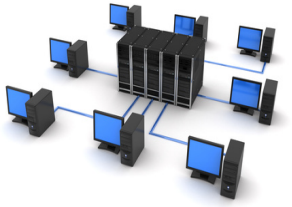
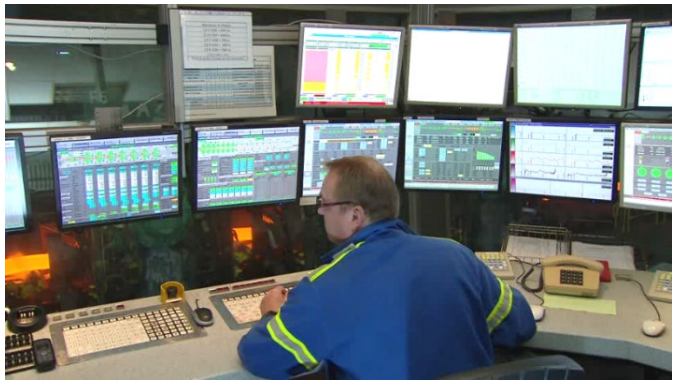


CABLE MANAGEMENT REQUIREMENTS



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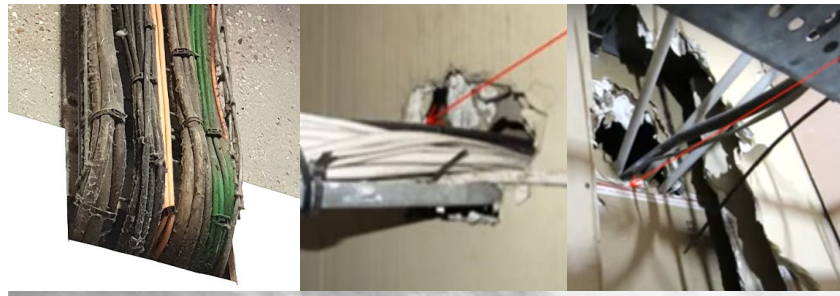
COSTS AND RISKS

- **Initial cost** of the firestop product
- **Initial cost** of the firestop installation

- Additional costs for the maintenance
- Risk of non-compliance of the firestop
- Risk of damaging the cables
- Risk of network failure



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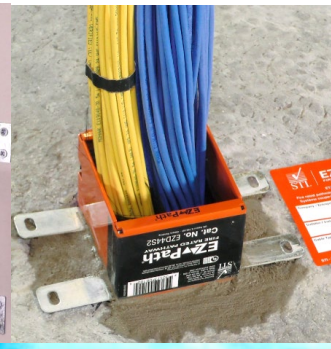
INITIAL COSTS

- Product cost
- Installation cost



COÛTS SUPPLÉMENTAIRES ET RISQUES

NO ADDITIOPNAL COSTS OR RISKS TO EXPECT

- Coût de maintenance et des produits
- Risque de mauvaise manipulation

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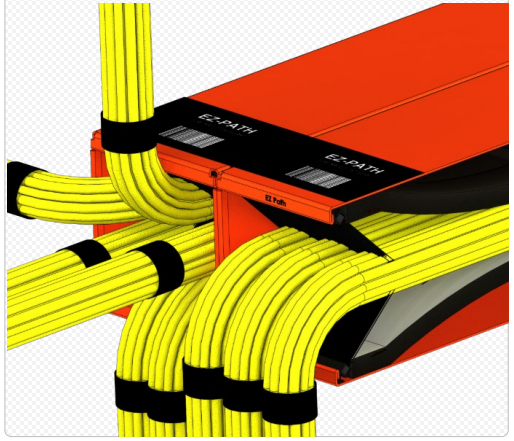
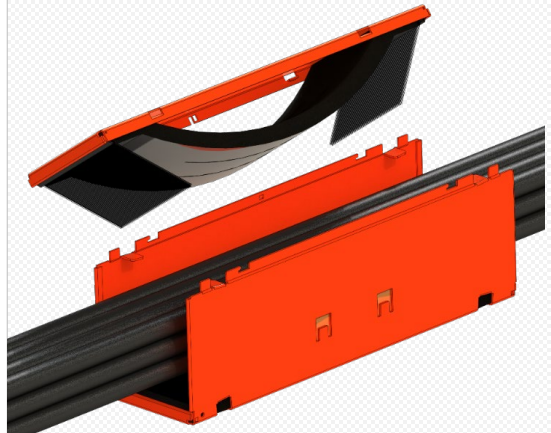
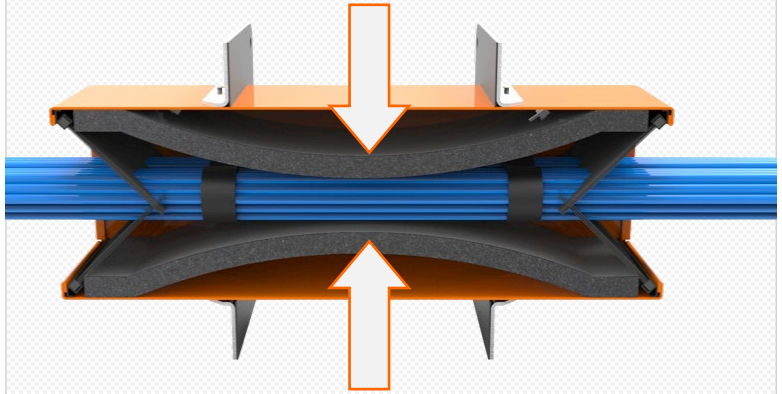
NO SHARP EDGE



FOR EXISTING CABLES

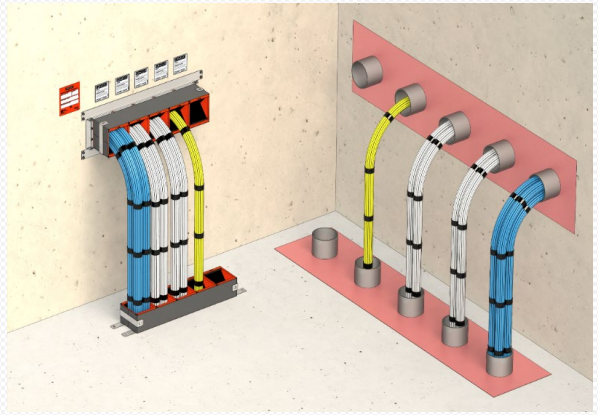


AUTOMATICALLY ADAPT TO CABLE CHANGES

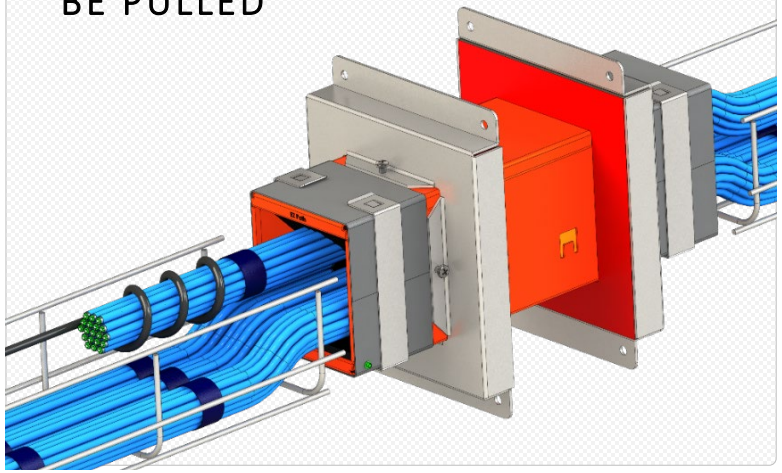


CONNECTION TO EARTH

SAVING FLOOR SURFACE



CABLES CAN BE PULLED



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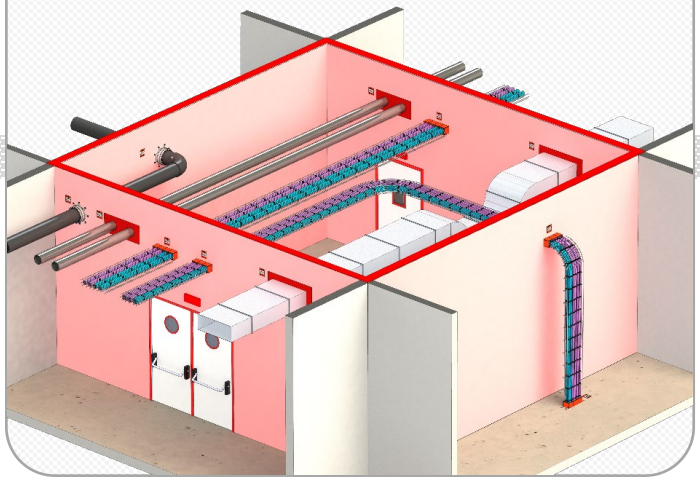
EZ-Path® ensures

NETWORK INTEGRITY

RETURN ON INVESTMENT

Only initial costs

FIRE SAFETY



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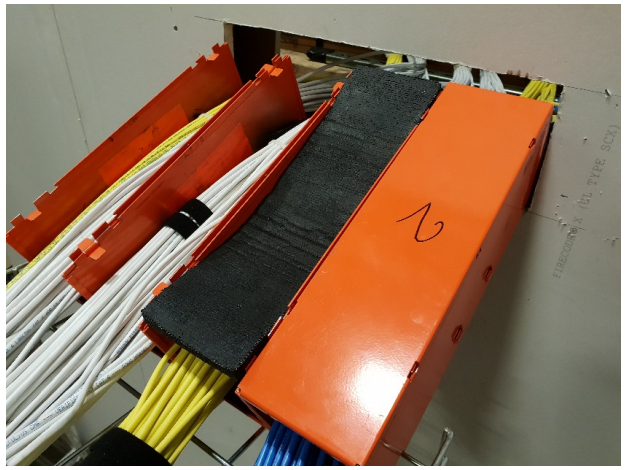
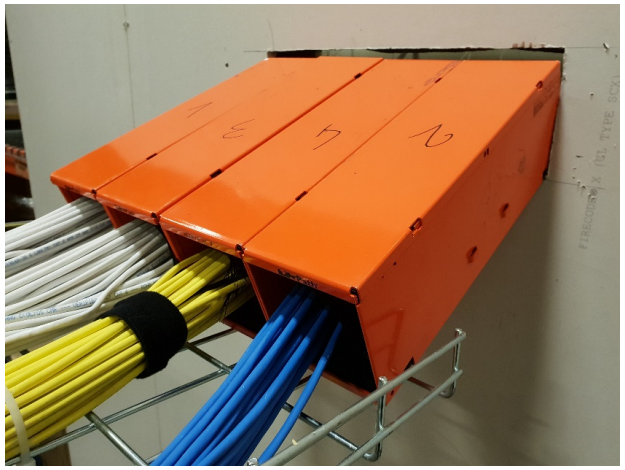
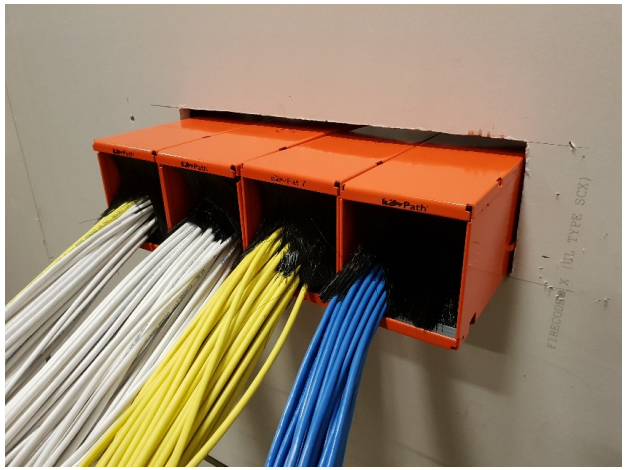
EZ-Path can be open for existing construction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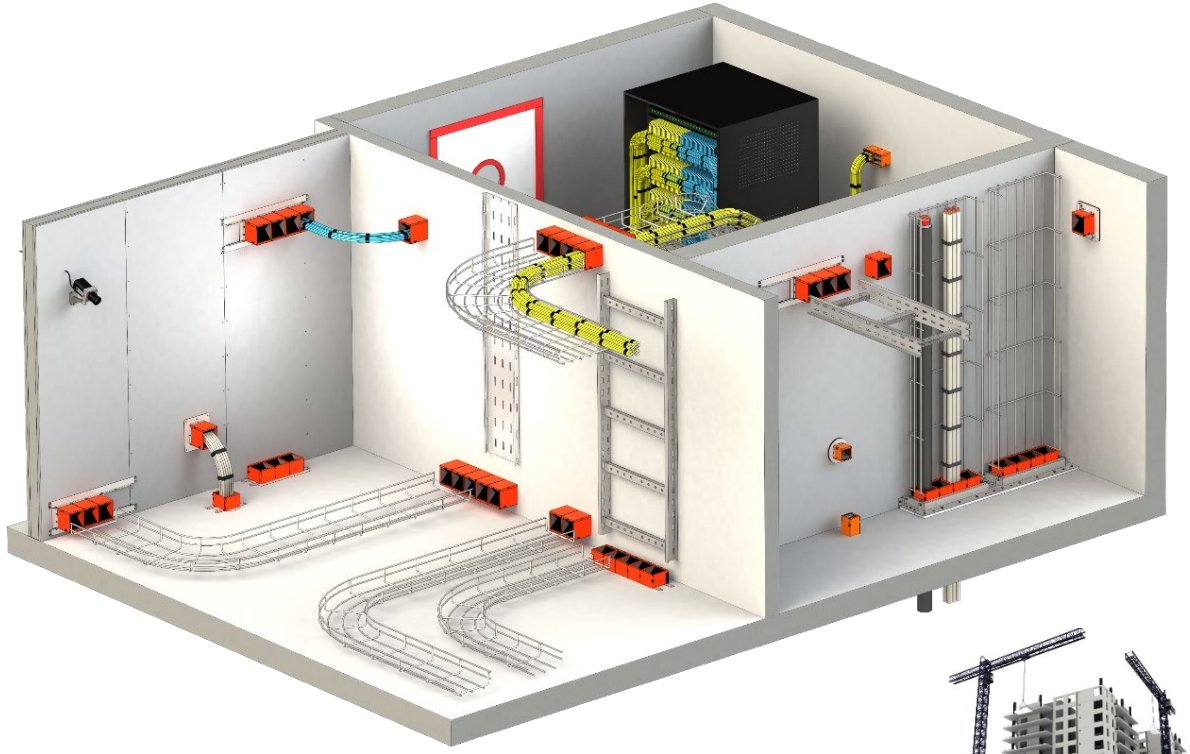
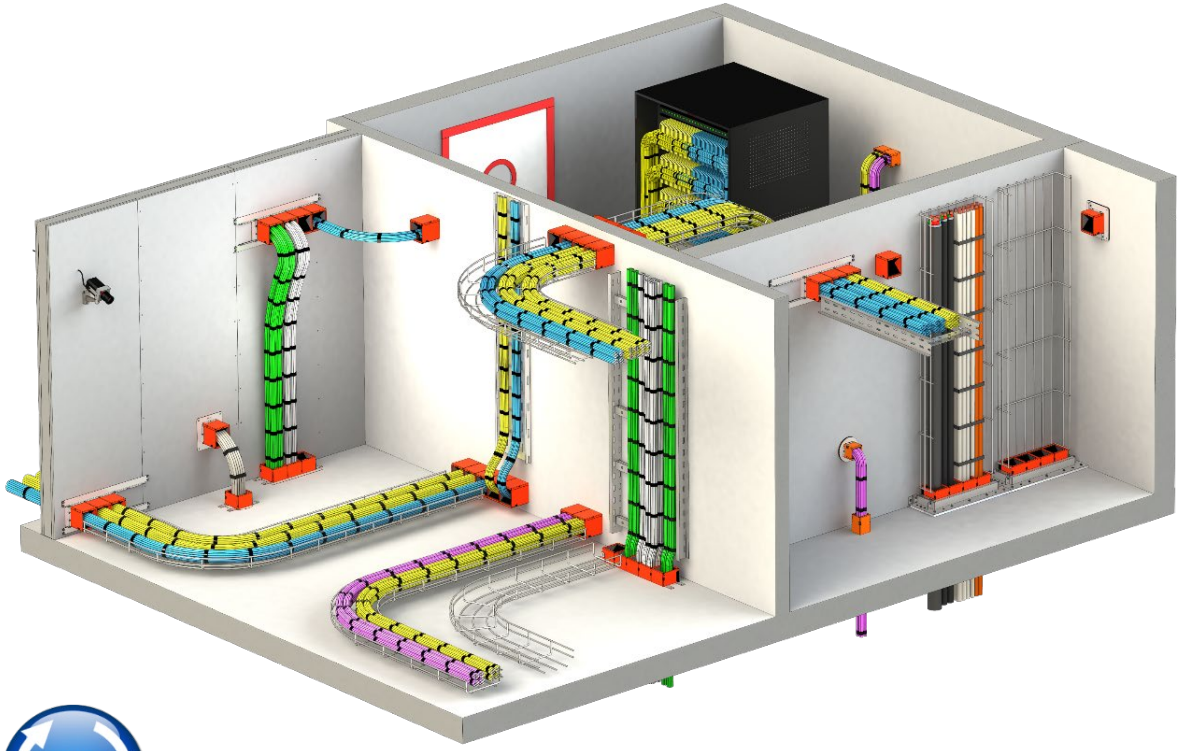
FIRE SAFETY IS ENSURED DURING CONSTRUCTION





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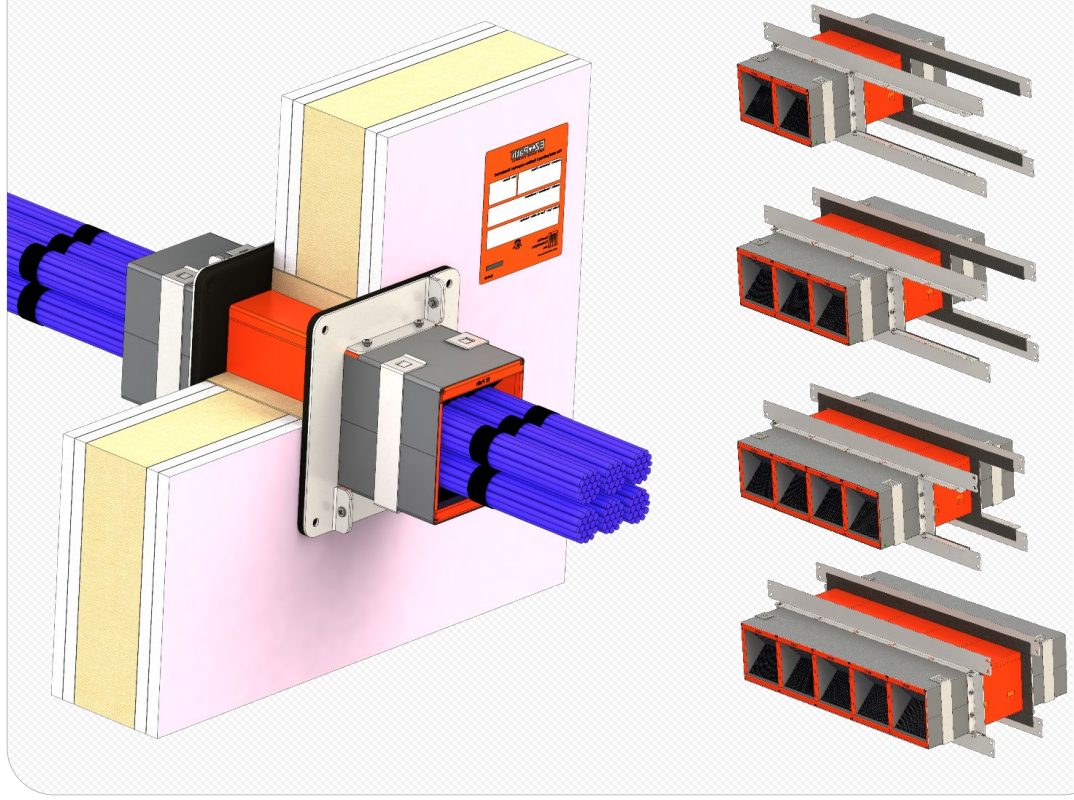
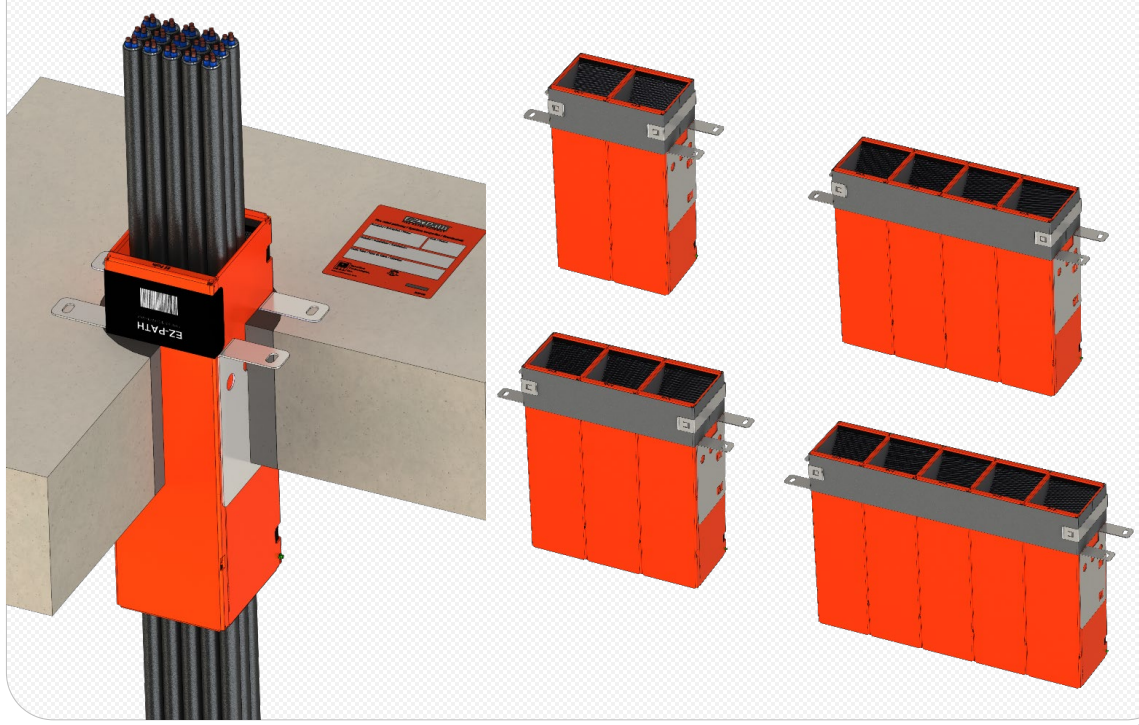
EZ-Path® Range

Drywall and concrete



Floors



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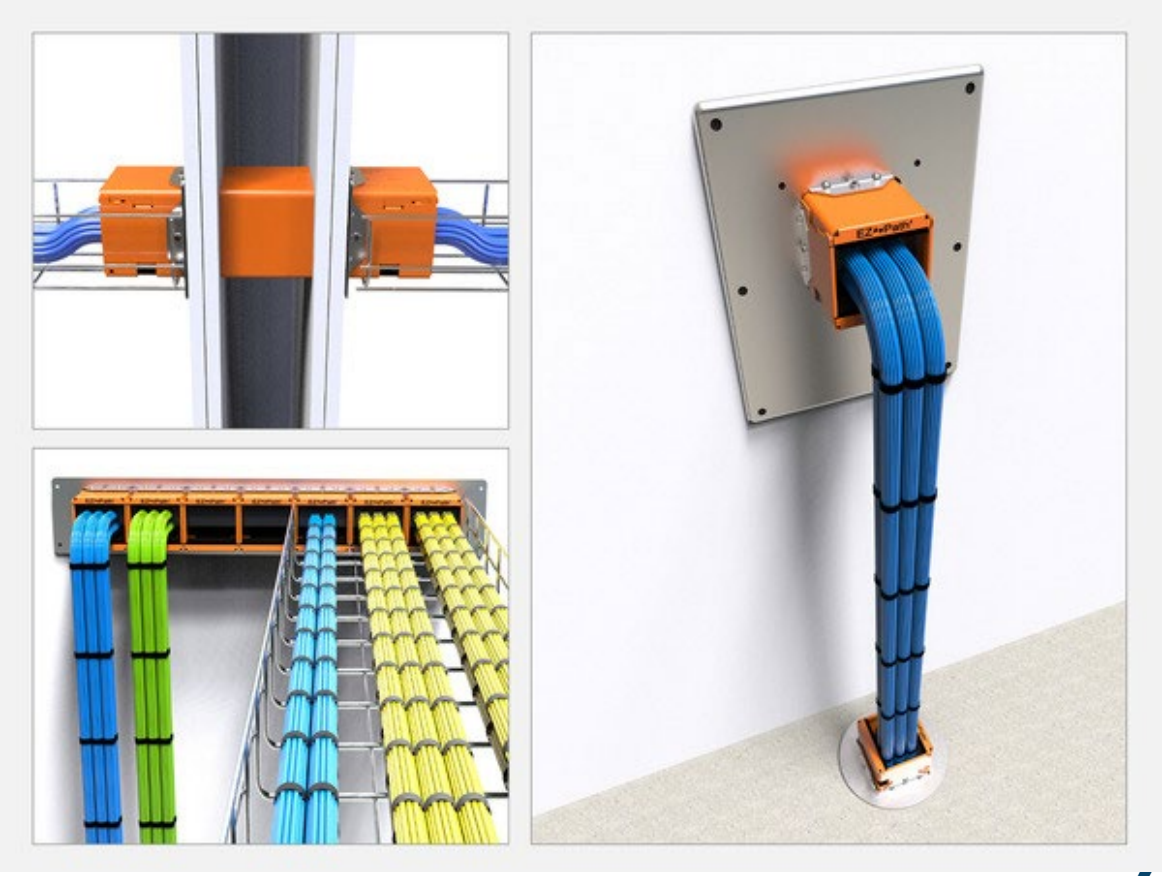
Data Communications UL Systems

Identifying System Variables

Four Variables:

1. Assembly Type & Rating
2. Hole Size/Annular Space
3. Cable Type / Fill %
4. Firestop Device or Material



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Verify all system details

- Type of barrier & its hourly rating
- Type of penetrant(s)
- Maximum hole size
- Annular space: minimum AND maximum
- Maximum cross-sectional cable fill %
- Special considerations:
  - Sleeve?
    - Extended or Flush?
    - Angle of penetrant?

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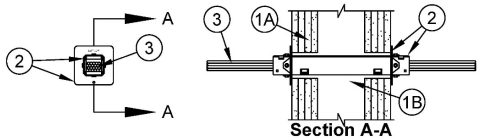
Always start with a system

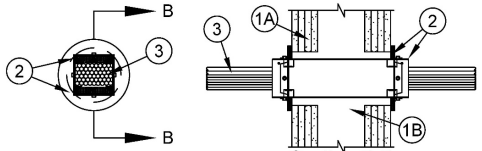
Classified by
Underwriters Laboratories, Inc.
to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115

System No. W-L-3377

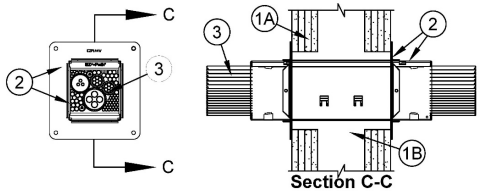
ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 1, 2, 3 and 4 Hr (See Items 1 and 3)	F Ratings - 1, 2, 3 and 4 Hr (See Items 1 and 3)
T Rating - 3/4, 1, 1-1/2 and 2 Hr (See Item 3)	FT Rating - 3/4, 1, 1-1/2 and 2 Hr (See Item 3)
L Rating At Ambient - Less than 1 to 7 CFM/Device Module (See Item 2)	FH Ratings - 1, 2, 3 and 4 Hr (See Items 1 and 3)
L Rating At Ambient - Less than 1 to 7 CFM/Device Module (See Item 2)	FTH Rating - 3/4, 1, 1-1/2 and 2 Hr (See Item 3)
	L Rating At Ambient - Less than 1 to 7 CFM/Device Module (See Item 2)
	L Rating at 400 F - Less than 1 to 3 CFM/Device Module (See Item 2)



Section A-A



Section B-B



Section C-C

1. **Wall Assembly -** The 1, 2, 3 or 4 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described within the individual U300, U400, V400 or W400 Series Wall or Partition Designs in the UL Fire Resistance Directory and shall incorporate the following construction features:
   A. **Studs -** Wall framing shall consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced max 16 in. (406 mm) OC. Steel studs to be min 3-1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) OC.
   B. **Gypsum Board* -** Thickness, type, number of layers and fasteners as specified in the individual Wall and Partition Design. See Table for opening sizes.

   The hourly F and FH Ratings are dependent upon the hourly rating of the wall in which it is installed.
2. **Firestop Device* -** Series 22 EZ Path device modules consist of a 1.4 by 1.4 by 10-1/2 in. (36 by 36 by 267 mm) long galv steel tube with an intumescent material lining. Series 33 EZ Path device modules consist of a 3 by 3 by 10-1/2 in. (76 by 76 by 267 mm) long galv steel tube with an intumescent material lining. Series 44+ EZ Path device modules consist of a 4 by 4-5/8 by 14 in. (102 by 118 by 356 mm) long galv steel tube with an intumescent material lining. Firestop device modules to be installed in accordance with the accompanying installation instructions. Firestop device modules secured in place by means of steel wall plates installed with gasketing material supplied with product. Steel wall plates installed on both sides of wall and secured to each device by means of steel screws provided with device. Firestop device module is to be installed with ends projecting an equal distance beyond each surface of the wall assembly. The annular space between the device and opening shall be min 0 in. (point contact) to max 1/8 in. (3 mm) for Series 22 device, max 1/2 in. (13 mm) for Series 33 device and max 1/4 in. (6 mm) for Series 44 device. The opening size and L Ratings for each device vary according to whether device module is blank (no cables) or loaded (with cables) and which cable type and size is used, as tabulated below:

   SPECIFIED TECHNOLOGIES INC - EZ PATH Series 22, 33 or 44+ Fire Rated Pathway

Device	Max Cable Fill	Cable Type	L-Rating (CFM)		Opening Size Diam or Dimensions, in. (mm)
			Ambient	400° F	
Series 22	0%	-	1.4	1.4	2 (51) or 1-3/4 x 1-3/4 (44 x 44)
Series 22	1-25%	3A	Less Than 1	Less Than 1	2 (51) or 1-3/4 x 1-3/4 (44 x 44)
Series 22	26-50%	3A	Less Than 1	Less Than 1	2 (51) or 1-3/4 x 1-3/4 (44 x 44)
Series 22	51-75%	3A	Less Than 1	Less Than 1	2 (51) or 1-3/4 x 1-3/4 (44 x 44)
Series 22	76-100%	3A	Less Than 1	Less Than 1	2 (51) or 1-3/4 x 1-3/4 (44 x 44)
Series 22	100%	3F	Less Than 1	Less Than 1	2 (51) or 1-3/4 x 1-3/4 (44 x 44)
Series 33	0%	-	Less Than 1	Less Than 1	4 (102) or 3-1/4 x 3-1/4 (82 x 82)
Series 33	100%	3A	4	3	4 (102) or 3-1/4 x 3-1/4 (82 x 82)
Series 33	100%	3F	1.3	Less Than 1	4 (102) or 3-1/4 x 3-1/4 (82 x 82)
Series 33	100%	3G, 3H	7	2	4 (102) or 3-1/4 x 3-1/4 (82 x 82)
Series 33	100%	3I	1.8	1.8	4 (102) or 3-1/4 x 3-1/4 (82 x 82)
Series 44+	0%	-	Less Than 1	Less Than 1	6 (152) or 4-1/8 x 4-3/4 (120 x 120)
Series 44+	1-25%	3A-3I	1.5	1.5	6 (152) or 4-1/8 x 4-3/4 (120 x 120)
Series 44+	26-50%	3A-3I	2.3	2.3	6 (152) or 4-1/8 x 4-3/4 (120 x 120)
Series 44+	51-75%	3A-3I	2.3	2.3	6 (152) or 4-1/8 x 4-3/4 (120 x 120)
Series 44+	76%-100%	3A-3I	2.3	2.3	6 (152) or 4-1/8 x 4-3/4 (120 x 120)

2A. **Firestop Device* - Extension Module -** (Optional, Not Shown) - Module attached to ends of Series 33, Series 44+ firestop device (Item 2) to increase its length to facilitate installation in thicker walls. Each module consists of a galv steel tube with an intumescent material lining. Extension module to be installed in accordance with the accompanying installation instructions. When module is used, firestop device (Item 2) and extension module(s) secured in place by means of steel wall plates installed with gasketing material supplied with product. Steel wall plates installed on both sides of wall and secured to each device or extension module(s) by means of steel set screws provided with wall plates. Firestop device and extension module(s) assembly to be installed with ends projecting an equal distance beyond each surface of the wall assembly.

SPECIFIED TECHNOLOGIES INC - EZ PATH Series 33 or Series 44+ Extension

3. **Cables -** Cables may represent a 0 to max 100 percent visual fill within the loading area for the firestop device module. Cables to be rigidly supported on both sides of the wall assembly. Any combination of the following types of cables may be used:
   A. Max 400 pair No. 24 AWG (or smaller) copper conductor telecommunication cable with polyvinyl chloride (PVC) or plenum-rated jacketing and insulation.
   B. Max 750 kcmil single copper conductor power cable with XLPE jacket and insulation
   C. Max 7/C No. 12 AWG copper conductor control cable with PVC or XLPE jacket and insulation.
   D. Max 3/C No. 2/0 AWG metal clad or armored cable with steel or aluminum jacket.
   E. Max 3/C No. 8 AWG NM cable (Romex) with PVC insulation and jacket.
   F. Max four pair No. 22 AWG (or smaller) copper conductor data cable with PVC or plenum rated jacketing and insulation.
   G. Coaxial cable with fluorinated ethylene or PVC insulation and jacketing having a max diam of 5/8 in. (16 mm).
   H. Optical fiber cable with PVC or polyethylene (PE) jacket and insulation and having a max diam of 5/8 in. (16 mm).
   I. Max RG6/U coaxial cable with fluorinated ethylene, polyethylene (PE), PVC or plenum rated jacketing and insulation.

When Series 22 EZ Path device modules are used and when the hourly rating of the wall assembly is 1 hr, the T, FT and FTH Ratings are 3/4 hr except that for Items 3F, 3G and 3H, the T, FT and FTH Ratings are 1 hr. When the hourly fire rating of the wall assembly is 2 hr or greater, the T, FT and FTH Ratings are 3/4 hr when cables are installed. When no cables are installed within the device module, the T, FT and FTH Ratings are 1 hr in 1 hr walls and 1-1/2 hr for 2, 3 and 4 hr walls. When Item 3A, 3B, 3C, 3D or 3E is used, the maximum F and FH Ratings are 2 hr. When max 200 pair No. 24 AWG telecommunication cable and/or 350 kcmil power cable is used or when Item 3F, 3G, 3H or 3I is used, the maximum F and FH Ratings are 4 hr.

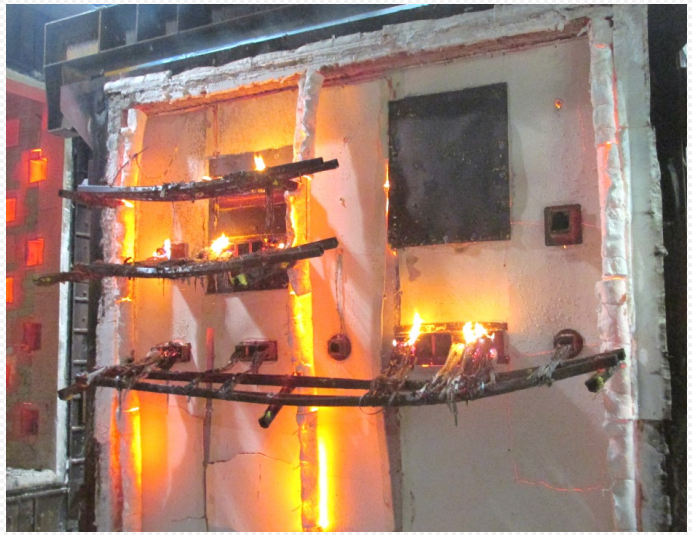
When Series 33 EZ Path device modules are used and when the hourly rating of the wall assembly is 1 hr, the T, FT and FTH Ratings are 3/4 hr. When the hourly fire rating of the wall assembly is greater than 1 hr, the T, FT and FTH Ratings are 3/4 hr when Item 3A, 3B, 3C, 3D or 3E is used. Otherwise the T, FT and FTH Ratings are 1 hr. When Item 3A, 3B, 3C, 3D or 3E is used, the maximum F and FH Ratings are 2 hr. When max 200 pair No. 24 AWG telecommunication cable is used or when Item 3F, 3G, 3H or 3I is used, the maximum F and FH Ratings are 4 hr.

When Series 44 + EZ Path device modules are used and when Item 3A, 3B, 3C, 3D or 3E is used, the max F and FH Ratings are 3 hr and the T, FT and FTH Ratings are 1 hr. When Item 3F or 3G is used, the max F and FH Ratings are 4 hr and the T, FT and FTH Ratings are 1-1/2 hr. When Item 3H or 3I is used, the max F and FH Ratings are 4 hr and the T, FT and FTH Ratings are 2 hr. When device empty, the T, FT and FTH Ratings are 1-1/2 Hr.

+Bearing the UL Listing Mark

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

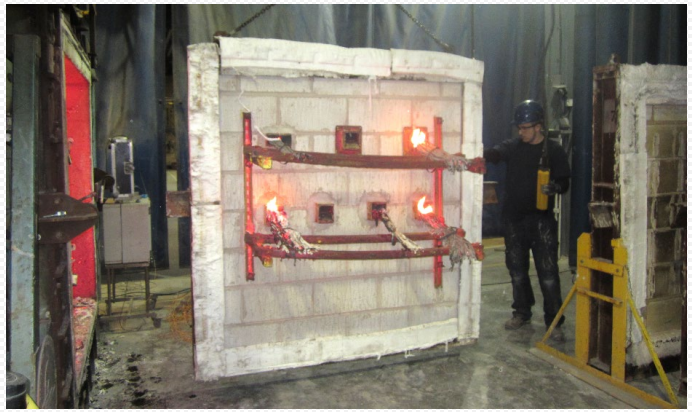
1



Flexible wall = Gypsum wall

Thermocouples to measure temperature

2



Rigid wall = Concrete, bricks wall

3

Rigid wall = Concrete floor

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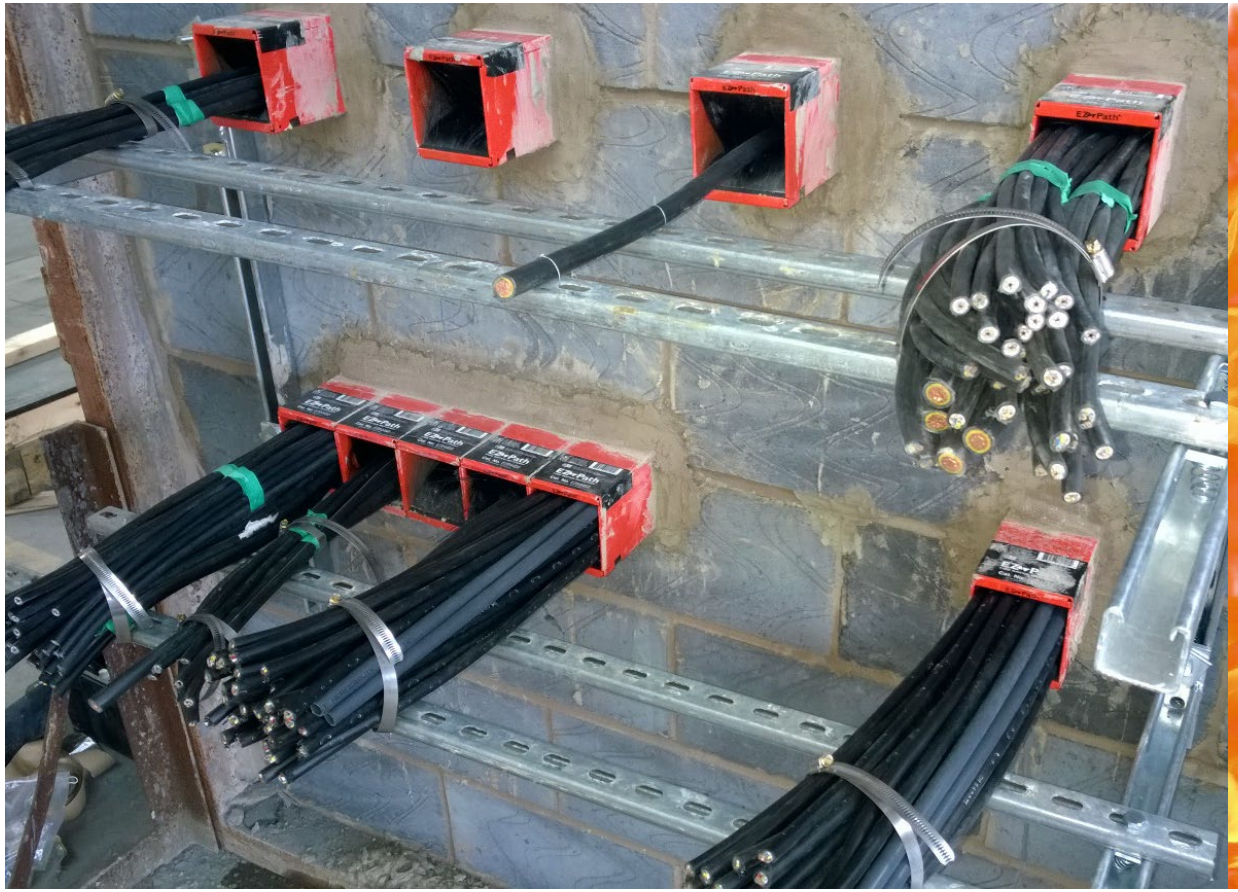

4hrs

Not exposed to fire

Fire side

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After 4 hours of fire exposure

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Installation Video

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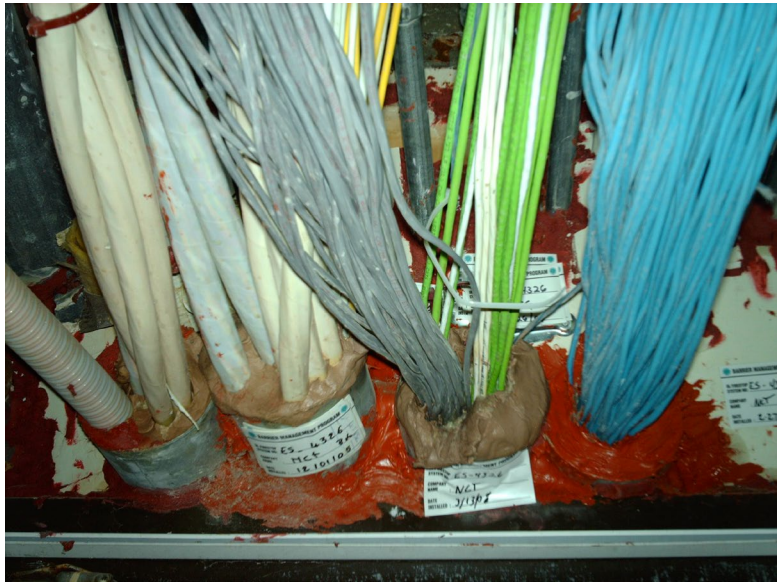
Incorrect Firestop Installations



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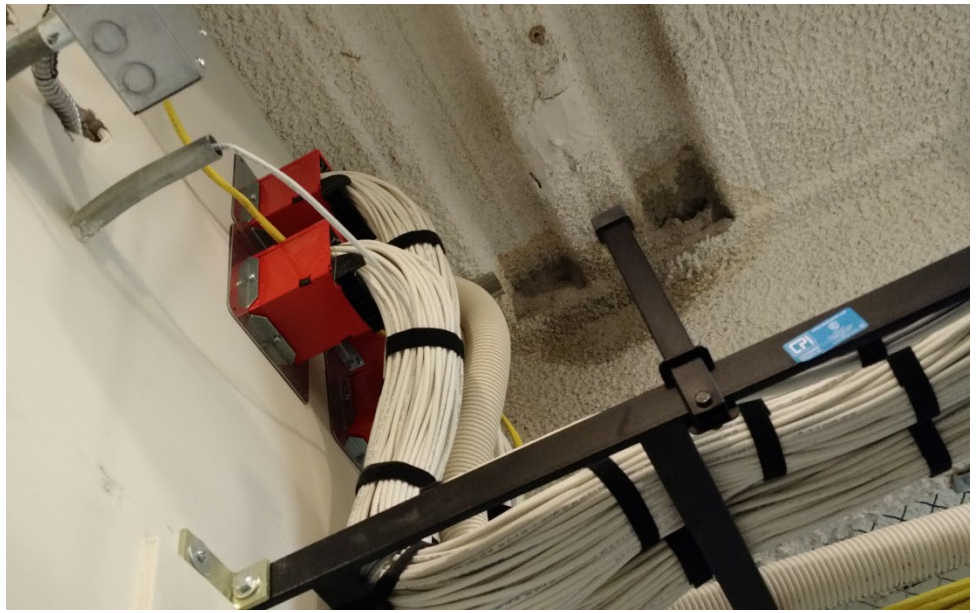
Correct Firestop Installations



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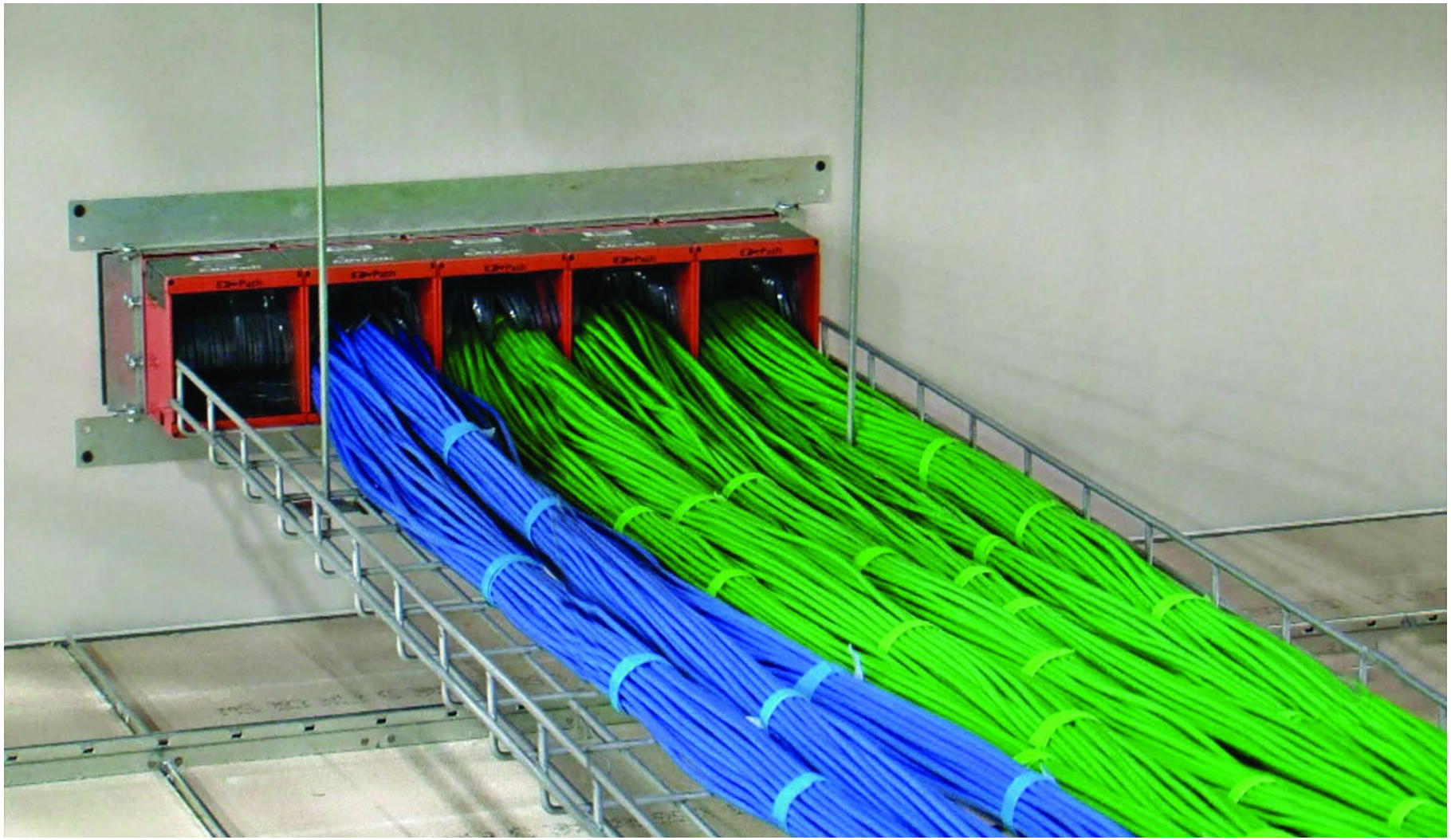
Correct Firestop Installations



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Correct Firestop Installations

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Correct Firestop Installations

FCIA

STI Specified

Today we will cover…

1. Open Path Devices
   - Product Description
   - UL system documentation
   - Installation & Repair Instructions
   - Advantages & Disadvantages / Limitation of use
   - Acceptable / not acceptable installation.

2. Latex Intumescent Firestop Sealant
   - Product Description
   - UL system documentation
   - Installation & Repair Instructions
   - Advantages & Disadvantages / Limitation of use
   - Acceptable / not acceptable installation.

3. Q&A

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MEP Penetrations

- Metallic Penetrants
  - Steel, iron, copper, conduit, etc.
- Plastic Penetrants
  - PVC, cPVC, etc.
- Cables
- Cable Tray
- Busway
- Ducts

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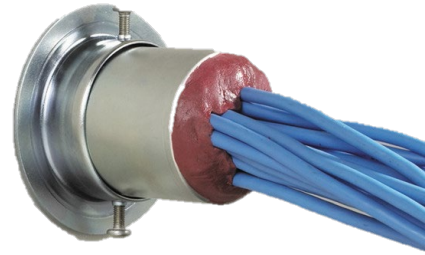
MEP Penetrations

Common penetration firestop products

- Sealants
- Collars & Wrap Strip
- Putty Pads & Box Insert
- Pillows
- Comp Sheet
- Mortar
- Cast-In Devices
- Cable Devices



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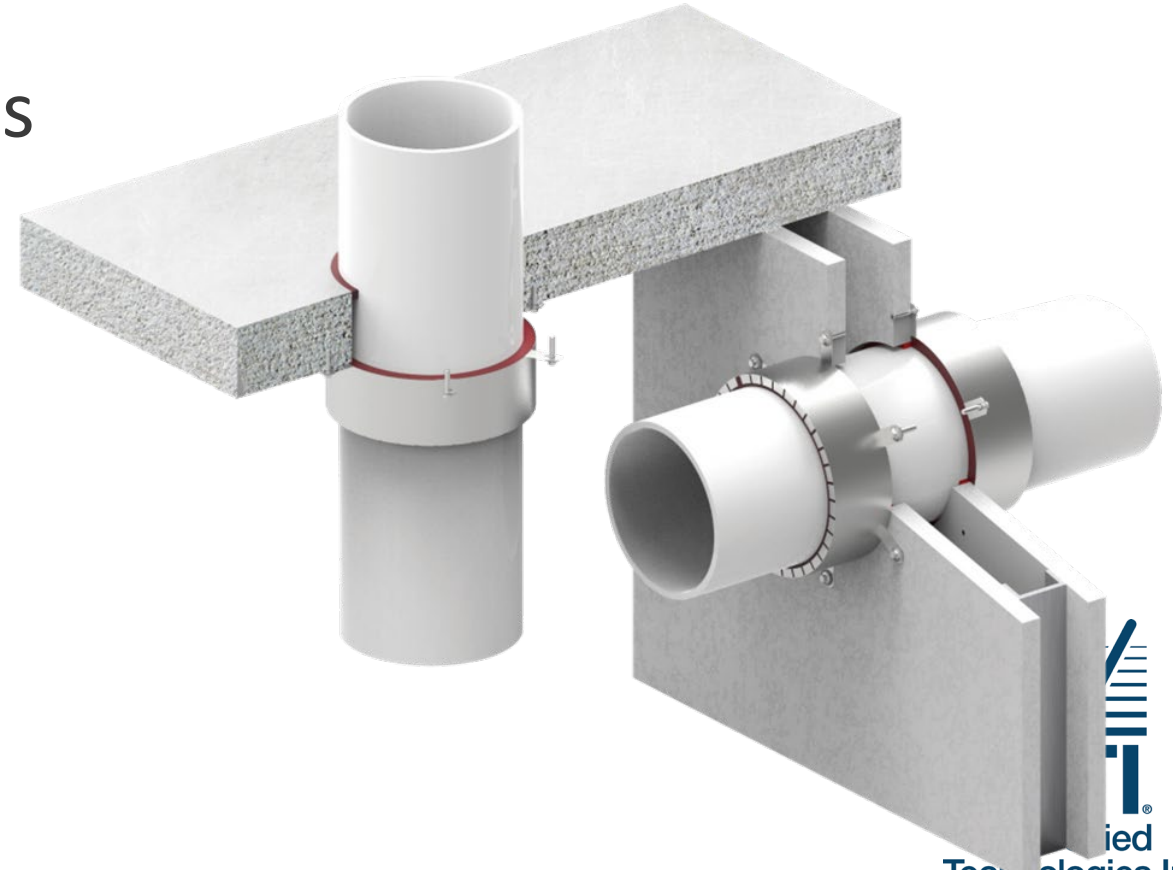
Are intumescent materials necessary?

As combustible penetrants soften with heat, intumescent firestop materials will:

- Collapse the penetrant as it burns
- Stop fire from spreading
- Form a tough smoke seal
- Reduce the transmission of heat



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Fiberglass Pipe Insulation

Non-Metallic Pipe

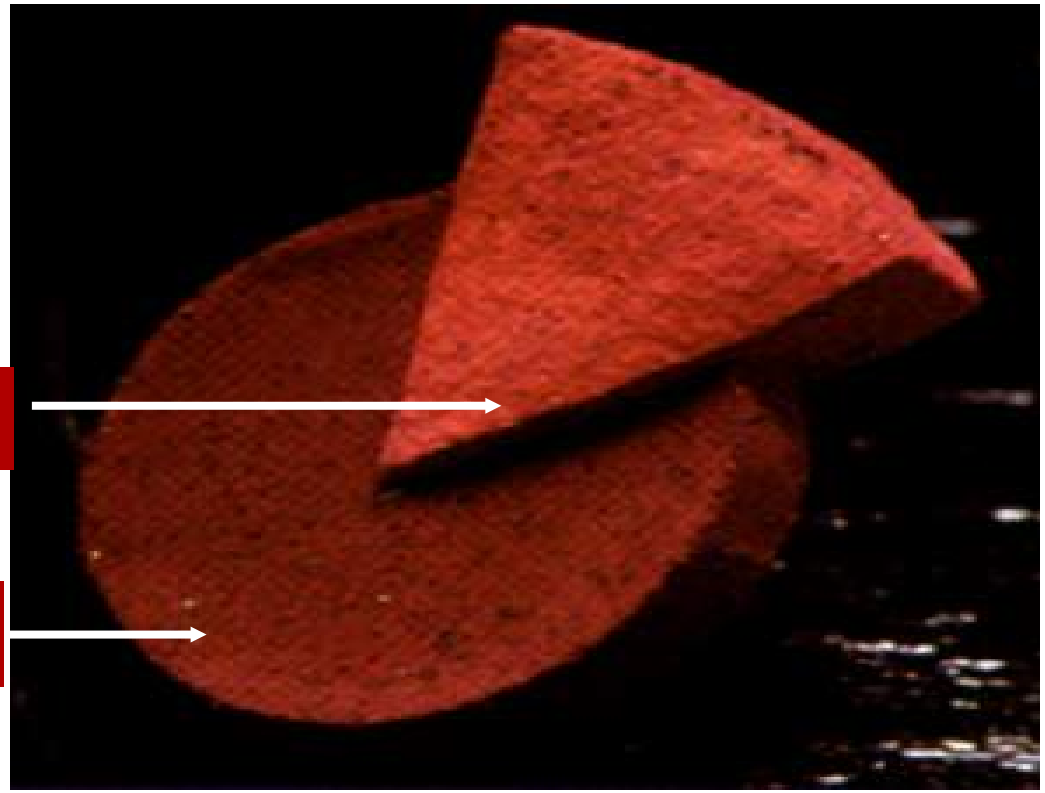
Plastic-Jacketed Cable

Polypropylene Lab Acid Waste Piping

Intumescence =
Expansion With Heat

Expansion With Heat

Before Heat Applied



A Cured Section of Intumescent Firestop Sealant

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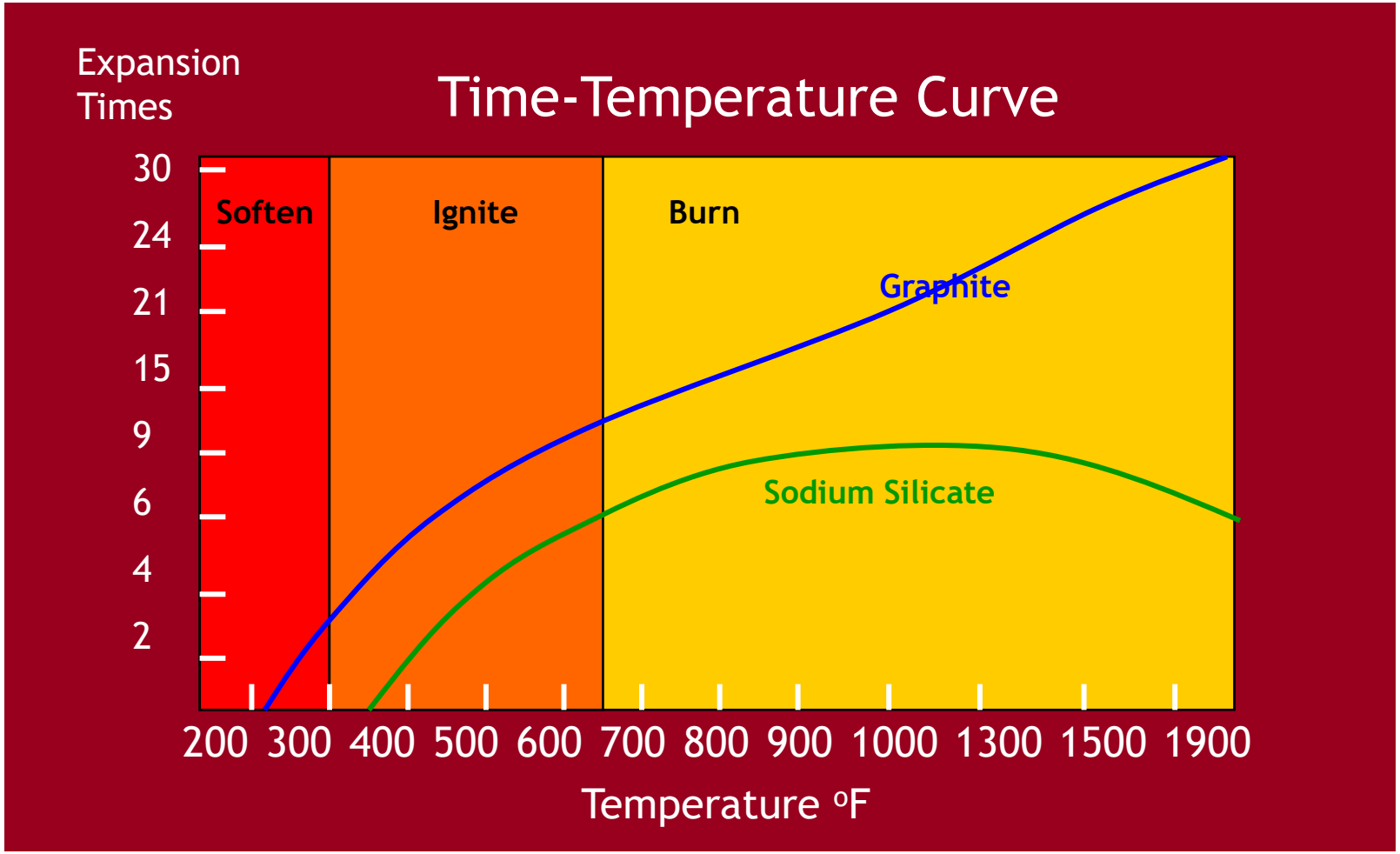

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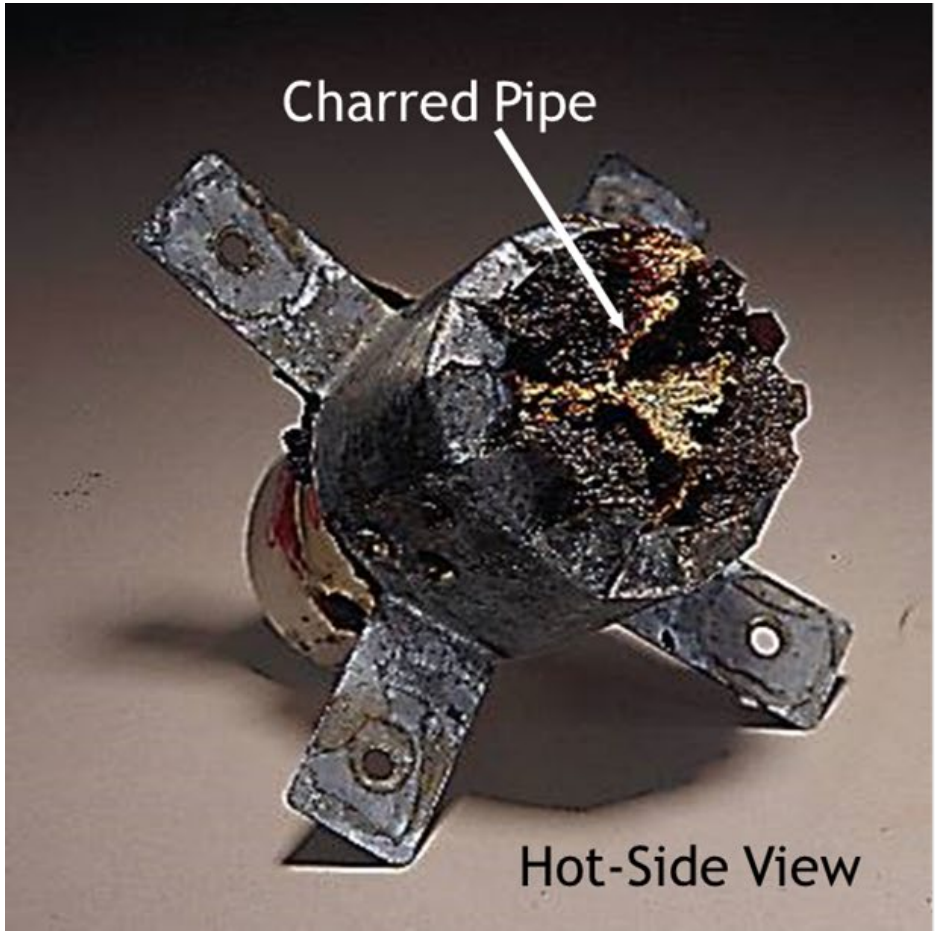
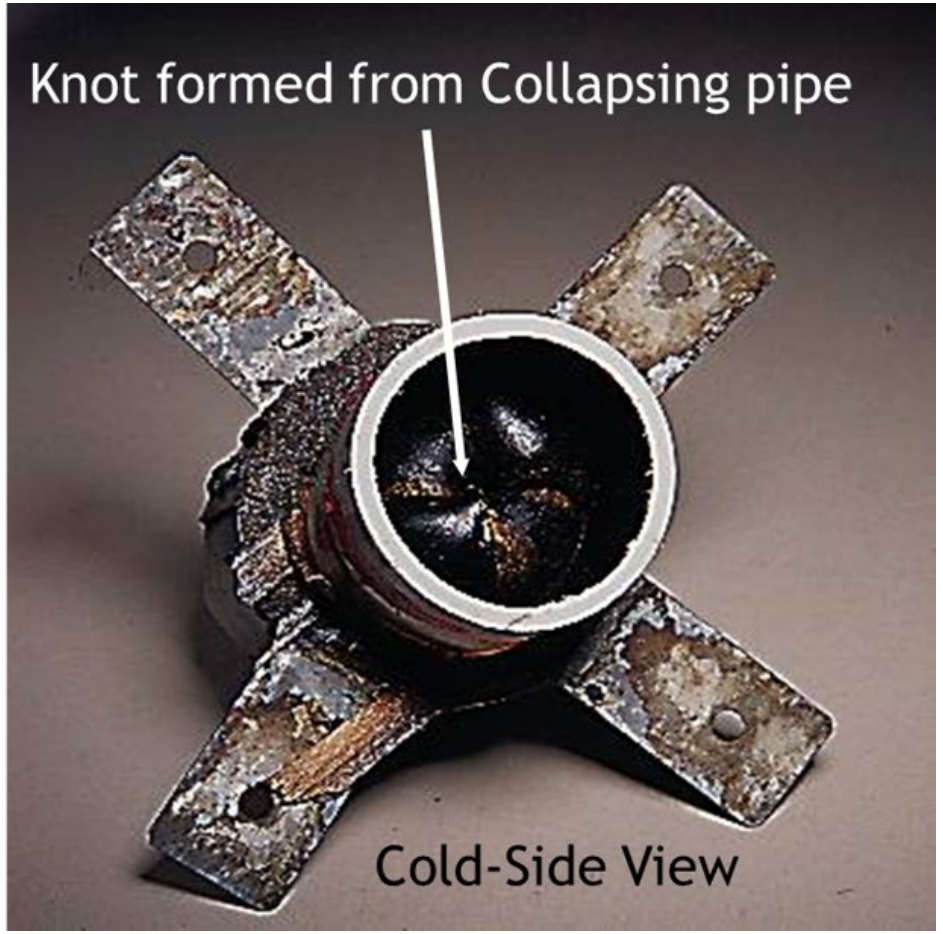
Are intumescent materials necessary?





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YES!

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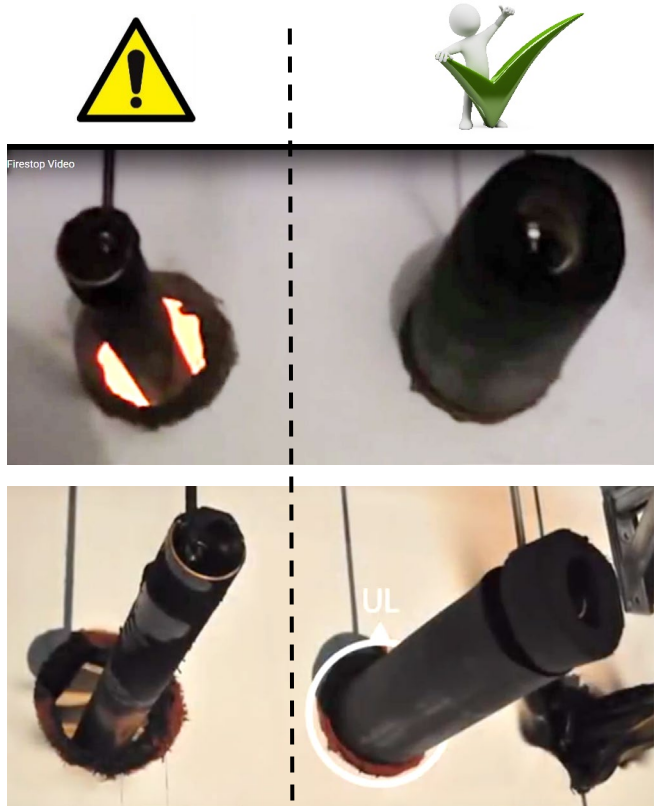
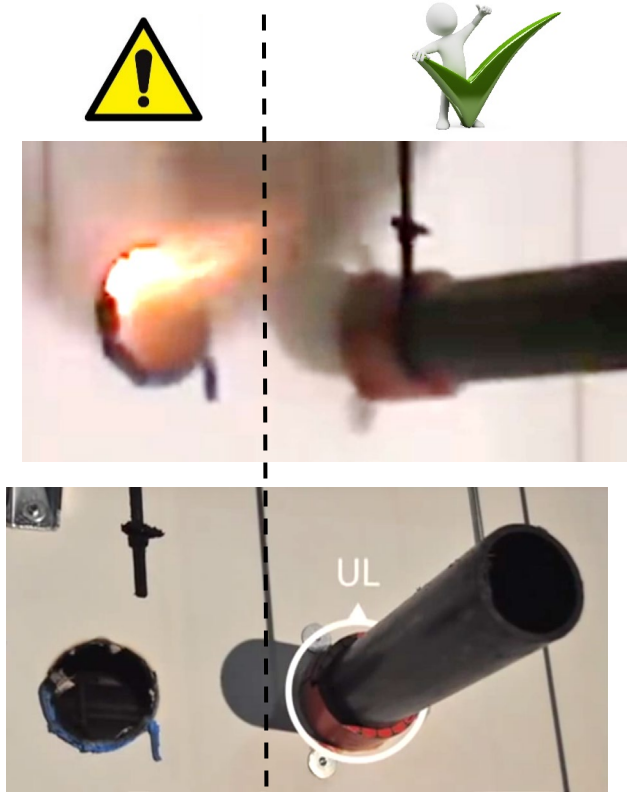
Are intumescent materials necessary?

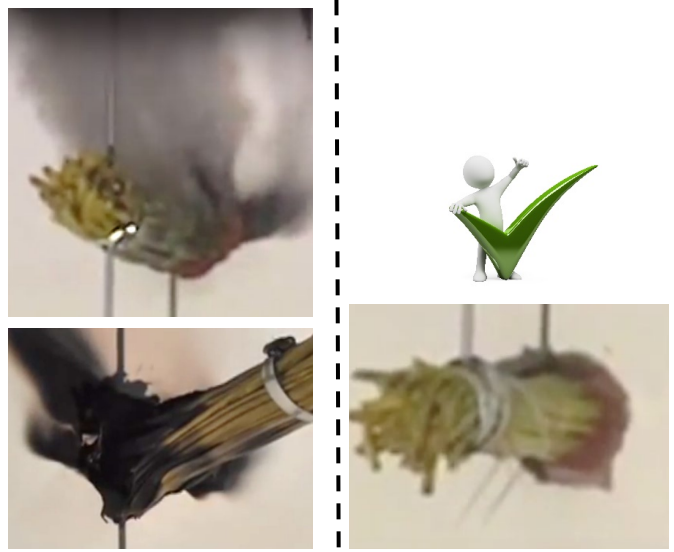
Metallic pipe with thermal insulation



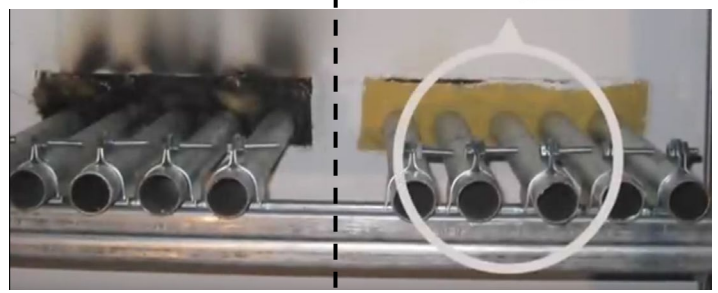
Plastic pipe



Cable



Metallic pipes



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Firestopping is a system

Firestopping is not just one item;

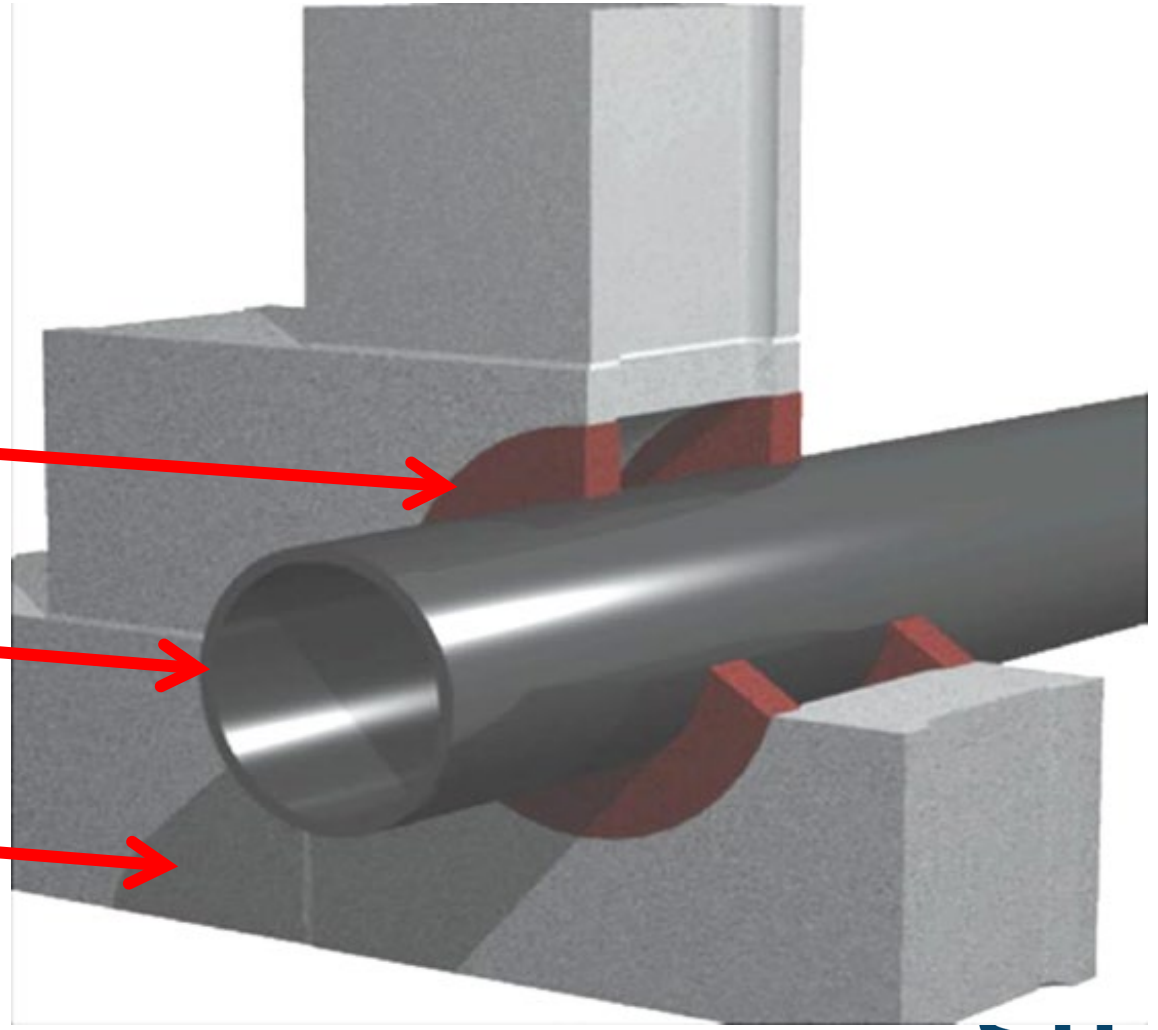
rather, it is a SYSTEM consisting of:

sealing method used to:

- seal the opening
- protect the penetrants

penetrant or penetrants (if any)

fire-rated barrier being penetrated



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Always start with a system

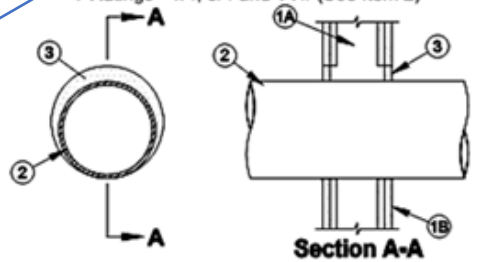
Every application has its own <u>system</u> which calls out:

- Hourly Fire Rating
- Type of Barrier
- Type of Penetrant
- Min/Max Annular Space*
- Firestop Materials

System No. W-L-1222

F Ratings - 1 and 2 Hr (See Item 1)

T Ratings - 1/4, 3/4 and 1 Hr (See Item 2)



1. **Wall Assembly -** The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300 or U400 Series Wall or Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

   A. **Studs -** Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3-1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) OC.

   B. **Gypsum Board* -** Thickness, type, number of layers and fasteners as specified in the individual Wall and Partition Design. Max diam of opening is 10-5/8 in. (270 mm).

   The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed.

2. **Through Penetrant -** One metallic pipe, conduit or tube to be installed eccentrically or concentrically within the firestop system. Pipe, conduit or tubing may be installed at an angle not greater than 45 degrees from perpendicular. The annular space between the pipe, conduit or tube and the periphery of the opening shall be min 0 in. (0 mm, point contact) to max 2 in. (51 mm). Pipe, conduit or tube to be rigidly supported on both sides of the wall assembly. The following types and sizes of metallic pipes, conduits and tubes may be used:

   A. **Steel Pipe -** Nom 8 in. (203 mm) diam (or smaller) Schedule 5 (or heavier) steel pipe.

   B. **Iron Pipe -** Nom 8 in. (203 mm) diam (or smaller) cast or ductile iron pipe.

   C. **Conduit -** Nom 6 in. (152 mm) diam (or smaller) rigid steel conduit, nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing (EMT) or nom 4 in. (102 mm) diam (or smaller) flexible steel conduit.

   D. **Copper Pipe -** Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe.

   E. **Copper Tube -** Nom 4 in. (102 mm) diam (or smaller) Type L (or heavier) copper tube.

Type of Penetrant	Max Diam	T Rating
Steel or iron pipe, steel conduit or EMT	2 in. (51 mm)	1 hr
Steel or iron pipe, steel conduit or EMT	8 in. (203 mm)	3/4 hr
Copper pipe or tube	4 in. (102 mm)	1/4 hr

2A. **Through Penetrating Product* - Flexible Metal Piping -** As an alternate to Item 2, one nom 1-1/4 in. (32 mm) diam (or smaller) steel flexible metal pipe to be installed either concentrically or eccentrically within the firestop system. The annular space between the pipe and the periphery of the opening shall be min 0 in. (0 mm, point contact) to max 2 in. (51 mm). Pipe to be rigidly supported on both sides of the wall assembly.

OMEGA FLEX INC

TITEFLEX CORP

A BUNDY CO

WARD MFG INC

3. **Fill, Void or Cavity Material* - Sealant -** Min 5/8 in. (16 mm) thickness of fill material applied within annulus, flush with both surfaces of wall assembly. At point contact location, min 1/4 in. (6 mm) diam bead of fill material applied at metallic pipe/gypsum board interface on both surfaces of wall.

SPECIFIED TECHNOLOGIES INC - SpecSeal LCI Sealant

*Bearing the UL Classification Mark

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Verify all system details

- Type of barrier & its hourly rating
- Type of penetrant(s)
- Maximum hole size
- Maximum penetrant size
- Annular space: minimum AND maximum
- Special considerations:
  - Sleeve?
  - Coupling?
  - Angle of penetrant?

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MEP Penetrations

Installing Sealants

- Start with a system
- Verify all system details
- Clean the substrates
- Use backing if required
- Install sealant to correct depth
- Tool sealant

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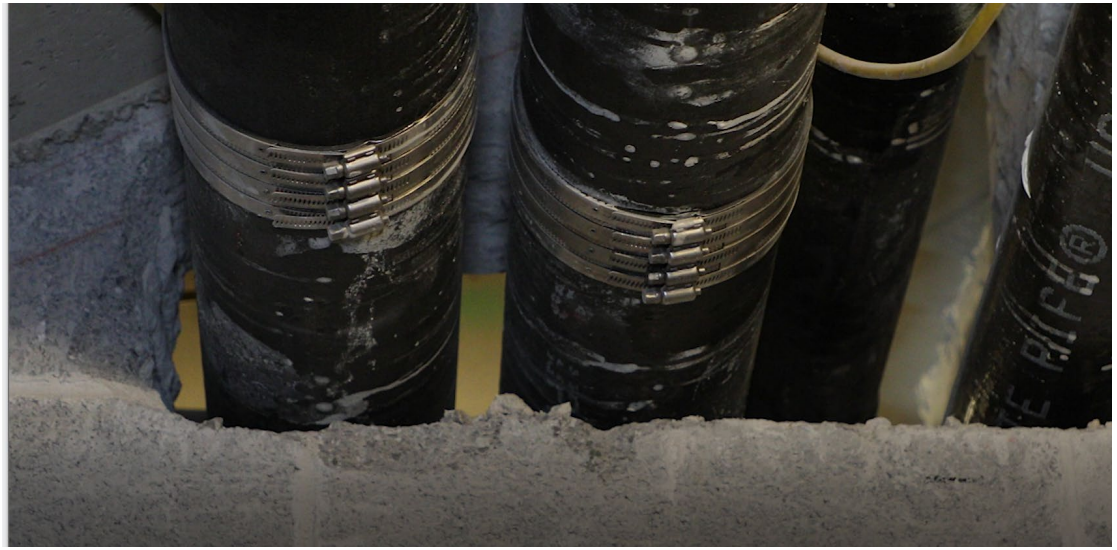
Use backing (if required)



- Step 1: Verify system details
- Step 2: Tightly pack mineral wool, recessed to accommodate sealant depth

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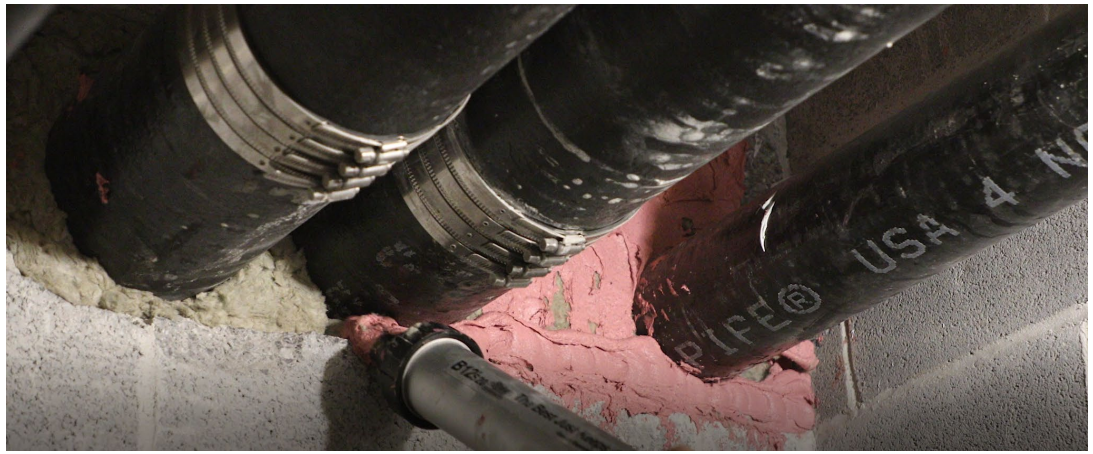
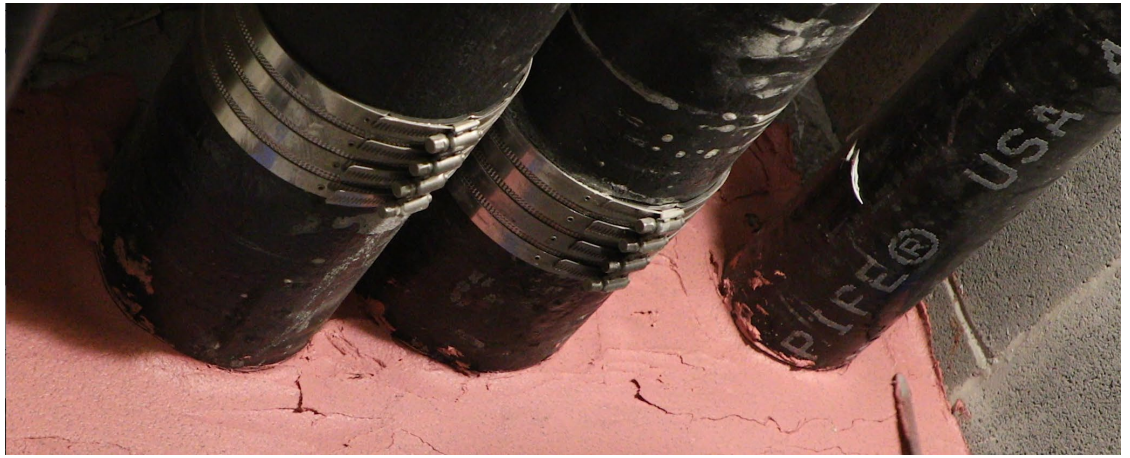
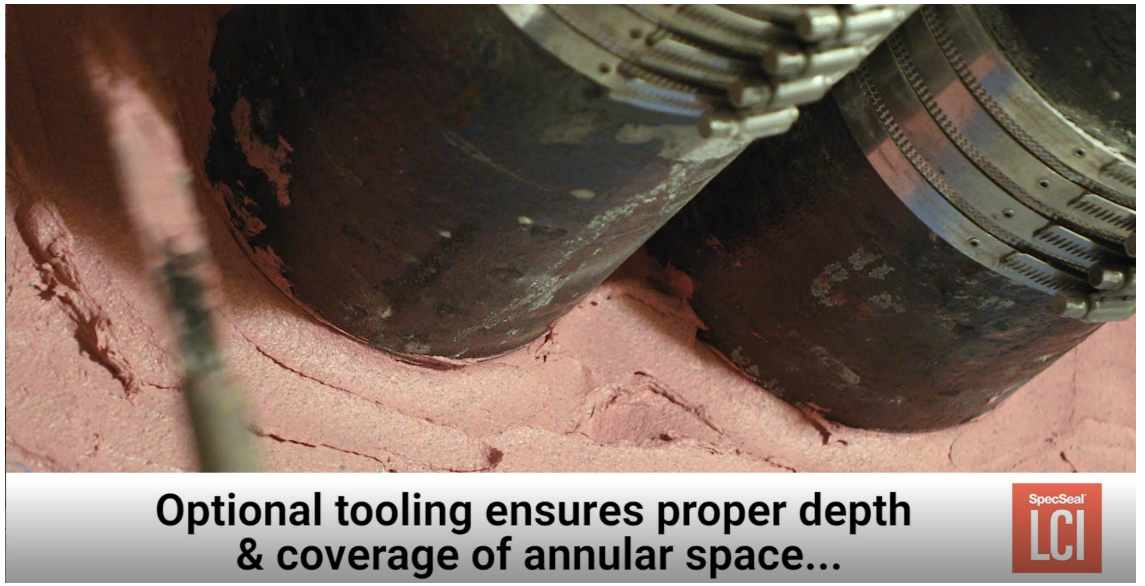
Installing the sealant





- Step 3: Install sealant to proper depth, on top side of the floor or both sides of the wall.
- Step 4: Tooling



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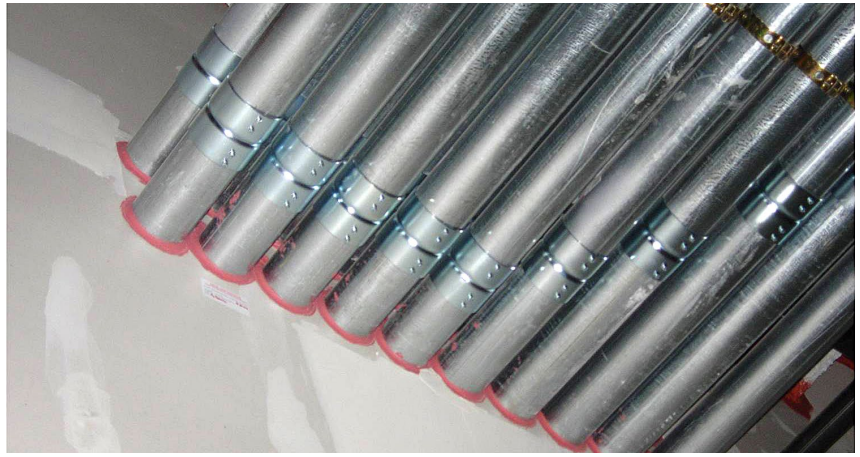

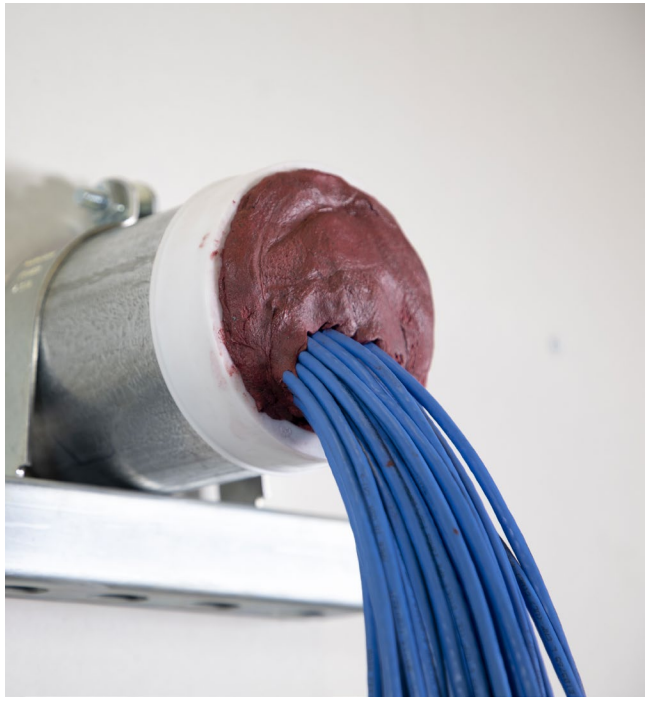

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But this is often what you get.

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Improper Firestop Installations

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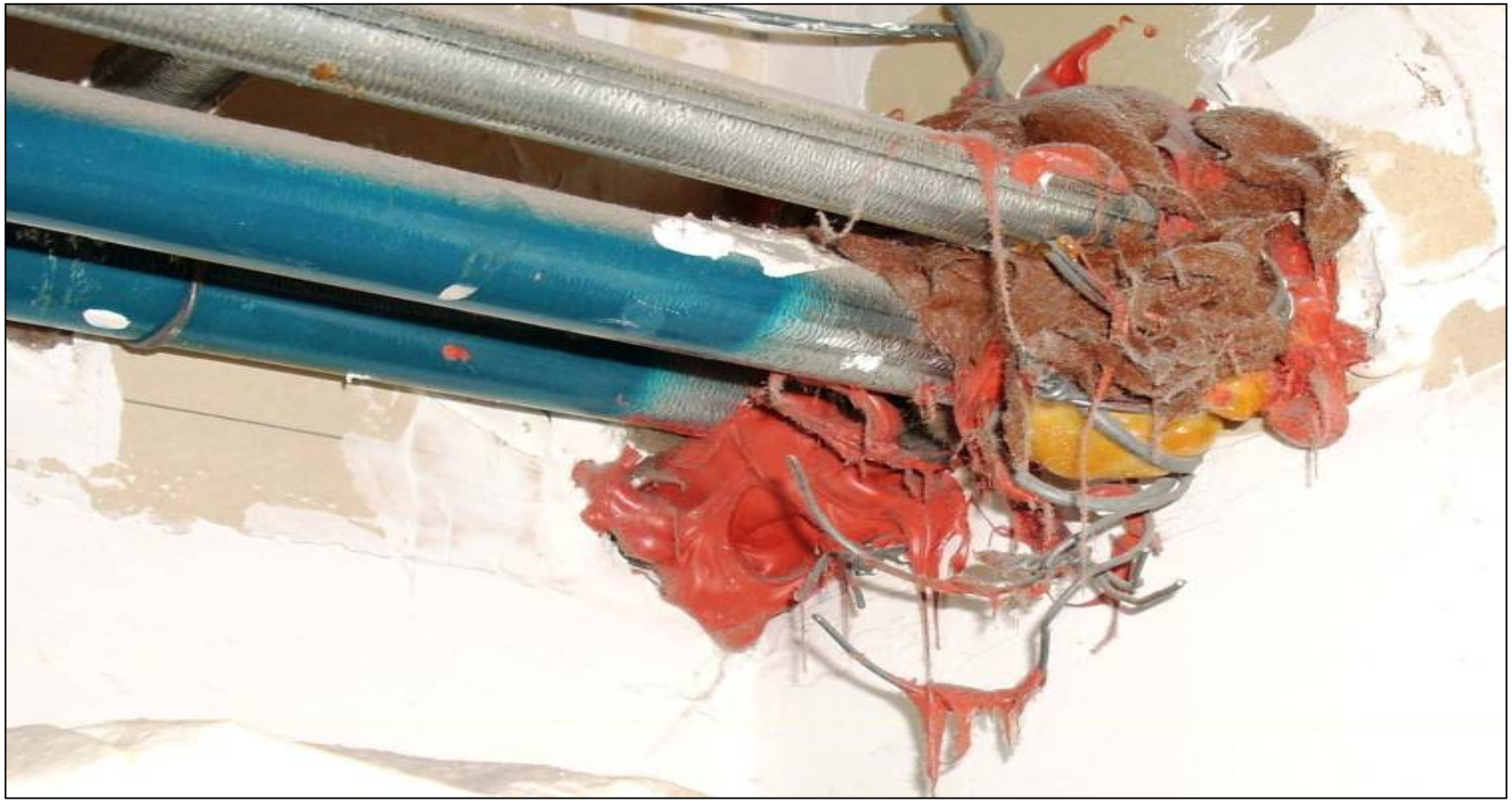
Improper Firestop Installations



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Improper Firestop Installations

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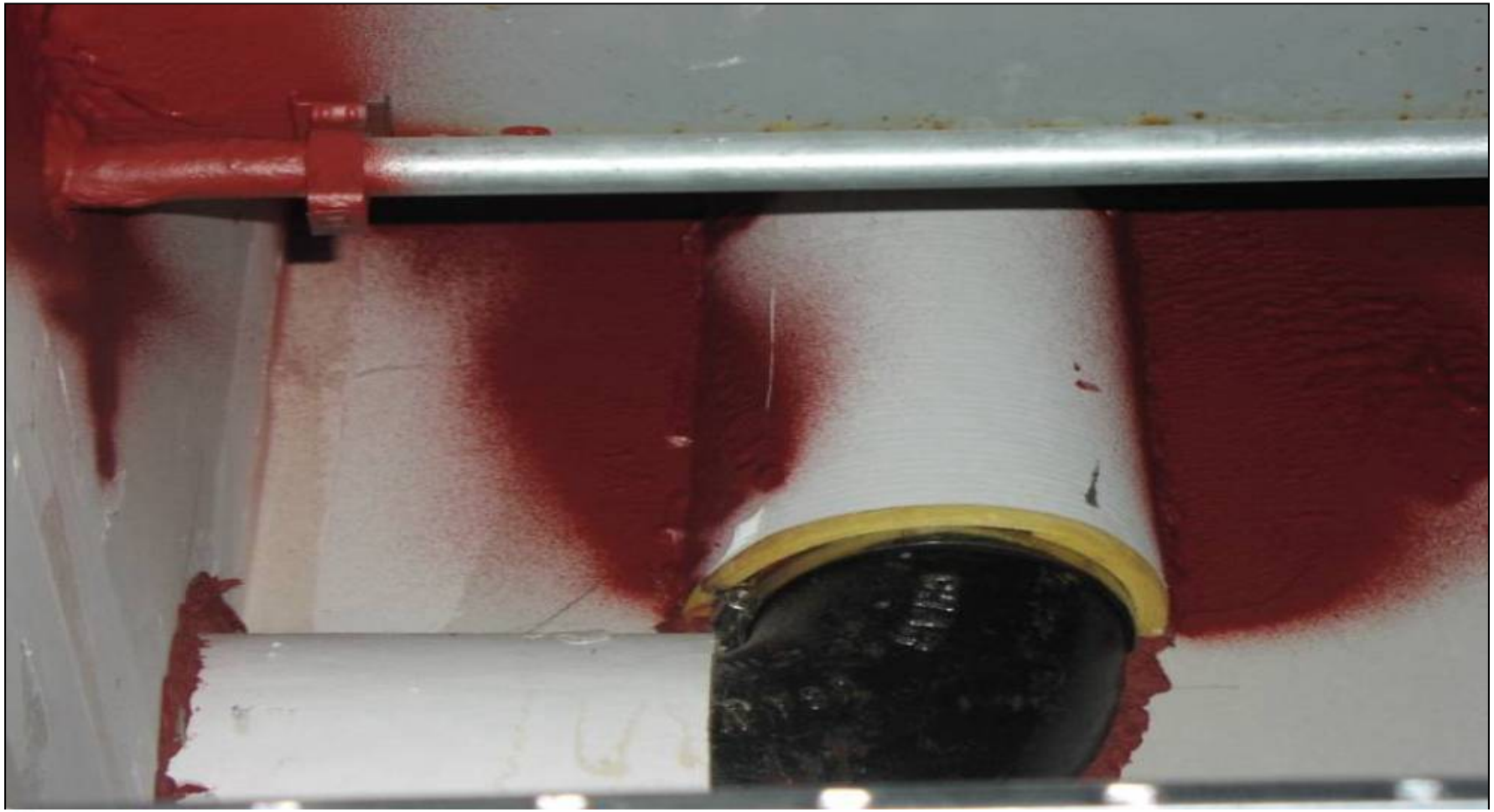
Improper Firestop Installations



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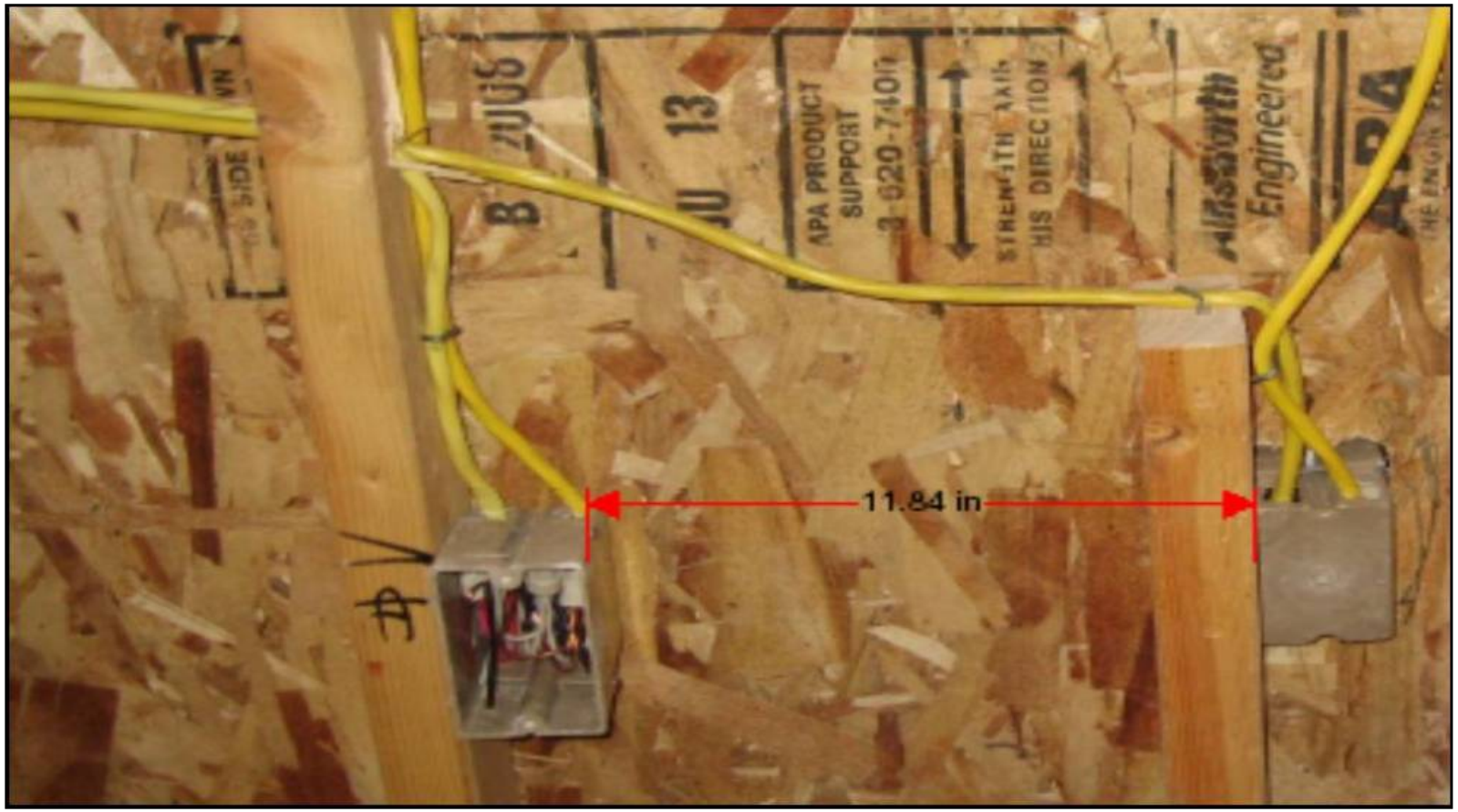
Improper Firestop Installations



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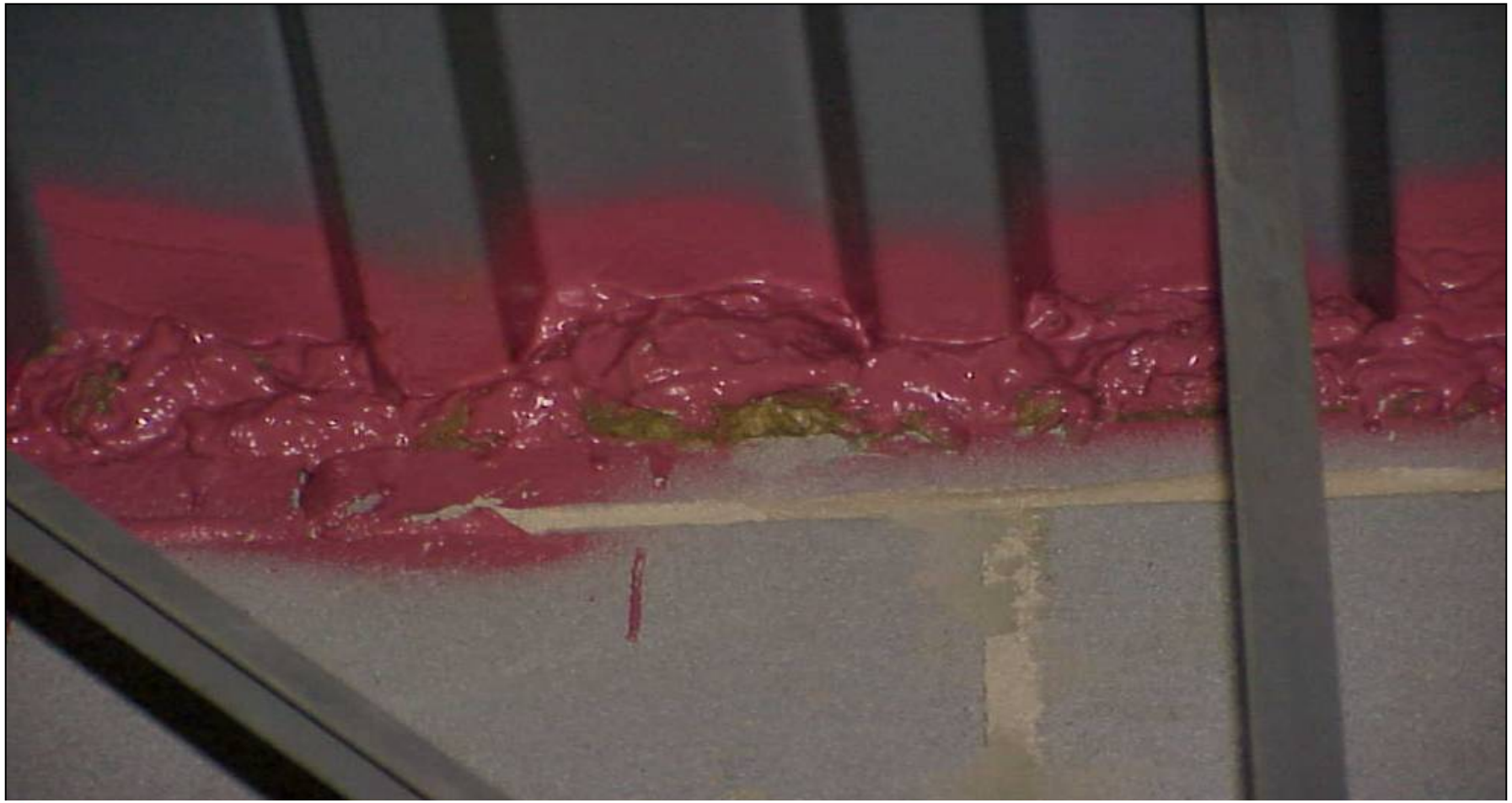
Improper Firestop Installations



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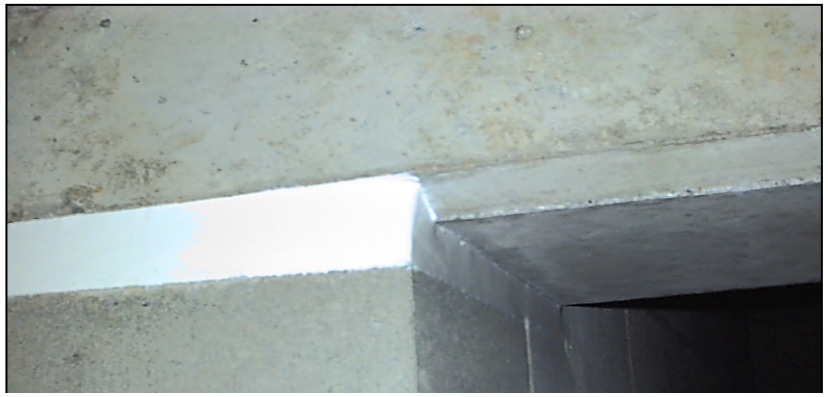
Correct Firestop Installations



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Correct Firestop Installations

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Correct Firestop Installations

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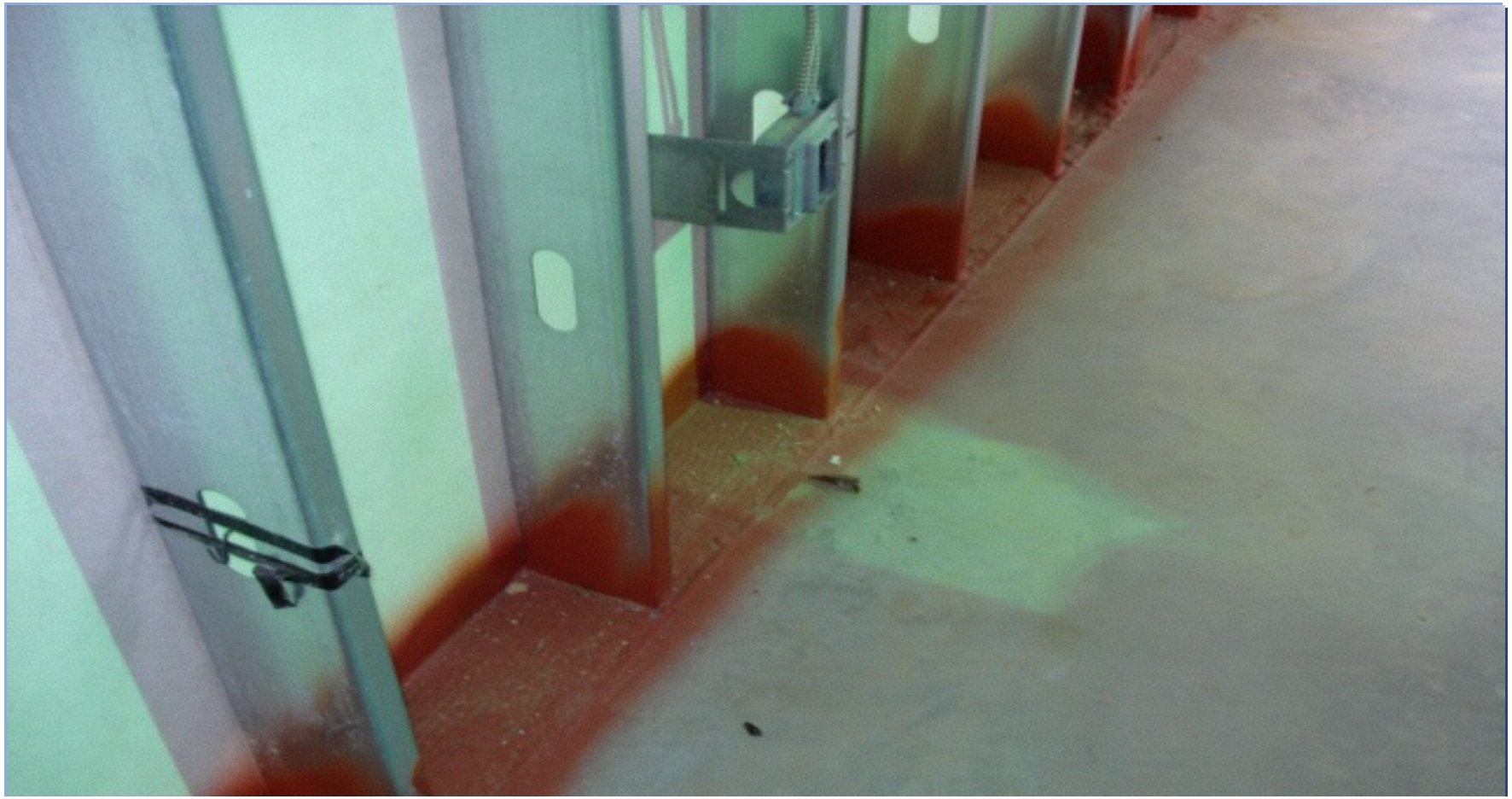
Correct Firestop Installations



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Correct Firestop Installations

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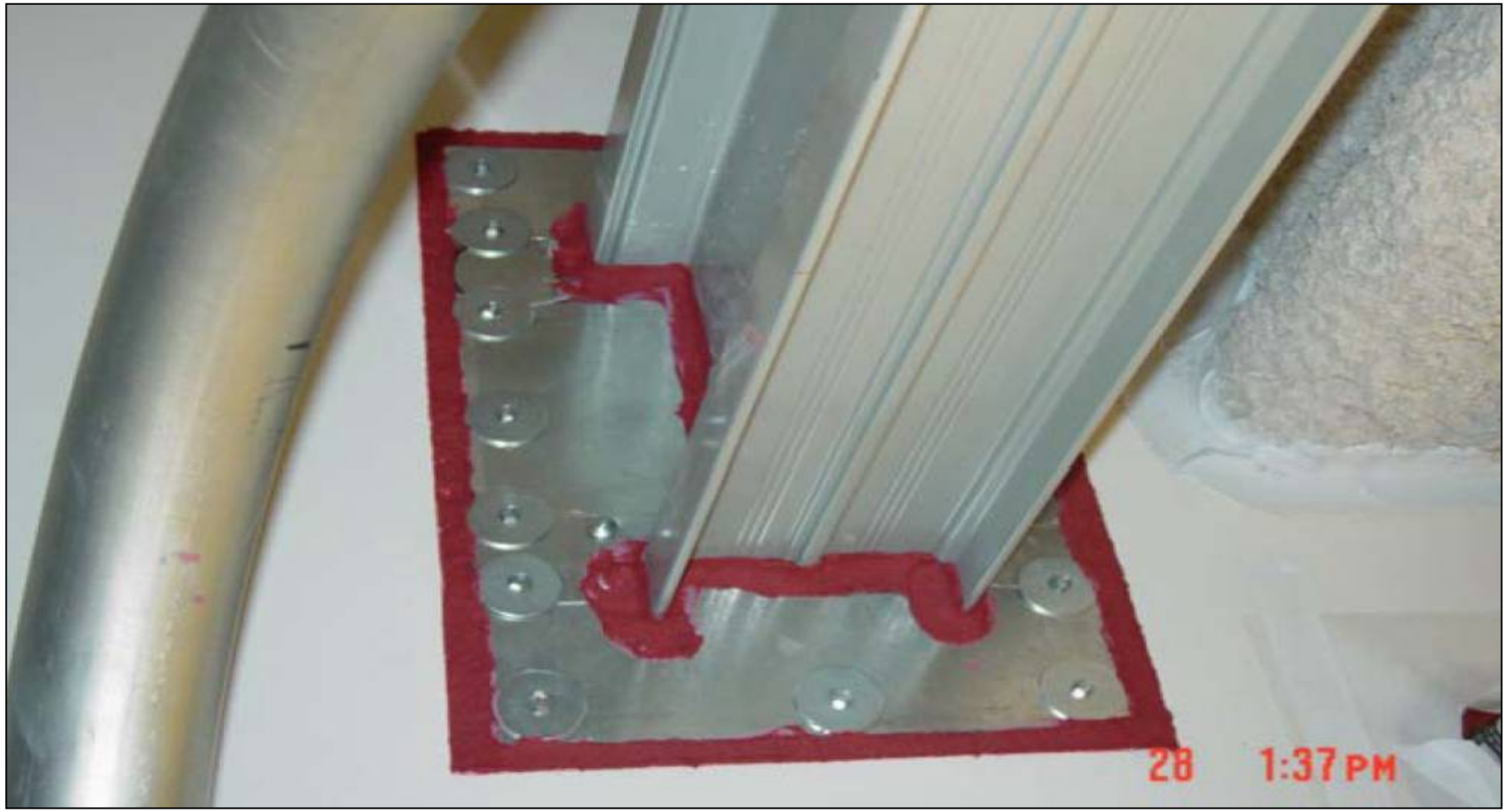
Correct Firestop Installations



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Thank you

Fouad Hajj

Regional Manager (GCC & South Asia)

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