



PasFiPro '25

9-10 FEBRUARY | DOHA, QATAR

FCIA  **NFCA** 

FCIA 2025 DOHA MEMBER MEETING & SYMPOSIUM

PASSIVE FIRE PROTECTION INSPECTION

Presented by:

Bill McHugh

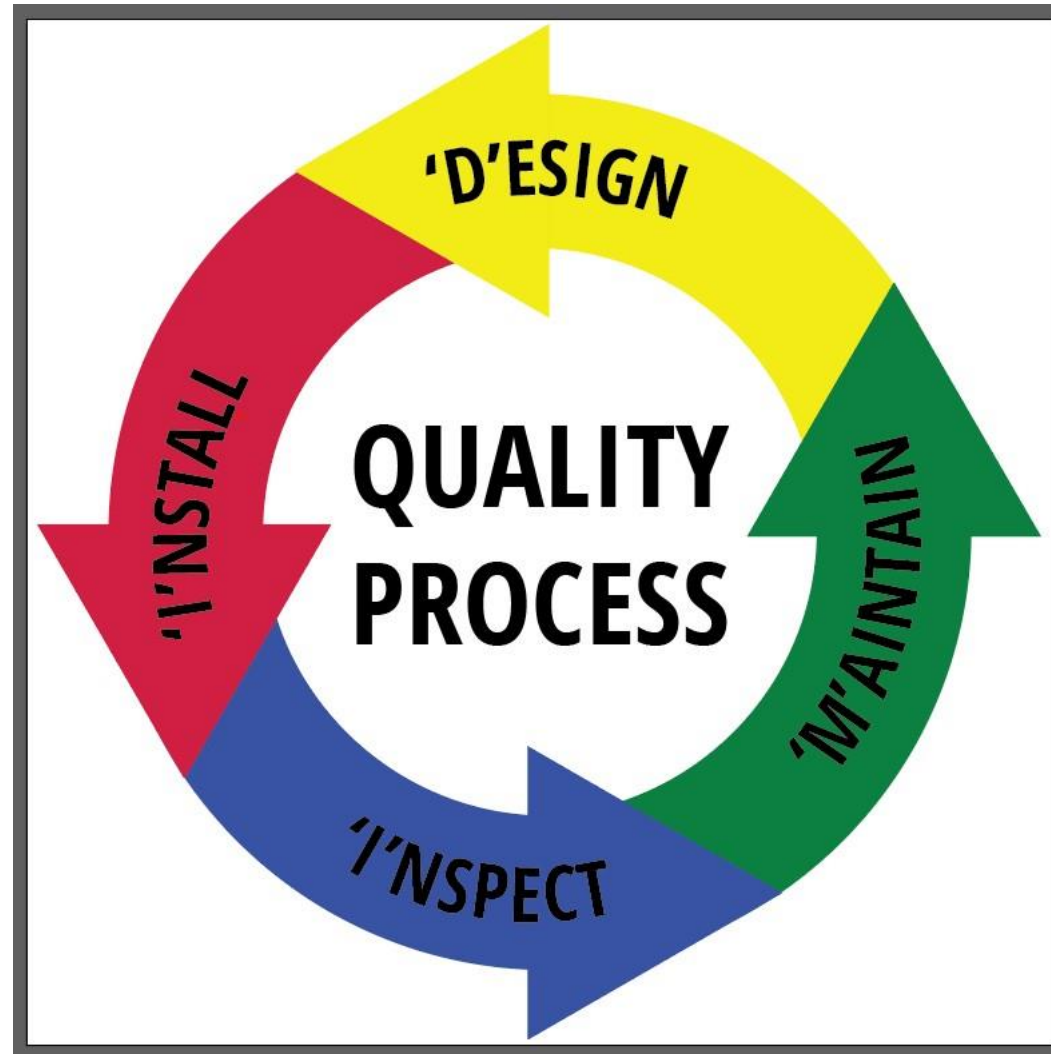
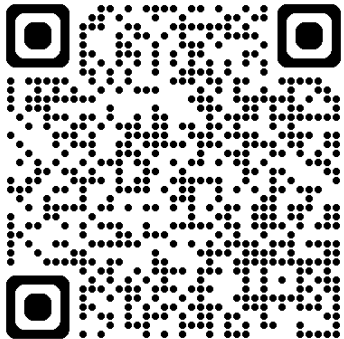
Abhishek Chhabra

FCIA/NFCA

D-DESIGN - Specs, Code

FCIA's DIIM™

I-INSTALL
FM 4991/UL QFCP
Programs AND
Mfr. Education



M-Maintain
PFP/BARRIER
MANAGEMENT
Fire Codes

I-INSPECT

IBC Ch. 17 -NFPA 80 - NFPA 1

UL Product iQ Cont.

Access and Reading a Firestop System

- **Review Live:**

- U410
- C-AJ-1155
- C-AJ-4036
- C-AJ-8001
- W-L-2030
- W-L-2154
- W-L-5001



UL Product iQ Cont.

Access and Reading a Joint System

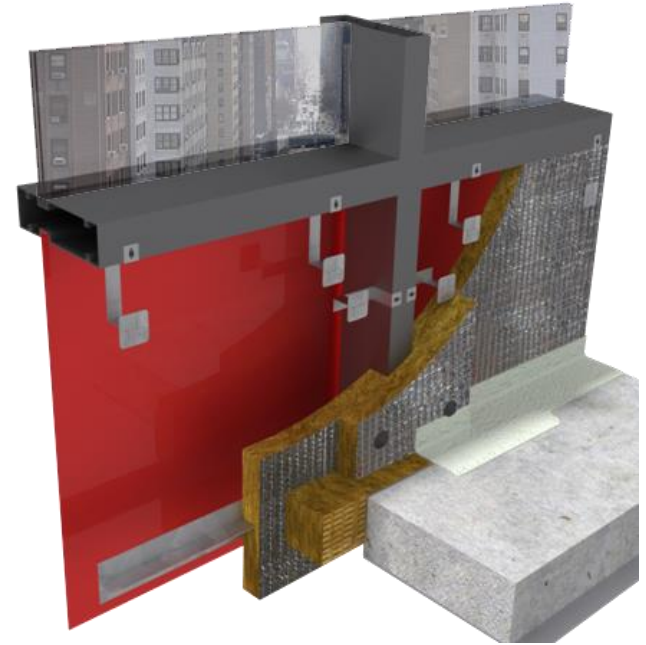
- **Review Live:**
 - BW-S-0002
 - FF-D-1001
 - HW-D-0221



UL Product iQ Cont.

Access and Reading a PFC System

- Review Live:
 - CW-D-1046



Installation....

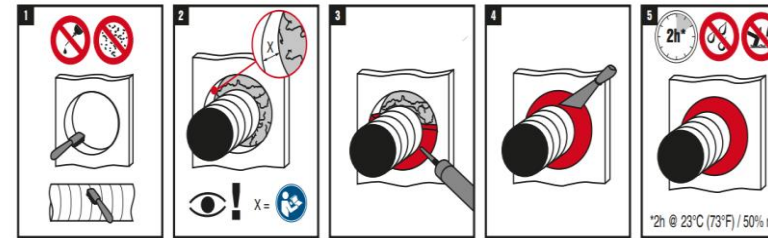
- **Install in accordance with..**
 - *Listings*
 - *Manufacturers Instructions*
- **MANUFACTURER Defines...**
 - CLEAN,
 - DRY,
 - FREE OF OILS, WAX, FORM OILS
- **MANUFACTURER Compatibility Statements**
 - Copper
 - CPVC
 - Penetrating Items
 - Substrates
 - EVERYTHING



en Before handling and for specific application details, refer to Hilti product literature, 3rd party published listings and national approvals. For industrial use only.

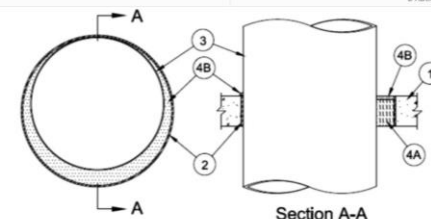
fr Avant toute utilisation et pour tout détail concernant une application, se référer à la documentation Hilti, à la liste de publications des tierces parties et aux approbations nationales. Seulement pour utilisateurs professionnels.

es Antes de usar y para detalles específicos de aplicación, véase la información que acompaña al producto Hilti, el listado publicado por terceros y las aprobaciones nacionales. Solamente para los usuarios profesionales.



System No. C-AJ-1155
February 20, 2015

ANSI/UL1479 (ASTM E814)	CAN/ULC 5115
F Rating — 2 and 3 Hr (See Item 3)	F Rating — 2 and 3 Hr (See Item 3)
T Rating — 0 Hr	FT Rating — 0 Hr
L Rating At Ambient — Less Than 1 CFM/sq ft	FH Rating — 2 and 3 Hr (See Item 3)
L Rating At 400 F — 4 CFM/sq ft	FTH Rating — 0 Hr
W Rating — Class 1 (See Item 4)	L Rating At Ambient — Less Than 1 CFM/sq ft
	L Rating At 400 F — 4 CFM/sq ft



1. Floor or Wall Assembly — Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) concrete. Wall may also be masonry.

FCIA Recommended Professional Practice Identification Systems

“Labelling”

-On-

Wall/Horizontal Assy.
Penetrating Item
Hanging



Firestop & Inspection

- ASTM E2174 / ASTM E2393 – “*Inspection Process*”



Firestop & Inspection

What SYSTEM is THIS?



Firestop & Inspection



Sheet Metal?



Composite Sheet?



**Possible UL
System Nos.:
C-AJ-5138,
C-AJ-5209,
W-J-5091,
Etc.**

Affinity Firestop Photo

Firestop & Inspection

What SYSTEM is THIS?



Firestop & Inspection



What SYSTEM is THIS?

Firestop & Inspection



What SYSTEM is THIS?

Firestop & Inspection

What SYSTEM is THIS?



Firestop & Inspection

- Build **ASSEMBLY** Right!!
 - NFPA 1 – “Fire-Resistive Patches or complete panel replacement”
 - Gypsum Panel Choice
 - Regular, Type X, Type C
 - Gypsum Block
 - Concrete/Masonry
 - Clay Tile Block
 - **Walls Not Continuous**
 - **Holes & Repair Method**



Figure 1: Damaged Gypsum Panel



Figure 2: Square Off Damaged Area



Figure 3: Frame Opening



Figure 4: Apply Gypsum Panel Patch



Figure 5: Tape and Finish Patched Area

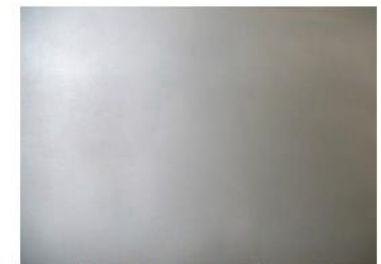


Figure 6: Redecorate Repaired Area

Firestop & Inspection

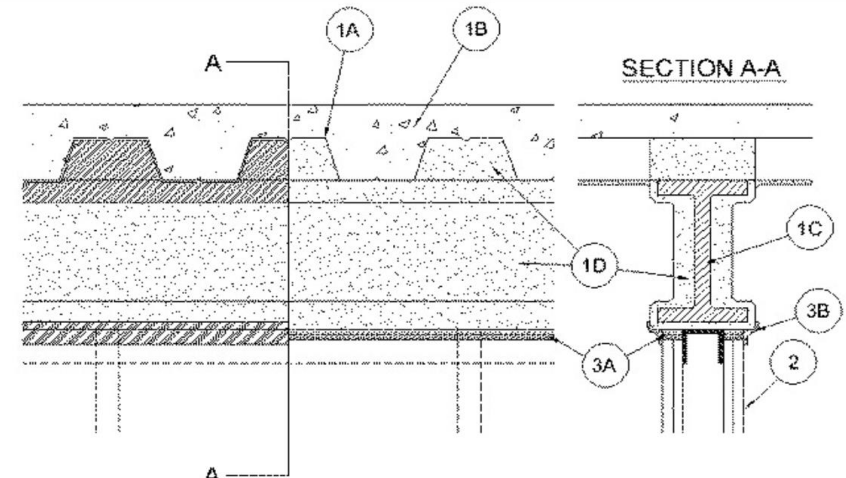
- Penetrations & Joints –
 - Annular Space Sizes
 - Sleeve Lengths
 - Wrong System
 - Wrong Products (Unlisted)



Firestop & Inspection

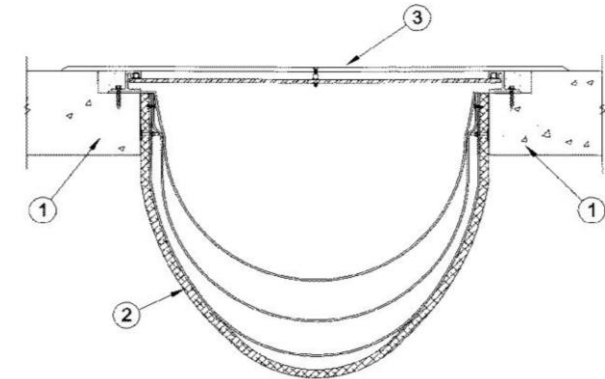
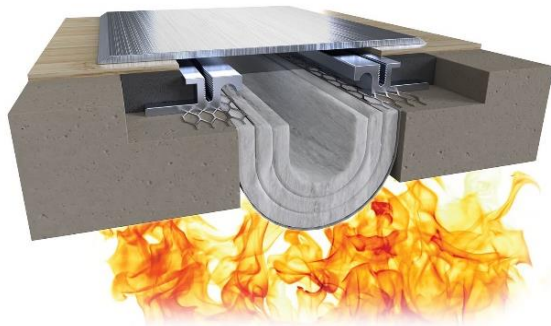
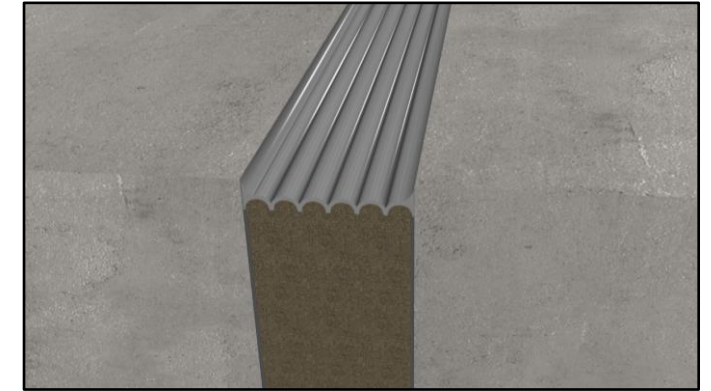
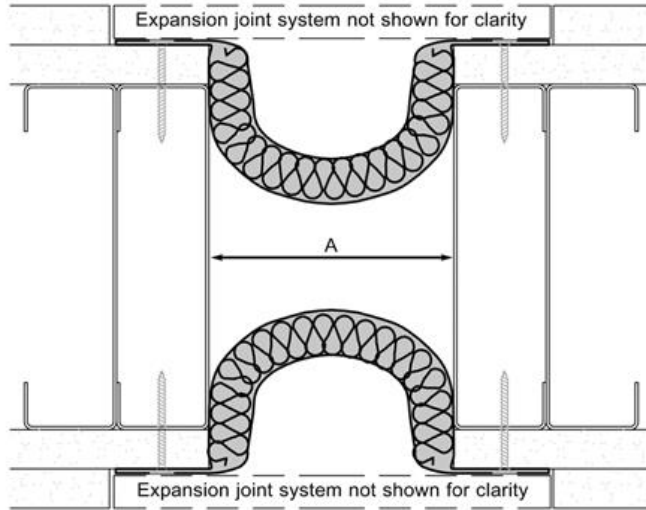
HW-D-0259

- Beam Size, Shape
 - **INCREASED** Fireproofing Thickness on Web of Beam
 - Acceptance Criteria – 250°F Ave / 325°F Individual Point on non-fire side
 - Rest of beam protected based on beam design
- 
- The technical drawing illustrates a cross-section of a beam with fireproofing. On the left, a side view shows a beam with a trapezoidal fireproofing profile. A horizontal line labeled 'A' indicates the section line. Callouts 1A and 1B point to the top surface of the fireproofing. On the right, 'SECTION A-A' shows the beam's cross-section. Callout 1C points to the vertical web of the beam, and callout 1D points to the fireproofing layer on the web. The fireproofing is shown as a stippled area, while the beam material is hatched.



UL Solutions Image

Firestop & Inspection - Fire Rated Expansion Joints = FF-D-4001, -1201, -1204...more



Balco, Construction Specialties, Inpro,
MM Systems, UL Solutions

Firestop & Inspection

FF-D-4001

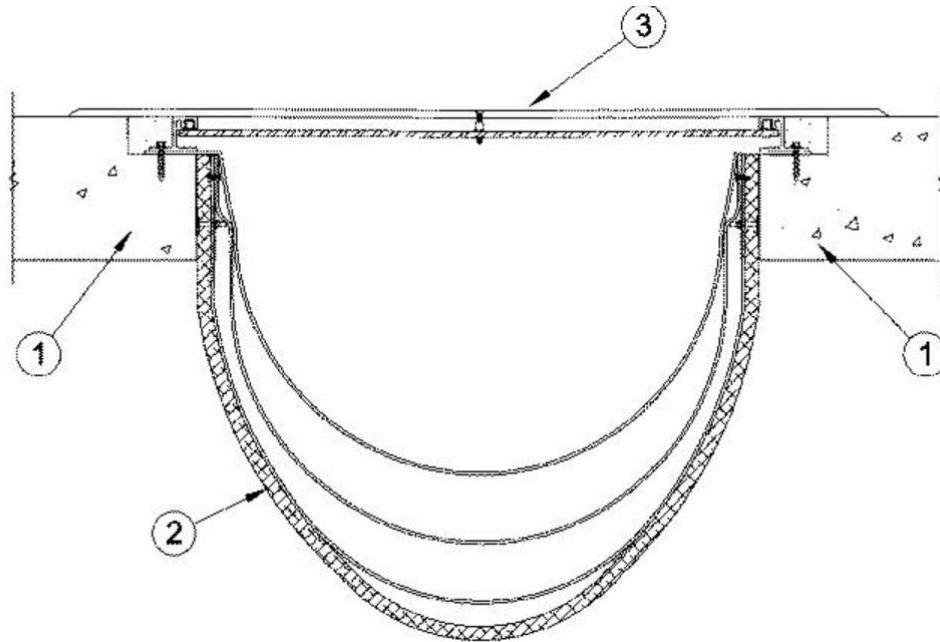
System No. FF-D-4001

September 20, 2000

Assembly Rating — 2 Hr

Nominal Joint Width — 25 to 36 in.

Class II and III Movement Capabilities — 50% Compression or Extension



1. **Floor Assembly** — Reinforced lightweight or normal weight (100-150 pcf) structural concrete having a min thickness of 4-1/2 in. at stepped-edges receiving joint cover (Item 3).

2. **Mechanical Joint Assembly*** — **Nom width of joint is 25 to 36 in.** Flexible multilayer mat material with galv steel mounting angles on longitudinal edges. The mechanical joint assembly shall be installed in accordance with the installation instructions accompanying the units.

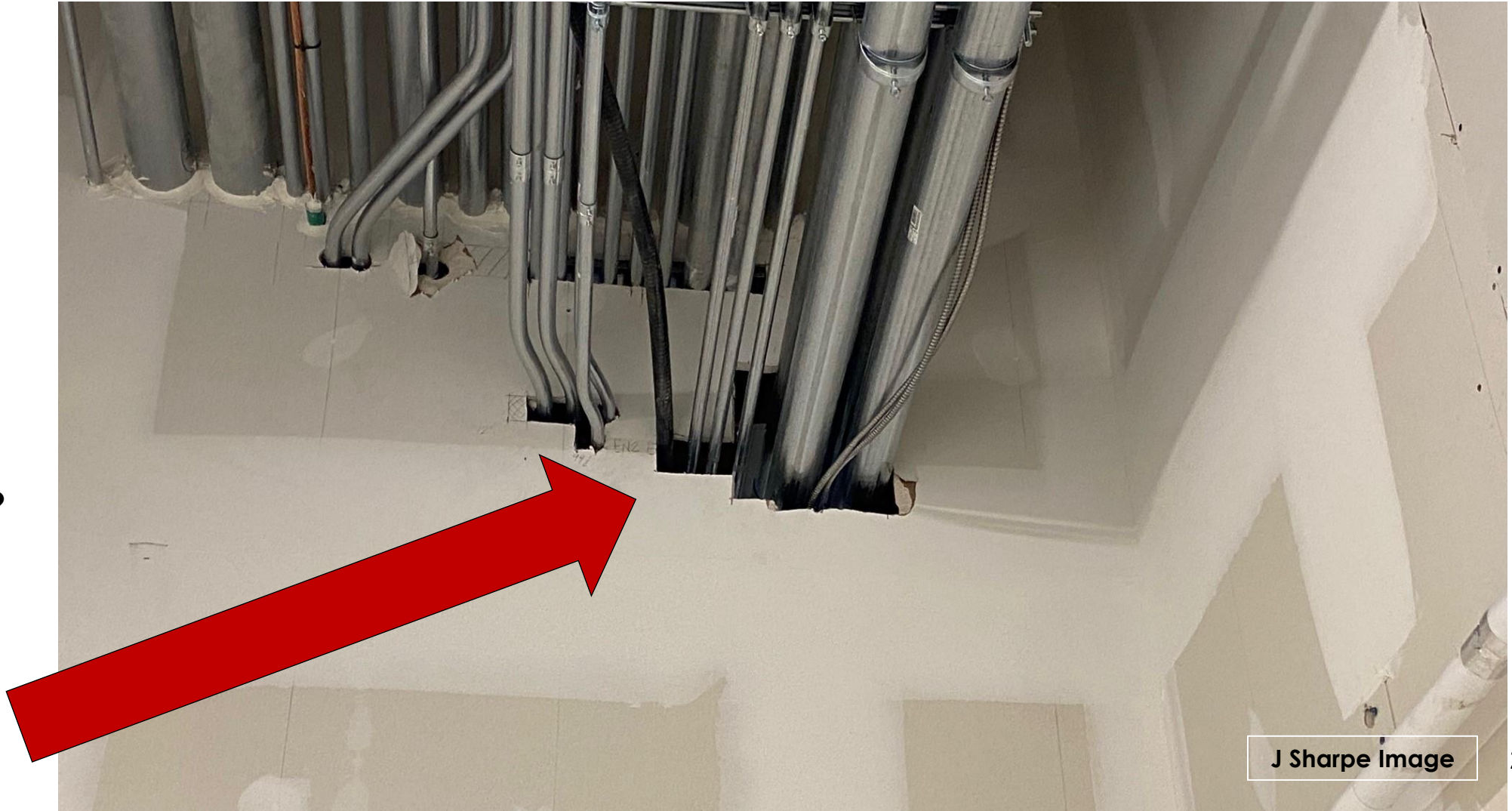
CONSTRUCTION SPECIALTIES INC — FB97-25F-++ through FB97-36F-++ (++=max width of joint opening)

3. **Joint Cover** — Min 0.030 in. thick joint cover formed of aluminum, bronze, stainless steel or galv steel. Joint covers anchored to floor slabs on each side of joint opening, continuous over entire length of joint, in accordance with the manufacturer's installation instructions.

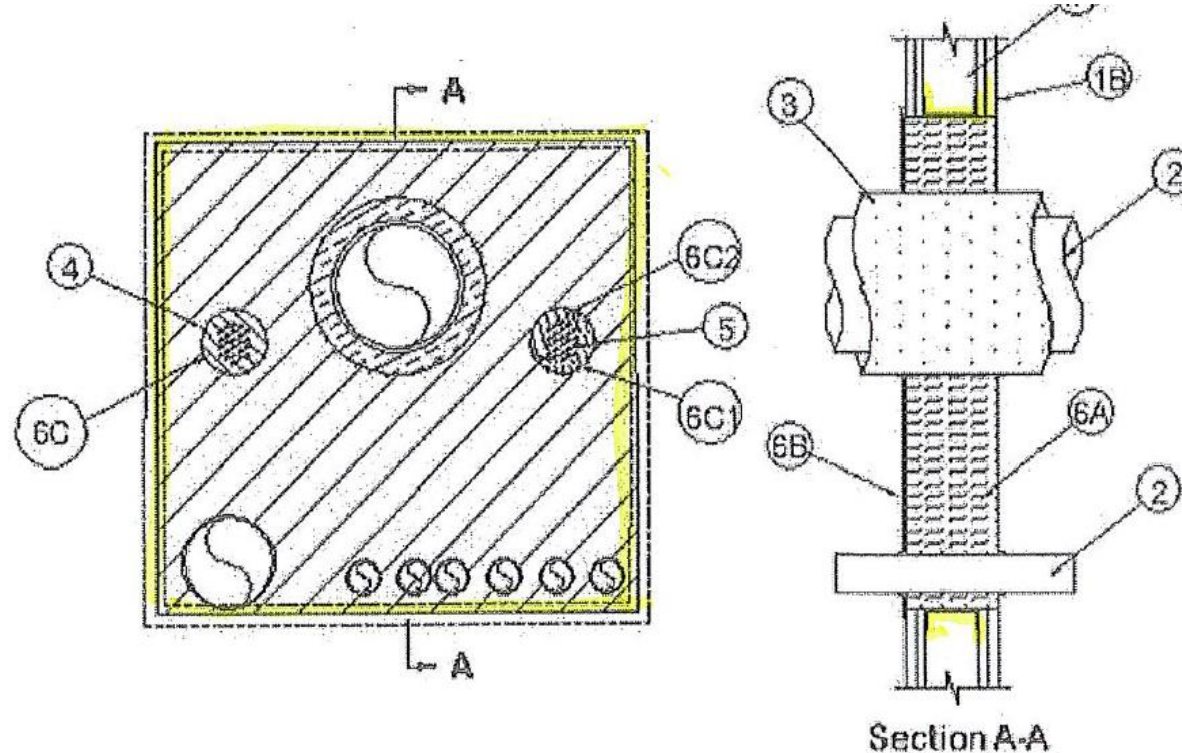
As an alternate, where the linear joint opening is enclosed within a chase wall and is non load bearing, a cover consisting of a creased sheet of min 2 mil stainless steel foil secured with 1 in. wide continuous galv steel washer strips along each side of the joint opening may be used.

Firestop & Inspection

FRAMING?



Firestop & Inspection



1. Wall Assembly — The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400, V400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:

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

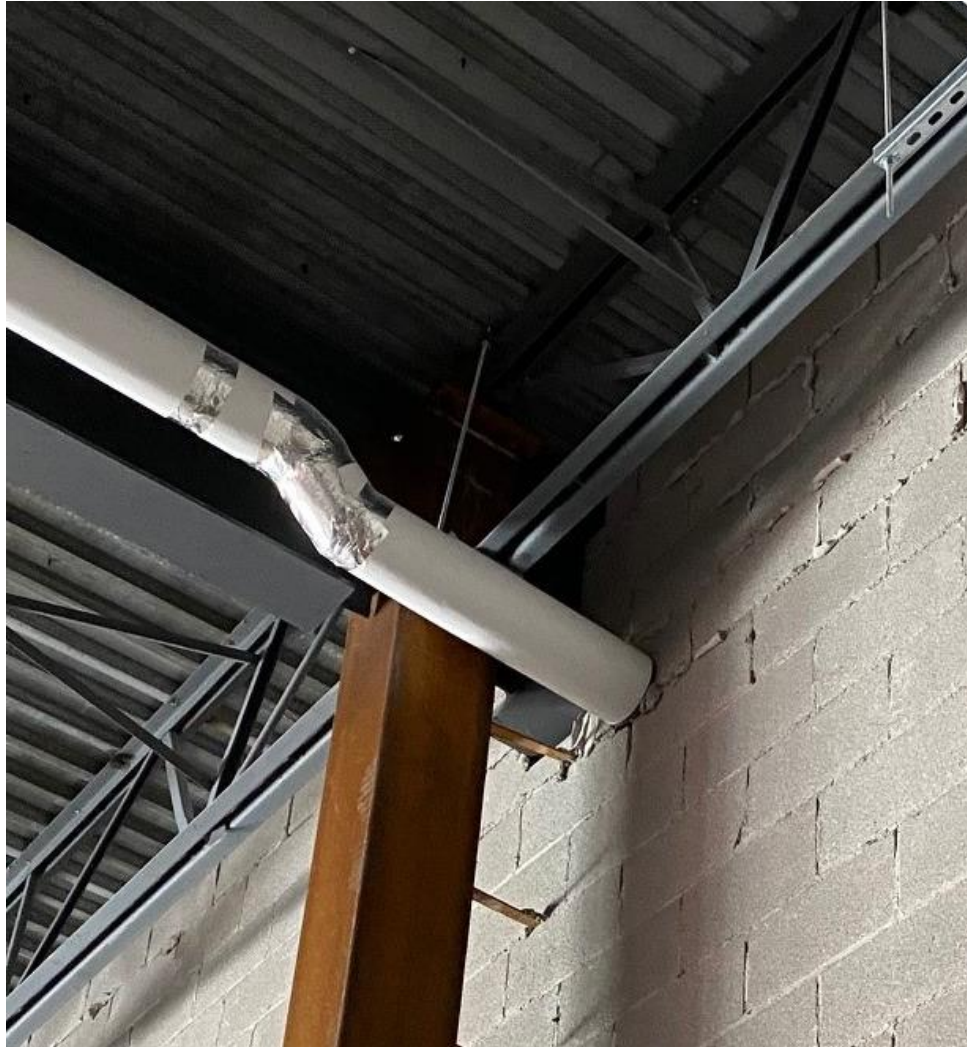
Firestop & Inspection

**Insulation
HIDING
Penetrating
Item**

**BIG Plastic
Pipes
NEED
COLLARS**

**Insulated
Metal
NEED
SEALANT
ONLY - MOST
CASES**

**BIG \$\$\$\$
Difference**



Firestop & Inspection

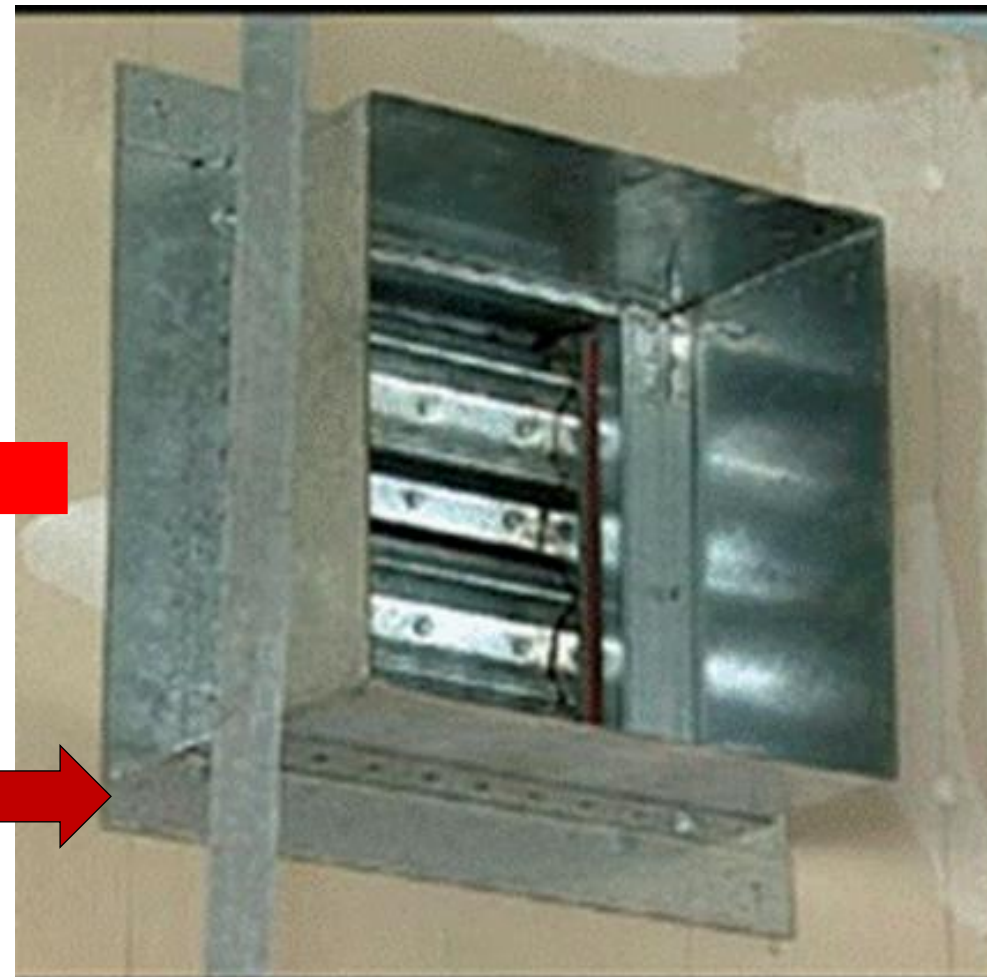
Transitions

Metal Pipe
Plastic Pipe

UNSAFE



Firestop & Inspection



Fire Damper Annular Space?

Firestop & Inspection

Annular
Space
Control

System
LIMITS
ANNULAR
SPACE



Firestop & Inspection



Mineral Wool and??

Heckler Photo

Firestop Inspection in Codes

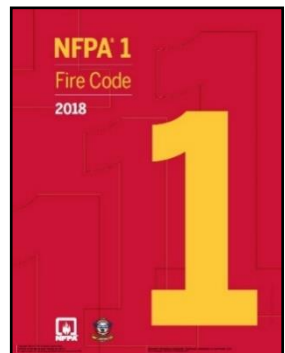
ASTM E2174 - ASTM E2393

- NFPA 101 / 5000 - Chapter 8 - Annex
- NFPA 1, Ch. 12 – ‘Quality Assurance Program’
- 2012 – 2018 International Building Code
 - CH 17 – Special Inspections
 - Buildings 75’ & higher above Fire Department Access
 - ***R Occupancies >250 occupants***
 - Occupancy Type III, IV, Chapter 16 Table 1604.5
- Abu Dhabi International Building Code
- National Building Code of Canada??
- Master Specifications

I – Inspection – NFPA 1 2018

12.3.2* Quality Assurance for Penetrations and Joints. In new buildings three stories or greater in height, a quality assurance program **for the installation of devices and systems** installed to protect penetration and joints shall be prepared and monitored by the RDP responsible for design. **Inspections** of firestop systems and fire-resistive joint systems shall be in accordance with 12.3.2.1 and 12.3.2.2.

= FM 4991/UL QFCP & ASTM E2174, ASTM E2393



I – Inspection – IBC Code Requirements

1705.16 Fire-resistant penetrations and joints. In **high-rise buildings or in buildings assigned to Risk Category III or IV in accordance with Section 1604.5, special inspections** for through-penetrations, membrane penetration firestops, fire resistant joint systems, and perimeter fire barrier systems that are tested and listed in accordance with Sections 714.3.1.2, 714.4.1.2, 715.3 and 715.4 shall be in accordance with Section 1705.16.1 or 1705.16.2. [IBC 1705.16]

I – Inspection – IBC Ch. 17, Ch. 2

TWO AHJ APPROVALS REQUIRED

APPROVED AGENCY. An **established and recognized agency** regularly engaged in conducting tests or furnishing inspection services, when such agency has been *approved*. [IBC 202 Definitions]

SPECIAL INSPECTOR. A qualified person **employed or retained by an *approved agency*** and *approved* by the *building official* as having the **competence** necessary to inspect a particular type of construction requiring *special inspection*. [IBC 202. Definitions]

Inspector Qualifications in ASTM E2174/E2393

- **FIRM 'Independent of, and Divested from ' Installing firm, Distributor, Manufacturer, Competitor, Supplier...**
- **FIRM 'Not a Competitor of the Installer, contractor, manufacturer, or supplier**
- **Inspector is other than the contractor...(GC)**
- **Submit notarized statements of Independence...**
- **2 Years Experience in construction inspections...**
- **ASTM E3038??**

Inspection Firm Qualifications – IAS AC 291

Management System Items

- **Minimum Qualifications & Technical Competency**
 - Firestopping – UL, FM, or IFC Firestop Exam Training, Inspector Supervision
- **Contracts – ‘within area of expertise’**
- **Safety**
- **Measuring & Monitoring Resources**
- **Recordkeeping**
- **Sample Handling**
- **Report Content, Coverage, Dispatching**
- **Complaints, Appeal, Feedback**
- **Internal Audits**



Inspection Firm Qualifications – IAS AC 291

Management System Items

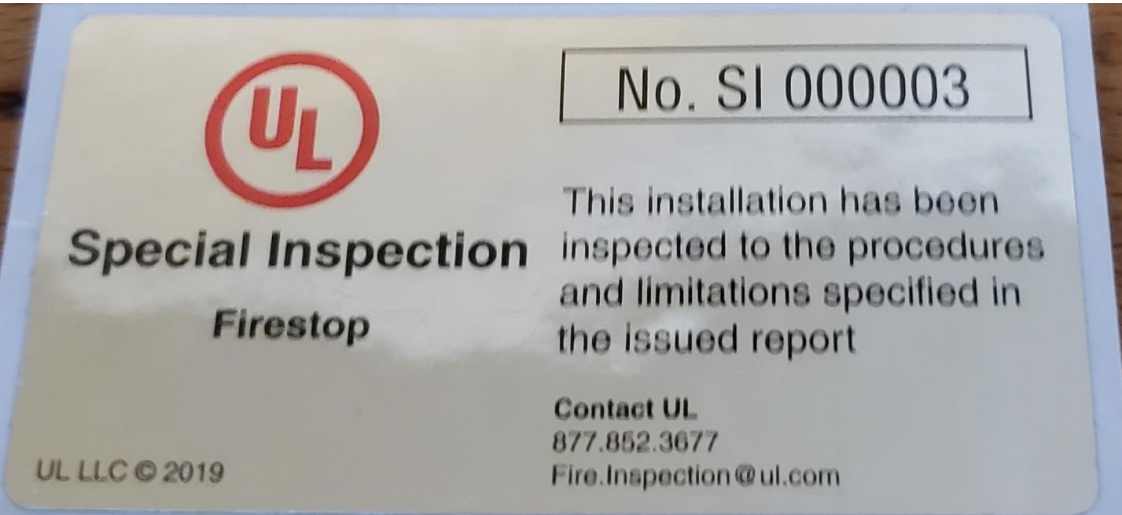
- **Risk to Impartiality – Conflicts of Interest**
- **Insurance**
- **Legal**
- **Intermediate and Final Reports**
 - **Notification of Discrepancies**
- **Status Reviews**
- **Management Review**

Firestop Special Inspection


ASTM E2174 – ASTM E2393

- Inspection Documents
 - Systems, Materials,
 - Manufacturers Instructions,
 - SDS,
 - Plans – Assembly Type
- Identification Systems (Labels)
 - Firestop Contractor Installed
 - Speeds System Evaluation

Firestop Installation, Special Inspection & Labels



Installed by (Contractor's name and address),
an FM Approved Firestop Contractor
Do Not Disturb – Fire Resistance Rated System
Serial No. xxxxxx


APPROVED

Firestop Inspection Process

ASTM E2174 – ASTM E2393

- **Observation Reviews**
 - During construction
 - Witnessed randomly of the installed systems on each floor
 - **E2174 - 10%, each **type** of Service Penetration Firestop System**
 - **Type = By System, By Firestop Installing Contractor**
 - **E2393 - 5% of Total Lineal Feet for each **type** of Fire Resistance Rated Joint System**
 - **Type = By System, By Firestop Installing Contractor**



Affinity Firestop Photo

Firestop Inspection Process

ASTM E2174 – ASTM E2393

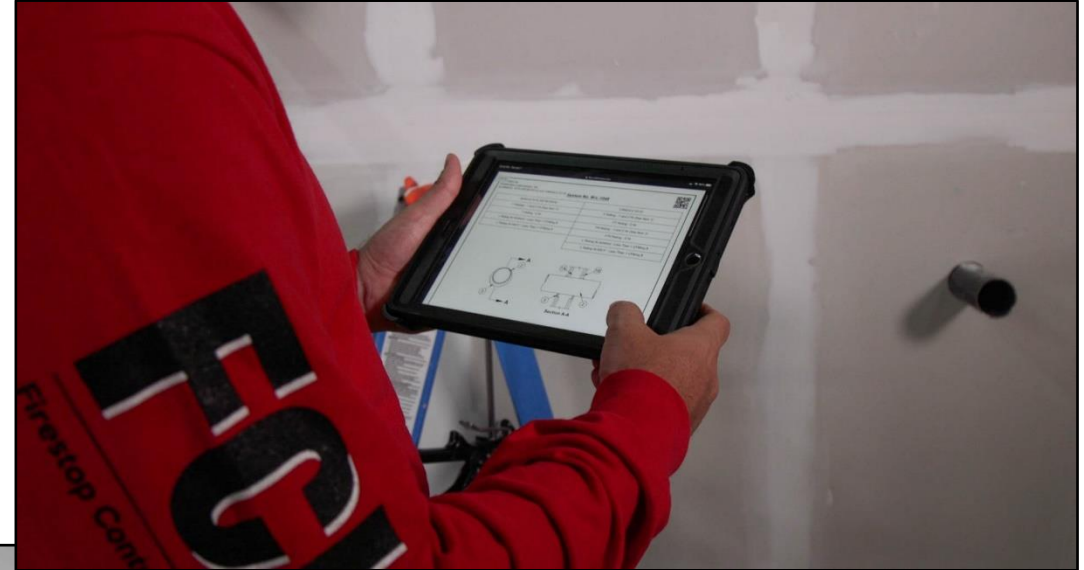
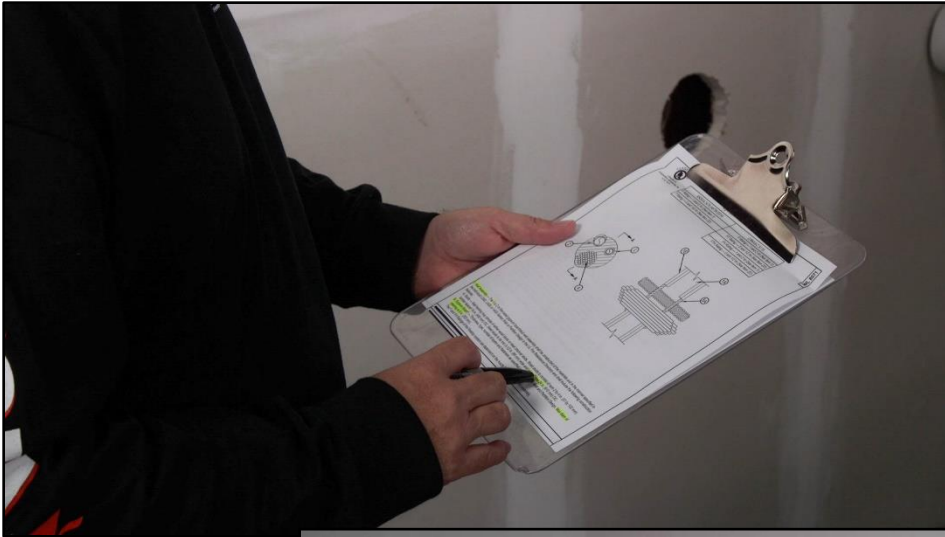
- Destructive Reviews (Testing)
 - Performed Post-Construction
 - **E2174** - Minimum 2%, no less than 1, each **type** per 930 m² (10,000 SF) of floor area
 - **Type = By System, By Firestop Installing Contractor**
 - **E2393** - Minimum 1 / 152 LM (500 LF) of Joint Area, by **type**, mandatory; Exception mechanical joints
 - **Type = By System, By Firestop Installing Contractor**



Affinity Firestop Photo

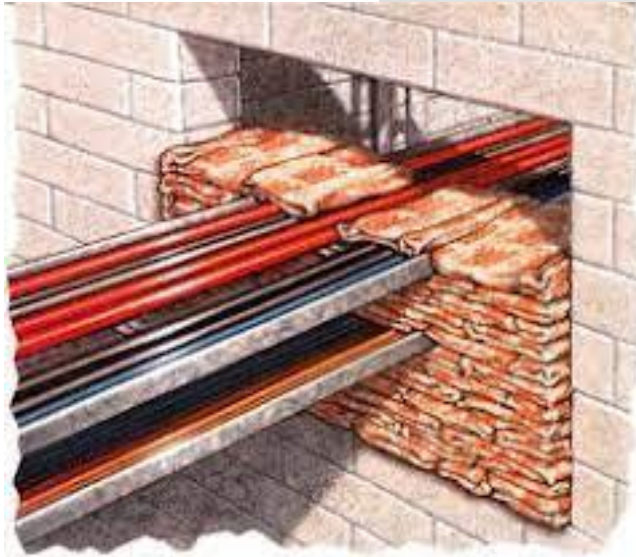
I – Inspection – VERIFY VS. LISTINGS....

2% Destructive or 10% Observation



I – Inspection – Procedures

- **Bags, Bricks, Foam**
 - **Wall/floor Type/Thickness**
 - **Penetrating Item(s)**
 - **Hole Size**



I – Inspection – Procedures

- MCT - Open Path
- Hole size, Pen(s)
- Wall/floor Type/Thickness



STI Image



Hilti Image

I – Inspection – Procedures

- **Firestop Mortar**
 - Hole size
 - Penetrating item(s)
 - Wall/floor Type/Thickness



Hilti Image

I – Inspection – Procedures

- **Firestop Composite Sheet**

- Fasteners
- Sealants/Wrap Strips
- Spacing
- Hole Size
- Tray Type, Size
- Penetrating Item(s)
- Wall/floor Type/Thickness



STI Image

I – Inspection – Procedures

- **Mineral Wool & Firestop Spray – Mineral Wool**
 - Compression, Orientation, Thickness, Product
 - Spray Thickness, Overlap
 - Gap Size
 - Wall/floor Type/Thickness



Hilti, STI Images



I – Inspection – Procedures

- **Mineral Wool & Firestop Tapes**
 - Density, Compression, Orientation, Product Type
 - Overlap, Adhesion
 - Wall/floor Type/Thickness



3M Image

I – Inspection – Procedures

- **Wrap Strips – Devices**
 - Elastomer Count/Size
- **Composite Sheet**
- **Kits**
 - Fasteners
 - Attachments
 - Bands
- **Bags**
- **Bricks**
- **Foam**



Hilti Image



STI Image

I – Inspection – Procedures

- **Wrap Strips – Devices**
 - Elastomer Count/Size
- **Composite Sheet**
- **Kits**
 - Fasteners
 - Attachments
 - Bands
- **Bags**
- **Bricks**
- **Foam**



Hilti Image



STI Image

I – Inspection – Procedures

- Firestop Sealants / Firestop Sprays
- Multiple Locations
- Forming Materials
 - Density
 - Compression
 - Fiber Orientation
 - Depth
 - **Tightly Packed**
 - **Wall/Floor Type, Thickness**
 - **Hole Size, Shape**
 - **Penetrating Item (s), covering, spacing**



Affinity Image

I – Inspection – Procedures

- Multiple Locations
- Sealants
 - Identify
 - Depth
 - Measure at 'Bond Line'
 - <2" – 2 locations 4 points
 - SHRINKAGE?

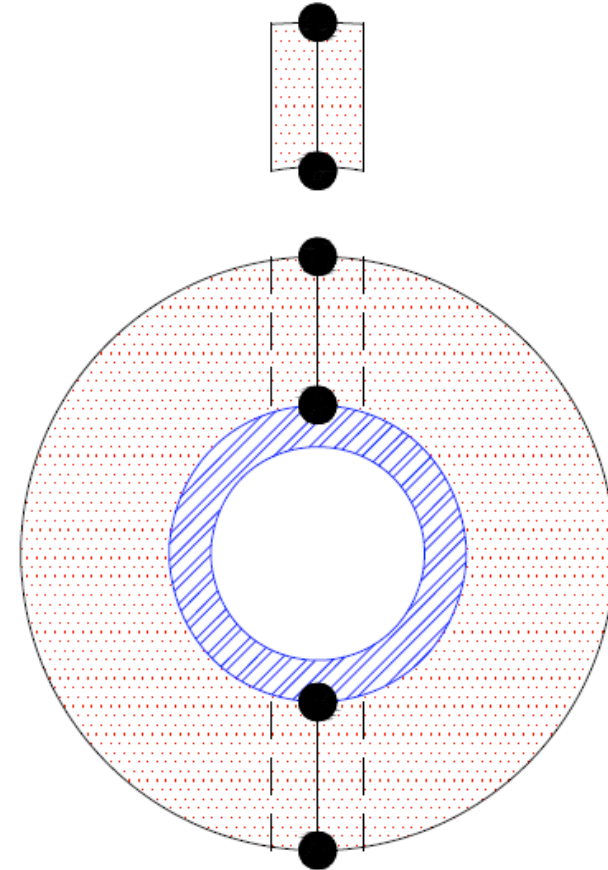


Figure 4

IFC Image

I – Inspection – Procedures

- Multiple Locations
- Sealants
 - Identify
 - Depth
 - Measure at 'Bond Line'
 - **<6" >2" – 3 Locations, 6 points**
 - SHRINKAGE?

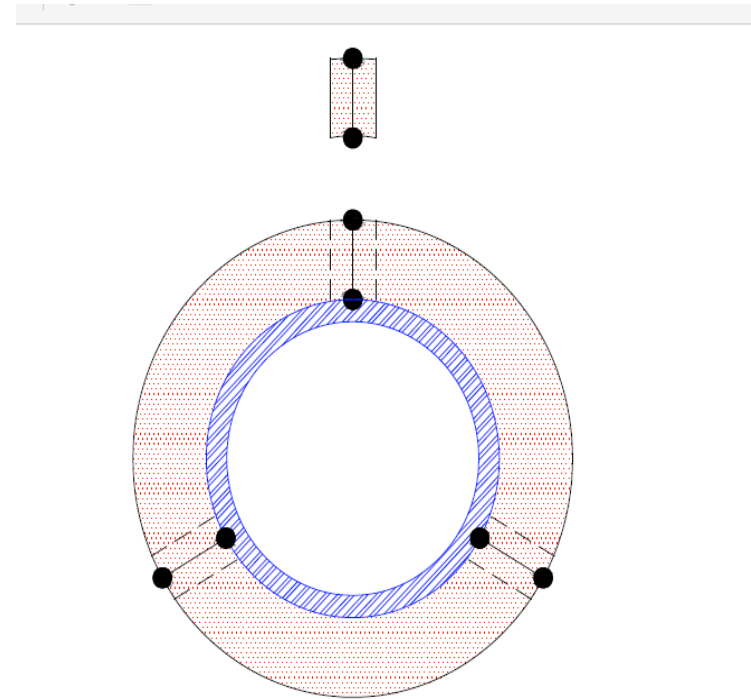


Figure 3

I – Inspection – Procedures

- Multiple Locations
- Sealants
 - Identify
 - Depth
 - Measure at 'Bond Line'
 - >6" – 4 Locations, 8 points
 - SHRINKAGE?

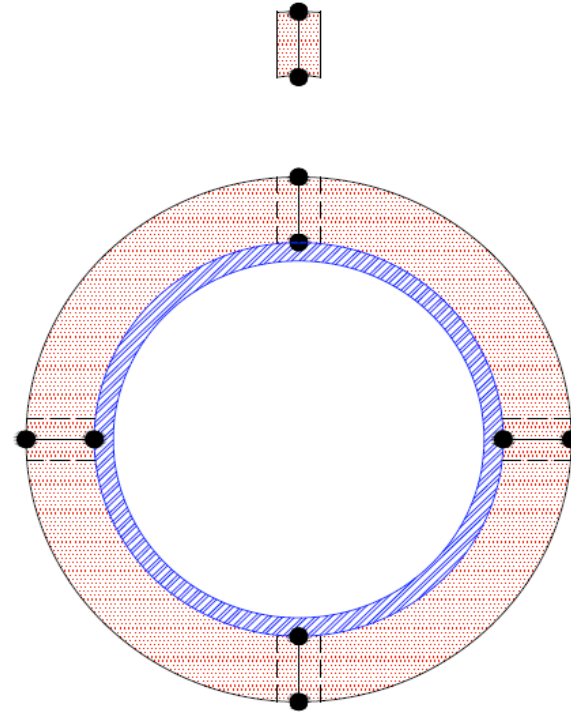
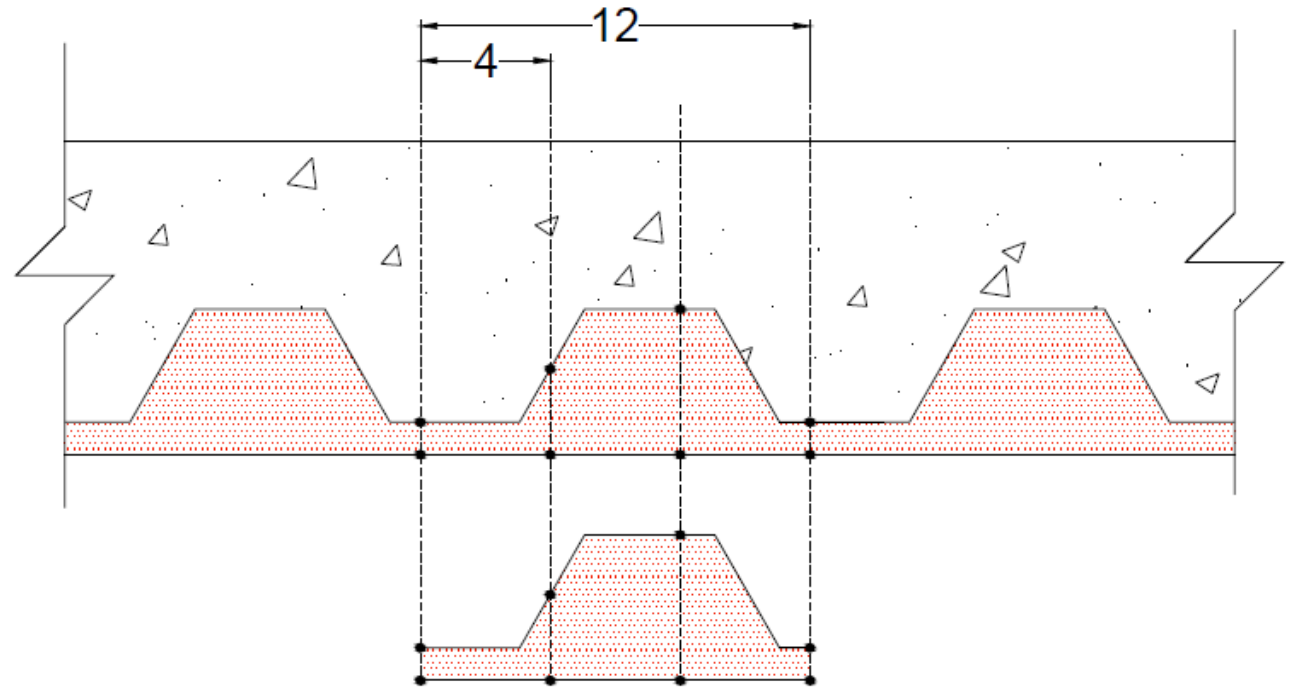


Figure 2

IFC Image

I – Inspection – Procedures

- Multiple Locations – JOINTS – HW, FF, FW, WW, Perimeter
- Sealants/Sprays
 - Identify
 - Depth
 - Measure at 'Bond Line'
 - **1/500 LF @ 8 Locations**
 - SHRINKAGE?



IFC Image

Firestop Identification system - LABELS

- **“Firestop System #XX – Do Not Remove or Tamper”**
 - Tested and listed system number.
 - Date of Installation.
 - Installing Contractor Company name, contact information.
 - Installing Individual Identifier

OR

- Bar Code
- Location Identifier in the Cloud
- 6” over, under, besides...



Adler Firestop Photo

Firestop Inspection Process

ASTM E2174 – ASTM E2393

- Variances / Deviation Notification
- ASTM E2174 & ASTM E2393
 - FS Contractor is notified of any deficiencies within **one day**
- IBC 1704.2.4
 - Work is in conformance to the documents
 - Otherwise it is **immediately** brought to the attention of the FS Contractor
 - If not corrected, AHJ and AA will be informed to take action



Affinity Firestop Photo

- **COMMUNICATION AGREEMENT**

Execution – Special Inspections

- **What's Acceptable?**
- **Firestopping *installation* in accordance with**
 - **Manufacturers Instructions**
 - **PDS**
 - **SDS**
 - **MII**
 - **Sell Sheets**
 - **Listings**

LISTINGS....



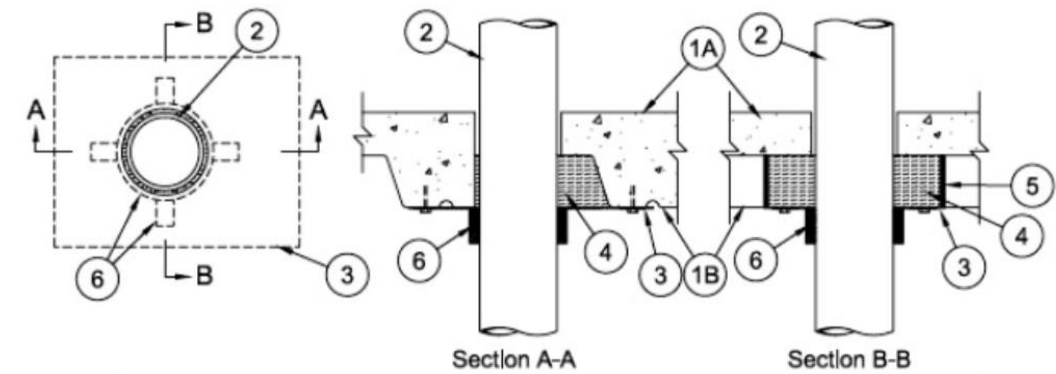
[General Information for Through-penetration Firestop Systems](#)

System No. F-A-2025

January 15, 2015

F Rating — 2 Hr

T Rating — 2 Hr



Firestop Inspection Process

ASTM E2174 - ASTM E2393

- Inspectors shall
 - Not be in CONFLICT...
 - Not supervise or direct FS Contractors
 - Systems Selection = Supervision
 - Commence reviews at FS installation
 - Review installation based on manufacturers installation instructions & Listing (system requirements)

Firestop Inspection Process – TOOLS...

ASTM E2174 - ASTM E2393

- Equipment – Options
 - Tapes
 - Tablets w/Systems
 - Borescope to explore areas that are concealed or partially
 - Flashlight
 - Laser Pointer
 - [Listings, Manufacturers Instructions]
 - NOT MICROMETERS



Firestop Repairs

- Repairs
 - Instruction requirements by manufacturer
 - Listed systems
 - Patch/infilling
 - Adhesion
 - Movement
 - F, FT, FH, FTH, L, M, W Ratings
 - ***As recommended by MFR***



Affinity Firestop Photo

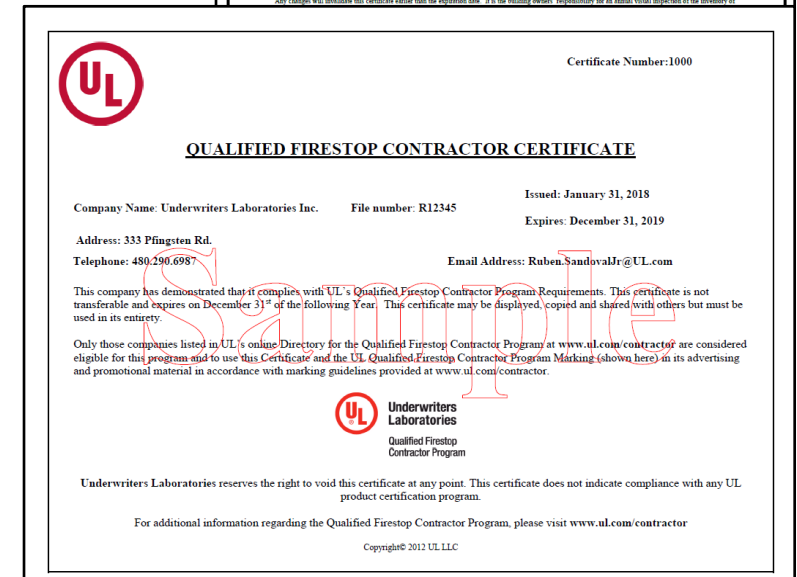
Master Audit Certificate of Compliance Program

A **Jobsite Specific Management System Audit** – Our audit provides verified processes were followed to properly installed firestop systems.

UL Solutions Image

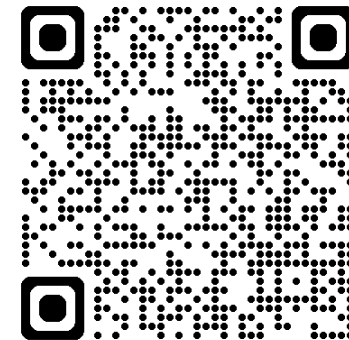
A **Renewable Jobsite Specific Certificate** – After completion of a successful audit, we issue a jobsite specific certificate that is renewable for the building owner.

Improved Firestop Systems Documentation – The MACC certificate in conjunction with the firestop systems documentation, **builds the fire-resistance inventory required by the 2018 International Fire Code** for fire and smoke protection features.



FM 4991 & UL/ULC QFC

- **UL QUALIFIED or FM 4991 APPROVED**
 - DRI – Appointed by Contractor, CEU's
 - Worldwide Program
 - Speeds Inspection
- **Listed @**
 - www.UL.com/PiQ
 - www.FCIA.org
 - www.ApprovalGuide.com

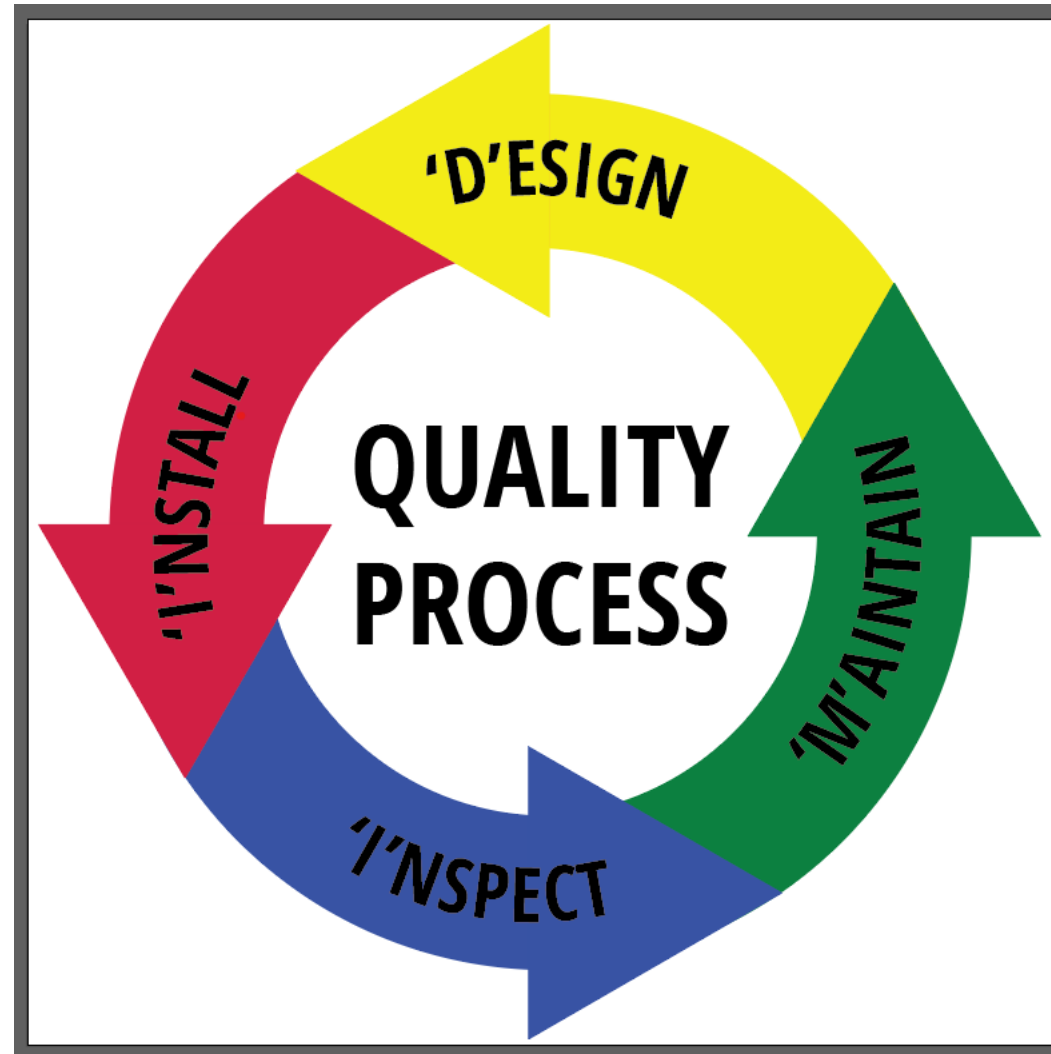
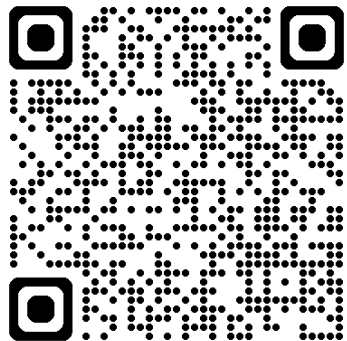


Firestop Systems – Module 4

Outline – Materials, Listings, Installation, Inspection

- Firestop Products
- Firestop Listings,
 - UL.com/PiQ – UL Product iQ
 - www.ApprovalGuide.com
 - Intertek Directory
- Installation Programs, QC, Management System
- Inspection

FM 4991/UL QFCP
Programs AND
Mfr. Education



PFP/BARRIER
MANAGEMENT
Fire Codes

IBC Ch. 17 -NFPA 80 - NFPA 1

FCIA 2025 DOHA MEMBER MEETING & SYMPOSIUM

PASSIVE FIRE PROTECTION INSPECTION

Presented by:

Bill McHugh

Abhishek Chhabra

FCIA/NFCA



PasFiPro '25

9-10 FEBRUARY | DOHA, QATAR

FCIA  **NECA** 