

FCIA at AWCI



March 27, 2009

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FCIA at AWC

- FCIA & AWC – 1994 - 2009
- *History of FCIA*
- *What's FCIA up to? Relationships*
- *Firestop Systems*
- *Quality contractors – DIIM, FM 4991, UL QFC*
- *Inspection*
- *FCIA's new Life Safety Organization*
- *Special program – AWC Mfrs.*
- *Why FCIA?*



FCIA at AWCI

- **Introducing FCIA – History**
 - ***1992 - 1999 – Contractors start businesses***
 - ***June 1998 – FCIA Association formed***
 - ***January 1999 – 1st FCIA Meeting – UL Chicago***
 - ***Committees & Strategies formed***
 - ***Accreditation***
 - ***Technical***
 - ***Code***
 - ***Liaison***
 - ***40 FCIA Contractor Members***



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- **Introducing FCIA - History**

- **1999 – 2001**

- *FCIA Accreditation Committee & FM Approvals
Develop FM 4991 – 1st DRI Exams*
 - *FCIA Technical Committee – Manual of Practice*
 - *FCIA Code Committee – Code, Standards*
 - *FCIA Liaison - Displays in Trade Shows*



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- **Introducing FCIA - History**

- **2001 – 2003**

- *FCIA Inspection idea becomes ASTM E 2174*
 - *Standard practice for the inspection...*
 - *FCIA & MasterSpec/BSD Relationship – FM Specs*
 - *FCIA Executive Director at Code Hearings*
 - *FCIA Code Consultant - Koffel Associates*
 - *FCIA Membership Grows to 75*
 - *FCIA Conferences Grow*
 - *FCIA Website, Enewsletters Grow*



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- **Introducing FCIA - History**

- **2003-2005**

- *FCIA Education Program for DRI Candidates*
 - *FCIA & MasterSpec add ASTM E 2174 to specs*
 - *FCIA Launches Life Safety Digest Magazine*
 - *Magazine of Effective Compartmentation*
 - *FCIA Membership grows to 120 members*
 - *FCIA Publishes Updates - Manual of Practice*
 - *FCIA Meets in Toronto, Canada*
 - *FCIA Apprenticeship & US DOL*
 - *FCIA Website - #1 Google – Firestop Contractors*
 - *FCIA “DIIM”*



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- **Introducing FCIA - History**

- **2006 – 2007**

- *FCIA & UL – Develop the UL Qualified Firestop Contractor Program*
 - *FCIA involved at IAPMO Code Efforts*
 - *FCIA joins UL Standards Technical Panel - Firestopping*
 - *FCIA Meets with NFPA 80 Chair – Add Firestopping*
 - *FCIA Meets in Montreal, Canada*
 - *FCIA Apprenticeship Standards Approved – WA State*



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- **Introducing FCIA - History**
 - **2007 & 2008**
 - ***FCIA Membership – Grows***
 - *175 in 2007, to 223 in 2008*
 - » *Domestic*
 - » *International*
 - ***FCIA IAS – Accreditation for Firestop Inspectors***
 - *AC 291 – DRI Exam, 1 year experience in quality assurance*
 - ***FCIA submits Firestop Draft to NFPA 80***
 - ***FCIA & Masterspec –***
 - *Add UL QFC*
 - *ASTM E2393*
 - *References FCIA MOP*



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- **Introducing FCIA - History**
 - **2007 & 2008**
 - *FCIA Plans Further Growth outside North America*
 - *FCIA at Trade Shows*
 - *Construction Specifications Canada*
 - *CONSTRUCT2008*
 - *FDIC*
 - *FCIA Firestop Inspector Accreditation Program*
 - *AC 291 – Firestopping Special Inspection Agencies*



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- **FCIA Membership – Bill Hoos, Chair**
 - **December 2000 – 40 Members**
 - **December 2005 – 123 Members**
 - **December 2006 – 141 Members**
 - **December 2007 – 171 Members**
 - **April 2008 – 165 Members...**
 - **December 2008 – 221**
 - **December 2009 – 270 ?**
 - **FCIA Retention about 88-94%**

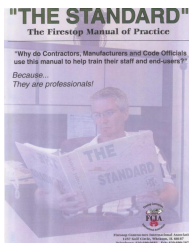


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- **Membership Growth Reflects FCIA's Activity...**

- Accreditation – FM, UL & IAS - Growth
- Apprenticeship – US BAT & SAC Dept. of Labor
- Technical & Education – MOP, UL TFPSS
- Codes & Standards – ICC, NFPA, ASTM, IAPMO
UL STP's
- Marketing – Relationships, Shows
- Program – Committee work, Education
- Legislative – Track, Advocate



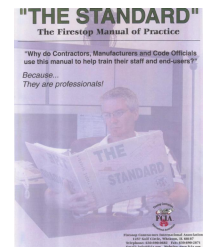
Build the Specialty Firestop Contractor Trade



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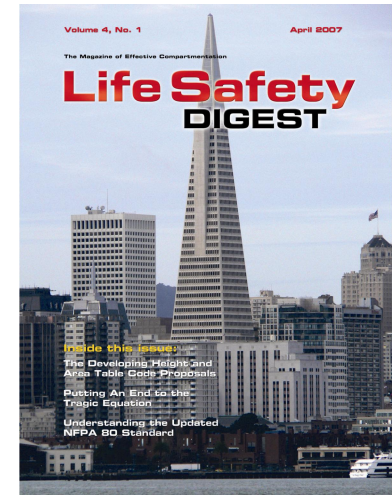


- **Membership Growth Reflects FCIA's Activity...**
 - FCIA Education Programs
 - FCIA UL Total Fire Protection Systems Symposium
 - FCIA Effective Compartmentation Symposium
 - FCIA Firestopping Quality Process
 - FCIA Education
 - *Build the Specialty Firestop Contractor Trade*



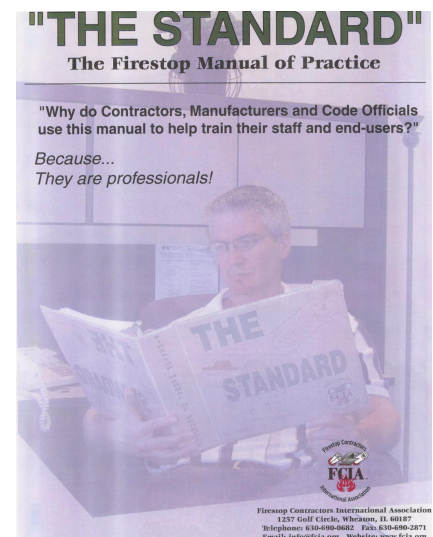
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- **FCIA Membership Benefits**
 - **FCIA Committee Participation**
 - **FCIA.org Website – 7000+/Mo.Visits**
 - Member Lists
 - FCIA FM, UL, IAS Contractor Lists
 - Members Only Access
 - **Discounts**
 - FCIA Manual of Practice & electronic updates
 - FCIA Conferences
 - **Relationships ...**
 - **FCIA Life Safety Digest, Enews**



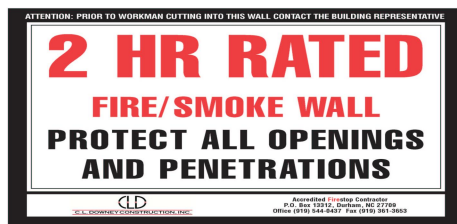
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- *Relationships*
 - *Contractors*
 - *Building Owners & Managers*
 - *Specifiers*
 - *Building Officials & Fire Marshals*
 - *FCIA at ICC – VO, H&A, TRB*
 - *FCIA at NFPA – FPF, FPRF, NFPA 80*



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- “TOTAL FIRE PROTECTION”
 - Effective Compartmentation -Fire Walls, Barriers, Smoke Barriers, / Fire Floors
 - Firestopping
 - Fire Dampers, Fire Glass
 - Detection & Alarm Systems
 - Sprinkler Suppression Systems
 - Building Personnel, Occupant and Firefighter Education



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Firestopping & Effective Compartmentation



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FCIA Code - Firestopping Focus – Design, Install, Inspect, Maintain

- **Designed** - A/E, Firestop Consultant
 - Tested and Listed Systems, FCIA Member Mfr's.
 - UL1479/2079, ASTM E814, E2307, BS476, ISO10295, EN 1366
- Properly **Installed**
 - FCIA Member, "FM 4991, or UL QFC Contractors"
- Properly **Inspected**
 - ASTM E 2174 & ASTM E 2393 Inspection
- Properly **Maintained**
 - FCIA Member, FM 4991, or UL QFC Contractor
 - International Fire Code; NFPA 101, soon NFPA 80

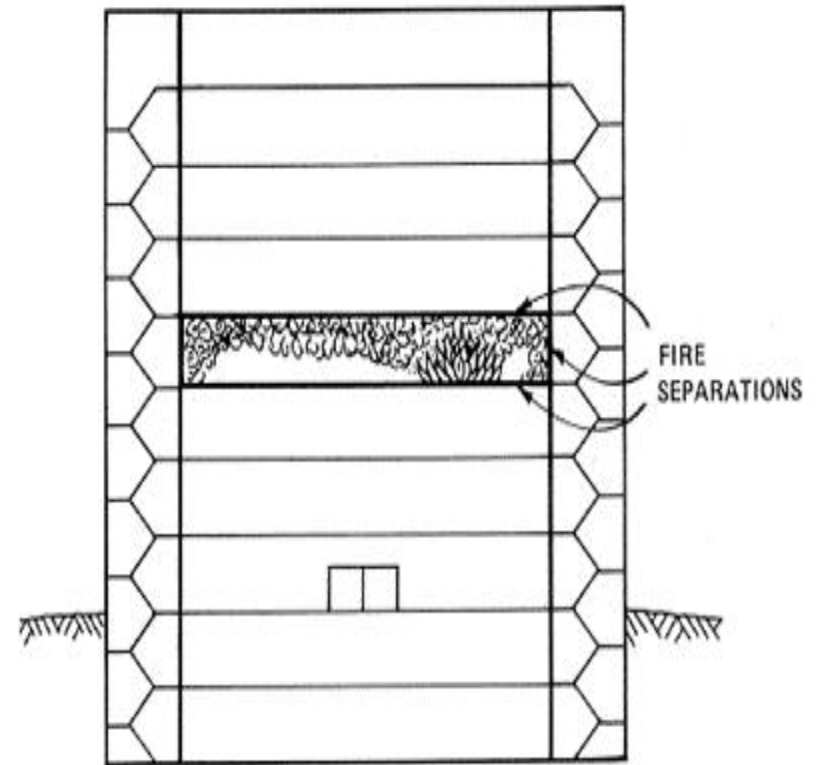
Means Reliable Firestopping and Effective Compartmentation

Firestopping, Compartmentation *and* Sprinklers



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- Effective Compartmentation & Firestopping
 - ***Specialty Firestop Contractors***
 - ***Zero Tolerance SYSTEMS***
 - ***DIIM***
 - ***Firestopping***
 - ***Compartmentation***



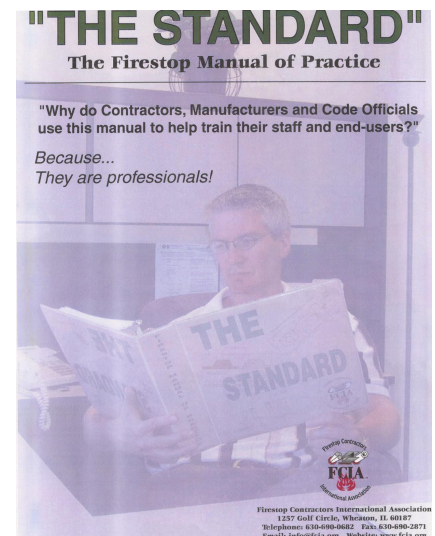
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- The FCIA Message...
 - Promote Specialty Firestop Contractor **TRADE**
 - Promote Firestop **SYSTEMS**
 - Promote **EFFECTIVE COMPARTMENTATION**
 - **Promote Reliability – “DIIM”**
 - **Develop the Specialty Firestop Contractor Trade Concept**



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- *Keys to Future Success*
 - Effective Fire-Smoke-Other Compartmentation
 - Finding more who share the DIIM Philosophy



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- **Code Requirements**
 - International Building Code – Chapter 7
 - New Construction
 - International Fire Code – Chapter 7
 - Existing Buildings
 - Enforced by Fire Marshal
 - NFPA 5000 – 101- Chapter 8
 - National Building Code – Canada
 - New and Existing Buildings
 - ***Minimum requirements for Construction & Maintenance***

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- **NFPA**
 - **NFPA 5000 – “Consensus Codes”**
 - **NFPA 101 – Life Safety Code**
 - **Healthcare Industry**

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- **US Codes were 3....**
 - **BOCA**
 - **SBCCI**
 - **UBC - ICBO**
- **Now One...or two**
 - **ICC Family**
 - **NFPA 5000**

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- **ICC=International Code Council**
 - **IBC – Building Code - New**
 - **IFC – Fire Code – Maintenance**
 - **Other “I-Codes”**

US ICC Adoptions – ICCsafe.org



FCIA Firestopping Process

- Compartmentation Codes - US
 - **Fire Resistance** – Time, in minutes or hours that materials or assemblies have withstood a fire exposure as determined by tests, methods based on tests, or this code NFPA. ICC adds...
“Systems”
 - **Ch. 7 – IBC - Fire Barrier** – Hourly Rated – IBC
 - **Ch. 8 - NFPA - Fire Barrier Walls** – wall other than fire rated, that have a fire resistance rating; 2 hour Rated – NFPA
 - **Ch. 7 IBC - Fire Wall** – Fire rating, structural independence
 - IBC – **Fire Partition** – Not Rated, not continuous.
 - IBC - NFPA - **Smoke Barrier** – Hourly Rated, continuous...

FCIA Firestopping Process

- Compartmentation Codes – US
 - **Smoke Barrier** – Firestopping
 - IBC – Hourly Rated, sealed, “**L**” *Rating* **<5cfm/sf**
 - NFPA - Similar
 - **Smoke Partition**
 - IBC – Continuous barrier, not rated
 - NFPA – Continuous membrane that is designed to form a barrier to limit the transfer of smoke.

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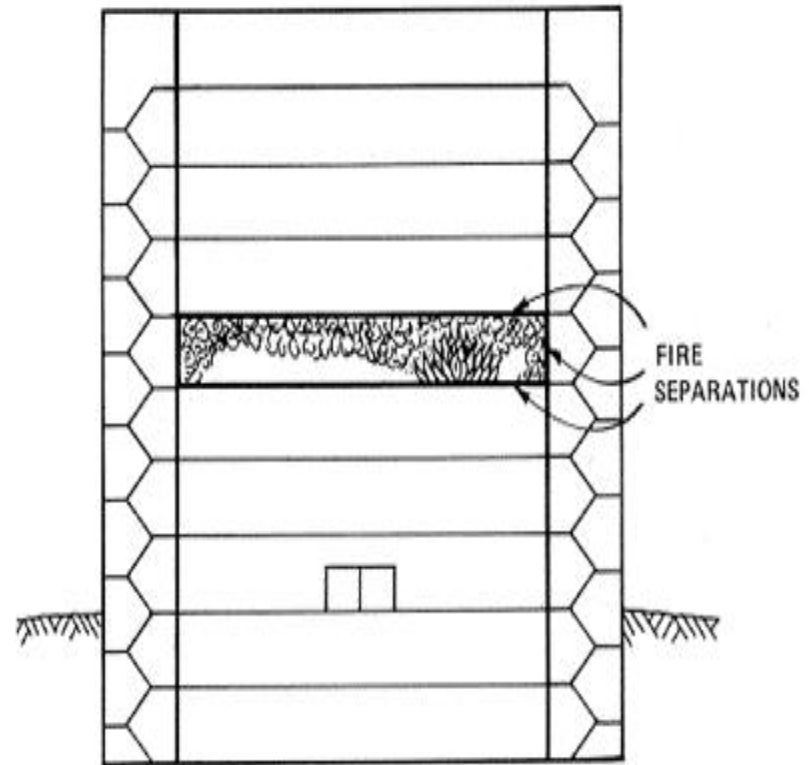
- Compartmentation - IBC?
 - Eliminated Rated Corridors in Schools, Others
 - Eliminated Rated Mechanical Rooms
 - Occupancy Separations Reduced
 - Increased Height and Area
 - Many “Sprinkler Trade Offs”

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- Optimization Debate
 - IBC Height and Area Tables
 - Increased allowable SF w/o compartments
 - Fire Resistance Rated Walls become '0' rated
 - » Add Non Resistance Rated Smoke Partitions
 - 12,000 SF to 250,000 SF depending on occupancy

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- Compartmentation Reductions
 - Education
 - Office
 - Mercantile
 - Multi Family Residential
 - Industrial – Insurance influences
 - Institutional - Healthcare – No change



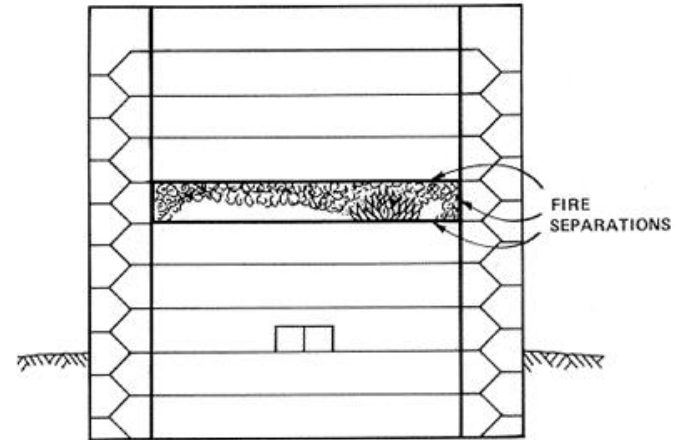
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- ***Supposition - Buildings are Safe because...sprinklers?***

NOPE...

- FCIA & Total Fire Protection
 - Detection & Alarms
 - Sprinkler Systems
 - Occupant Education
 - Compartmentation

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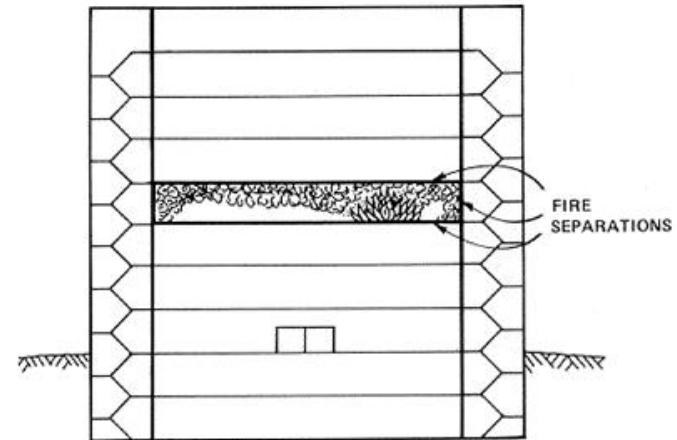
**LIFE SAFETY
&
HIGH-RISE
ORDINANCE**

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- Total Fire Protection Stats...
 - Detection & Alarms
 - Sprinkler Systems
 - Occupant Education
 - Compartmentation
- **11,000 *High Rises*, 70% in NY, SF, LA, CHI, HI...Compartmentation,etc...**
- **85% of *Schools* built before 1985...**

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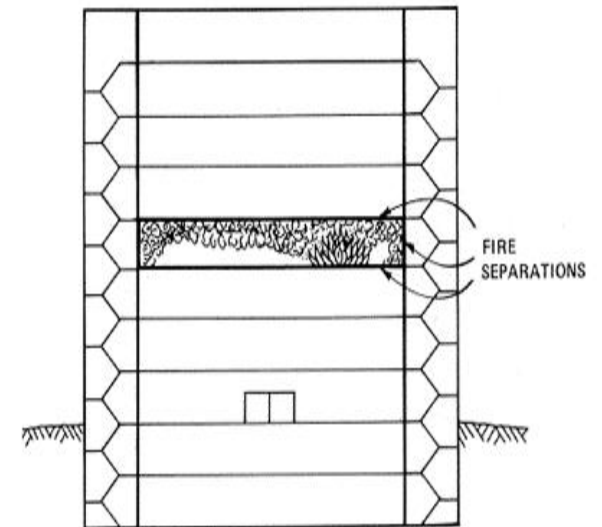
Chicago Dept. of Buildings



**LIFE SAFETY
&
HIGH-RISE
ORDINANCE**

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- Chicago High Rise Life Safety Code
 - Sprinklers in Pre 1975 Buildings
 - Now MANDATED as Required
 - ***COMPARTMENTATION EXCEPTION***
 - Life Safety Evaluation
 - Residential High Rise
 - Historic Structures



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The Canadian Commission on Building and Fire Codes (CCBFC):

- appointed by NRC
- members are volunteers
- represents regulators, construction industry and public interest

Oversees the code development system

*National Building Code of Canada
(NBC)*

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- Compartmentation Codes – Canada - NBC
 - *Fire separation* means a construction assembly that acts as a barrier against the spread of fire.
 - (See Appendix A.)
 - Appendix A:
 - *A fire separation may or may not have a fire-resistance rating.*

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- Effective Compartmentation for Safety
 - *Chemical, Biological, Radiation, Explosion*
 - Standards?
 - R - Nuclear Power Plants
 - E – Blast Strength? Check with manufacturer
 - C – Which Chemicals? Check with manufacturer
 - B – Which Agents? Check with manufacturer
 - How to Regulate for Terrorism?

FCIA at AWC Effective Compartmentation

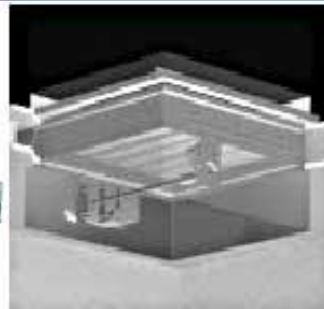
- Fire Walls and Floors –
 - *Continuous Fire Resistance Rated Assemblies*
 - Concrete
 - Concrete Block
 - Plaster
 - Gypsum Block
 - Drywall
 - Floor/Ceiling Assemblies
 - Firestop Systems

“Tested & Listed Wall/Floor Systems”



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Effective Compartmentation Features



New UL test standards for Life Safety
Dampers will take effect in July 2002



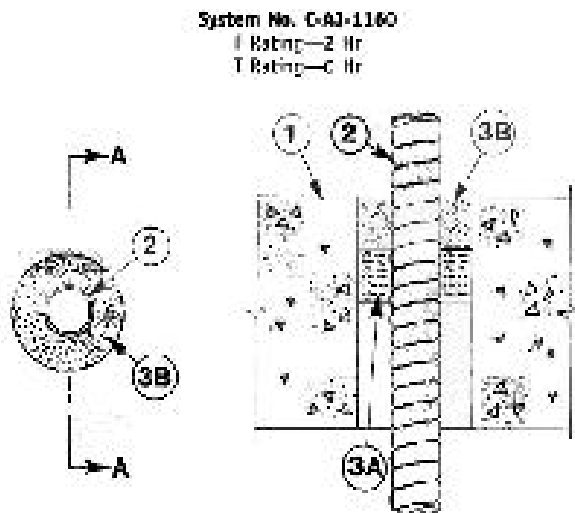
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- FCIA Members Understand Effective Compartmentation & Firestop Quality Process...
 - Firestop **Systems Tested to ASTM E 814, UL 1479/2079, CAN S-115, ASTM E 2307**
 - Specified by Professionals
 - **Installed by FCIA Member**
 - **Inspected to ASTM E2174 & ASTM E2393**
Inspection Process by Qualified Firms/Individuals
 - **Maintained** by FCIA Member Firestopping Contractors



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Design - Classified Systems



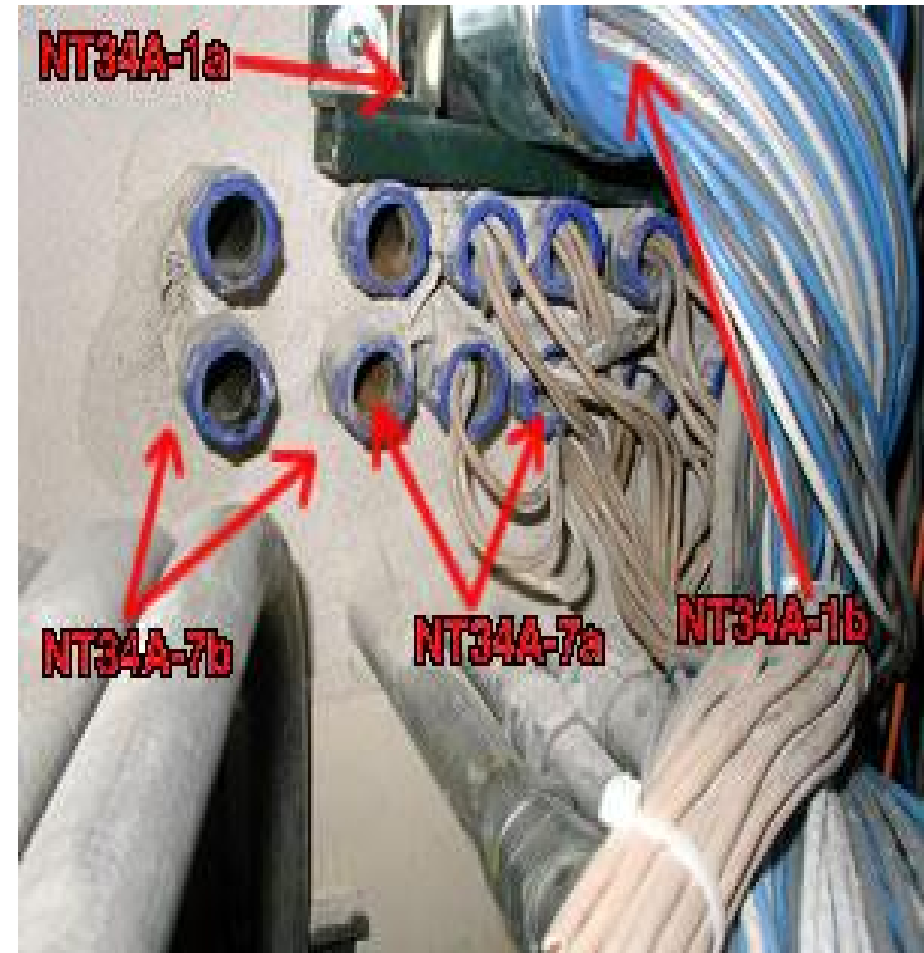
SECTION A-A

- Floor or Wall Assembly**—Min. 4-1/2 in. thick lightweight or normal weight (100 to 150 pcf) concrete. Wall may also be constructed of any UL Classified Concrete Block*. Size of circular through opening in floor or wall assembly to be 1/4 in. to 1-1/2 in. larger than diam. of flexible metal conduit (item 2) installed in through opening. Max diam. of opening is 6 in. See Concrete Block (LAC) category in the Fire Resistance Directory for names of manufacturers.
- Through Penetrating Product**—Max 4 in. diam. (or smaller) steel or non-ferrous (or smaller) aluminum Flexible Metal Conduits. Also one flexible metal conduit to be installed near center of circular through opening in floor or wall assembly. Flexible metal conduit to be rigidly supported on both sides of floor or wall assembly.
- Packing Material**—Max 1 in. thickness of ceramic (plumbe sticks) fiber blanket or mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be removed min. 1 in. from top surface of floor or from both surfaces of wall.
- FILL, Void or Cavity Material**—Caulk—Applied to fill the annular space around the flexible metal conduit. In floor, a min 3 in. depth of fill material to be installed flush with top surface of floor. In wall, a min 1 in. depth of fill material to be installed flush with wall surface on both sides of wall assembly.

Minnesota Mining & Mfg. Co.—11 77000

*Bearing the UL Classified Mark

(Bearing the UL Listing Mark)



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Design - Classified Systems



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- **Sealants**
 - Silicone, Latex, Intumescent
- **Wrap Strips**
 - “Thick, Thin, Wide, Less Wide”
- **Putties**
- **Pillows**
- **Composite Sheets**
- **Bricks / Plugs**
- **Pre Fabricated Kits**
- **Mortar**
- **Spray Products**
 - » Graphics
 - » STI, 3M, A/D, HILTI, Nelson



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- What are Firestop ***Systems***?
 - ASTM E814/UL 1479–UL S115 Tested Systems
 - **F Rating - Flame**
 - T Rating – Temperature
 - H Rating – Hose (CAN-Optional)
 - **L Rating – Smoke (UL)**
 - W Rating – Water (ULus)

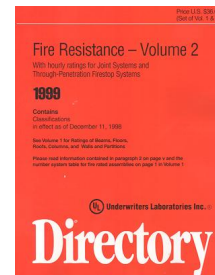


FCIA at AWC Hose Stream & “W” Rating



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- **Firestop Systems Directories – ULc, ULus[®],
*Systems Selection...Not as easy as it looks...***

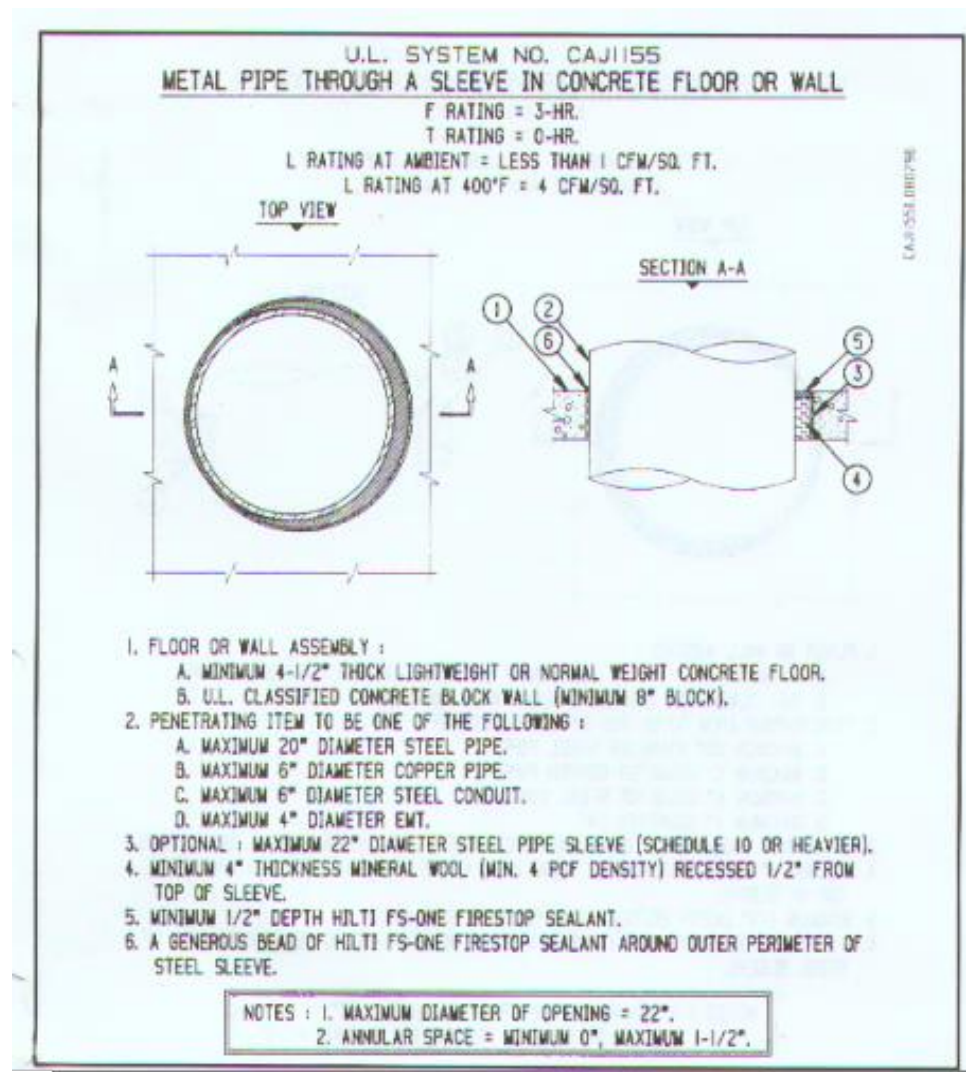


FCIA at AWC UL Systems

System Example:
CAJ

1155

Metal Pipe in
Concrete Floor or
Wall



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- **Firestop Systems Directories - UL[®]**

Alpha: The first letter is either “F” for floors, “W” for walls or “C” for a combination of walls and floors.

Alpha: The second letter or combination of letters, signify the following.

A	Concrete floors < 5”
B	Concrete floors > 5”
C	Frame floors
D	Deck construction
E – I	Reserved for future use
J	Concrete or Masonry walls < 8”
K	Concrete or Masonry walls > 8”
L	Framed Walls
M	Bulkheads
N – Z	Reserved for future use

FCIA at AWCI

- **Firestop Systems Directories - UL[®]**
 - F - Floors
 - W - Walls
 - C - Combination
 - A - Concrete floors < 5 inches
 - B - Concrete floors > 5 inches
 - C - Frame floors
 - D - Deck construction
 - E - I - Reserved for future use
 - J - Concrete or Masonry walls < 8 inches
 - K- Concrete or Masonry walls > 8 inches
 - L - Framed Walls
 - M - Bulkheads
 - N - Z - Reserved for future use

} First letter of the system

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- **Numeric:** The first digit of the four digit number, identifies the type of penetrant in accordance with the following list. The next three digits will be assigned sequentially to successfully tested systems.
 - 0000 – 0999 No Penetrant
 - 1000 – 1999 Metallic Pipe, Conduit or Tube
 - 2000 – 2999 Non Metallic Pipe, Conduit or Tube
 - 3000 – 3999 Cables
 - 4000 – 4999 Cables in a Tray
 - 5000 – 5999 Insulated Pipes
 - 6000 – 6999 Misc. Electrical Penetrates
 - 7000 – 7999 Misc. Mechanical Penetrates
 - 8000 – 8999 Mixed multiple penetrates
 - 9000 – 9999 Reserved for future use

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- **Firestop Systems Directories –**

- UL - Joints**

First letter of the system

- HW – S & D - Head of Wall
- BW – Bottom of Wall
- CW S & D – Curtainwall
- FF – Floor to floor
- FW – Floor to Wall
- CG – Corner Guards

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- **Firestop Systems Directories –**

- UL - Joints**

First letter of the system

- 0 – 999 = Less than 2" wide

- 1000-1999 = 2"-6"

- 2000-2999 = 6"-12"

- 3000-3999 = 12"-24"

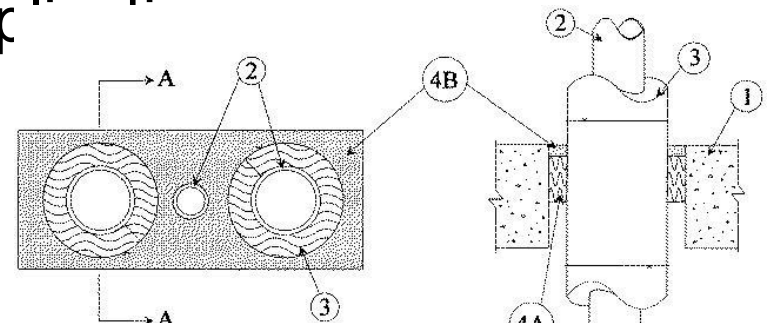
- 4000-4999 = 24++"

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- **ULc = AlphaNumeric:**
 - HW – Head of Wall Firestop Systems
 - JF – Joint Firestop Systems
 - SP – Service Penetration Systems
 - SPC – Service Penetration for Combustible Systems
- ***Renumbering is coming...similar to ULus***

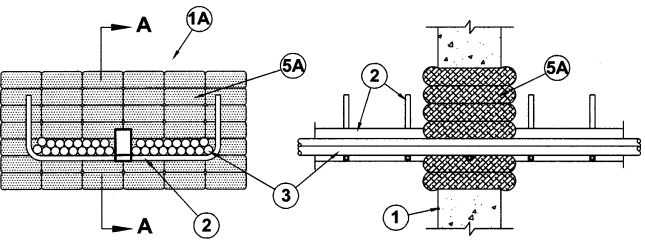
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- Firestop Products Become Firestop Systems --
 - “A Specific field erected construction, consisting of an assemblage of materials to prevent the spread of fire through openings in fire rated walls and floors using ASTM E 814 / UL 1479, S-115, UL 2079, E 2307, [BS476, ISO10295, EN 1366] as the test method...”
 - **S-115 – Incorporated all of UL 2079 in 2004**
 - **Testing** = Suitability statement for use of a firestop product in a specific system app “ “



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Design - Firestop Systems



Section A-A

System No. W-J-4021
F Rating — 2 Hr
T Rating — 0 Hr

- Wall Assembly** — Min 6 in. thick reinforced lightweight or normal weight (100-150 pcf) concrete. Wall may also be constructed of any UL Classified Concrete Blocks*. Max area of opening is 288 sq in. with max dimension of 24 in. See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.
- Cable Tray** — Max 18 in. wide by 6 in. deep center-hung cable tray formed from min 0.060 thick aluminum with nom 1/2 in. square tubular rungs spaced 6 in. OC. The annular space between the cable tray and the top and bottom of the opening shall be 1/2 in. min to 5-1/2 in. max. Cable tray to be rigidly supported on both sides of the wall assembly.
- Cables** — Max 3 in. deep cable loading within cable tray. Any combination of the following types and sizes of cables may be used:
 - Max 200 pair No. 24 AWG (or smaller) copper conductor cable with polyvinyl chloride (PVC) jacketing and insulation.
 - Max 7/C No. 2/0 AWG (or smaller) multiconductor power and control cables with XLPE or PVC insulation and XLPE or PVC jacket.
 - Max RG59/U (or smaller) coaxial cable with fluorinated ethylene insulation and jacketing.
 - Max 62.5/125 micron fiber optic cable with PVC insulation and jacketing.
 - Max 4 pair No. 24 AWG (or smaller) copper conductor Category 5 cable with Hytar insulation and jacketing.
 - Max 4/C No. 10 AWG (or smaller) copper or aluminum conductor aluminum or steel Metal-Clad# or Armored-Clad# cable.
- Nonmetallic Penetrants** — One or more nom 1-1/2 in. diam (or smaller) Optical Fiber Raceways* formed from either polyvinyl chloride (PVC) or polyvinylidene fluoride (PVDF). Min separation between optical fiber raceways is 2 in. When optical fiber raceway is included in the cable tray, no other cables may be installed in cable tray within 2 in. of optical fiber raceway. Raceway to be installed in accordance with Article No. 770 of the National Electrical Code (NFPA No. 70). See Optical Fiber Raceway (QAZM) category in the Electrical Construction Materials Directory for names of manufacturers.
- Firestop System** — The firestop system shall consist of the following:
 - Fill, Void or Cavity Material* — Pillows** — Max 9 in. long by 6 in. wide by 3 in. thick plastic covered intumescent pillows. Pillows to be installed lengthwise through the opening and positioned to extend equally in both directions from the approximate center line of the wall. Pillows tightly packed to fill the annular space between cables and periphery of opening and between cable tray and periphery of opening.
Specified Technologies Inc. — SpecSeal Firestop Pillows.
 - Fill, Void or Cavity Material* — Putty** — (Not Shown) — After installation of pillows (Item 4A), putty applied to seal any voids between cables, between cables and the pillows on both sides of the wall assembly.
Specified Technologies Inc. — SpecSeal Putty

*Bearing the UL Classification Marking
#Bearing the UL Listing Marking

Reproduced courtesy of Underwriters Laboratories, Inc.

Every application has its own unique UL tested assembly which specifies:

Hourly Fire Rating

Type of Barrier

Type of Penetrant

Min/Max Hole/Gap Size

Firestop Products

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How Systems are Selected & Installed

- Wall or Floor Construction Type
- Wall or Floor Thickness
- Penetrating Item, coverings
- Size of the Penetrating Item
- Annular Space, Gap Sizes
- Firestop Fill Material(s)

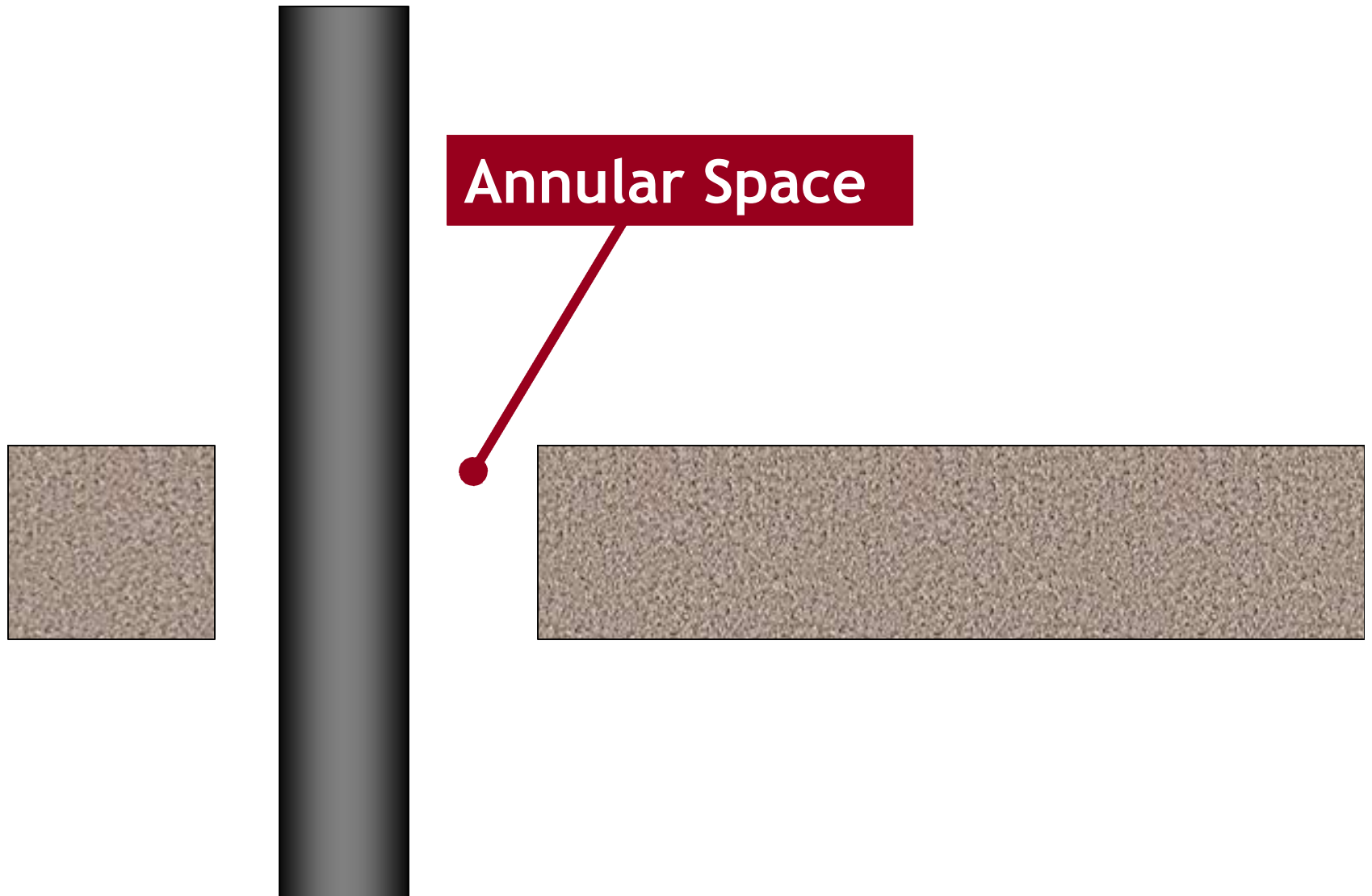


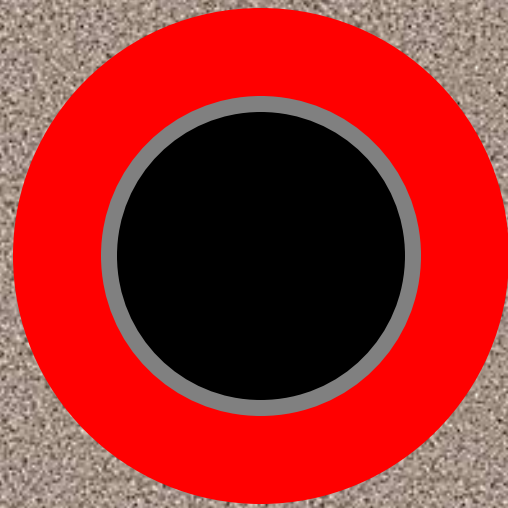
How Installers Select UL Systems

- Wall or Floor Construction Type
- Wall or Floor Thickness
- Penetrating Item, coverings
- Size of the Penetrating Item
- Annular Space, Gap Sizes
- Firestop Fill Material(s)

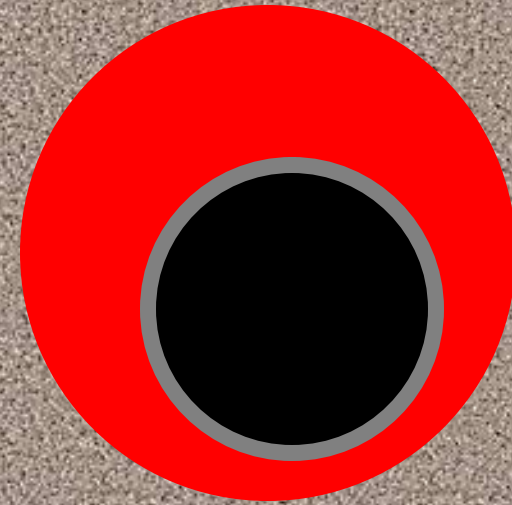


Min/Max Hole Size

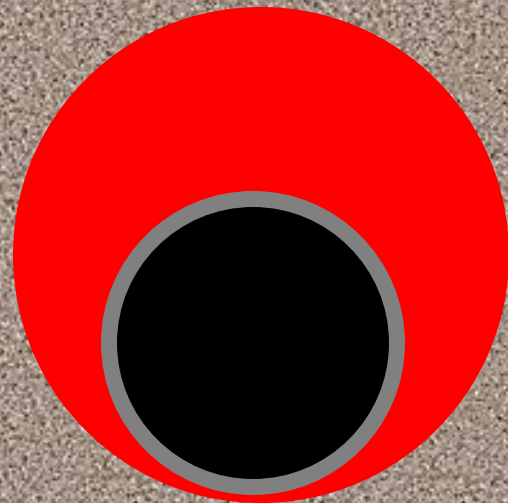




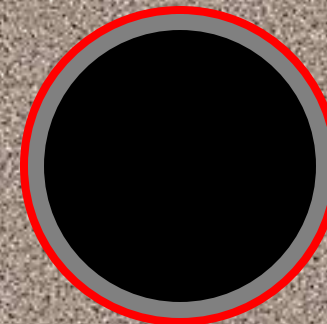
1. Centered



2. Off-Centered



3. Point Contact



**4. Continuous
Point Contact**

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- Field or other Variances to Tested and Listed Systems?
 - Too Many Penetrating Items
 - Annular Space / Gap too large / small
 - Something in the way
 - Oversized penetrating item
 - Oversized Insulation
 - Tolerances??



FCIA at AWC

- Variances to Systems? – Now What...
 - First Action in Process
 - **Find another system** – Same Manufacturer
 - Find another system – Different Manufacturer
 - **If no system exists in either case....**
 - *Engineering Judgment* – “EJ”
 - *Equivalent Fire Resistance Rated Assembly* – “EFRRRA”
 - *Based on sound engineering IFC Protocol*
- ***SPECIFY THE RULES FOR THIS***

Firestop sealant must be well bonded to
penetrating item and surrounding wall or
floor



Pack

1



Caulk

2

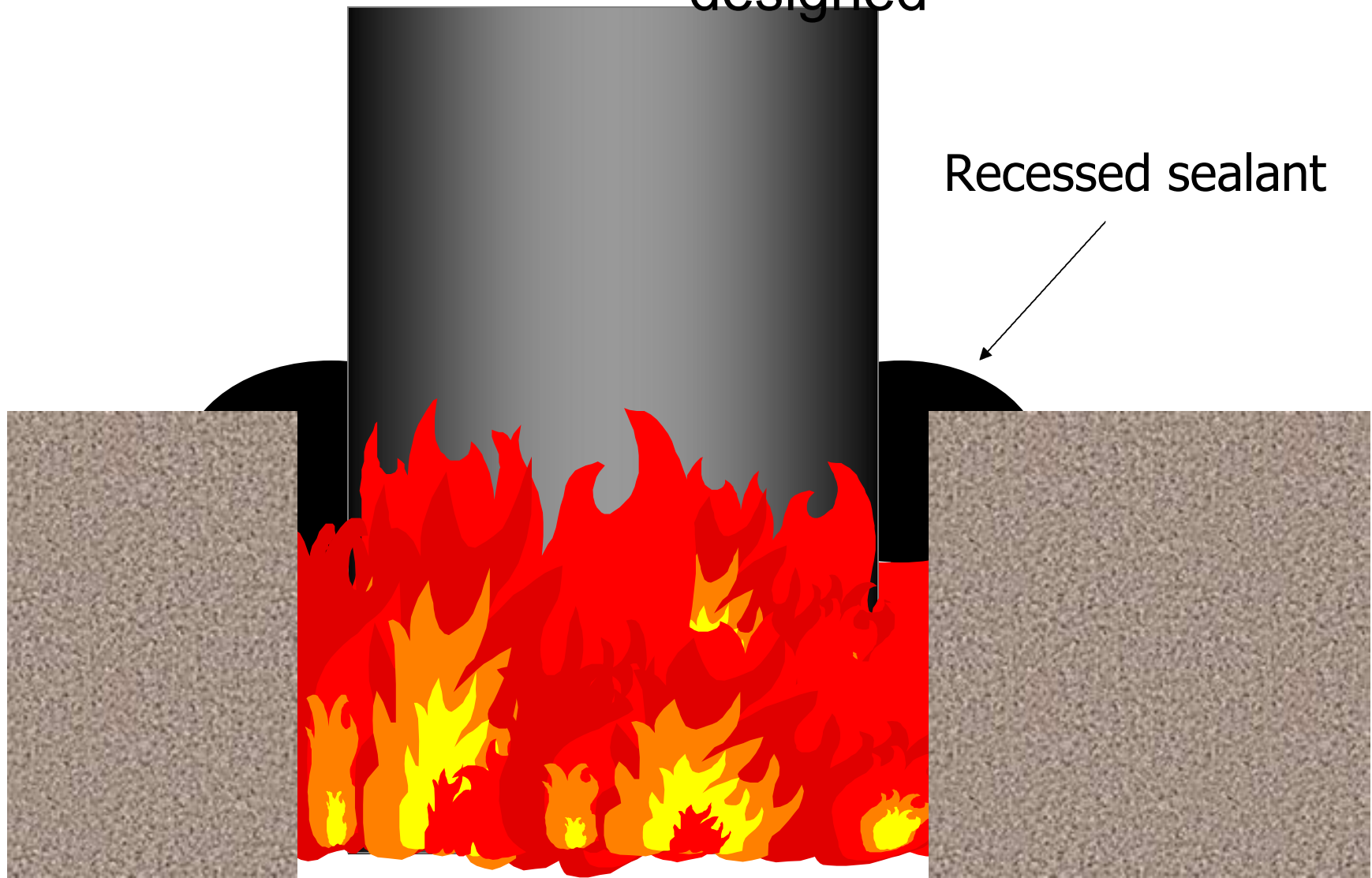


Tool

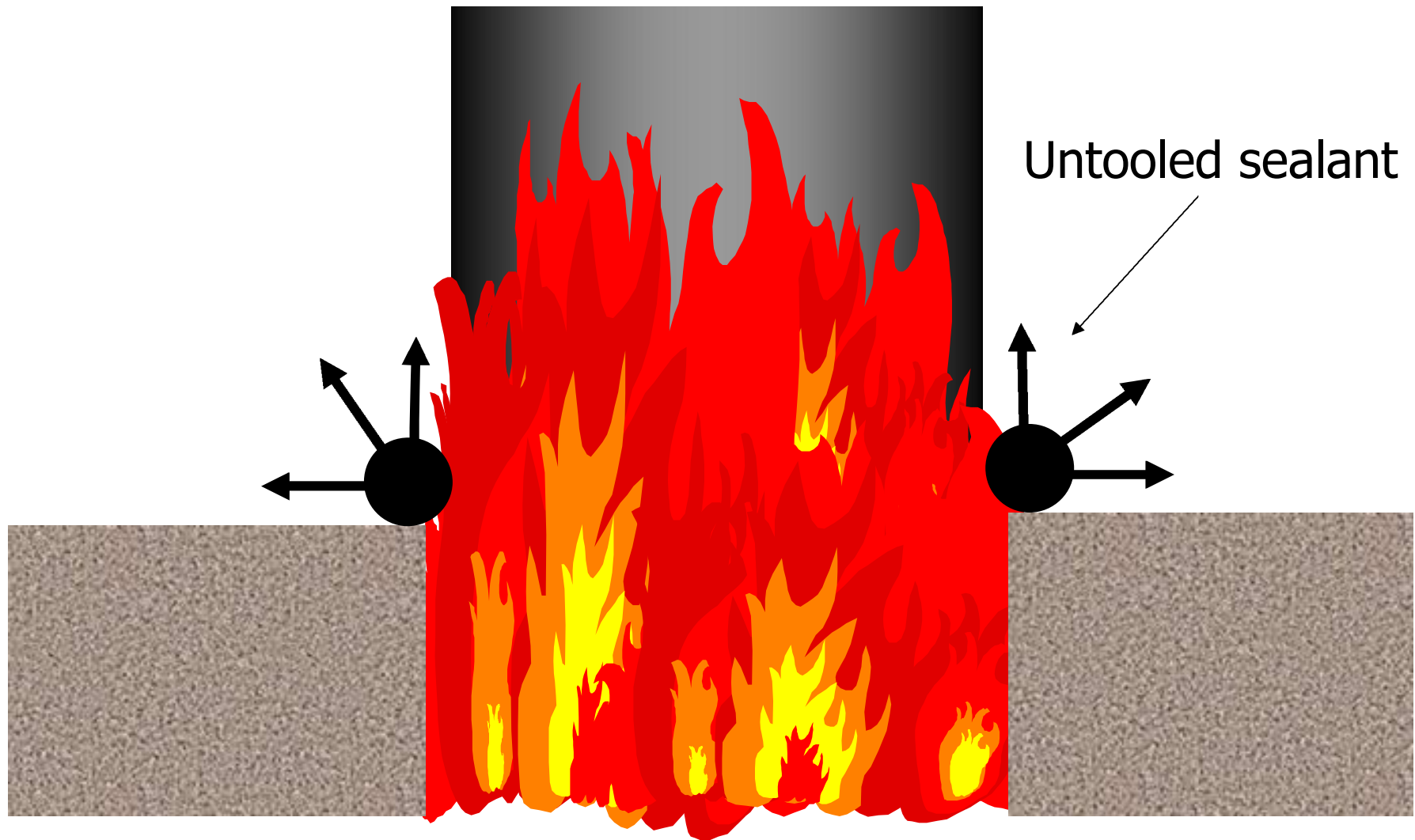
3

Always Check BOTH SIDES

When the sealant is properly recessed, it will expand inward and work the way it was designed



Left untooled, the sealant will expand outward during a fire, and likely fail



Properly Tooled Penetrations



Large Insulated Pipes



Multiple Insulated Pipes



Sleeved Pipes



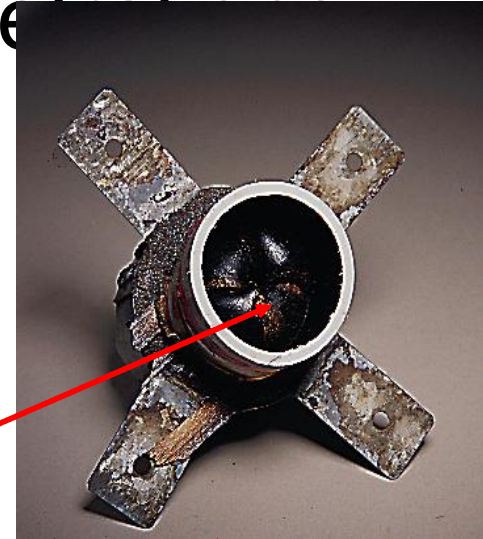
Correct Collar or Sealant must be Selected for Combustible Penetration



Hot-Side View

Charred Pipe

Knot formed from
Collapsing pipe

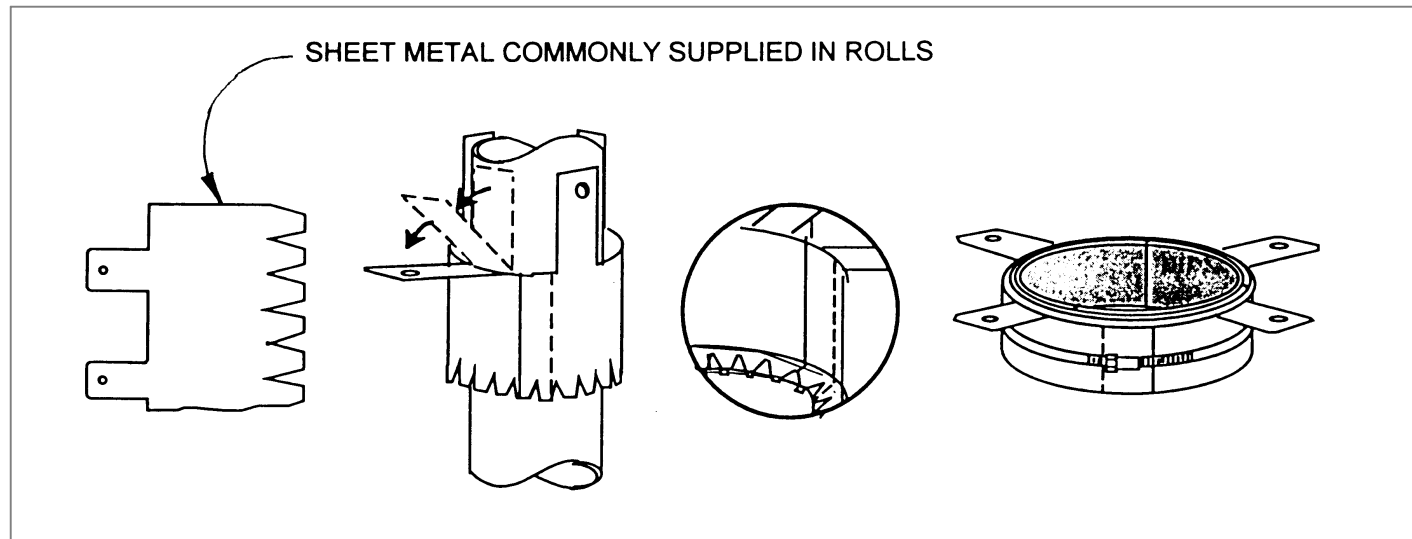


Cold-Side View

- Intumescent sealant expands and fills the void that opens as the combustibles burn away
- Collar expands to crush the pipe

Intumescent Wrap Strips and Steel Collars

- **Key Points - Restricting Collars**
 - Fastening Tabs – 90 degree bends for expansion
 - Directional Tabs
 - Bands

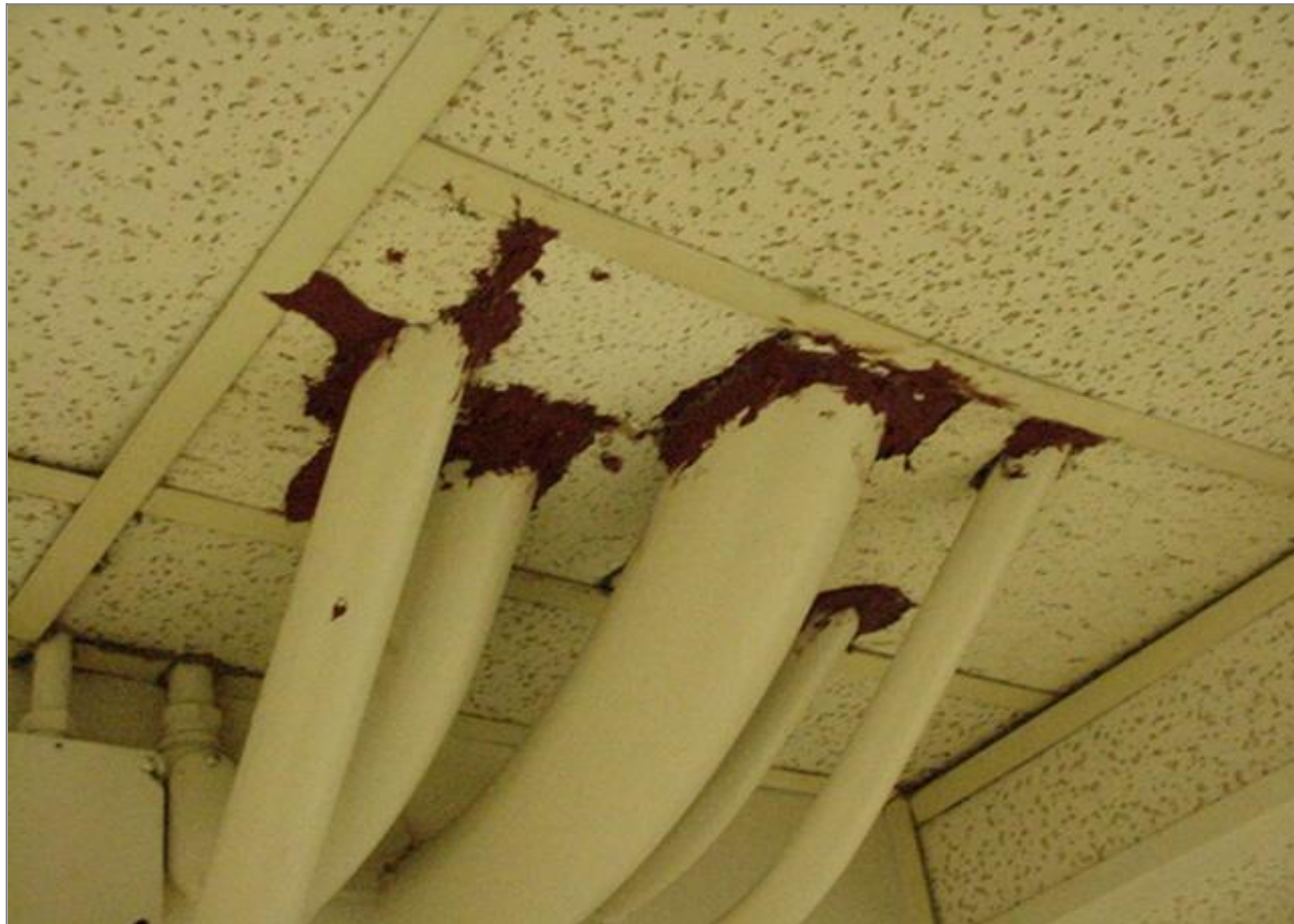


Unlisted, Untested Firestop Systems

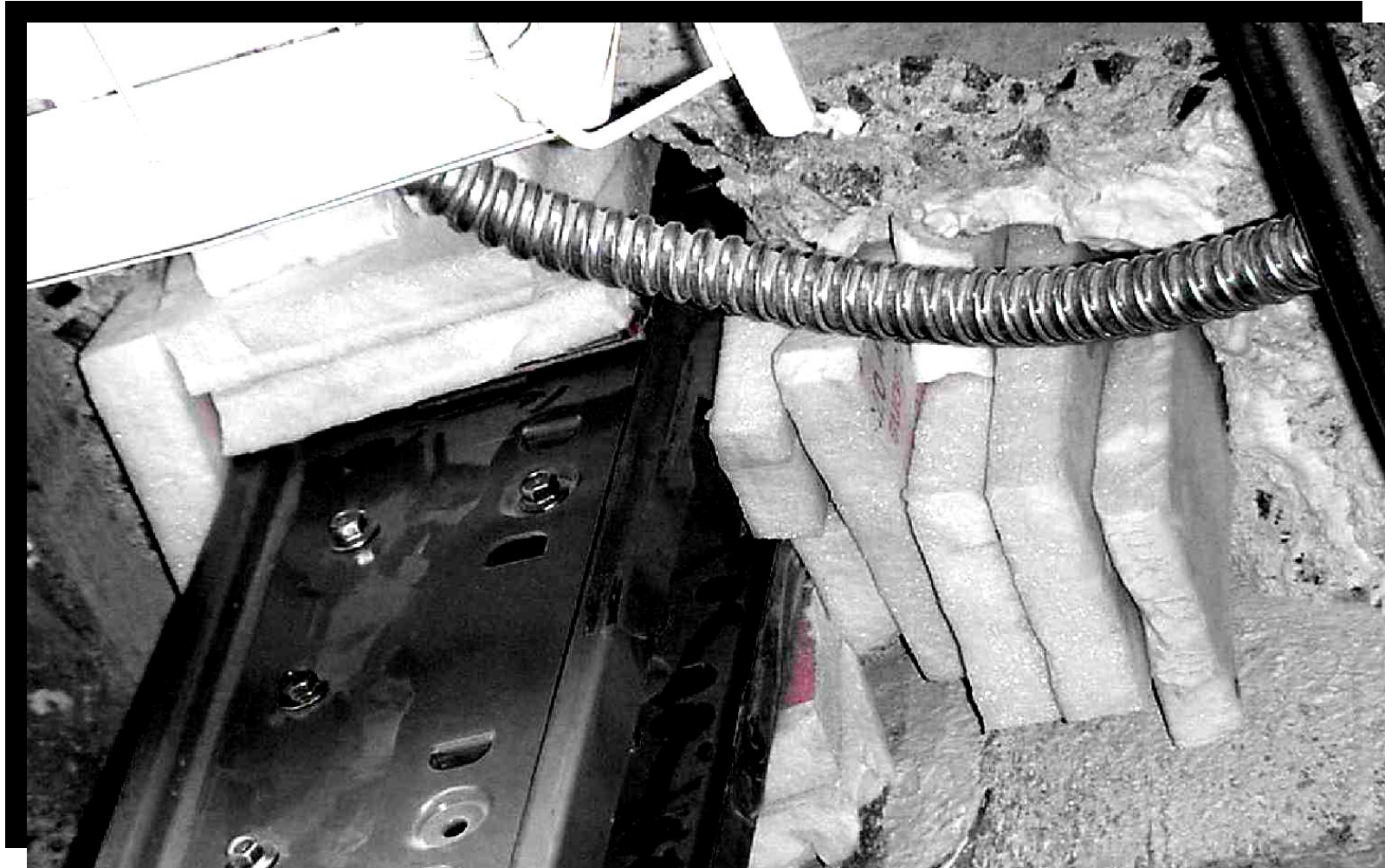


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Unlisted, Untested Firestop Systems



Polystyrene Block in CMU Slab



Joint Compound



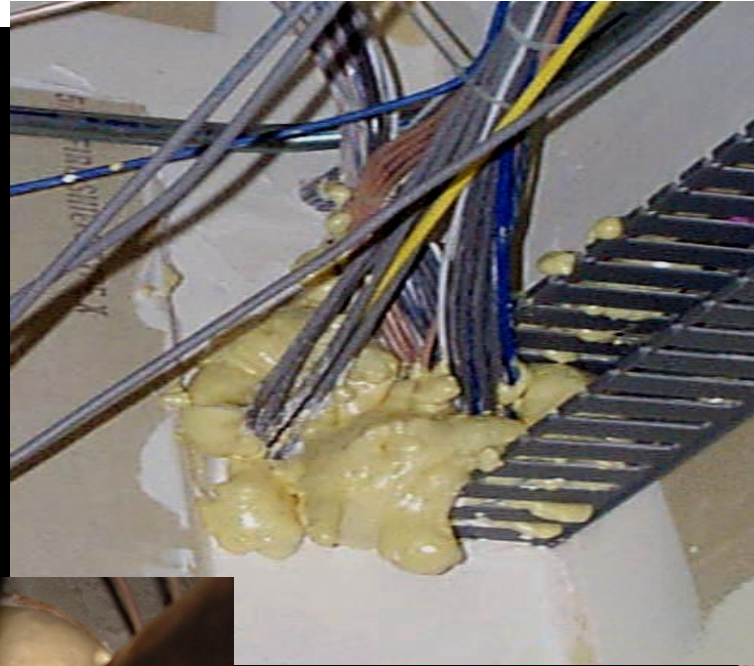
Incomplete is ineffective



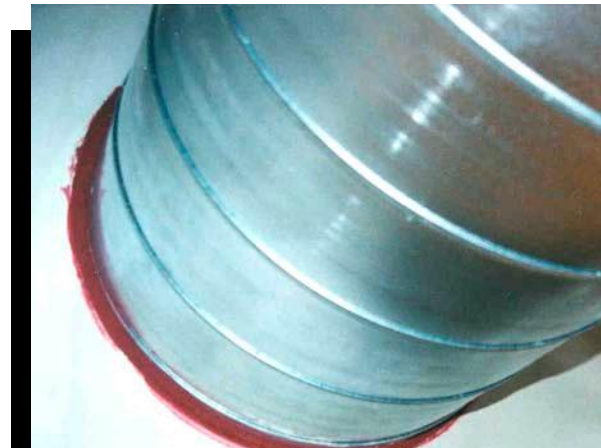
Right Product, Incomplete Installation



Great
Stuff



Sealant must be applied
BEFORE sheet metal flanges
in Duct Applications



Fire/Smoke Dampers

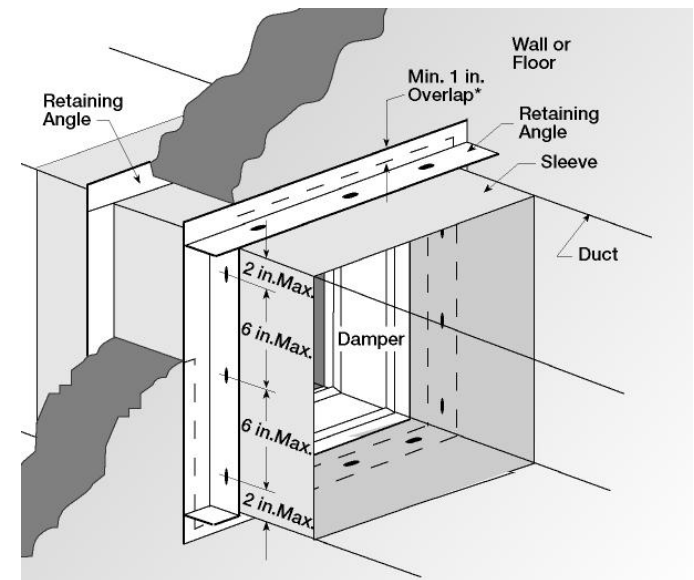
- Dampers are UL 555, 555S Listed **Systems**
- Installed to manufacturer's written instructions (Systems – Angles...no sealants)
- Firestop sealants - not miraculous –
 - Improper hole sizing or poor installation...

**Consult the Damper
Manufacturer & the
Authority Having
Jurisdiction**



Fire/Smoke Dampers

- Retaining angles
- 1 in. barrier overlap
- Attach angles to sleeve only
- All four sides ...
- Both sides of barrier is standard
- One side if tested...
- Breakaway Connections



Fire/Smoke Dampers Firestop Installation

- Combination Fire Smoke Dampers
- Multi-blade Fire Dampers
- Underfloor applications
- Max. size 72" W x 96"

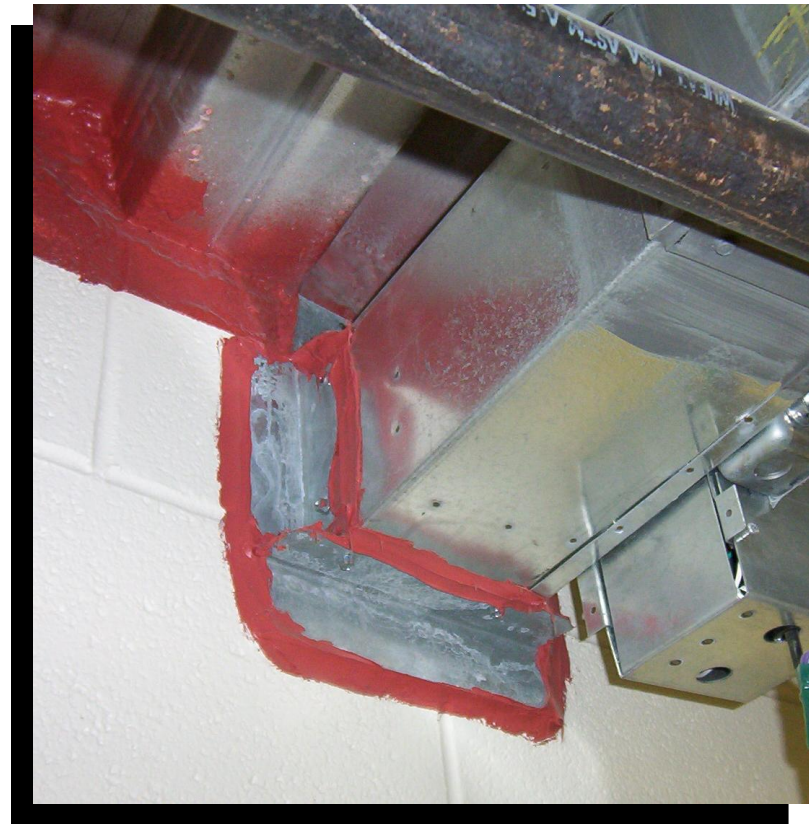
- Greenheck Slide



Fire/Smoke Dampers

- Dampers with sealant provide smoke protection

Consult the Damper Manufacturer & the Authority Having Jurisdiction



Installing an Incorrect System May Void the Fire / Smoke Damper Manufacturer's Warranty



Barriers With Combustible Penetrants

- Plastic Pipe
- Plastic-Jacketed cables
- Certain pipe insulation



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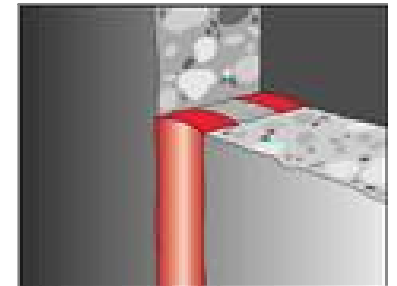
- Firestop Joint Systems Definition – UL 2079
 - “A joint system is a specific construction consisting of adjacent wall and floor assemblies, and the materials designed to prevent the spread of fire through a linear opening between the wall and / or floor assemblies”
 - “ANSI / UL 2079 ” – Qualified Joint System



» Specified Technologies Graphic

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- Firestop Joint Systems Definition – UL 2079
 - Min. Positive Pressure – .01 Water, 12” below assy.
 - Movement Cycling
 - Class I – min. 500 cycles, min. 1 cycle / minute
 - Class II- min. 500 cycles, min. 10 cycles / minute
 - Class III-min 100 cycles, min. 30 cycles / minute
 - Fire Tested at Maximum Joint Width
 - No Load Bearing Characteristics, unless noted
 - Assembly, L or W Ratings



Good Firestop Applications



Floor to Wall



Top of Wall

Joints and Seams

Top of Wall



Joints and Seams

I-Beam to Fluted Deck



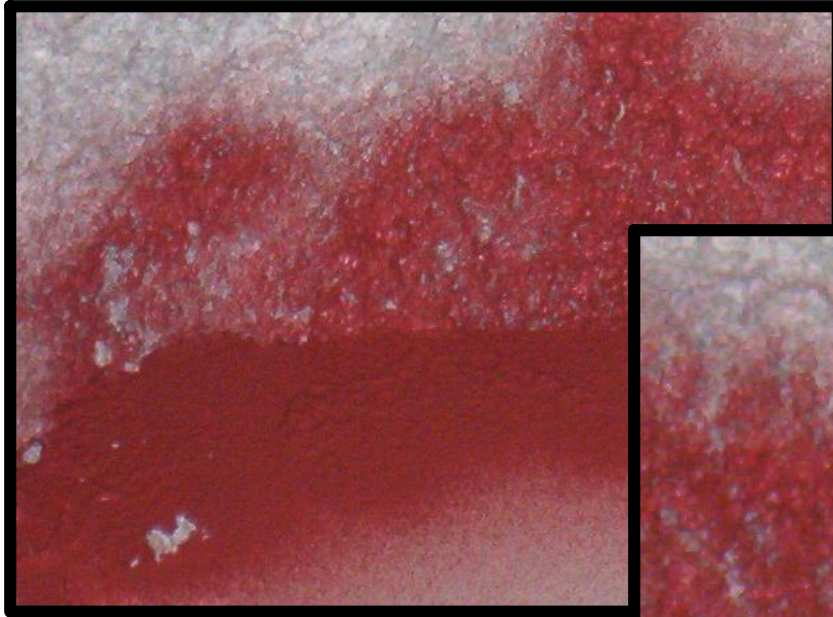
Penetrations with Top of Wall



Unacceptable Substitutes

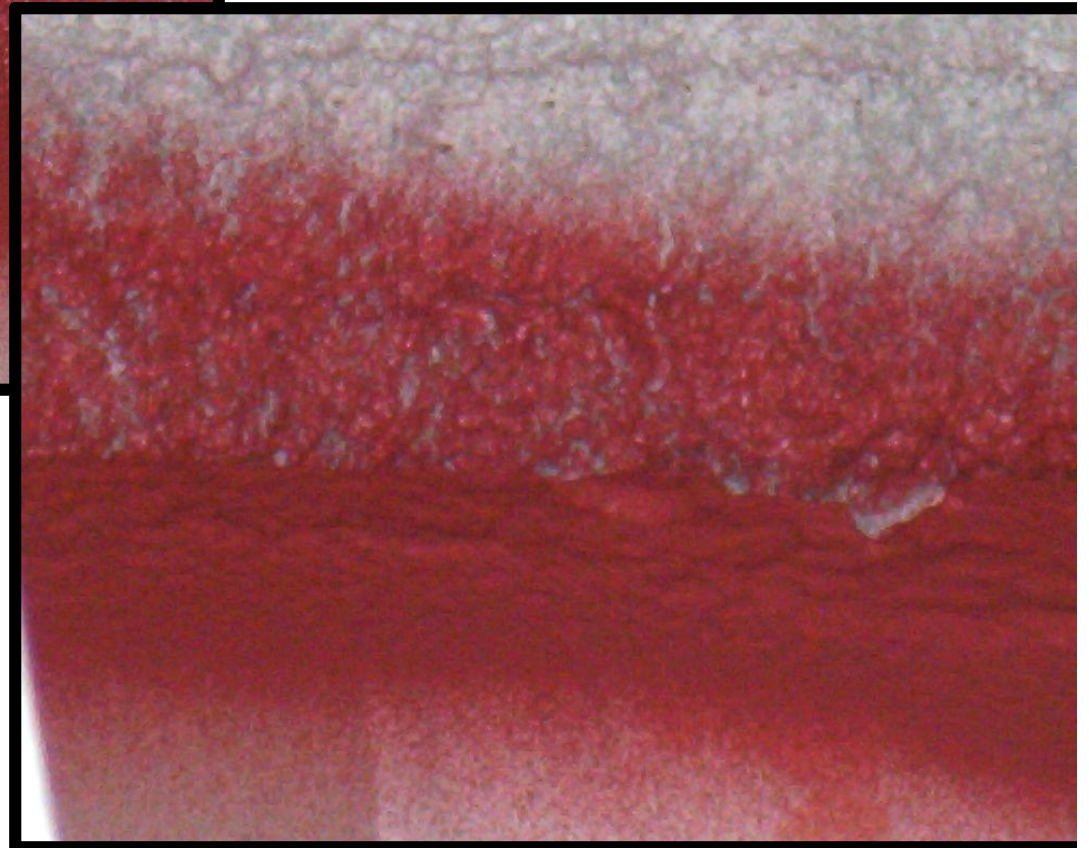


Unacceptable Substitutes



Insufficient Material?

Non Code
Compliant!



Unacceptable Substitutes



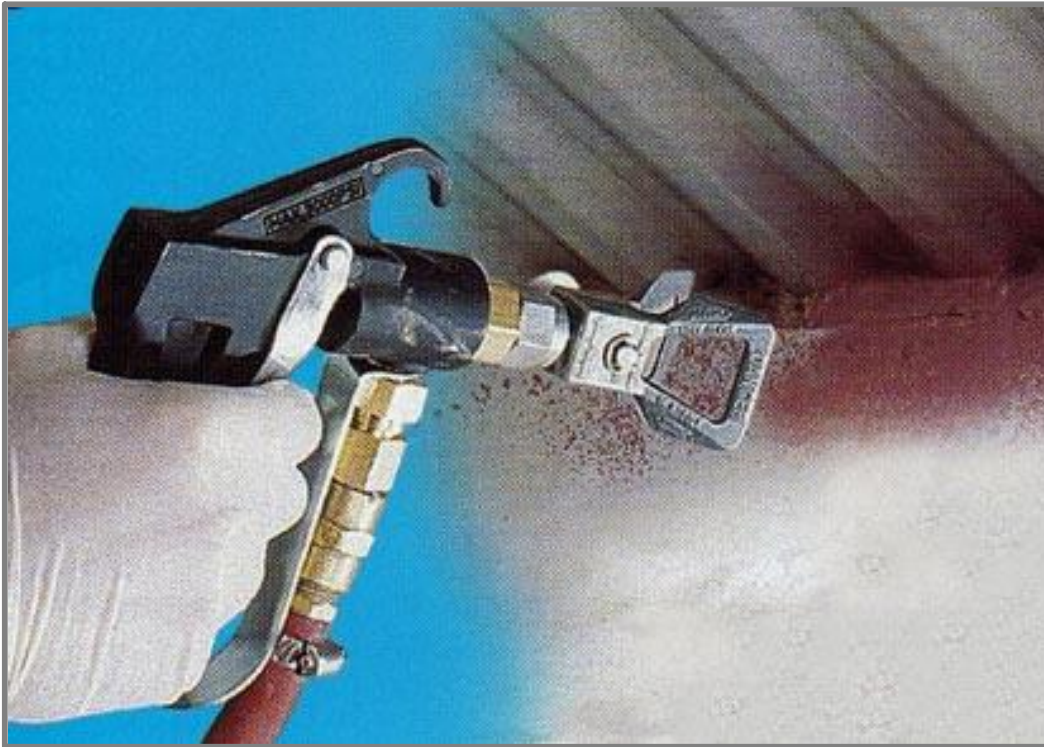
Spackle is not Firestop



Results of Improperly Installed Mineral Wool



Mineral Wool



With Sealant



FCIA at AWC

- Firestop Perimeter Systems
Definition – ASTM E 2307
 - “A Perimeter Fire Containment System is a specific field erected construction consisting of a floor with a fire resistance rating, and an exterior curtainwall with no hourly resistance rating, and the fill material installed between the floor and the curtain wall to prevent the vertical spread of fire in a building.”



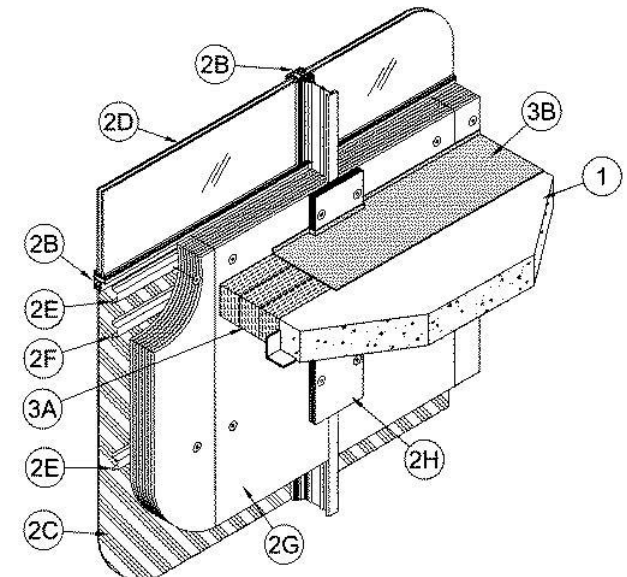
FCIA at AWC

- **Firestop Perimeter Systems – ASTM E 2307**

- Movement Classes = ANSI / UL 2079
- Fire and Temperature Ratings
 - Integrity – Similar to “F” Rating
 - Insulation – Similar to “T” Rating
 - No “L” Rating, Hose Stream
- CurtainWall Spandrel Panels
 - Protected with insulation, other systems
 - Interior Fire Spread only – No Leapfrog
 - Testing = 33” above slab for Leapfrog Prevention...

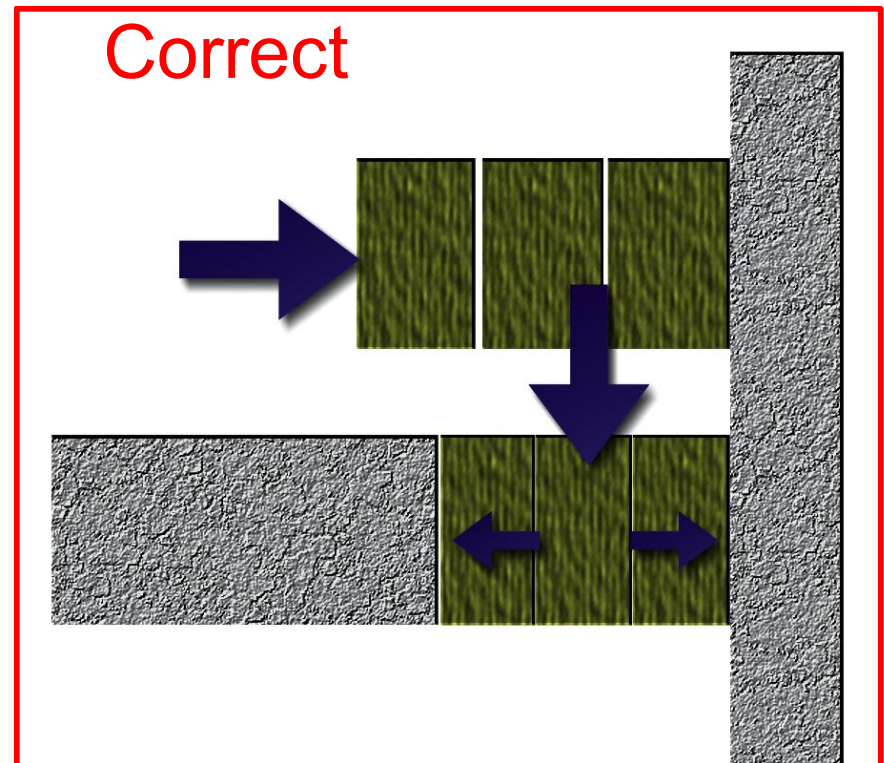
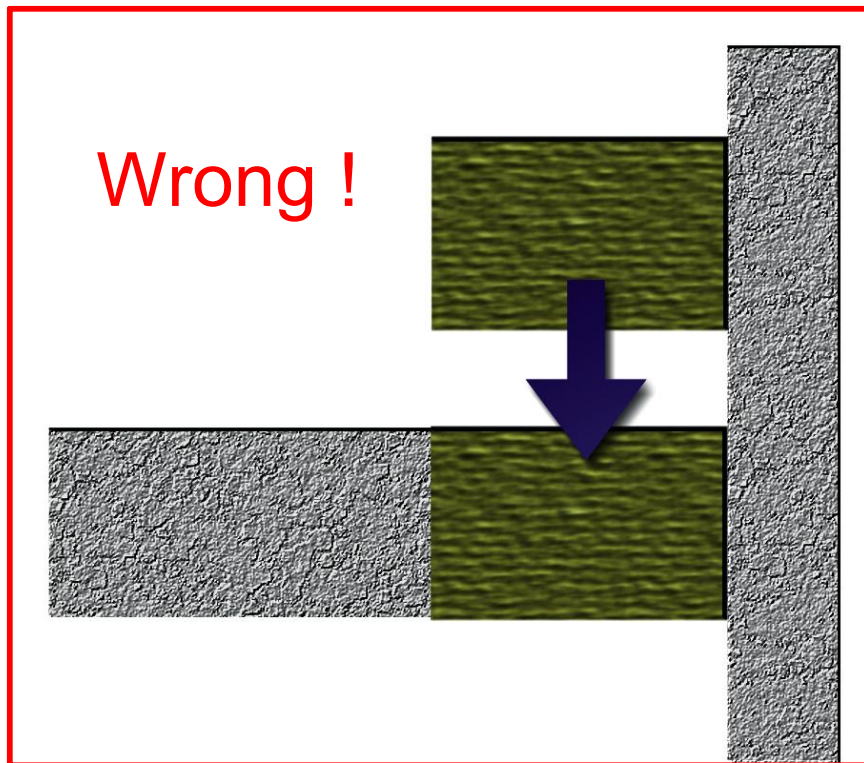


STI Graphic



Proper Installation of Mineral Wool

- Compressed mineral wool must be inserted perpendicular to the joint to allow for movement between the slab and wall.





Properly Installed and Ready to Spray



Joints and Seams

Edge of Slab



Wall to Wall / Wall to Floor

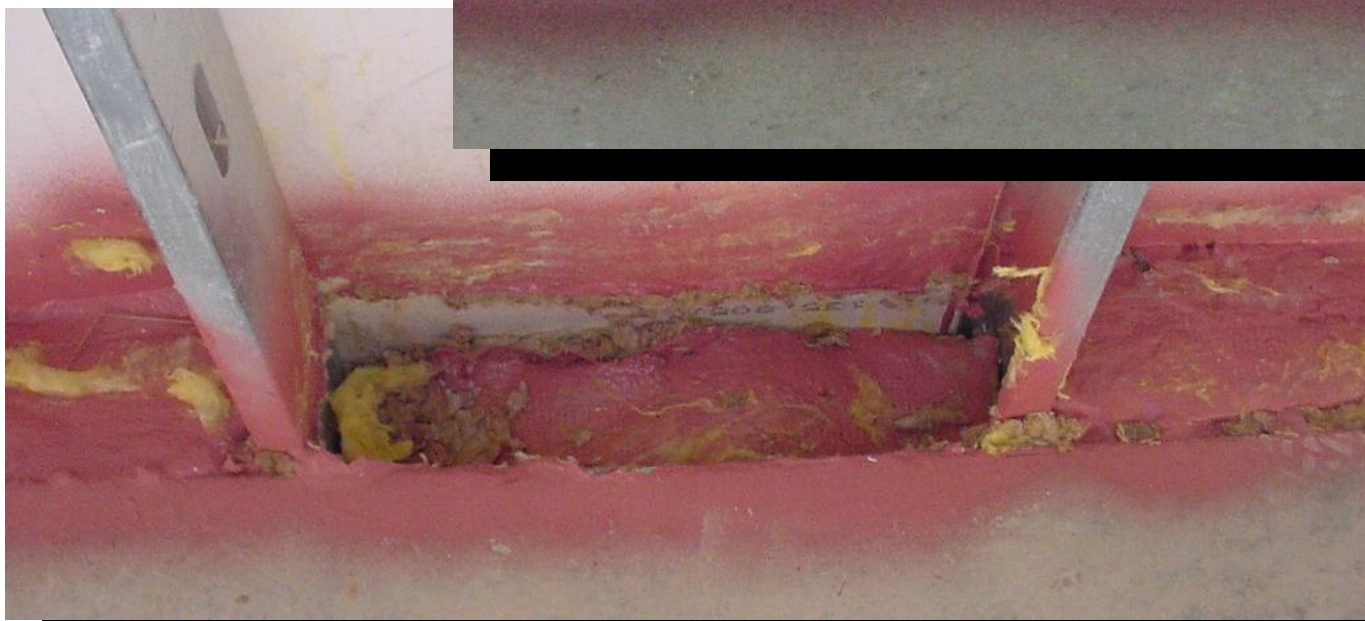
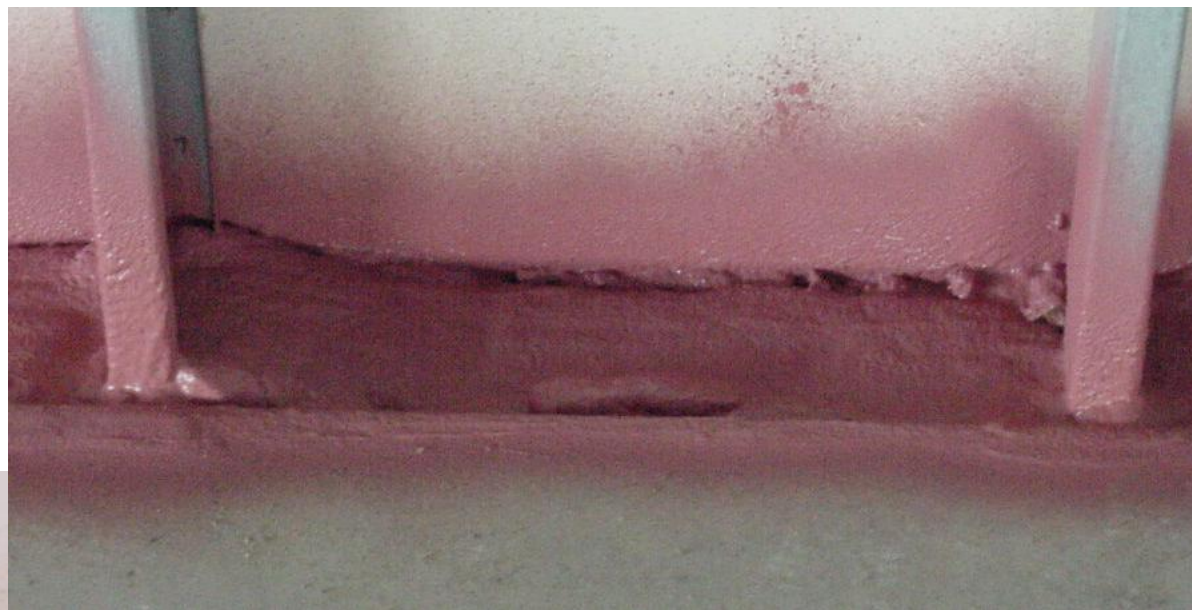
Caulk and Self Leveling



Floor to Wall: Concrete floor assembly to pre-cast concrete wall assembly



Poor Firestop Installation of Perimeter Barriers



FCIA at AWC1



Photos Courtesy of Omega Point Labs, 3M

FCIA at AWC

Specialty Firestop Contractors & Installation

- Firestopping Industry Installation Methods
- *3 Types*
 - **All Trades** -“He/She who pokes hole, fills hole”
 - **Multiple Contracts** to Firestop Contractors, Subs, GC/O
 - GC/O - Sub to **Single Source Specialty Firestopping Contractor**
- *Qualifications??*

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ZERO TOLERANCE PROCESS

- **“F” Fire & “T” Temperature, “H” Hose**
- **“L” Smoke**
- **“W” Water**
- **Insulation/Integrity**
- **Movement Capability**
- **Annular Space Sizes, Gap Sizes**
- **DOCUMENTATION**

FCIA at AWCI

Quality Process – Contractor Qualifications

- Designated Responsible Individual (DRI)
- Office Facility & Procedures Audit
- Field Procedures Audit



**Underwriters'
Laboratories of Canada**
Laboratoires des Assureurs du Canada
**Qualified Firestop
Contractor Program**



**Underwriters
Laboratories Inc.**
**Qualified Firestop
Contractor Program**

FCIA at AWC

UL QFC & FM 4991 Requirements

FM 4991 & UL – DRI's

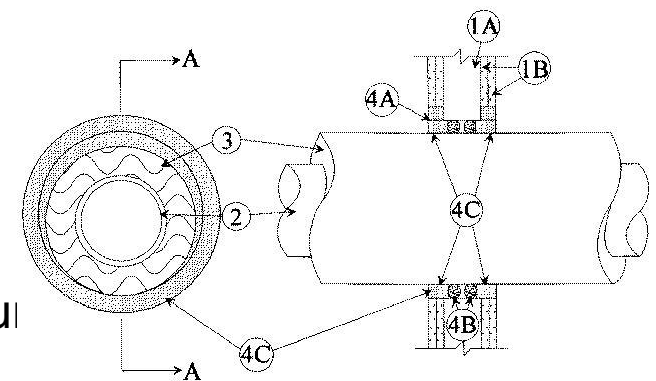
- Pass Rigorous Examination
 - FCIA Manual of Practice
 - Firestop Systems Selection & Protocol
 - Quality Protocol
- Retested every 3 years (FM Only)
- CEU Requirement – 6 ea. 3 yrs.
- One DRI per Approved Contractor Location
 - Installation & Maintenance

FCIA at AWC

Facility and Procedures Audit – Office

- ***Firestopping Firm's Quality Manual***

- Training & Education
- Systems Selection
- Communications to Field
- Material Controls
- Systems installation “protocol”
- Labeling
- Record keeping - Variance Procedure
- Non-Conformances
- Documentation
- Project closeout



CONFIGURATION A

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Initial ***Firm*** Jobsite Audit

- Verification of firestop systems installation
- Verify Quality Procedures
- Verify “communication”
 - Office to field, field to office
- “Culture of Quality...”



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Company Annual Review

- Continued satisfactory performance
 - Quality Manual
- Documented - Archived record keeping
- Employee Training Documentation
- Jobsite Visit
- DRI CEU Verification

FCIA at AWC

Quality Process – UL & FM Contractors

- Designated Responsible Individual (DRI)
- Office Facility & Procedures Audit
- Field Procedures Audit

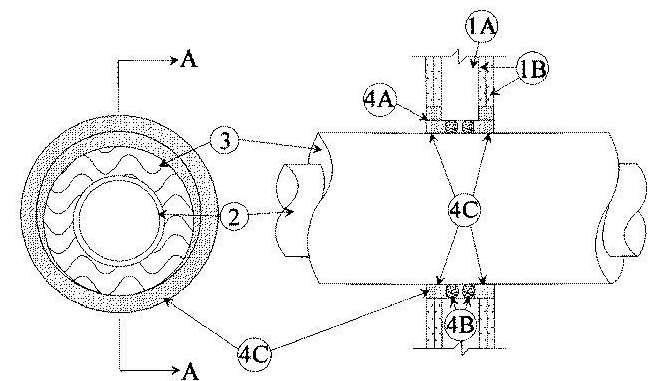


FCIA at AWC

Facility and Procedures Audit – Firm Office

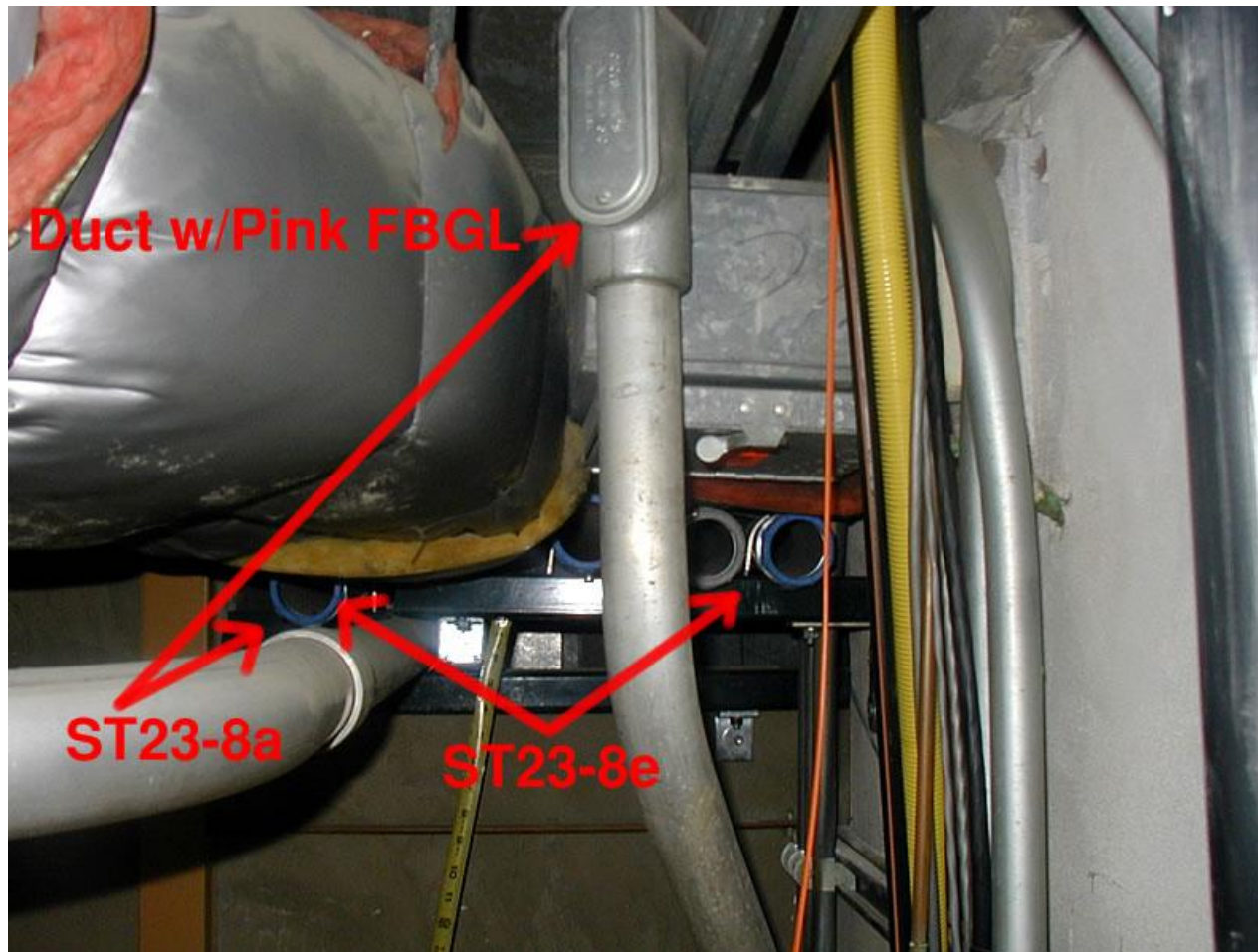
- ***Firestopping Firm's Quality Manual***

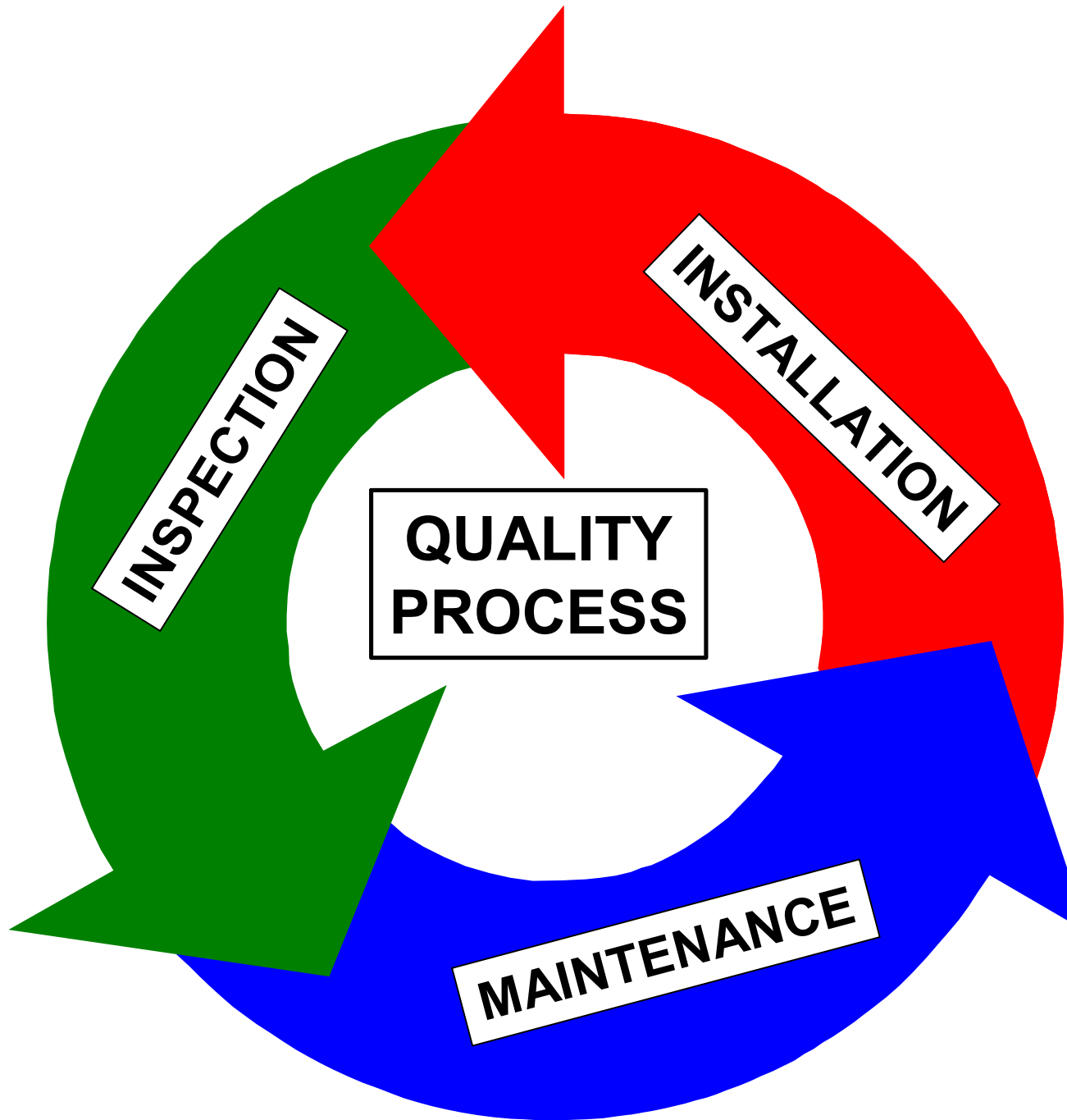
- Training & Education
- Systems Selection
- Communications to Field
- Material Controls
- Systems installation “protocol”
- Labeling
- Record keeping - Variance Procedure
- Non-Conformances
- Documentation
- Project closeout



CONFIGURATION A

FCIA at AWC Inspection





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- ASTM E 2174 & ASTM E 2393 –
- “Standard Practice for On-Site Inspection of Installed Fire Stops – Pen’s - Joints”
- “Standard Inspection Procedure”
 - Fire Marshals & Code Officials
 - Inspection Firms
 - Architects
 - Other Qualified Firms

FCIA at AWC

- ASTM E 2174/ASTM E 2393 -
“Inspector Firm Requirements”
 - Inspector NOT Related to Installing firm
 - Distributor, Manufacturer, Competitor, Supplier
 - Meet at least one criteria.....
 - 2 years experience (Construction, Field), education, and credentials acceptable to AHJ
 - Accredited by AHJ
 - Meet ASTM E699
 - FCIA Chairs new committee
 - International Accreditation Services

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- ASTM E 2174/ ASTM E 2393 –
“Inspection Process”
 - Pre Construction Meeting
 - Review Documents – Identify Conflicts
 - Materials - ASTM E 814 or UL 1479-S115 Systems
 - “exactly as Identified on inspection documents”

FCIA at AWC

- ASTM E 2174/ ASTM E 2393 –
“Inspection Process”
- Pre Construction Meeting
 - Mock Ups
 - Destructive Testing
 - Installation Measurements
 - Discuss Inspection Method
- Required for During/Post Insp. Methods

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- ASTM E 2174/ ASTM E 2393 –
“Inspection Process”
- During Construction Inspection Method
 - Firestop Installation Start
 - Random witness 10%, each type of Firestop
 - No Less than one

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- ASTM E 2174/ ASTM E 2393 –
“Inspection Process”
- Post Construction Method –
 - Destructive Testing
 - Minimum 2% , no less than 1, each type
per 10,000 SF of floor area
 - If 10% variance per firestop type
 - Inspection stops
 - Installer inspects, repairs
 - Inspector reinspects

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- ASTM E 2174/ ASTM E 2393
“Inspection Process”
- Inspection Forms
 - One for each type of firestop
 - Submit 1 day after inspection to Authorizing Agency
 - Numbered – Controlled
- Required – During/Post Construction Methods

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- ASTM E 2174/ ASTM E 2393 –
“Inspection Process”
- - Final Report – During/Post Inspection Method
 - Name, address, location –
project, installer, inspector
 - Type and quantity of firestops inspected
 - Verification method
 - Percentage Deviation
 - Copies of all documents sent
to Authorizing Agency

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- ASTM E 2174/ ASTM E 2393 –
“Inspection Process”
- Why require ASTM E 2174 / ASTM E 2393
 - Quality Process Cycle
 - Verify Field Installations
 - “Service & Testing”....Demming
 - **Qualifications of Inspectors**
 - FCIA Project

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Quality Assurance

Specifications— 07 84 00... MF95

- 07 84 10 – Through Penetration Firestop Systems
 - Pipes, cables, ducts, cable trays, MEP&C Systems
- 07 84 20 – Fire Resistive Joint Systems
 - Top of Wall
 - Fire Resistance Rated Joints
 - Perimeter Joints (Floor Slab edge/Exterior Wall)
- MF 04 – Multiple Sections - (was 07270)

FCIA at AWC

- Specifications— Systems Testing
 - “F” Ratings = Fire Resistance Rated Assy.
 - “T” Ratings = F & T??
 - “H” Ratings – Hose Stream – (Canada)
 - “L” Ratings = Fire & Smoke Resistance Rated Construction
 - “W” Ratings – Floors; Functional when? Floor Loading Capabilities?
- Match Physical Properties of Environment

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- Specifications – Inspection
 - ASTM E 2174 & ASTM E 2393
 - Standards for the inspection of installed firestopping
 - “Qualified Contractor plus Inspection means the correct value for the trade...”

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- Specifications– Contractor Qualification
 - FCIA Members
 - *[http://www.FCIA . org](http://www.FCIA.org)*
 - FM 4991 Approved Firestop Contractors
 - UL Qualified Firestop Contractors

FCIA at AWC

- Specifications– References
 - FM 4991 – Std., Firestop Contractor Approval
 - UL Qualified Firestop Contractor Program
 - ASTM E 2174 & ASTM E 2393
 - FCIA Manual of Practice
 - UL S-115, 1479, ASTM E 814 - Penetrations
 - UL 2079, ASTM E1966 – Joints, Walltops
 - ASTM E 2307 – Perimeter Fire Containment

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- Firestopping Quality Process
 - FCIA Member Specialty Firestop Contractors
 - ASTM E 2174 & ASTM E 2393 Inspection
 - Qualifications?
 - FCIA Member Firestop Inspectors
 - Materials – Suitable for applications...

FCIA at AWC

- **ASTM E 2174-04 – Standard Practice for On-Site Inspection of Installed Fire Stops**
- **ASTM E 2393-04 - Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers**
- **Initiated – FCIA April, 2001 – San Antonio**



FCIA at AWC

- MasterSpec - SpecLink
- FM Approved & UL Qualified Contractors
- Inspection
 - ASTM E 2174-04 & ASTM E 2393-04



Firestop Contractor Stats

Design Listings Reviewed

- Total of 985 Design Listings submitted
- Total of 345 Engineered Judgments submitted
- Accuracy of what is installed on site compared to Design Listings submitted:
 - FCIA, FM 96%
 - FCIA 76%
 - Non FS 32%
- Accuracy of what is installed on site compared to Engineer Judgments submitted:
 - FCIA, FM 93%
 - FCIA 73%
 - Non FS 12%



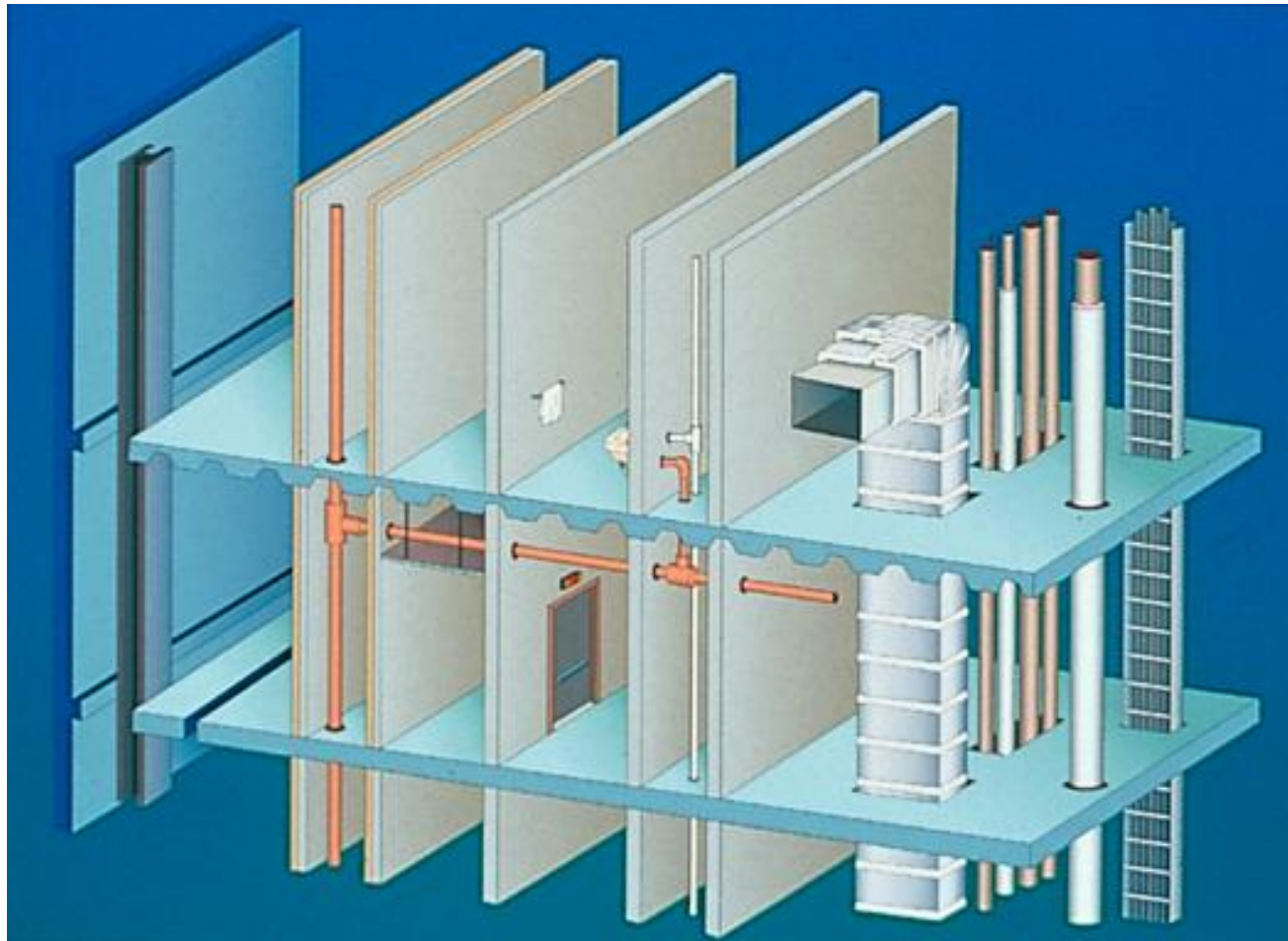
FCIA at AWCI

FCIA Members, FM Approved, UL Qualified
Zero Tolerance” Quality Control

- Investment in Education
- Investment in Manual of Practice
 - Project Successful Proven Contractor
 - Education, Training, Accountability
 - = Reduced Risk – Life, Property, Business

www . fcia. org

FCIA at AWCI Maintenance



FCIA at AWC

International Fire Code – 2003 & 2006

703.1 Maintenance. The required fire resistance rating of fire-resistance rated construction (including walls, fire stops, shaft enclosures, partitions, smoke barriers, floors, fire resistive coatings and sprayed fire resistant materials applied to structural members and fire resistive joint systems) shall be maintained. Such elements shall be properly repaired, restored or replaced when damaged, altered, breached or penetrated. Openings made therein for the passage of pipes, electrical conduit, wires, ducts, air transfer openings, and hoes made for any reason shall be protected with approved methods capable of resisting the passage of smoke and fire. Openings through fire-resistance rated assemblies shall be protected by self closing or automatic-closing doors of approved construction meeting the fire protection requirements for the assembly.

2009 IFC Code Change – “ANNUAL INSPECTION, by owner”

Why not Photoluminescent Marking Systems – 4/24/2009?

FCIA at AWC

FCIA Recommendations

- ***DIIM for Firestopping – expands to AWC Members***
 - *Design – Specifiers, Owners*
 - *Install – FCIA Members, UL Qualified FCIA Members*
 - *Inspect – Professionals*
 - *Maintain – FCIA Members*



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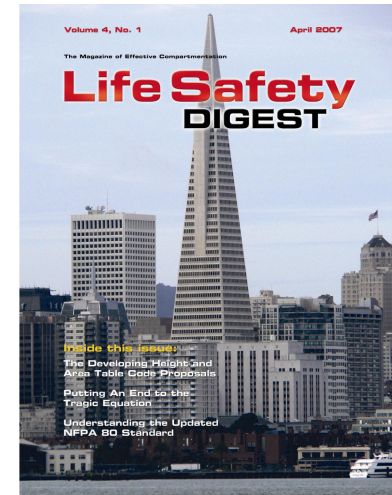
FCIA Invites you...

- Promote Effective Compartmentation
- Firestop Systems for Fire and Life Safety, and you...



FCIA at AWCI

- Support AWCI, and Join FCIA
 - FCIA Committees
 - FCIA.org Website Listing
 - 7000+/Mo.Visits - Member Lists
 - Discounts
 - FCIA Manual of Practice & electronic updates
 - FCIA Conferences
 - FCIA Life Safety Digest, Enews
 - Relationships...
 - Contractors - \$1185/yr. All types
 - Manufacturers - \$3000/yr.
 - Associates - \$310 (Reps, Distr)



FCIA at AWC

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FCIA at AWCI



March 11, 2009