FCIA DIIM & Firestopping
I & I & M – Webinar
Installation, Inspection, Maintenance

GoToWebinar

19 November 2014

Contacts

Firestop Contractors International Association

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Learning Objectives

Upon completing this program, the participant should know how to:

1. **Recognize Perimeter Fire Containment, Penetration, Joint Product Design/Testing, Installation & *Inspection* & Management Standards & Code Requirements for Firestopping … to become a 'System'.**
2. **Focus on Perimeter Fire Containment for Curtainwalls**
3. **Understand Requirements for Firestopping for Safety in the US and Canada**
4. **Section 07 84 00++ Highlights**
5. **Learn about 'Why compartmentation and Firestopping".**

Outline

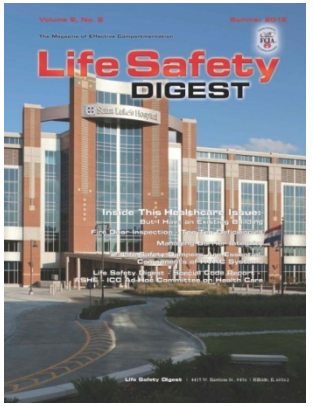
- FCIA – A Trade Association
  - Total Fire Protection & Effective Compartmentation
  - Codes, Testing, Products - Materials
  - Firestopping for Safety – A Quality Protocol
    - DIIM

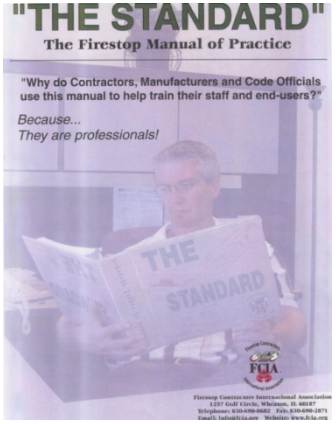
“DIIM”

- Firestopping for Safety – DIIM
  - Properly ***Designed*** and Specified Firestopping FCIA - 07-84-00 - Specification
  - ***Tested and Listed Systems*** - ASTM E 814 / UL 1479 - UL 2079, ULC-S-115, ASTM E2307
  - Professional ***Installation*** – FCIA Member, FM 4991 Approved, UL Qualified Contractors
  - Properly ***Inspected*** - ASTM E 2174 / 2393 Protocol by IAS AC 291 Accreditation Criteria for Inspection Agencies
  - ***Maintained*** (Annually - FCIA Members – NFPA 101, International Fire Code

Firestop Contractors International Association

- FCIA – Worldwide Association
- Firestop Contractors, Manufacturers, Consultants, Reps, Distributors,
- Life Safety Digest
- FCIA Website Resources - FREE
- FCIA MOP on PDF FREE to Specifiers, Architects, Governmental Bldg./Fire Officials, worldwide..
  - **www.fcia.org**





“TOTAL FIRE PROTECTION”

- Effective Compartmentation
  - Fire Barriers, Fire Walls/Floors, Smoke Barriers
  - Firestopping, Fire Dampers, Swinging and Rolling Fire Doors, Fire Rated Glazing
- Detection & Alarm Systems
- Sprinkler Suppression Systems
- Education & Egress–
  - Building Owners & Managers, Building Occupants and Firefighters

“DIIM”

- Firestopping for Safety – DCIIMM
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Building & Fire Code Requirements

- NFPA 5000 – 101- Chapter 8
- National Building Code – Canada
- UAE Fire and Life Safety Code – Chapter
- International Codes –
  - New and Existing Buildings International Building Code – Chapter 7
  - International Fire Code – Chapter 7

- ***Minimum requirements - Construction***

Building & Fire Code Requirements

- 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, Ch 8. **ICC adds… *"Systems"***

Building & Fire Code Requirements

- Compartmentation Codes – US –
  - ***Exterior Walls***
  - ***Fire Walls***
  - ***Fire Barriers***
  - ***Fire Partitions (Not NFPA)***
  - ***Smoke Barriers***
  - ***Smoke Partitions***

Building & Fire Code Requirements

- Compartmentation Codes – US –
  - ***Continuity***
  - ***Openings & Penetrations***
  - ***Robustness***

Building & Fire Code Requirements

- Compartmentation Codes – US –
  - ***Ch. 8 – NFPA – ASTM E 119, UL 263, NFPA 220***
  - **Ch. 7 – IBC - Fire Barrier –** Hourly Rated – IBC
  - **Ch. 7 IBC - Fire Wall** – Fire rating, structural independence
  - **Ch. 8 NFPA – NFPA 221 – High Challenge Fire Walls**
  - IBC – **Fire Partition** – Rated, not continuous.

Building & Fire Code Requirements

- Fire Barriers
  - Fire Area Separations
  - Mixed Use Occupancies
  - Incidental Uses
  - Hazardous Area Separations
  - Exit Enclosures
  - Shaft enclosures
  - Horizontal Exits
  - Corridor Walls - NFPA

Building & Fire Code Requirements

- Smoke Barriers
  - Healthcare
  - Other Occupancies

- NFPA 101 - no quantified L Rating for Firestops
- IBC – Quantified L Rating for Firestops

Building & Fire Code Requirements

- Compartmentation Codes – US
  - **Smoke Barrier – Firestopping for Continuity**
    - IBC – Hourly Rated, "L" Rating
      - <5cfm/sf (IBC 2006)
      - < 50 cfm, 100sf of Wall Area (IBC 2009)
    - **NFPA –** … 'restricting the passage of smoke'…
      no quantified "L" Rating … YET
      - Continuous, Barrier to Barrier, … through concealed spaces,
      - Not always fire resistance rated.
  - **Smoke Partition**
    - IBC – Continuous barrier, not rated…'retard'.
    - NFPA – Continuous membrane that is designed to form a barrier to ***limit the transfer of smoke***….

Building & Fire Code Requirements

- Compartmentation Codes – US –
  - ***Exterior Walls***
  - ***Fire Walls***
  - ***Fire Barriers***
  - ***Fire Partitions (Not NFPA)***
  - ***Smoke Barriers***
  - ***Smoke Partitions***

Building & Fire Code Requirements

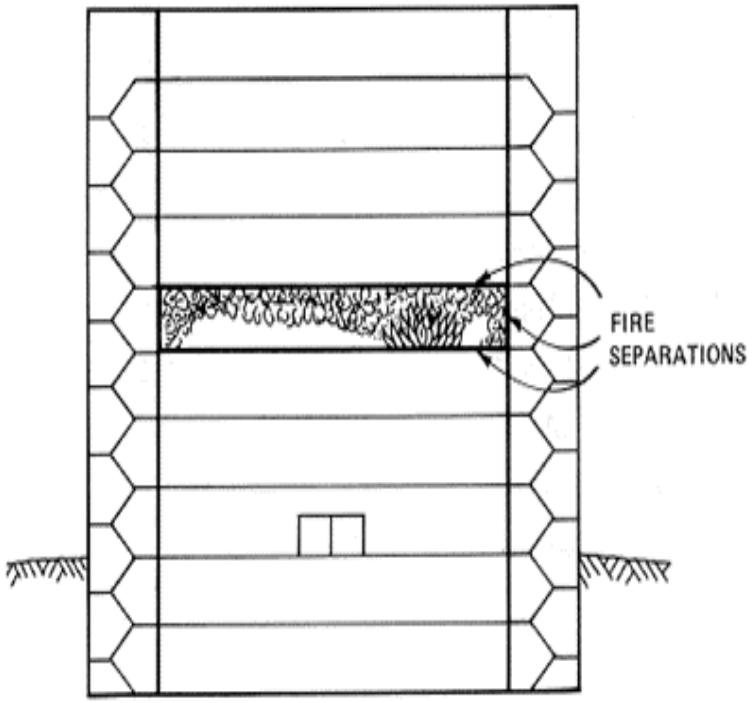
- ***Continuous Fire Resistance***
  - **Walls / Horizontal Assemblies – Continuity**
    - Firestop Products Become Firestop Systems
      - Penetrations
      - Joints – Head /Bottom of Wall – Perimeter Joints
    - Fire & Smoke Damper Duct Systems
    - Fire Doors and Hardware Systems
      - Rolling & Swinging
    - Fire Rated Glazing

Building & Fire Code Requirements

- *Chemical, Biological, Radiation, Explosion, etc.*
  - **Standards?**
    - **R - Nuclear Power Plant Standards**
    - **E – Blast Strength? Check with manufacturer – 2psf**
    - **C – Which Chemicals? Check with manufacturer**
    - **B – Which Agents? Check with manufacturer**
    - **G – Germ – Check with manufacturer & industrial hygenist**
  - **How to Regulate for Unexpected Events?**
  - **Due Diligence - Review Required by code?**

Fire Resistance Continuity
All Occupancies

- Effective Compartmentation
  - Education
  - Office
  - Mercantile
  - Multi Family Residential
  - Industrial – Insurance influences
  - Institutional – Healthcare



Buildings are Safe Because….

- ***Total Fire Protection Stats - North America High Rise***

- ***11,025 Tall Buildings - 20 + stories***
- *70% in NY, SF, LA, CHI, HI, Toronto…*
  - ***2/3 Canada's high rise built before 1985***

= Compartmentation Primary in Older Structures

- ***Chicago, NY, Toronto – Older stock of buildings***
- ***SF, LA, HON – Earthquakes***

» ***Source, Emporis.com***

Buildings are Safe Because….

- ***Total Fire Protection***
  = Safer buildings…

- ***Compartmentation***
- ***Sprinklers, Alarms,***
- ***Egress Strategies***

- ***NIST Reports…***

Buildings are Safe Because….

- **National Institute of Standards & Technology ‘NIST Reports - World Trade Center 7 –**
- **Chapter** 4.6, 'Factors that could have mitigated structural collapse'
  - ***“..improved compartmentation in tenant areas to limit the spread of fires‘***

- ***‘But first…DIIM’***

Continuity – Barriers, Walls & Horizontal Assemblies

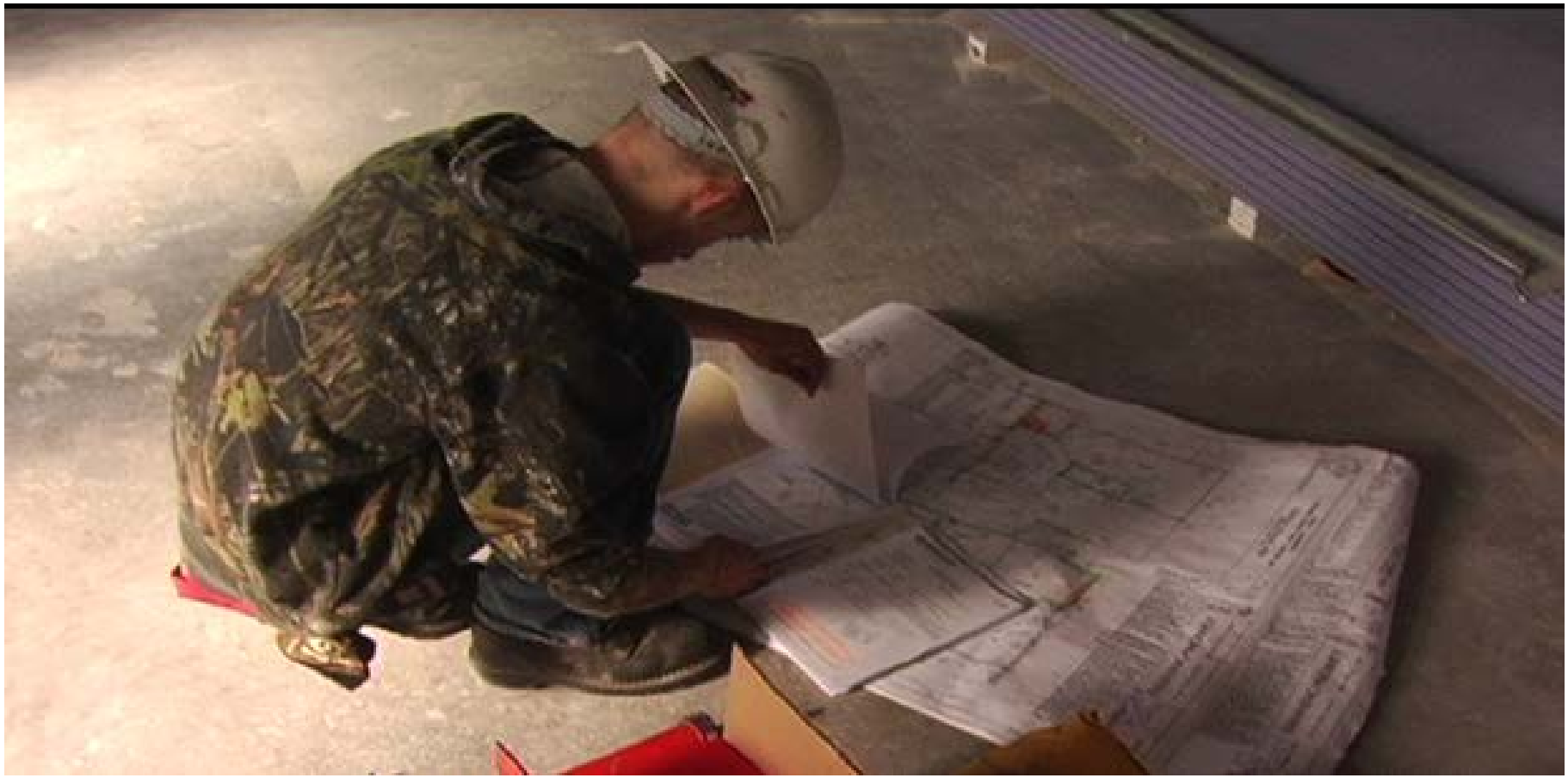
- Fire Walls and Floors –
  - ***Continuous Fire Resistance Rated Assemblies***
    - Concrete
    - Concrete Block
    - Plaster
    - Gypsum Block
    - Gypsum Board / ‘Drywall’
    - Floor/Ceiling Assemblies
    - Firestop Systems

“Tested & Listed Wall/Floor Systems”

Continuity

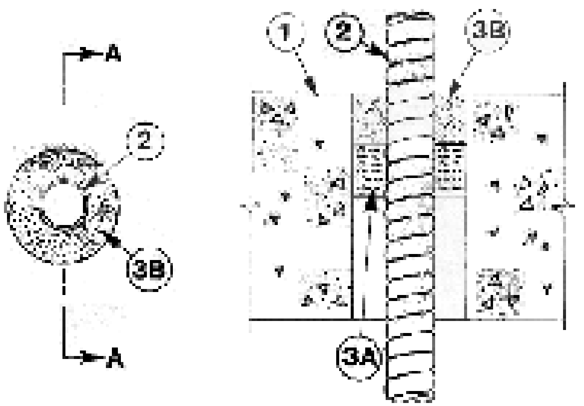
Effective Compartmentation Features

Firestopping for Continuity
I – Listed Systems



Firestopping for Continuity
I – Classified Systems

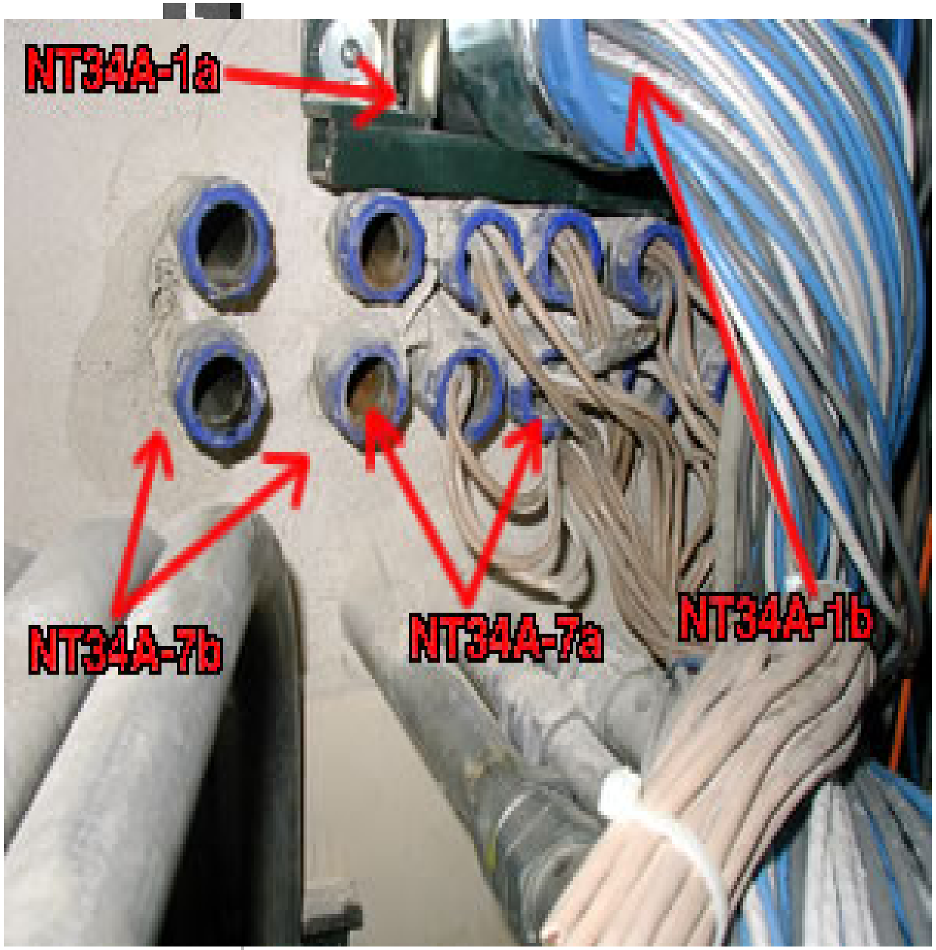
System No. C-AJ-1160
F Rating—2 Hr
T Rating—0 Hr



SECTION A-A

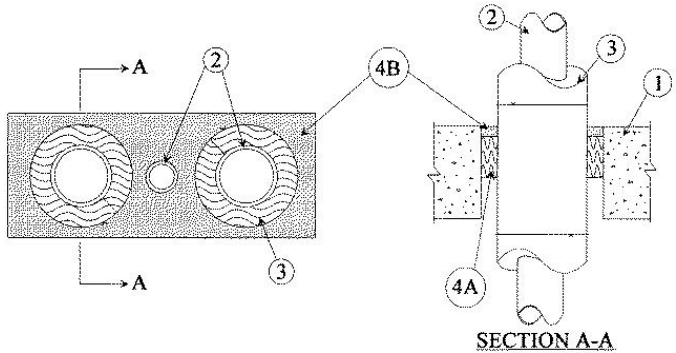
1. Floor or Wall Assembly—Min 4-1/2 in. thick lightweight or normal weight (100 to 150 pcf) concrete. Wall may also be constructed of any UL Classified Concrete Blocks*. Diam of circular through opening in floor or wall assembly to be 1/8 in. to 1-1/2 in. larger than diam of flexible metal conduit (Item 2) installed in through opening. Max diam of opening is 6 in.
See Concrete Block (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. Through Penetrating Product*—Nom 4 in. diam (or smaller) steel, or nom 3/4 in. diam (or smaller) aluminum Flexible Metal Conduits. Max 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.
Alliance Cable Corp.
3. Packing Material—Nom 1 in. thickness of ceramic (alumina silica) fiber blanket or mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed min 1 in. from top surface of floor or from both surfaces of wall.
4. Fill, Void or Cavity Material*—Caulk—Applied to fill the annular space around the flexible metal conduit. In floors, a min 1 in. depth of fill material to be installed flush with top surface of floor. In walls, 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.—CP [illegible]+

*Bearing the UL Classification Marking
†Bearing the UL Listing Mark



Firestopping for Continuity

- 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 / **FM 4990,** ULC-S-115**,** UL 2079, **E-2307** as the test method…"
  - **Testing = Suitability statement for use of a firestop product in a specific *system* application**

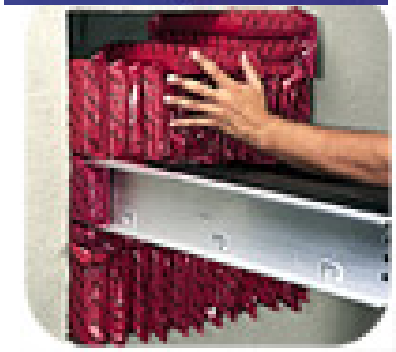


Firestopping for Continuity
Firestop Products

- **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, AD, HILTI, Nelson

Fire/Smoke Dampers & Firestops

- Dampers are UL 555, 555S Listed ***Systems***
  - Installed to manufacturer's written instructions (Systems – Angles…no sealants)
- Firestop sealants – UL 1479 –
  - Improper hole sizing or poor installation…

Consult the Damper Manufacturer & the Authority Having Jurisdiction

Graphics - Greenheck

Fire/Smoke Dampers
Firestop Installation

- Combination Fire Smoke Dampers
- Multi-blade Fire Dampers
- Underfloor applications
- Max. size 72” W x 96” H
- SYSTEM…AHJ

- Greenheck Graphic

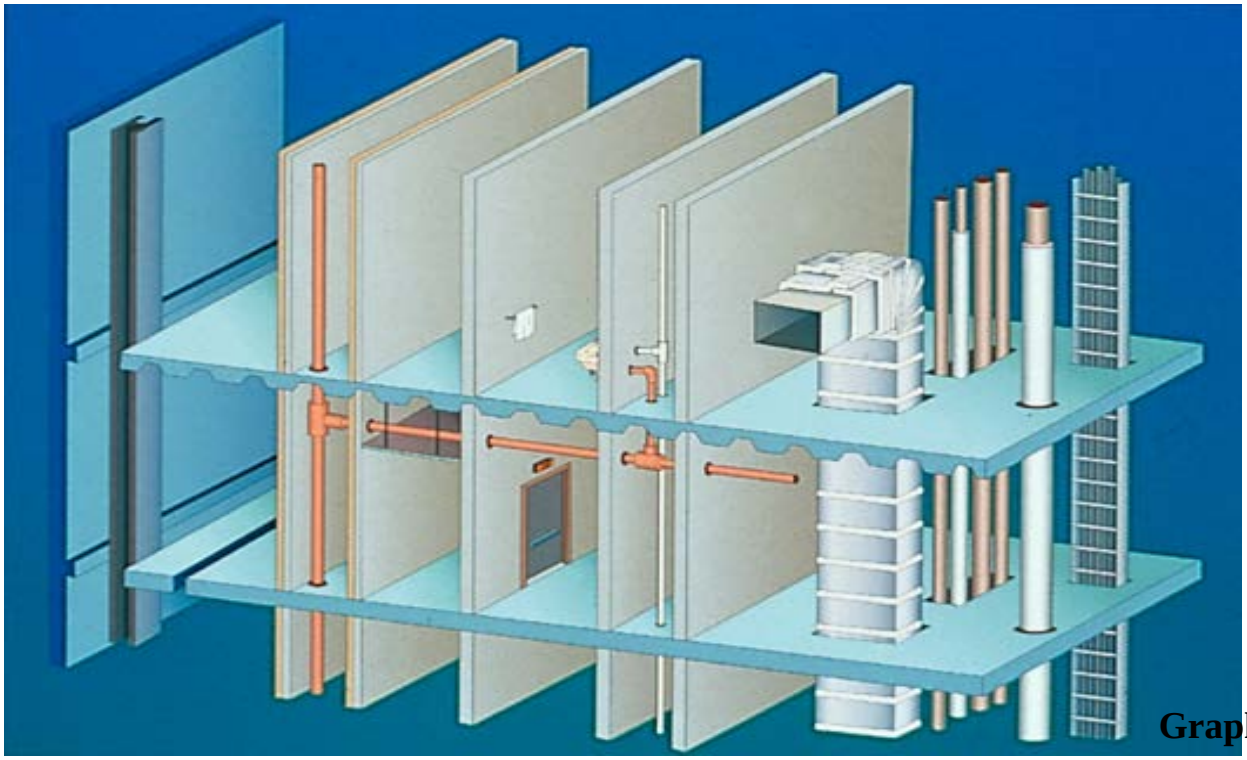
Firestop Materials, Systems & Physical Properties

- **Serve Building Needs**
  - **Smoke**
  - **Germs**
  - **Chemical Resistance – Cleaning?**
  - **Chemical, Biological, Radiation?**
- **Product Types**
  - **Intumescent, Latex, Silicone**
  - **Ablative**
  - **Endothermic**

Graphics – 3M, STI, Nelson

D- Design
SYSTEMS SELECTION
SYSTEMS ANALYSIS

Who's Responsible, How to Choose???



Graphics – STI

Firestopping for Continuity

Products become SYSTEMS

- After Installation…
- **‘Field Erected Construction…Tested to…’**
  - Standards - ASTM E814/UL 1479–UL 2079, ASTM E 1966, ASTM E 2307, ULC S-115, FM 4990
  - **F Rating - Flame**
  - T Rating – Temperature
  - H Rating – Hose
  - **L Rating – Smoke**
  - W Rating – Water

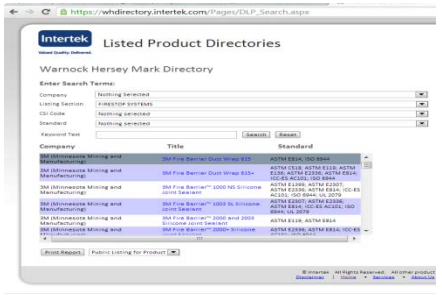
Graphics – 3M

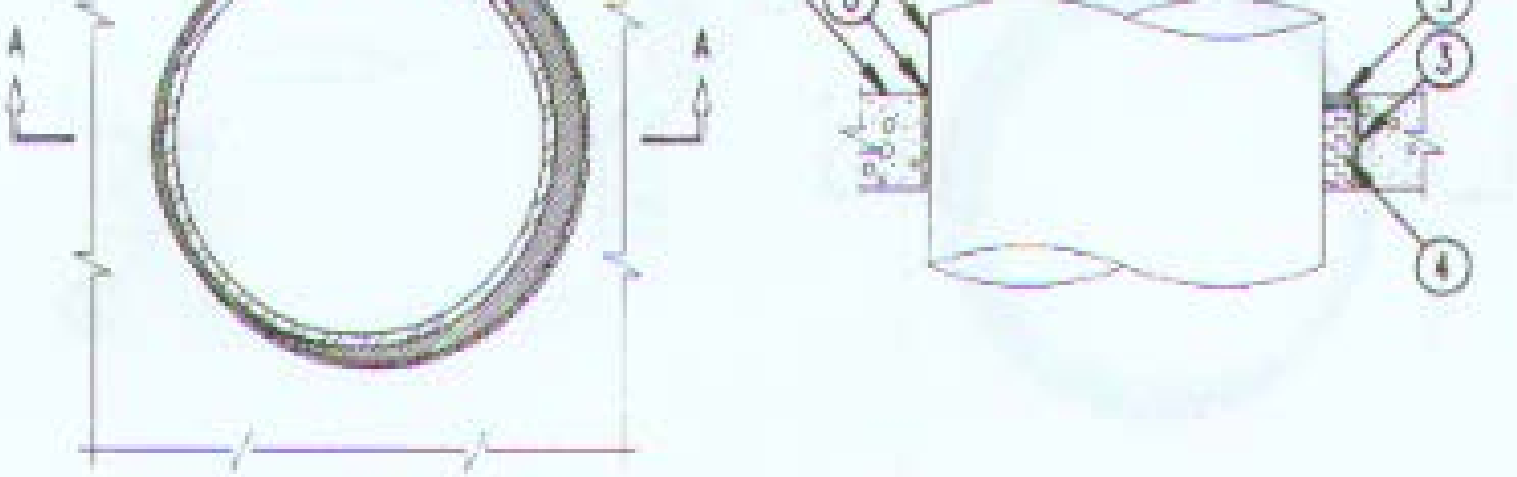
Products become Systems
Hose Stream = Shock Test

Firestopping for Continuity Products become Systems

- **Firestop Systems Directories –**
  - **UL**
  - **Intertek**
  - **FM Approvals**

Systems Selection & Analysis…Not as easy as it looks…





1. FLOOR OR WALL ASSEMBLY :
   A. MINIMUM 4-1/2" THICK LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR.
   B. U.L. CLASSIFIED CONCRETE BLOCK WALL (MINIMUM 8" BLOCK).
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
   A. MAXIMUM 20" DIAMETER STEEL PIPE.
   B. MAXIMUM 6" DIAMETER COPPER PIPE.
   C. MAXIMUM 6" DIAMETER STEEL CONDUIT.
   D. MAXIMUM 4" DIAMETER EMT.
3. OPTIONAL : MAXIMUM 22" DIAMETER STEEL PIPE SLEEVE (SCHEDULE 10 OR HEAVIER).
4. MINIMUM 4" THICKNESS MINERAL WOOL (MIN. 4 PCF DENSITY) RECESSED 1/2" FROM TOP OF SLEEVE.
5. MINIMUM 1/2" DEPTH HILTI FS-ONE FIRESTOP SEALANT.
6. A GENEROUS BEAD OF HILTI FS-ONE FIRESTOP SEALANT AROUND OUTER PERIMETER OF STEEL SLEEVE.

NOTES : 1. MAXIMUM DIAMETER OF OPENING = 22".
2. ANNULAR SPACE = MINIMUM 0", MAXIMUM 1-1/2".

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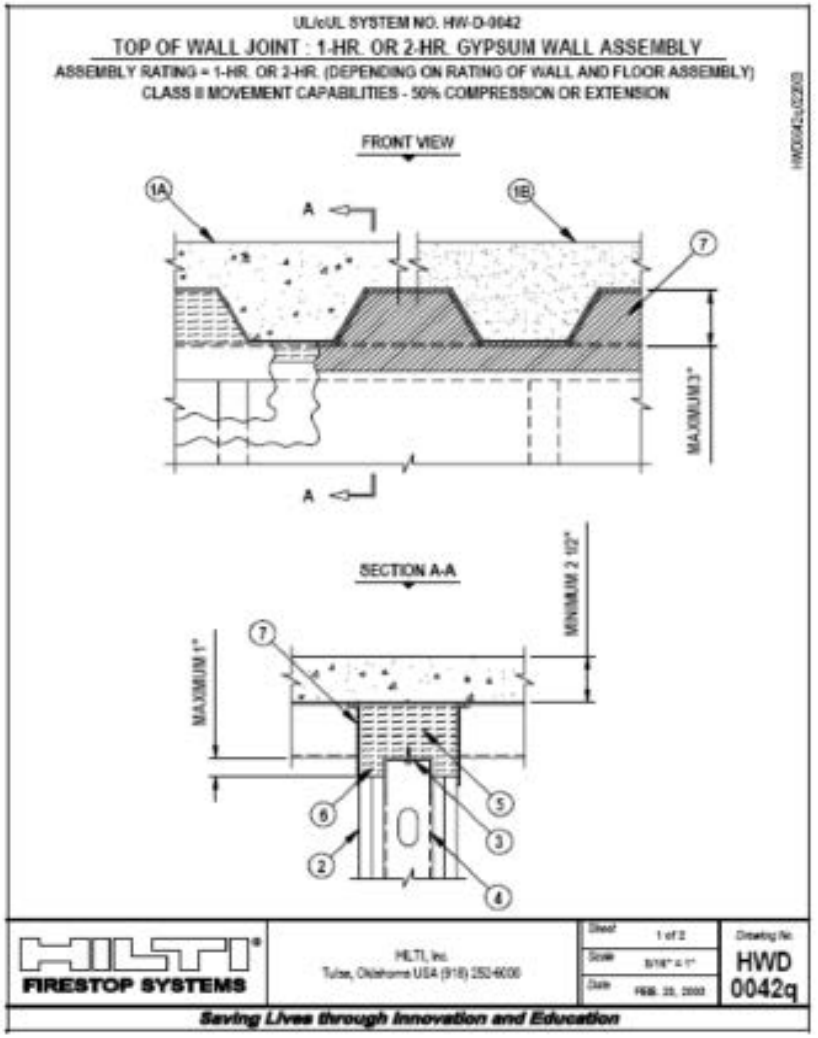
Fire Stop Technologies, Inc.

Gypsum Wall assembly running up to concrete over metal deck



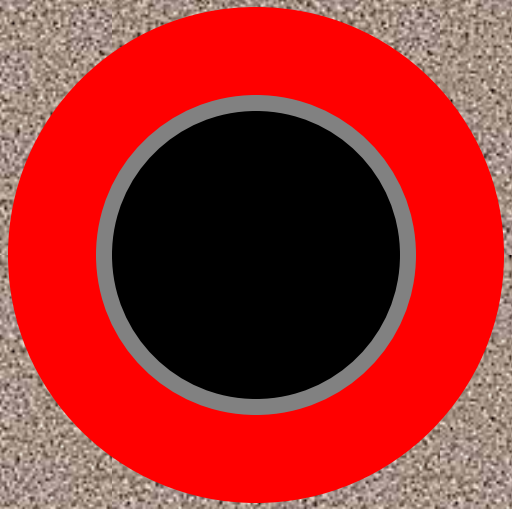
HILTI Photos

How do Contractors Select Systems & Inspection Agencies Analyze?

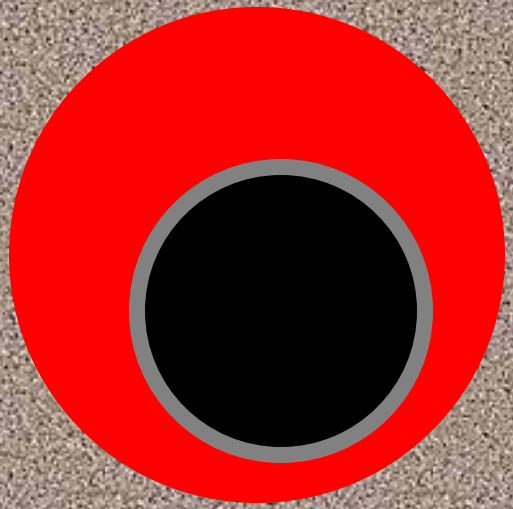
- Wall or Floor Construction Type, Rating
- Wall or Floor Thickness
- Penetrating Item, Coverings
- Size, Type, Thickness
- Annular Space Sizes
- Joint / Gap Sizes
- Backing Materials
- Fill Material(s)

= Rated Firestop System

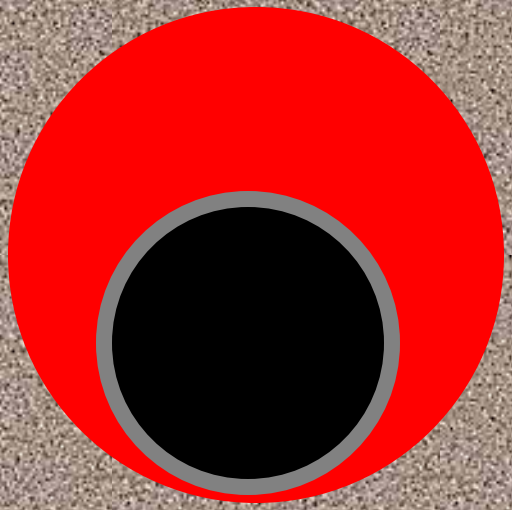
STI Graphic



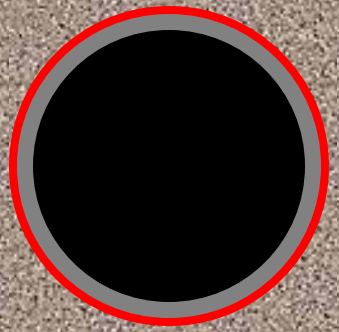
1. Centered



2. Off-Centered



3. Point Contact



4. Continuous Point Contact

Engineering Judgments/EFRRA

- Field or other Variances to
  Tested and Listed Systems?
  - Impractical
  - Annular Space / Gap too large / small
  - No System Exists
- Why???
  - Lack of Planning
  - Unique Conditions

Fire Stop Technologies, Inc.

Engineering Judgments/EFRRA

- Variances to Systems at Site ? – Now What…
  - **First Action in Process**
    - **Find another system** – Same Manufacturer
    - **Find another system –** Different Manufacturer
    - **If no system exists in either case**….
  - **Second Action –**
    - ***Engineering Judgment* – "EJ"**
    - ***Equivalent Fire Resistance Rated Assembly – "EFRRA"***
  - ***Based on engineering, IFC Protocol***

International Firestop Council – Manufacturers – firestop.org

IFC Guidelines for Evaluating Engineering Judgment Guidelines

‘Construction industry professionals, building officials, fire officials, firestop contractors and other stakeholders need appropriate guidelines for evaluating and using such judgments.

As such, IFC developed *Recommended IFC Guidelines for Evaluating FireStop Systems in Engineering Judgments*.

IFC EJ Guidelines - Engineering Judgments for firestop systems should:

1. Not be used in lieu of tested systems when available;

2. Be issued only by a firestop manufacturer's qualified technical personnel or in concert with the manufacturer by a knowledgeable registered Professional Engineer, Fire Protection Engineer, or an independent testing agency that provides listing services for firestop systems;

3. Be based upon interpolation of previously tested firestop systems that are either sufficiently similar in nature or clearly bracket the conditions upon which the judgment is to be given. Additional knowledge and technical interpretations based upon accepted engineering principles, fire science and fire testing guidelines (e.g. ASTM E 2032 – Standard Guide for Extension of Data from Fire Endurance Tests, ULC Subject C263E – Criteria for Use in Extension of Data from Fire Endurance Tests, or ASTM E2750 – Standard Guide for Extensions of Data for Penetration Seals) may also be used as further support data;

IFC EJ Guidelines

Engineering Judgments for firestop systems should:

4. Be based upon full knowledge of the elements of the construction to be protected, the understanding of the probable behavior of that construction and the recommended firestop system protecting it were they to be subjected to the appropriate Firestop Standard Fire Test method for the rating indicated on the Engineering Judgment;

5. Be limited only to specific conditions and configurations upon which the engineering judgment was rendered and should be based upon reasonable performance expectations for the recommended firestop system under those conditions;

6. Be accepted only for a single, specific job and project location and should not be transferred to any other job or project location without thorough and appropriate review of all aspects of the next job or location's circumstances.

IFC EJ Guidelines - Basic Presentation Requirements

Proper EJ's should:

1. Be presented in appropriately descriptive written form with or without detail drawings where appropriate;

2. Clearly indicate that the recommended firestop system is an EJ;

3. Include clear directions for the installation of the recommended firestop system;

4. Include dates of issue and authorization signature as well as the issuer's name, address and telephone number;

5. Reference tested system(s) upon which design (EJ) is based on;

6. Identify the job name, project location and firm EJ is issued to along with the non-standard conditions and rating supported by the EJ;

IFC EJ Presentation Guidelines – What's Seen?

7. Have proper justification (i.e. UL, Intertek or other independent laboratory system(s) and or opinions);

8. Provide complete descriptions of critical elements for the firestop configuration. These should include, but not be limited to the following:

a. Basic, Common

- **Type(s) of assembly used or being penetrated;**
- **Rating supported by the EJ.**

b. Through Penetrations

- **Penetrating item(s) (type, size, etc.);**
- **Annular space requirements, (minimum, maximum, actual, nominal, etc.)**
- **Opening size;**
- **Firestop product(s) to be used, type and amount (thickness if applicable);**
- **Accessory items(s) (i.e. anchors, backing material, etc.)**

c. Joints

- **Joint Width (installed width, nominal)**
- **Movement Capability;**
- **Movement Class (thermal wind sway, seismic);**
- **Accessory item(s) (i.e. insulation type, thickness and compression, etc.)**

IFC EJ Presentation Guidelines – What's Seen?

d•Duct Enclosure Systems – SEE www.Firestop.org

e• Firestop System – annular space dimensions, floor/wall construction, design number, components, installed thickness.

f. Perimeter Fire Barrier Systems –

- Type(s) of assembly used or being penetrated;

- Hourly Rating required

- Closest Listed System upon which the EJ is based

- Joint Width

- Static or Dynamic

- Safing Insulation Types), thickness and compression, etc.

- Five Basic Principles

1. Mechanical Attachment of the Spandrel Insulation

2. Protection of the Mullions

3. Compression Fitting and Orientation of the Safing Insulation

4. Installation of a Reinforcement Member(s), stiffener, at the safe-off area behind the spandrel insulation.

5. Firestop Coating, type, thickness,

IFC EJ Presentation Guidelines – What's Seen?

f• Continuity Head-of-Wall Joints

- ***Joint Width, (installed width, nominal)***
- ***Movement Capability***
- ***Movement Class – (thermal, wind sway, seismic)***
- ***Accessory Item(s) (i.e. insulation type, thickness, compression, etc.)***

IFC recommends that these guidelines be considered when evaluating whether any firestop system engineering judgment meets minimal requirements. Questions concerning the EJ request should be addressed to the initiator of the judgment.

INSTALL FIRESTOP SYSTEM
Firestop Sealant, MW installation to Tested and Listed System Limits
= Firestop System

Pack

1

Apply Sealant

2

Tool/Smooth

3

Walls - BOTH SIDES

STI Graphic

Properly Tooled/Smoothed Firestop Sealants

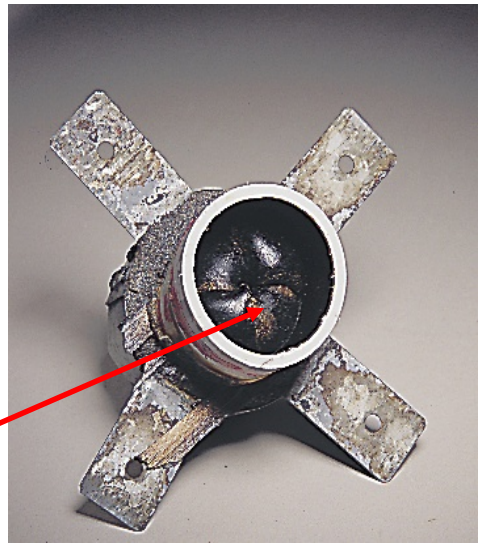
Firestop SolutionsGraphic

Sleeved Pipes

Correct Collar or Sealant Must Be Selected for Combustible Penetrations

Charred Pipe

Knot formed from Collapsing pipe



Cold-Side View

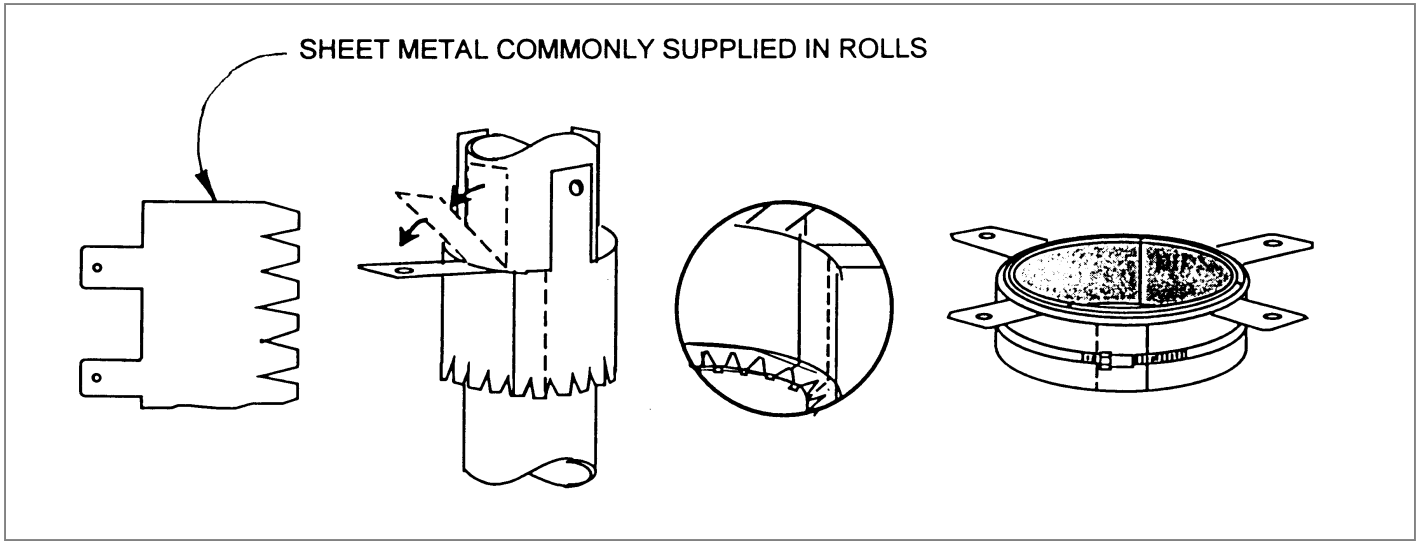
Hot-Side View

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

STI Graphic

Intumescent Wrap Strips and Steel Collars

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



STI Graphic

Unlisted, Untested Firestop Systems

Firestopping for Safety

Unlisted, Untested Firestop Systems

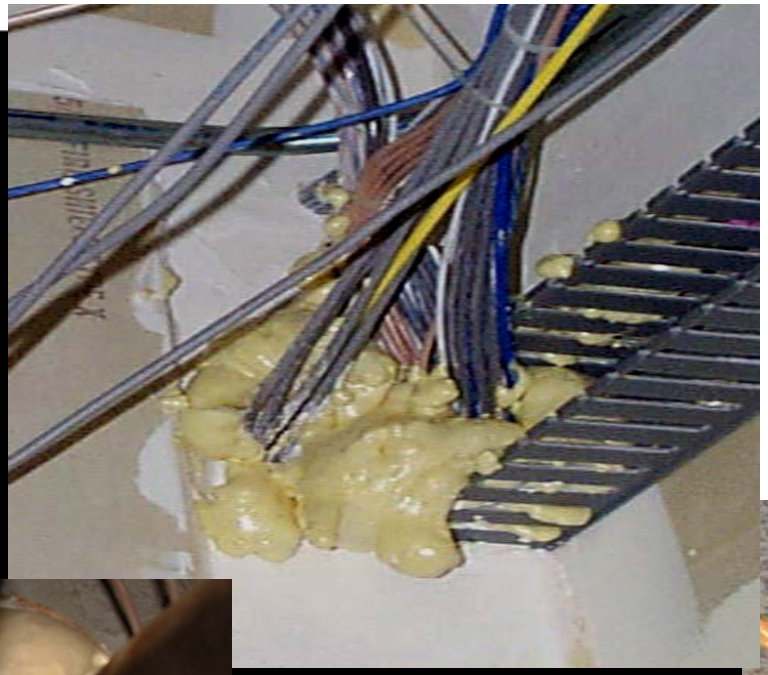
Fire Stop Technologies, Inc.

Joint Compound

Incomplete is ineffective

Graphics – Firestop Solutions

Great Stuff



Graphics – Firestop Solutions

Fire/Smoke Dampers & Firestops

- Dampers are UL 555, 555S Listed ***Systems***
  - Installed to manufacturer's written instructions (Systems – Angles…no sealants)
- Firestop sealants – UL 1479 –
  - Improper hole sizing or poor installation…

Consult the Damper Manufacturer & the Authority Having Jurisdiction

Graphics - Greenheck

Fire/Smoke Dampers
Firestop Installation

- Combination Fire Smoke Dampers
- Multi-blade Fire Dampers
- Underfloor applications
- Max. size 72” W x 96” H
- SYSTEM…AHJ

- Greenheck Graphic

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

Graphics – Firestop Solutions

Barriers With Combustible Penetrants

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

Graphics - STI

Firestop Joint Systems Definition

–

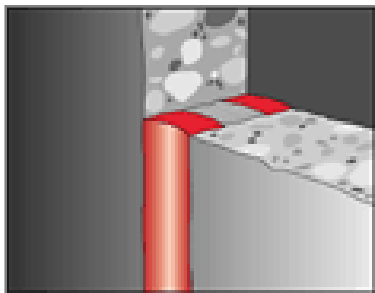
- UL 2079, ASTM E 1966, ULC-S-115
  - "A joint system is a **specific construction** consisting of adjacent **wall and floor assemblies, *and* the materials** designed to prevent the spread of fire through a linear opening between the wall and / or floor assemblies"

Graphics - STI

Firestopping for Safety

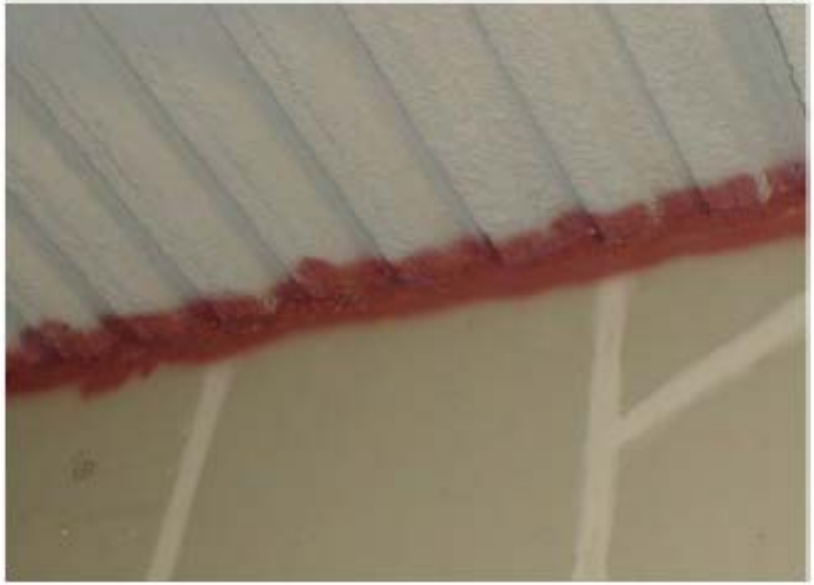
- Firestop Joint Systems Definition – UL 2079
  - Min. Positive Pressure – .01 Water, 12” below assy.
  - Movement Cycling
    - Class I – min. 500 cycles, min. 1 cycle / minute
    - Class II- min. 500 cycles, min. 10 cycles / minute
    - Class III-min 100 cycles, min. 30 cycles / minute
  - Fire Tested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

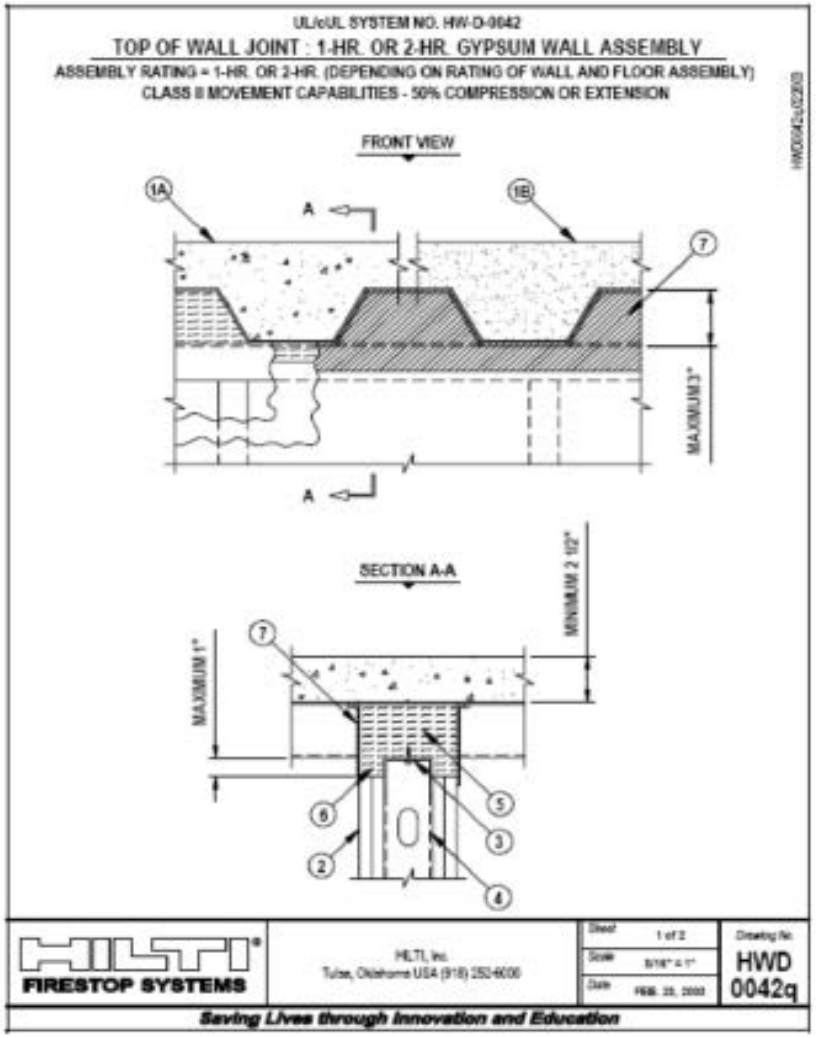
HILTI Graphic



Gypsum Wall assembly running up to concrete over metal deck

Fire Stop Technologies, Inc.





HILTI Photos

Firestop Applications

Floor to Wall

Fire Stop Technologies, Inc.

Top of Wall

Graphics – Firestop Solutions

Joints and Seams

Head of Wall

Graphics – Firestop Solutions

Joints and Seams

I-Beam to Fluted Deck

Graphics – Firestop Solutions

Penetrations in Head of Wall

Graphics – Firestop Solutions

Unacceptable

Graphics – Firestop Solutions

Results of Improperly Installed Mineral Wool

Graphics – Firestop Solutions

Firestop Perimeter Fire Containment Systems

- 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."

Graphic - Superl

Tamweel Towers, Dubai
Perimeter Fire Protection
Gulf News: A discarded cigarette ???

Energy & Fire Codes Converge

- ***Safer Buildings - Tamweel Apartment Tower…***

‘Tamweel Tower fire started by cigarette butt, say Dubai Police..’

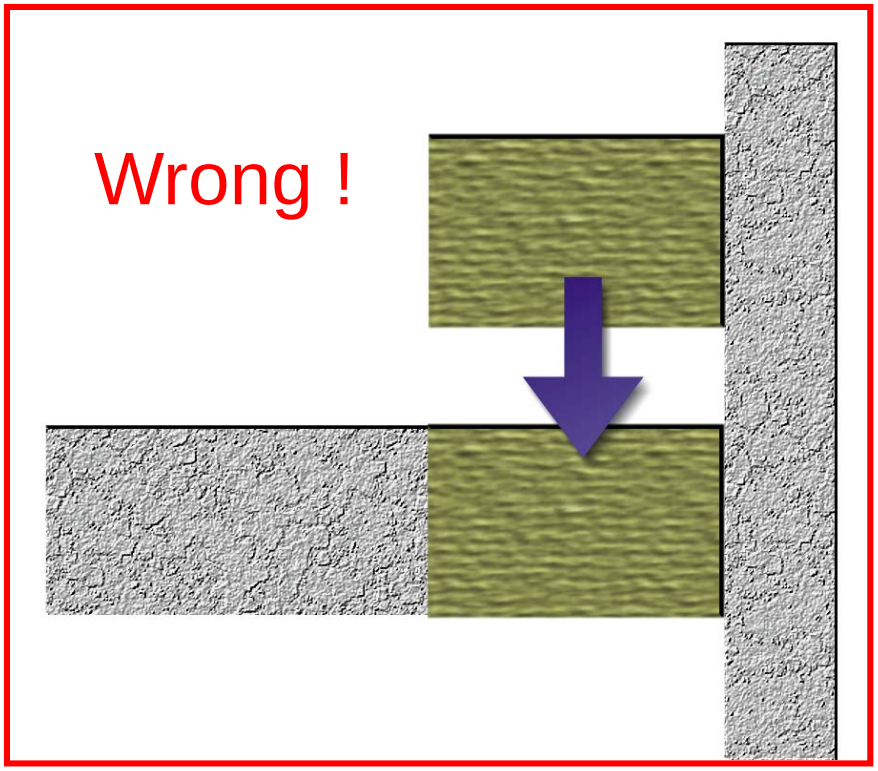
thenational.ae

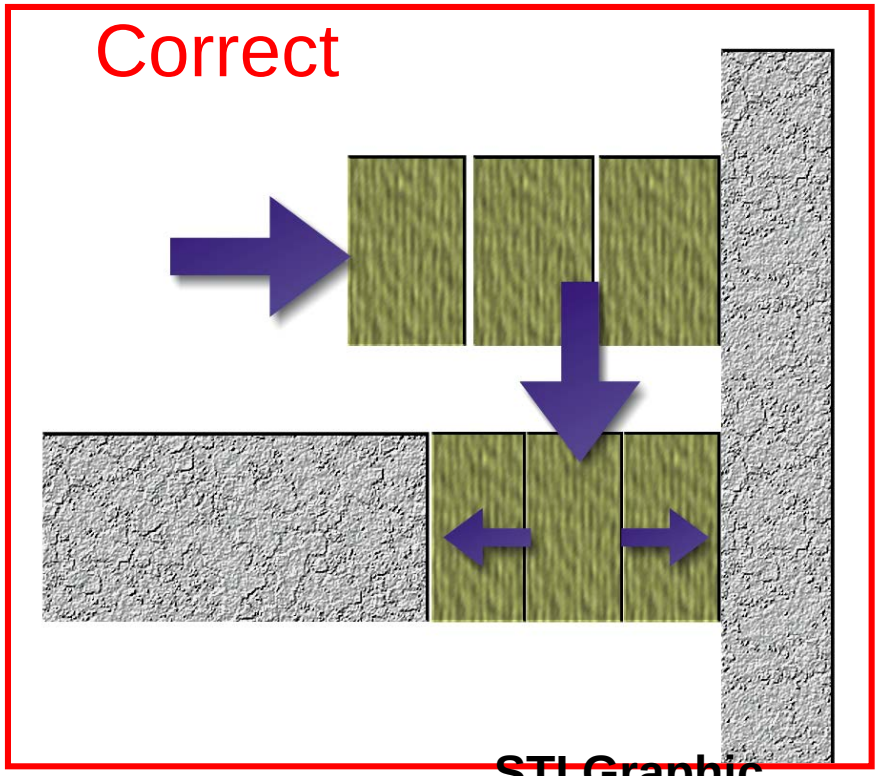
Firestop Perimeter Fire Containment Systems

Graphic – Intertek

Proper Installation of Mineral Wool

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

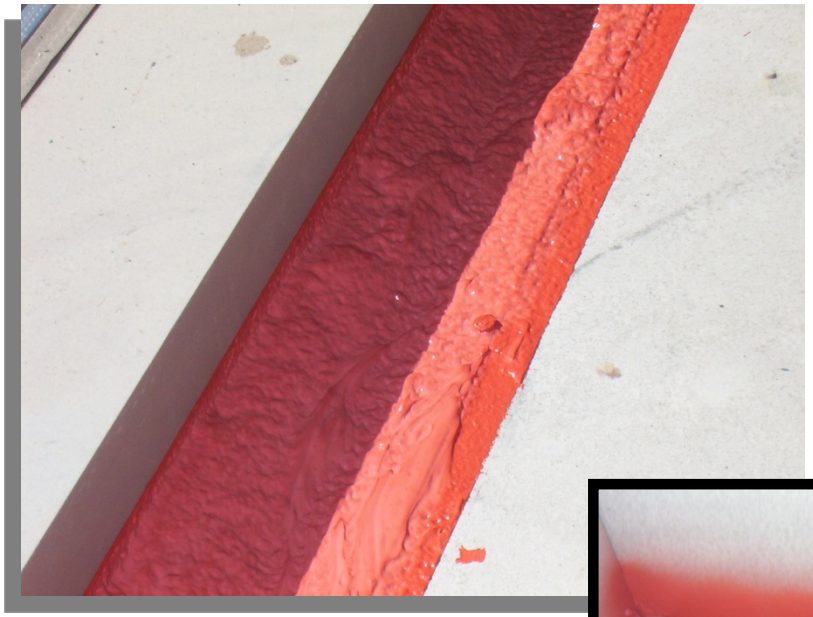




STI Graphic

STI Graphic

Firestop Installed at Perimeter of Floors at Curtainwall



Graphics – Firestop Solutions

Safer Buildings …

– Tamweel Apartment Tower, Dubai

Safer Buildings …

- ***Safer Buildings - Tamweel Apartment Tower…***

‘Tamweel Tower fire started by cigarette butt, say Dubai Police’

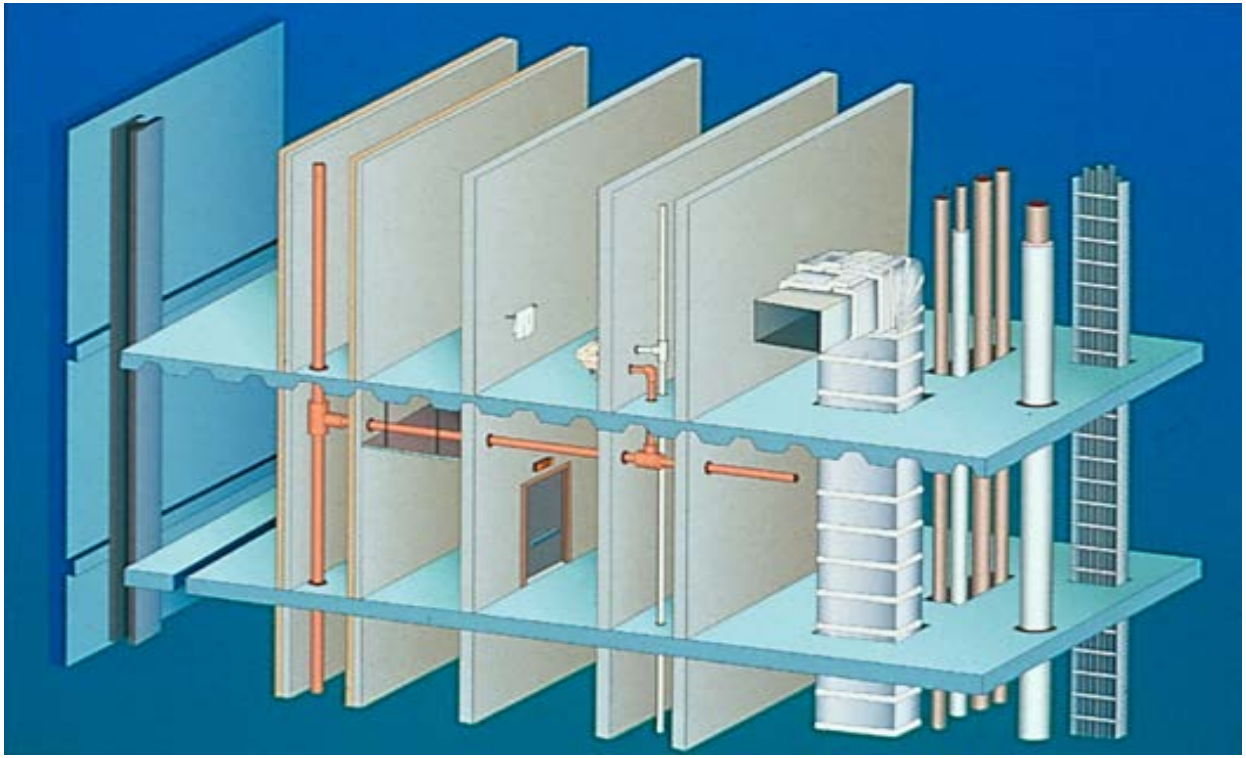
[thenational.ae]

Firestop Products Become Systems when Installed to SYSTEM

Graphics – OPL, 3M

I- Installation

Who’s Responsible, How to Choose???



Graphics – STI

Installation – Who?

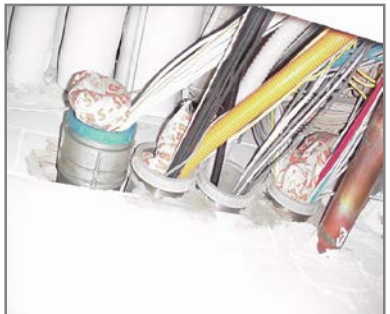
- Firestopping wrong, missing
- Systems Documentation?
- As Built Documentation??

Conclusion –

Without Single Firestopping Trade….

fire & life safety risks

Adler Photo



3 Firestop Installation Methods

- **Each Trade**
  - "He/She who pokes hole, fills hole"
- **Multiple Contracts**
  - Firestop Contractors, Trades
- **Single Source Firestop Contractor**
  - ***FCIA Member in Good Standing***
  - ***FM 4991, UL, ULC Qualifiied***

Why Contractor Qualifications?

- **Firestopping Ratings - F, T, H, L W**
- **Zero Tolerances?**
  - **Annular Space Sizes, Gap Sizes**
- **Product Properties**
  - **Movement**
  - **Compatibility**
  - **Storage, Application, Curing Temps**
- **SYSTEMS DOCUMENTATION**

Firestop Contractor Qualifications

1. **Bought at Hardware Store, etc.**
   - Contractor or Individual?

2. **Manufacturer Trained Individuals**
   - 1 hour program
   - ½ day program
   - 2 day education

3. **ULC Qualified, FM 4991 Approved Companies**
   - 3rd Party Verified ***Company*** Management System
   - ***Individuals*** Pass 3rd Party Exam
   - ***Individual*** Knowledge – FCIA MOP
   - All Manufacturers Products Covered
   - ***Company gets Approved or Qualified, not Individual***

Firestop Contractor Qualifications?

- **Manufacturer Educated**
  - **Short Class – 25 - 60 minutes**
    - Some Training
    - Worker educated
    - Short test
    - Administered by salesperson
  - **Worker Education at Shop**
  - **Manufacturer HQ Education**
    - 1-2 Days Education
    - Test – Teach to the Test?
    - Not 3rd Party

Firestop Contractor Qualifications

- **Association Member**
- Insurance – Classification?
  - Specialty Firestop Contractor?
  - Plumber, other trade??
- Workforce – Educated as Firestop/Containment Workers
- Bonding Capability
- Project References & Experience
- **Management System reviewed by….**
  - **FM 4991, UL or ULC ?**

Firestop Contractor Qualifications

FM & UL/ULC – 4 Components

1. Office Facility Quality Management System Audit
2. Field – Jobsite Audit
3. Employ a person
   - – UL/FM Firestop Exam @ 80% or better
   - – DRI if employed by Approved/Qualified Firm,
     - • ***Designated Responsible Individual (DRI)***
4. Annual Audit

FM APPROVED 4991

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

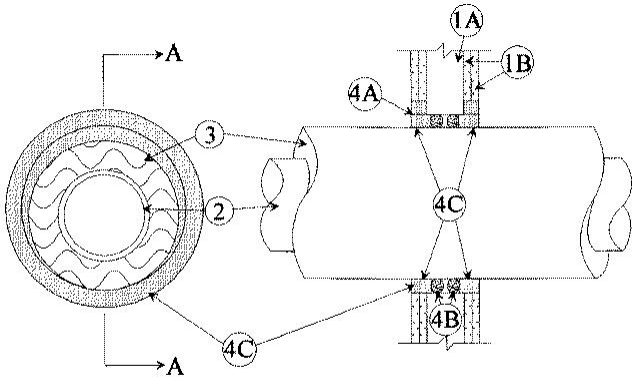
UL Underwriters Laboratories Inc.
Qualified Firestop Contractor Program

1. Office Audit of Company Management System Manual

- Controlled Management Processes
- Project Successful Proven Contractor
- Education, Training, Accountability

1. FM, UL/ULC Company Audit of Management System (MS)

- Employee Training & Education
- Systems Selection
- Communicate systems to Field
- Material Controls
- Systems installation “protocol”
- Labeling
- Record keeping - Variance Proce
- Non-Conformances
- Documentation
- Project closeout



CONFIGURATION A

2. Company MS **Jobsite Audit** by **ULC, FM or UL**

- Verification of firestop systems Processes
- Verify Management System Works
- Verify Company “communication”
  - Office to field, field to office
- “Culture of Quality…”

» Adler Photo

3. **DRI –** Company Appoints DRI if ….

- **Pass Rigorous Firestop Examination**
  - FCIA Firestop Manual of Practice
  - Firestop Systems Selection & Protocol
  - Management System Knowledge
- Keep CEU's – 6 FM, 10 UL, ea. 3 yrs.
- Retested every 3 years (FM Only)
- One DRI per Approved Contractor Location

FM APPROVED 4991

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

UL Underwriters Laboratories Inc.
Qualified Firestop Contractor Program

4. Annual Audit
FM 4991 UL / ULC
Contractor Company Personnel

- Continued satisfactory performance
  - Quality Manual Implementation
- Documented - Archived record keeping
- Employee Training Documentation
- Jobsite Visit
- DRI CEU Verification
- **Find @www.fcia.org**

UL-ULC/FM 4991Contractor Company Benefits

Quantified Differentiation …

- **Focus on the Company & Individual**
- Investment in Company Procedures
- Investment in People Education
- Investment in FCIA Manual of Practice
  - Project Successful Proven Contractor
  - Education, Training, Accountability

= Reduced Risk – Life, Property, Business

Specified Technologies Inc.
THE FIRESTOP AUTHORITY

3530 33rd Way NW
Olympia, WA 98502-3233
p | 360.866.2722
f | 360.866.8184
m | 360.791.7915
email: bjohnson@stibestop.com
website: www.stibestop.com

Wednesday, February 10, 2010

Mr. Randy Perry
Adler Firestopping Ltd.
#23, 53016 Hwy 60
Acheson, AB T5T 1M9
Canada

Re: Qualified Firestop Applicator

As the firestop manufacturer with more UL and ULC Classified Firestop System Coverage than any other, we are intimately familiar with *UL and ULC's QFC Program*. We recognize the program as one of two best-in-class, third-party, quality assurance methods available to building project decision-makers to help ensure applicator quality. As such, we fully endorse the program and those applicators that have invested heavily to earn their way to become a member in this elite group of professionals.

It is our understanding that Adler Firestopping Ltd. is a ULC (Underwriters Laboratories of Canada) ***Qualified Firestop Contractor (QFC)*** in good standing. This can be verified at the bottom of the page at the following link:
http://www.ul.com/global/eng/pages/offerings/industries/buildingmaterials/qualifiedcontractorprogram/qualifiedfirestop/

Moreover, Randy Perry has successfully attended our intensive, two-day FIT Level II program, taken the exam, earned a passing score and is within the two-year expiry period before renewal will be required. A copy of his certificate can be made available upon request.

Regards,

John Hurley
Regional Manager, Western US and Canada

Underwriters Laboratories

Certificate Number: 1016

QUALIFIED FIRESTOP CONTRACTOR CERTIFICATE

Issued: 2/1/2010
Expires: 2/1/2011

Company Name: Adler Firestopping Ltd. File number: NC10757

Address: Edmonton Office, #23, 53016 Hwy 60, Acheson, AB, T7X 5A7 CANADA

Telephone #: (780)-962-9495 Fax #: (780)-962-9794 Email Address: randy@adlerfirestopping.com

This company has demonstrated that it complies with UL's Qualified Firestop Contractor Program Requirements for Canada. Under this programme, the Contractor has demonstrated knowledge of selection and installation of firestop systems as evidenced by the successful performance in a written examination by a "Designated Responsible Individual" (DRI). The Contractor has also established a Management System specifically focused on the proper selection and installation of ULC Listed Firestop Systems.

This certificate is not transferable and expires one (1) year after the issue date. This certificate may be displayed, copied and shared with others but must be used in its entirety. Only those companies listed in ULC's Online Certifications Directory for the Qualified Firestop Contractor Program at **www.ulc.ca/contractor** are considered eligible for this program and to use this Certificate and the ULC marking (shown here) in its advertising and promotional material in accordance with the marking guidelines provided with this Certificate.

Underwriters' Laboratories of Canada,
Qualified Firestop Contractor Program

Underwriters Laboratories of Canada® reserves the right to void this certificate at any point. This certificate does not indicate compliance with any ULC Product Certification Program. For additional information regarding the Qualified Firestop Contractor Program, please visit **www.ulc.ca/contractor.**

Firestop Contractors FCIA International Association

FIRESTOP CONTRACTORS INTERNATIONAL ASSOCIATION

Membership Certificate

This certifies that

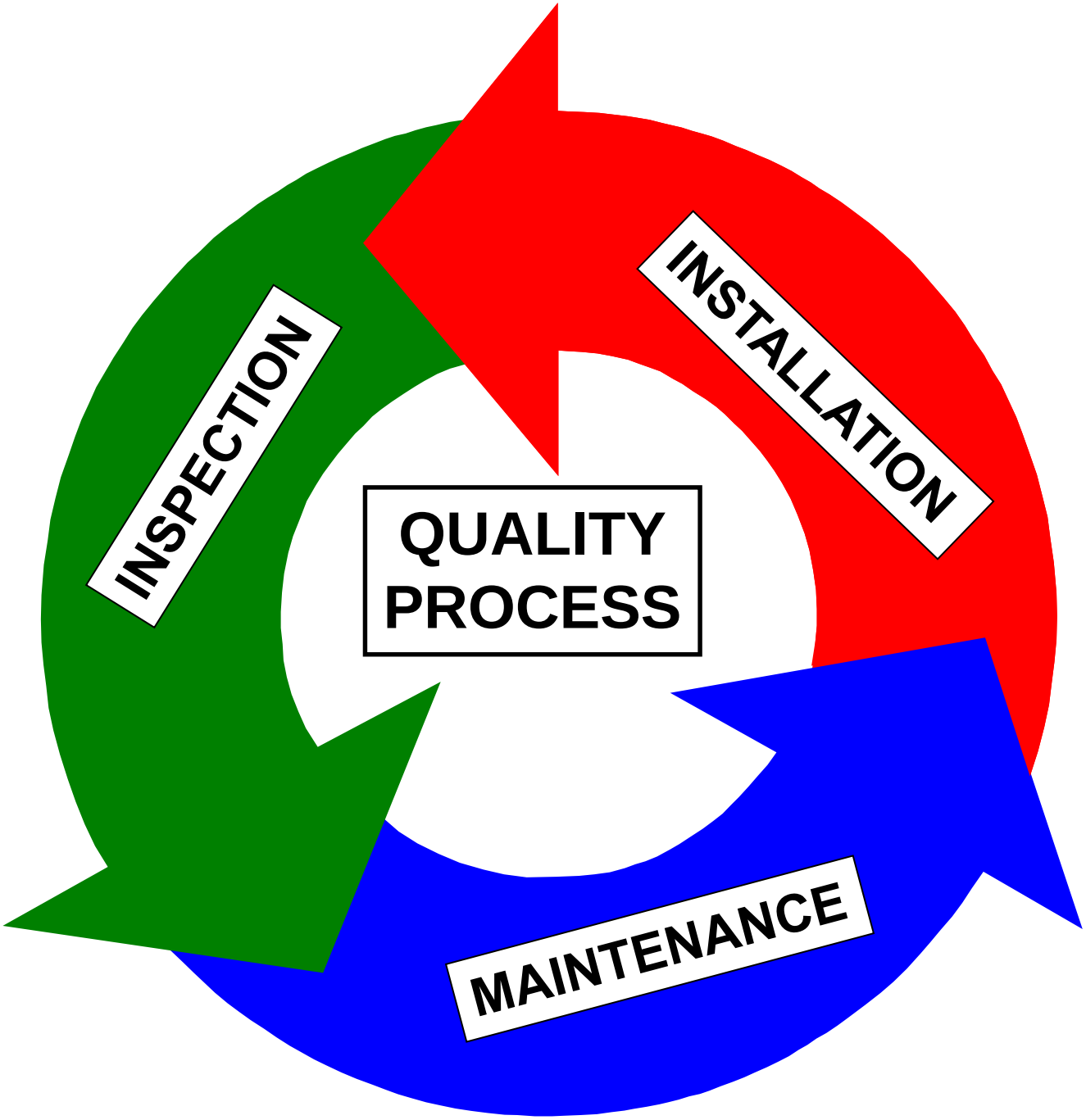
Adler Firestopping, Ltd.

Edmonton, Alberta

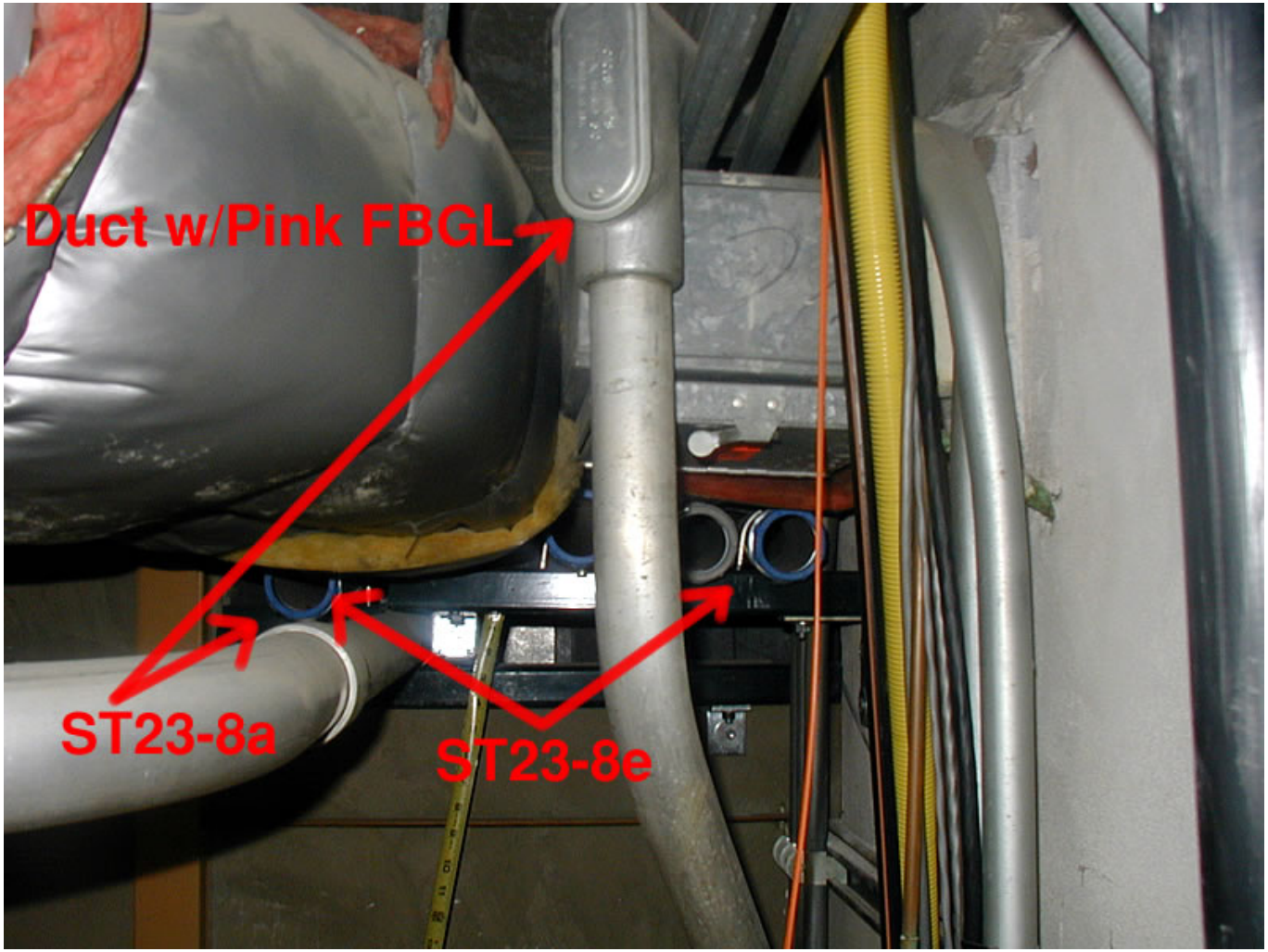
is a Firestop Contractor Voting Member of the Firestop Contractors International Association and pledges to further the mission of FCIA.

Robert N. LeClair, Jr., *President, FCIA*
Don Murphy, *Vice President*
Don Sabrsula, *Secretary*
Scott Rankin, *Treasurer*
Randall Bosscawen, *Director*
Mike Dominguez, *Director*
Aedan Gleeson, *Director*
Bob Hasting, *Director*

I – Inspection
Systems Analysis


INSPECTION
INSTALLATION
QUALITY
PROCESS
MAINTENANCE

Firestop Installation & Inspection



Firestop Installation & Inspection

- ASTM E 2174/ ASTM E 2393 –





Firestop Installation & Inspection

- ASTM E 2174/ASTM E 2393 -

Submitted by Adler Firestopping

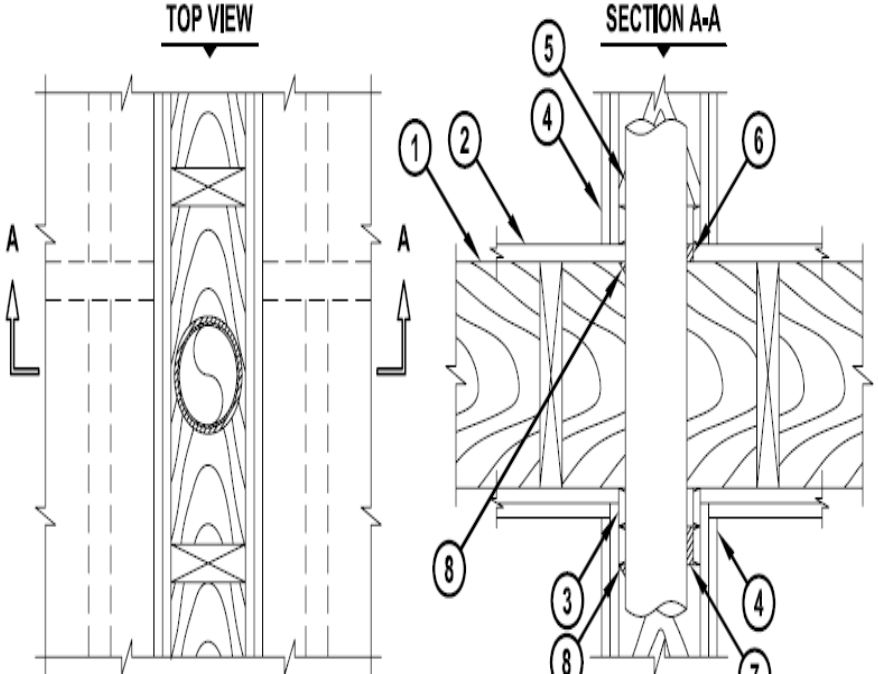
ULC SYSTEM NO. SPC 46

PLASTIC PIPE THROUGH WOOD FLOOR/CEILING ASSEMBLY

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

FH, FT AND FTH-RATING = SEE ULC FIRE RESISTANCE DIRECTORY

NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL



I – Inspection – Options

- **Contractor Self Inspection**
  - Verify Management System validity
  - Not 2%, 10%
  - Required for FM & UL, ULC Contractors
- **Manufacturer Inspection**
  - Does not exist … Survey, maybe
- **ASTM E 2174 & ASTM E 2393 –**
  - Independent 3rd Party
  - Destructive, Non Destructive
  - Specified Frequency

I – Inspection – Code Requirements

[A] 104.4 Inspections. The *building official* shall make all of the required inspections, or the *building official* shall have the authority to accept reports of inspection by *approved agencies* or individuals. Reports of such inspections shall be in writing and be certified by a responsible officer of such *approved agency* or by the responsible individual. The *building official* is authorized to engage such expert opinion as deemed necessary to report upon unusual technical issues that arise, subject to the approval of the appointing authority.

I – Inspection – Code Requirements

[A] 110.3 Required inspections. The *building official*, upon notification, shall make the inspections set forth in Sections 110.3.1 through 110.3.10.

[A] 110.3.6 Fire- and smoke-resistant penetrations. Protection of joints and penetrations in fire-resistance rated assemblies, *smoke barriers* and smoke partitions shall not be concealed from view until inspected and *approved*.

I – Inspection – Code Requirements

[A] 110.4 Inspection agencies. The *building official* is authorized to accept reports of *approved* inspection agencies, provided such agencies satisfy the requirements as to qualifications and reliability. [IBC 110.4]

[A] 110.6 Approval required. Work shall not be done beyond the point indicated in each successive inspection without first obtaining the approval of the *building official*….More. [IBC 110.6]

I – Inspection – Code Requirements

Definitions

[A] 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]

[A] APPROVED. Acceptable to the *building official* or authority having jurisdiction.

[IBC 202 Definitions]

I – Inspection – Code Requirements

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]

I – Inspection – Code Requirements

SECTION 1703 APPROVALS

1703.1 Approved agency. An *approved agency* shall provide all information as necessary for the *building official* to determine that the agency meets the applicable requirements.

I – Inspection – Code Requirements

1703.1.1 Independence. An approved agency shall be objective, competent and independent from the contractor responsible for the work being inspected. The agency shall also disclose possible conflicts of interest so that objectivity can be confirmed. **[IBC 1703.1.2]**

1703.1.2 Equipment. An approved agency shall have adequate equipment to perform required tests. The equipment shall be periodically calibrated. **[IBC 1703.1.2]**

I – Inspection – Code Requirements

1703.1.3 Personnel. An approved agency shall employ experienced personnel educated in conducting, supervising and evaluating tests and/or inspections.

[IBC 1703.1.3]

I – Inspection – Code Requirements

1704.2 Special inspections. Where application is made for construction as described in this section, **the owner or the registered design professional in responsible charge acting as the owner's agent** shall employ one or more approved agencies to perform inspections during construction on the types of work listed under Section 1705. **These inspections are in addition to the inspections identified in Section 110. [IBC 1704.2]**

I – Inspection – Code Requirements

1704.2.1 Special inspector qualifications. The special inspector shall provide written documentation to the building official demonstrating his or her competence and relevant experience or training. Experience or training shall be considered relevant when the documented experience or training is related in complexity to the same type of special inspection activities for projects of similar complexity and material qualities. These qualifications are in addition to qualifications specified in other sections of this code.

The registered design professional in responsible charge and engineers of record involved in the design of the project are permitted to act as the approved agency and their personnel are permitted to act as the special inspector for the work designed by them, provided they qualify as special inspectors.

I – Inspection – 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, fireresistant 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.

I – Inspection –
Code Requirements

HIGH-RISE BUILDING. A building with an occupied floor located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access. [IBC 202]

I – Inspection – Code Requirements

1705.16.1 Penetration firestops. Inspections of penetration firestop systems that are tested and listed in accordance with Sections 714.3.1.2 and 714.4.1.2 shall be conducted by an approved inspection agency in accordance with ASTM E 2174.

1705.16.2 Fire-resistant joint systems. Inspection of fire resistant joint systems that are tested and listed in accordance with Sections 715.3 and 715.4 shall be conducted by an approved inspection agency in accordance with ASTM E 2393.

Firestop Systems Inspection ASTM E 2174 - ASTM E 2393

- "Standard Practice for On-Site Inspection of Installed Fire Stops – Penetrations - Joints"
  - Standard Inspection Procedure
  - Special Inspection Agency Companies
  - Other Qualified Firms
  - Report to Building Owner, Fire Marshals & Code Officials

Inspection in Codes
ASTM E 2174 - ASTM E 2393

- NFPA 101 / 5000 - Chapter 8 - Annex
- 2012 International Building Code
  - CH 17 – Special Inspections
    - Buildings 75’ & higher above Fire Department Access
    - Occupancy Type III, IV, Chapter 16 Table 1604.5
- Abu Dhabi International Building Code

Inspection Firm & Indvidual Qualifications ASTM E 2174 - ASTM E 2393

- Inspector Firm & Inspectors
  - **‘Independent of, and Divested from** ’ Installing firm, Distributor, Manufacturer, Competitor, Supplier…
  - **‘Not a Competitor** of the Installer, contractor, manufacturer, or supplier ….
  - **Submit notarized statements** of …

Inspection Firm & Individual Qualifications
ASTM E 2174 - ASTM E 2393

- Inspector Personnel meet at least one criteria…..
  - 2 years experience (Construction, Field), education, and credentials acceptable to AHJ
  - Accredited by AHJ
  - Meet ASTM E699

- **NEW Inspection Agency *Company* Qualification – IAS AC 291 – W/Individual Certs.**

INTERNATIONAL ACCREDITATION SERVICE
Leading Accreditors Since 1975

Firm and Individual Qualifications IAS AC 291

- Inspector Firm shall have at least one staff..
  - PASS UL or FM Firestop Exam
  - 1 year Quality Assurance

    Or…
  - PASS UL/FM Firestop Exam, *and* PE, FPE, Registered Architect, or
  - PASS UL/FM Firestop Exam, *and* Education by Certified Agency

Firm and Individual Qualifications IAS AC 291

- **Specify IAS AC 291 –**
  - Quantified Qualifications
  - Helps AHJ with “Approved Agency”
  - Not in ASTM Standards, Code

- **Specify Individual Certifications**
  - 3rd Party, Independent Exams verify Knowledge
    - FM Firestop Exam
    - UL Firestop Exam

Inspection Process
ASTM E 2174 - ASTM E 2393

- Pre Construction Meeting
  - Review Documents – Identify Conflicts
  - Review Materials – SYSTEMS
    - **ASTM E 814 or UL 1479, FM 4990, ASTM E 1966, UL 2079, ASTM E 2307 Systems, ULC S-115**
    - Inspection Documents
      - Manufacturer Product Data Sheets
      - Tested and Listed Systems & EJ's
      - Safety Data Sheets

Inspection Process
ASTM E 2174 - ASTM E 2393

- Pre-Construction Meeting
  - Mock Ups
  - Destructive Testing
  - Installation Measurements
  - Discuss Inspection Method
- Meeting Required
  - During/Post Inspection Methods

Inspection Methods
ASTM E 2174 - ASTM E 2393

- During Construction
  - Random witness, Each Floor
    - **10%, each type** of Penetration Firestop,
    - **5% of Total Lineal Feet** of Fire Resistance Rated Joint System, each type

Adler Photo

Inspection Methods
ASTM E 2174 - ASTM E 2393

- Post Construction - Destructive Testing
  - Minimum 2% , no less than 1, each type per 10,000 SF of floor area
  - Minimum 1 / 500 LF of Joint Area, mandatory
  - If 10% variance per firestop type
    - Inspection stops
    - Installer inspects, repairs
    - Inspector reinspects

Adler Photo

Inspection Methods
ASTM E 2174 - ASTM E 2393

- Variances….
  - ASTM E 2174 & ASTM E 2393
    - One Day Notice after discovery to Contractor
  - International Building Code 1704.2.4
    - ‘Brought to IMMEDIATE attention of contractor’
    - ‘If not corrected, Building Official AND RDP… prior to completion of that phase’

Adler Photo

Inspection Methods
ASTM E 2174 - ASTM E 2393

- Both Methods…
  - If 10% variance per firestop type
    - Inspection stops
    - Installer inspects, repairs
    - Inspector reinspects
  - Inspector Shall not Supervise Workers…
  - Inspect @ Firestop Installation Start

Inspection Forms
ASTM E 2174 - ASTM E 2393

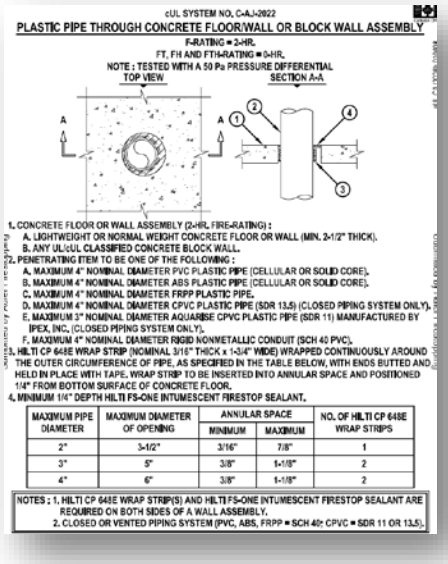
- One for each type of firestop
- Submit 1 day after Inspection to Authorizing Agency
- Numbered – Controlled
- Required – During/Post Construction Methods

Inspection Reports - IBC

1704.2.4 Report requirement. Special inspectors shall keep records of inspections. The special inspector shall furnish inspection reports to the building official, and to the registered design professional in responsible charge. Reports shall indicate that work inspected was or was not completed in conformance to approved construction documents. **Discrepancies shall be brought to the immediate attention of the contractor for correction.** If they are **not corrected**, the discrepancies shall be brought to the attention of the building official and to the registered design professional in responsible charge **prior to the completion of that phase of the work**. A final report documenting required special inspections and correction of any discrepancies noted in the inspections shall be submitted at a point in time agreed upon prior to the start of work by the applicant and the building official.

Inspection Final Report
ASTM E 2174 - ASTM E 2393

- Name, address, location –
  project, installer, inspector
- Type and quantity of firestops inspected
- Verification method
- Percentage Deviation
- Copies of all documents sent
  to Authorizing Agency



cUL SYSTEM NO. C-AJ-2022

PLASTIC PIPE THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL ASSEMBLY

F-RATING = 2-HR.
FT, FH AND FTH-RATING = 0-HR.
NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL

TOP VIEW

SECTION A-A

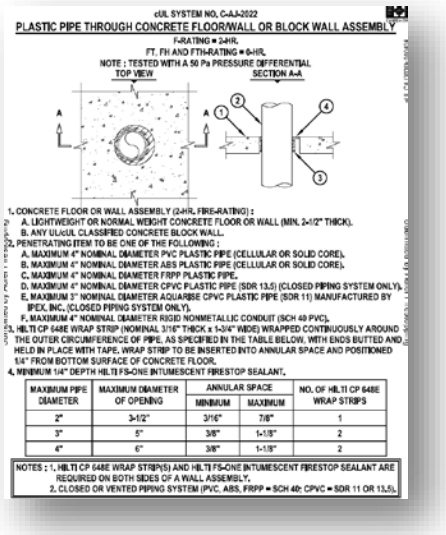
1. CONCRETE FLOOR OR WALL ASSEMBLY (2-HR. FIRE-RATING) :
   A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MIN. 2-1/2" THICK).
   B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
   A. MAXIMUM 4" NOMINAL DIAMETER PVC PLASTIC PIPE (CELLULAR OR SOLID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

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

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

Firestopping & Compartmentation for Safety

- Copies of all documents sent to Authorizing Agency
- Product Data Sheets
- ‘SYSTEMS’, Fire Rated
  Assemblies = As Builts
- Inspection Docs
- Warranty Docs
- Maintenance Requirements
- Letters of Compliance
- FCIA Member in
  Good Standing Certificate



cUL SYSTEM NO. C-AJ-2022

PLASTIC PIPE THROUGH CONCRETE FLOOR/WALL OR BLOCK WALL ASSEMBLY

F-RATING = 2-HR.
FT, FH AND FTH-RATING = 6-HR.
NOTE : TESTED WITH A 50 Pa PRESSURE DIFFERENTIAL

TOP VIEW | SECTION A-A

1. CONCRETE FLOOR OR WALL ASSEMBLY (2-HR. FIRE-RATING) :
   A. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR WALL (MIN. 2-1/2" THICK).
   B. ANY UL/cUL CLASSIFIED CONCRETE BLOCK WALL.
2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING :
   A. MAXIMUM 4" NOMINAL DIAMETER PVC PLASTIC PIPE (CELLULAR OR SOLID CORE).
   B. MAXIMUM 4" NOMINAL DIAMETER ABS PLASTIC PIPE (CELLULAR OR SOLID CORE).
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   D. MAXIMUM 4" NOMINAL DIAMETER CPVC PLASTIC PIPE (SDR 13.5) (CLOSED PIPING SYSTEM ONLY).
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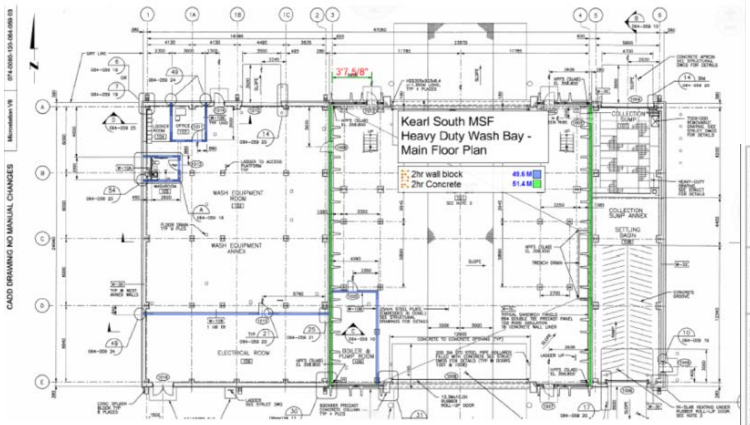
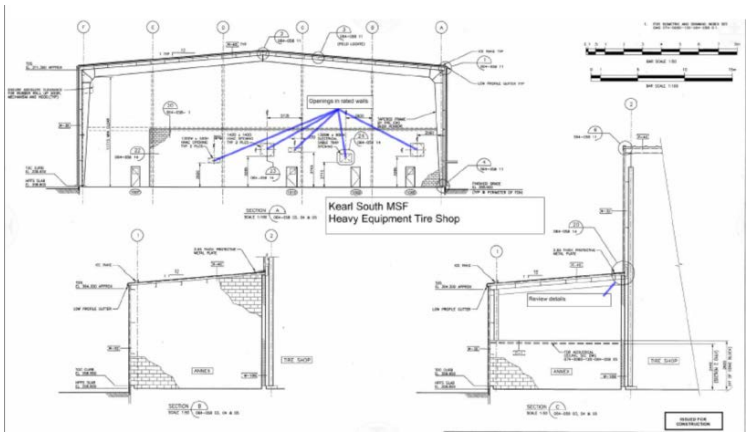
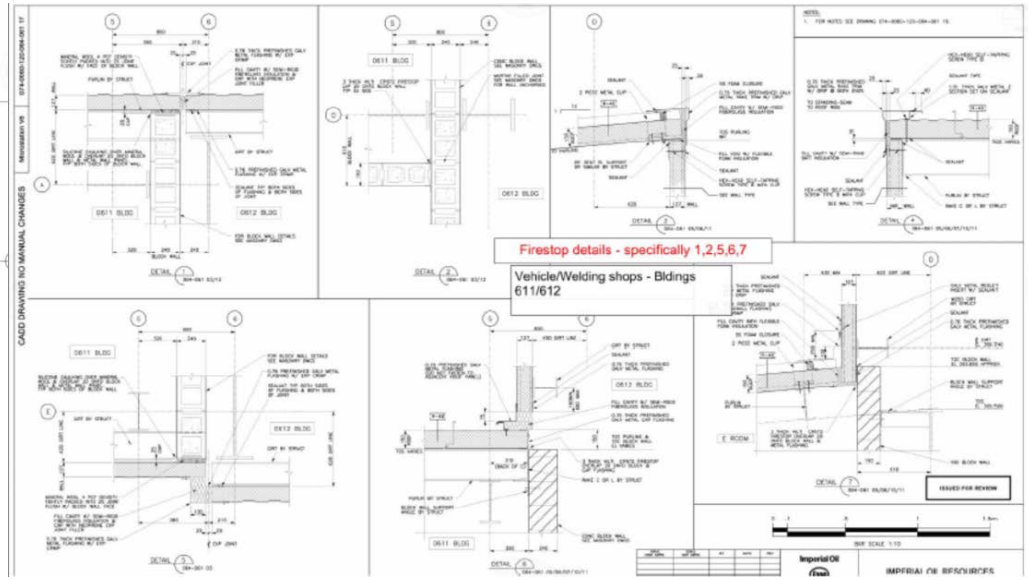
Firestopping & Compartmentation for Safety

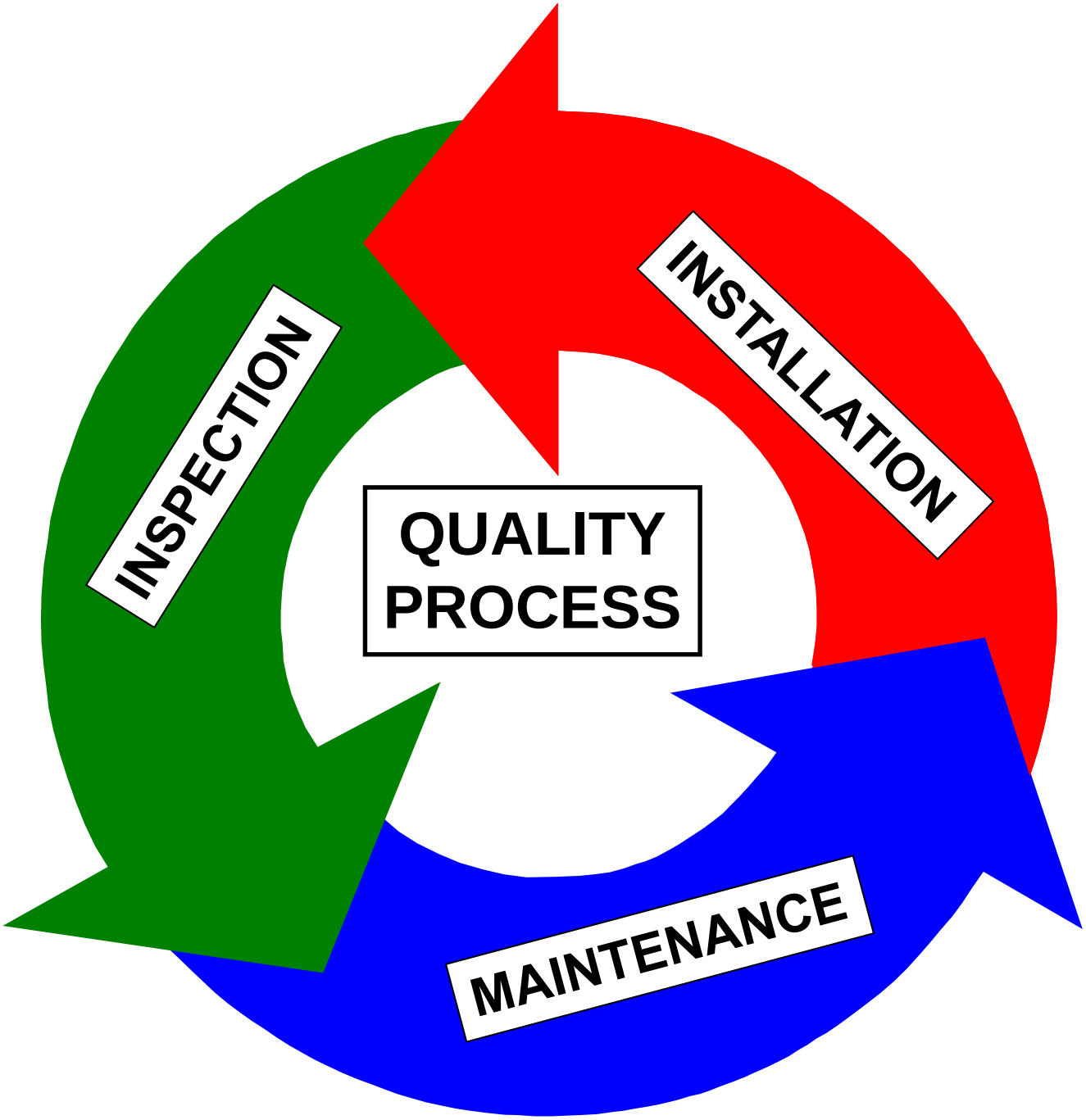






Why Specify?
ASTM E 2174 - ASTM E 2393

- DIIM – 'II' of Quality Process
  - Install, Inspect
- Verify Field Installations
- **Specify Accredited Inspection Agencies**
  - IAS AC 291 – Accreditation Criteria for Special Inspection Agencies
- **Individuals Educated & Trained**
  - **3rd Party Exam, Approved Source**
  - **FM or UL Firestop Exam**


INSPECTION
INSTALLATION
QUALITY
PROCESS
MAINTENANCE

07-84-00 Specifications (FREE @ FCIA.org)

MasterFormat - 07 84 00 - Firestopping

- **Part I –** FCIA Member, FM 4991 Approved or UL Qualified Firestop Installer/Contractor - Valid DRI, Test Standards
- **Part II – Products –** Testing, Properties
    - Pipes, cables, ducts, cable trays, MEP&C Systems -
    - Fire Resistance Rated Joints –
        - Head of Wall, Wall to Wall, Wall to Floor
    - Perimeter Fire Containment Joints
        - Floor Slab edge/Exterior Wall
- **Part III, Execution, Quality Assurance (DIV 1 Referrence)**
    - **ASTM E 2174 & ASTM E 2393 Inspection**
    - **IAS AC 291** Special Inspection Agency –
        - Individual on staff passed FM or UL Firestop Exam

07-84-00 Specifications

- **Systems Testing – Part 1 – DIIM References**
  - Penetrations - ASTM E 814 & UL 1479,
  - Joints - ASTM E 1966, UL 2079, S115 -
  - Perimeter - ASTM E 2307 –
  - FM 4991 Standard for the Approval of Firestop Contractors
  - UL Qualified Firestop Contractor Program
  - ASTM E 2174 & ASTM E 2393 - Inspections
  - IAS AC 291 Accredited Special Inspection Agency

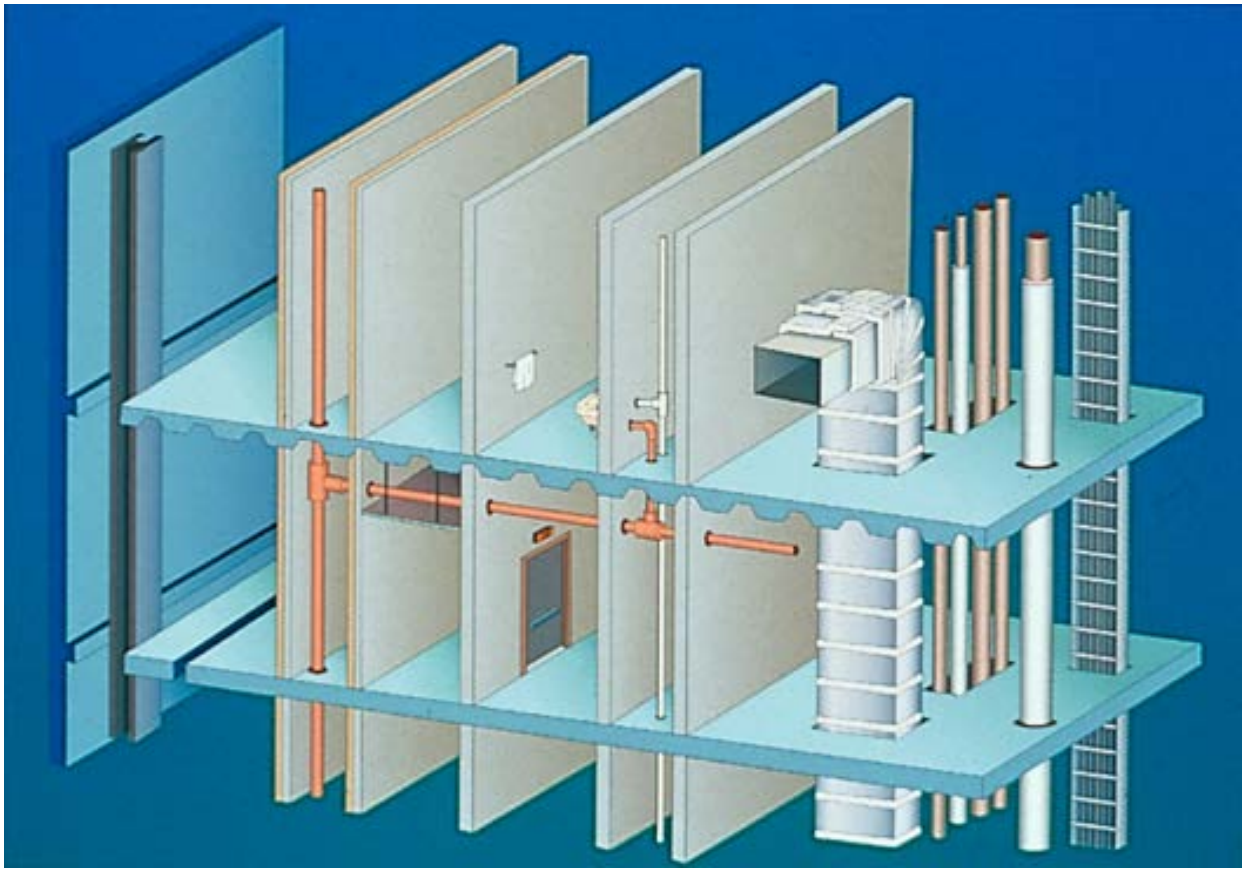
07-84-00 Specifications

- **Single Source Product??**
- YES, BUT…..
  - '…to the greatest extent possible.'
  - Number of Systems v. EJ's
  - IFC Protocol for EJ's
    - ***No EJ if Tested/Listed System Available***

07-84-00 Specifications

- **Part 1 - Systems**
  - “F” Ratings - Fire Resistance Rated Assy.
  - “T” Ratings - = F & T??
  - “H” Ratings – Hose Stream
  - “L” Ratings = Smoke Resistance
  - “W” Ratings – Floors, Walls
- Materials & Physical Property Requirements
  - Chemicals, Movement, Exposure

M – Maintenance
(& Management)



Firestop Maintenance

- **Maintenance**
  - **Code Required**
  - **How??**

- **How to keep Track – Barrier Management Initiatives**

  Paper

  Software

  Labeling

National Fire Protection Association - NFPA 101-2012

- **SECTION 4.5.8 Maintenance, Inspection, and Testing.**
- **4.5.8.1** **Whenever or wherever any device**, equipment, system, condition, arrangement, level of protection, fire-resistive construction, or any other feature **is required for compliance** with the provisions of this Code, **such device**, equipment, system, condition, arrangement, level of protection, fire-resistive construction, or other feature ***shall thereafter be continuously maintained*** in accordance with applicable NFPA requirements or requirements developed as part of a performance-based design, or as directed by the AHJ. [101:4.6.12.1]

National Fire Protection Association - NFPA 101-2012

- **4.5.8.2 No existing life safety feature *shall be removed or reduced*** where such feature is a requirement for new construction. [101:4.6.12.2]
- **4.5.8.3*** **Existing life safety features obvious to the public, if not required by the Code, *shall be either maintained or removed*.** [101:4.6.12.3]
- **4.5.8.4 Any device**, equipment, system, condition, arrangement, level of protection, fire-resistive construction, or any other feature **requiring periodic testing, inspection, or operation** to ensure its maintenance ***shall be tested, inspected, or operated*** as specified elsewhere in this Code or as directed by the AHJ. [101:4.6.12.4]
- **4.5.8.5 Maintenance, inspection, and testing *shall be performed under the supervision of a responsible person who shall ensure*** that testing, inspection, and maintenance ***are made at specified intervals*** in accordance with applicable NFPA standards or as directed by the AHJ. [101:4.6.12.5]

International Fire Code Maintenance

SECTION 703
FIRE-RESISTANCE-RATED CONSTRUCTION

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 ***visually inspected by the owner annually*** *and* 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 holes** made for any reason ***shall be protected with approved methods*** capable of resisting the passage of smoke and fire.

UAE Fire and Life Safety Code of Practice Maintenance & Management

Chapter 1, SECTION 21
Firestopping

21.15.2 The required fire resistance rating of installed firestop systems shall be *visually inspected by the owner or owner's inspection agency annually.* Damaged, altered or breached firestop systems shall be properly repaired, restored or replaced to comply with applicable codes as per the guidelines of Civil defense.

21.15.3 Any new Openings made therein for the passage of through penetrants, shall be protected with approved firestop system to comply with applicable codes as per the guidelines of Civil defense.

National Fire Code of Canada

National Fire Code of Canada

- ***Division B – Part 2, Building and Occupant Fire Safety***
  2.2.1.2 – Damage to Fire Separations – where *fire separations* are damaged so as to affect their integrity, they shall be repaired so that the integrity of the *fire separation* is maintained…

- **City of Calgary – Best Practices (1997)**

- **FCIA Manual of Practice – Appendix, Maintenance**
  FCIA recommends Barrier Management for Effective Compartmentation and Structural Protection

- **Best Practice Guide - NRC**

Includes Fire Dampers, Fire Doors…and Continuity

“TOTAL FIRE PROTECTION”

- Effective Compartmentation
  - Fire Barriers, Fire Walls/Floors, Smoke Barriers
  - Firestopping, Fire Dampers, Swinging and Rolling Fire Doors, Fire Rated Glazing
- Detection & Alarm Systems
- Sprinkler Suppression Systems
- Education & Egress–
  - Building Owners & Managers, Building Occupants and Firefighters

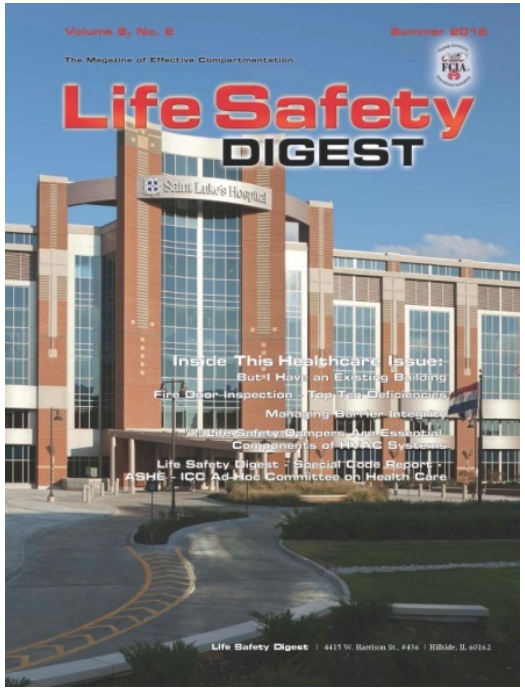
FCIA DIIM & Firestopping

Proper ***'DCIIM'*** Means Reliable Systems…

- **Properly *Designed -*** A/E **-** Consultant
  - Tested and Listed Systems, FCIA Member Mfr's., Compartments per IBC, NFPA Codes, SUBMITTALS….***Specified (CCS,CDT, RSW)***
- Properly ***Coordinated & Installed***
  - **FCIA Member, FM 4991, or UL *Qualified Contractors***
- Properly ***Inspected***
  - ASTM E 2174 & ASTM E 2393, by IAS ***Qualified Inspectors at IAS AC 291 Accredited Inspection Firms***
- Properly ***Maintained & Managed*** –
  - FCIA Member, FM 4991, or UL Qualified, IAS Accredited Firms

FCIA DIIM & Firestopping
I & I - Inspection Webinar

- Free Subscription to Life Safety Digest
  - Business Card
- Specifications @ FCIA.org,



Effective Compartmentation is a SYSTEM

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FCIA DIIM & Firestopping
I & I - Inspection Webinar

GoToWebinar

19 November 2014