FCIA’s DIIM: Firestop 101 Education Program

• Design
• Installation
• Inspection
• Maintain Protection
D-DESIGN
Specs, Code, Standards

I-INSTALLATION
MS Programs AND Mfr. Education

QUALITY PROCESS

I - INSPECTION
IBC Ch. 17
NFPA 80
NFPA 1

BARRIER MANAGEMENT
Fire Codes
NFPA 101, 1, IFC
Barrier Management
“DIIM” – Design, Install, Inspect, Maintain

• Fire Resistance & Smoke Resistant Firestopping
  • Properly *Designed* Building Codes
    • FCIA - 07-84-00 – Specification – *CCS*
    • *Tested and Listed Systems* –
      • ASTM 814, UL 1479, ASTM E 1966, UL 2079, E2307, E2837, E3037
    • Movement, (M) Smoke (L), Water (W)
  • Professional *Installation* –
    • FCIA Member, ULC Qualified Contractors, FM 4991 Approved
  • Properly *Inspected* –
    • ASTM E2174 / E2393, by IAS AC 291 Agencies, ULC, IFC, FM Exams
  • *Protection Maintained* – Annually – by FCIA Members
1. **Floor or Wall Assembly** — Min 2-1/2 in. (64 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1000 - 2400 kg/m³) concrete floors or min 3 in. (76 mm) thick reinforced lightweight or normal weight concrete walls. Wall may also be constructed of any UL classified Concrete Blocks. Max dia of opening 9 in. (229 mm).

   See Concrete Blocks (CA72) category in the Fire Resistance Directory for names of manufacturers.

2. **Steel Sleeve** — (Optional) - Nom 9 in. (229 mm) diam (or smaller) Schedule 10 (or heavier) steel sleeve cast or grouted into floor or wall assembly. Steel sleeve may be installed flush or may project max 2 in. (51 mm) beyond the floor or wall surfaces. As an alternate, nom 9 in. (229 mm) diam (or smaller) sleeve fabricated from nom 0.019 in. (0.49 mm) thick galv steel cast or grouted into floor or wall assembly flush with floor or wall surfaces.

3. **Through Penetrations** — One metallic pipe to be installed concentrically or eccentrically within opening. Penetrant to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of metallic pipes may be used:
   A. **Steel Pipe** — Nom 4 in. (102 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. **Iron Pipe** — Nom 4 in. (102 mm) diam (or smaller) cast or ductile iron pipe.
   C. **Copper Tubing** — Nom 2 in. (51 mm) diam (or smaller) Type L (or heavier) copper tubing.
   D. **Copper Pipe** — Nom 2 in. (51 mm) diam (or smaller) Regular (or heavier) copper pipe.

   F Rating is 2 Hr for Penetrants A and B. F Rating is 1 Hr for Penetrants C and D.

4. **Pipe Covering** — Nom 1-1/2 in. (38 mm) thick hollow cylindrical heavy density glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory-applied self-sealing lap tape. Transverse joints secured with metal fasteners or with butt tape supplied with product. Annular space between the pipe covering and periphery of opening or sleeve shall be min 1/2 in. to max 1 in. (13 mm to 25 mm).

   See Pipe and Equipment Covering - Materials (BRG1) category in the Building Materials Directory for names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a smoke Developed Index of 50 or less may be used.

   T Rating is 3/4 Hr for nom 1-1/2 in. (38 mm) thick pipe covering for Penetrants A and B. T Rating is 1 Hr for nom 1-1/2 in. (38 mm) thick pipe covering for Penetrants C and D. T Rating is 0 Hr for all Penetrants when pipe coverings less than nom 1-1/2 in. (38 mm) thick.
Specs – Starts Barrier Management Process

• NEW Buildings – 07-84-00 Specs
  • www. FCIA .org
• Part I – Products…but
  • Systems
  • Product Properties
  • Manufacturers
• “Single Manufacturer to the greatest extent possible” – EJ/EFRRRA’s
Specs – Key Parts

• NEW Buildings – 07-84-00 Specs
  • www. FCIA .org

• Part II– Contractor/Installer Qualifications
  • FCIA Member in Good Standing, AND
  • FM 4991, Standard for the Approval of Firestop Contractors, OR
  • UL Qualified Firestop Contractor Program
  • AND
  • Manufacturer Accredited, Approved, Trained
Specs – Key Parts

• NEW Buildings – 07-84-00 Specs
  • www.FCIA.org

• Part II – Qualifications – Special Inspection
  • Special Inspection Agency –
    • IAS AC 291 Accredited Special Inspection Agencies
  • Special Inspector Qualifications
    • FM Firestop Exam
    • UL Firestop Exam
    • AND
    • IFC Exam
Specs – Key Parts

• NEW Buildings – 07-84-00 Specs
• Part III – Execution
  • Special Inspection
    • ASTM E 2174 - Penetrations
    • ASTM E 2393 - Joints
Specs – Don’t Forget Division 1 – ALL Divisions Documentation for Building Life Cycle

• Reference 01-78-00 Closeout Submittals
  • 01 78 29 Final Site Survey
  • 01 78 33 Bonds
  • 01 78 36 Warranties
  • 01 78 39 Project Record Documents
  • 01 78 43 Spare Parts
  • 01 78 46 Extra Stock Materials
  • 01 78 53 Sustainable Design Closeout Documentation
Building & Fire Code Requirements

• Fire-Resistance Rated Barriers – Defined Terms
  • Exterior Walls
  • Fire Walls
  • Fire Barriers
  • Fire Partitions (Not NFPA)
  • Smoke Barriers
  • Smoke Partitions
  • Archaic Assemblies
Existing Buildings

• Archaic Assemblies
  • Clay Tile Block
  • Gypsum Block
  • Plaster
  • Clay Tile/Concrete
  • Unidentified Assemblies

• Tested … Calculated … Prescriptive
Smoke Barriers & Firestopping

• Smoke Barriers differ from Smoke Partitions?

  • **Smoke Barrier** –
    • **IBC** – Hourly Rated, Quantified Firestop “L” Rating
      • < 5cfm/sf (IBC 2006)
      • < 50 cfm, 100 sf of Wall Area (IBC 2009)
    • **NFPA** – … ‘restricting the passage of smoke’…
      • Hourly Rated, Quantified Firestop L Rating Chapter 8
      • NO quantified “L” Rating … Healthcare Chapter
      • Continuous, Barrier to Barrier, … through concealed spaces
      • Not always fire-resistance-rated

  • **Smoke Partition** –
    • **IBC** – Continuous barrier, not fire rated…’retard’
    • **NFPA** – Continuous membrane that is designed to form a barrier to *limit the transfer of smoke*…
Firestopping for Continuity
Products become SYSTEMS Based on Testing

• ‘Field Erected Construction…Tested to…’
  • Standards – ASTM E814 / UL 1479, UL 2079, ASTM E1966, ASTM E2837, ASTM E2307, FM 4990
  • F Rating – Flame
  • T Rating – Temperature
  • L Rating – Smoke
  • W Rating – Water
  • M Rating – Movement
Hose Stream Test

UL Photo
Building & Fire
Worldwide Code Requirements

- *Chemical, Biological, Radiation, Explosion, Germ, etc.*
  - Standards?
    - C – Which Chemicals? Check with manufacturer
    - B – Which Agents? Check with manufacturer
    - E – Blast Strength? Check with manufacturer
    - G – Germ – Check with manufacturer & industrial hygienist

- How to Regulate for Unexpected Events?
- Due Diligence - Review Required by code?
Barrier Continuity
Products become SYSTEMS

• Fire Rated Systems Directories –
  • FM Approvals
  • Intertek
  • UL/ULC Product iQ Online Directory

*Systems Selection & Analysis...Not as easy as it looks...*
Fire/Smoke Dampers & Firestops

- Dampers - UL 555, 555S
  - Listings - *Systems*
  - Installed to manufacturer’s written instructions
  - Systems – Angles…no sealants required.
- Firestop sealants – ULC-S115, UL 1479
  - Improper hole sizing or poor installation…

Consult the Damper Manufacturer & the Authority Having Jurisdiction

Greenheck Photo
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
- Tapes

STI, 3M, AD, HILTI, Nelson Photos
Barrier Continuity
I – Installation – Listed Systems
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 Qualified
D-DESIGN
Specs, Code, Standards

I-INSTALLATION
MS Programs AND Mfr. Education

BARRIER MANAGEMENT
Fire Codes
NFPA 101, 1, IFC
Barrier Management

QUALITY PROCESS

I – INSPECTION
IBC Ch. 17
NFPA 80
NFPA 1
INSPECTION
IN CODES

- ASTM E 2174 - ASTM E 2393

- FCIA Success @ 2012 International Building Code
  - CH 17 – Special Inspections
    - Buildings 75’ & higher above Fire Department Access
    - Occupancy Type III, IV, Chapter 16 Table 1604.5
  - Not all Jurisdictions Adopt...

- NFPA 101 / 5000 - Chapter 8 – FCIA ADDED to Annex

- NFPA 1 Refers to ‘Quality Assurance Program’ (FM/UL & Inspection)

• **Table 1604.5 – Risk III** - Buildings and other structures that represent a substantial hazard to human life in the event of failure, include but are not limited to:

  - Public Assy., Occupant Load >300
  - Bldgs. Containing Elem., 2nd’ary’, day care, >250
  - I-2, >50, no surgery, emergency; I-3
  - Occupancy load >5,000
  - Power-gen, h2o treatment, wastewater treatment, public utilities, not in IV
  - Buildings not in IV, with toxic or explosives

[BCNYS 2020, Table 1604.5]
• **Table 1604.5 – Risk IV** - Buildings and other structures designated as essential facilities, including but not limited to:
  • Group I-2 occupancies having surgery or emergency treatment facilities.
  • Fire, rescue, ambulance/police stations, emergency vehicle garages.
  • Designated earthquake, hurricane or other emergency shelters.
  • Designated emergency prep, communications and operations centers and other facilities required for emergency response.
  • Power-generating stations and other public utility facilities required as emergency backup facilities for

[BCNYS 2020, Table 1604.5]
Table 1604.5 – Risk IV - Buildings and other structures designated as essential facilities, including but not limited to:

- Buildings and other structures containing quantities of highly toxic materials that:
  - Exceed maximum allowable quantities per control area as given in Table 307.1(2) or per outdoor control area in accordance with the International Fire Code, and are sufficient to pose a threat to the public if released.
  - Aviation control towers, air traffic control centers and emergency aircraft hangars.
  - Buildings and other structures having critical national defense functions.
  - Water storage facilities and pump structures required to maintain water pressure for fire suppression.

[BCNYS 2020, Table 1604.5]
Search within Division 07 00 00 for the keywords/phrases below [if any]:

- Owner Special Inspection(s)
- Firestop Special Inspection(s)
- Inspect fire resistive joint system(s)
- Inspect penetration(s)
- “Inspection Agency” within 100 words of “firestopping”
- “Inspecting Agency” within 100 words of “firestopping”
Results: Special Inspection

BY PROJECT SIZE

AVERAGE 2016-2019YTD

- < $1m: 40%
- $1-5m: 51%
- $5-10m: 62%
- $10-25m: 65%
- $25-50m: 67%
- $50-100m: 70%
- > $100m: 81%
Projects over $10m by Building Type

- Religious Bldg: 43%
- Retail: 49%
- Warehouse (non-mfg): 54%
- Transport Bldg/Other: 57%
- Education: 63%
- Office: 65%
- Manufacturing: 68%
- Recreation Bldg: 68%
- Healthcare: 70%
- Parking Gar/Auto Svc: 71%
- Multifam Housing: 71%
- Gov’T Bldg: 72%
- Dormitories: 75%
- Hotels: 80%

AVERAGE 2016-2019YTD
Results: Special Inspection

Projects over $10m by Region

AVERAGE 2016-2019YTD

- West South Central: 53%
- East South Central: 60%
- West North Central: 62%
- Pacific Southwest: 64%
- Pacific Northwest: 64%
- Middle Atlantic: 65%
- South Atlantic: 75%
- East North Central: 76%
- New England: 85%
Firestop & Inspection

• ASTM E2174 / ASTM E2393 – “Inspection Process”
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 E2174 & ASTM E2393
  • Independent 3\textsuperscript{rd} Party
  • Destructive, Non Destructive
  • Specified Frequency
I – Inspection – Scope

• ASTM E2174 & ASTM E2393
  • Firestopping
• Other Scopes—Possibilities for IA’s
  • Walls, Horizontal Assemblies
  • Fire Dampers
  • Fire Rated Glazing
  • Fire Doors
I – Inspection –
IBC Code Requirements

• Required, International Building Code – Chapter 17
12.3.2.1 … Penetrations … shall be inspected in accordance with ASTM E2174 …

12.3.2.2 … Joint systems … shall be inspected in accordance with ASTM E2393 …

FCIA INTIATIVE WITH KOFFEL ASSOC.…
[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]
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

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 E2174.

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 E2393.

[IBC 1705.17.1 & .2]
Firestop Inspection in Codes
ASTM E2174 - ASTM E2393

• NFPA 1 - Ch. 12
• NFPA 101 / 5000 - Chapter 8 – Annex
• 2012 – 2018 International Building Code
• Ch. 17 - Special Inspections
  • Buildings 75’ & higher above lowest Fire Department Access
  • Occupancy Type III, IV, Chapter 16 Table 1604.5
• Abu Dhabi International Building Code
Firestop Systems Inspection Introduction
ASTM E2174 - ASTM E2393

• “Standard Practice for On-Site Inspection of Installed Fire Stops – Penetrations - Joints”
  • Standard Inspection Procedure
  • Special Inspection Agency Companies & Other Firms
  • Hired by & Report to Building Owner, Architect, Owners Rep, …other than GC.
    = Authorizing Authority
Firestop Inspection Firm & Individual Qualifications – ASTM E2174 - ASTM E2393

• Inspection Firm & Inspectors are:
  • ‘Independent of, and Divested from ’
    • Installing firm, Distributor, Manufacturer, Competitor, Supplier…
  • ‘Not a Competitor
    • …of the Installer, contractor, manufacturer, or supplier ….
  • Other than the contractor…
  • Submit notarized independence statements
Firestop Inspection Firm & Individual Qualifications – ASTM E2174 - ASTM E2393

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

- Inspection Agency **Company** Qualification –
- IAS AC 291 – w / Individual **Competencies**
Firestop Inspection Firm & Individual Qualifications – IAS AC 291

• Inspection Firm shall have staff..
  • PASS UL or FM Firestop Exam, or IFC Exam
  • 1 year Quality Assurance
    Or…
  • PASS UL/FM Firestop Exam, IFC Firestop Exam, and PE, FPE, Registered Architect, or
  • PASS UL/FM Firestop Exam, IFC Firestop Exam, and Education by Certified Agency
Firestop Inspection 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,
      • OR
    • UL Firestop Exam,
      • AND
    • IFC Exam
Professional Installations
Joints and Voids
Head-of-Wall

Firestop Solutions Photo
Joints and Voids
I-Beam to Fluted Deck

Firestop Solutions Photo
Sleeved Pipes
Affinity Firestop Photo
1. **Floor or Wall Assembly** — Min 2-1/2 in. (64 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m³) concrete floors or min 3 in. (76 mm) thick reinforced lightweight or normal weight concrete walls. Wall may also be constructed of any UL Classified Concrete Blocks*. Max diam of opening 9 in. (229 mm).

   See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.

2. **Steel Sleeve** — (Optional) - Nom 9 in. (229 mm) diam (or smaller) Schedule 10 (or heavier) steel sleeve cast or grouted into floor or wall assembly. Steel sleeve may be installed flush or may project max 2 in. (51 mm) beyond the floor or wall surfaces. As an alternate, nom 9 in. (229 mm) diam (or smaller) sleeve fabricated from nom 0.019 in. (0.48 mm) thick galv steel cast or grouted into floor or wall assembly flush with floor or wall surfaces.

3. **Through Penetrants** — One metallic pipe to be installed concentrically or eccentrically within opening. Penetrant to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of metallic pipes may be used:
   - **A. Steel Pipe** — Nom 4 in. (102 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
   - **B. Iron Pipe** — Nom 4 in. (102 mm) diam (or smaller) cast or ductile iron pipe.
   - **C. Copper Tubing** — Nom 2 in. (51 mm) diam (or smaller) Type L (or heavier) copper tubing.
   - **D. Copper Pipe** — Nom 2 in. (51 mm) diam (or smaller) Regular (or heavier) copper pipe.

F Rating is 2 Hr for Penetrants A and B. F Rating is 1 Hr for Penetrants C and D.

4. **Pipe Covering** (*Nom 1-1/2 in. (38 mm) thick pipe covering for penetrants A and B. T Rating is 1 Hr for nom 1-1/2 in. (38 mm) thick pipe covering for Penetrants C and D. T Rating is 0 Hr for all Penetrants when pipe coverings less than nom 1-1/2 in. (38 mm) thick.*

   See Pipe and Equipment Covering - Materials - (BRG) category in the Building Materials Directory for names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a smoke Developed Index of 50 or less may be used.

   T Rating is 3/4 Hr for nom 1-1/2 in. (38 mm) thick pipe covering for penetrants A and B. T Rating is 1 Hr for nom 1-1/2 in. (38 mm) thick pipe covering for Penetrants C and D. T Rating is 0 Hr for all Penetrants when pipe coverings less than nom 1-1/2 in. (38 mm) thick.
Firestop Inspection Process

- **Inspection Agency & Inspector**
  - Independent
  - Hired after systems submitted, etc.
  - Hired by building owner and manager or representative
  - Scope of work directed by AA
  - AHJ approval

 Affinity Firestop Photo
Firestop Inspection Process
ASTM E2174 - ASTM E2393

• Inspection Documents
  • 07-84-00 Specifications and Drawings
  • Manufacturer Product Data Sheets and Installation Instructions
  • Safety Data Sheets
  • Listed Systems and EJ’s/EFRRA’s
  • Identification Systems/Labels
Firestop Inspection Process
ASTM E2174 - ASTM E2393

• Pre-Construction Meeting
  • Document Review
  • Mock Up Review
  • Observation or Destructive Review (Testing)
  • Inspection Type Methodology
    • Frequency of reviews
    • Description of reviews
    • Specification and drawings
• Meeting(s) are required
  • During and Post Inspection

Affinity Firestop Photo
Firestop Inspection Process
ASTM E2174 - ASTM E2393

• Inspection Schedule
  • Notifies Inspector
  • Inspections within 2 days
  • Inspector verifies installation
    • Is in accordance with Documents
    • Meets Manufacturers Installation Instructions
Firestop Inspection Process
ASTM E2174 - ASTM E2393

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

Affinity Firestop Photo
Firestop Inspection Process
ASTM E2174 - ASTM E2393

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

• Inspection Documents
  • Identify System, Materials

• Identification Systems (Labels)
  • Firestop Contractor Installed
  • Speeds System Evaluation
Firestop Inspection Process
ASTM E2174 - ASTM E2393

• Variances / Deviations

• ASTM E2174 & ASTM E2393
  • FS Contractor is notified of any deficiencies within **one day**

• IBC 1704.2.4
  • Work is in conformance to the documents
  • Otherwise it is **immediately** brought to the attention of the FS Contractor
  • If not corrected, AHJ and AA will be informed to take action

• DETERMINE IMMEDIATELY
Firestop Inspection Process
ASTM E2174 - ASTM E2393

• Deviations - Both Methods
  • If any type does not comply
    • Repair
    • Replace
    • 1 additional inspection
  • If 10% variance per firestop type
    • Inspection stops
    • Installer inspects, repairs
    • Inspector re-inspects
• Document all Deficiencies
Firestop Inspection Process
ASTM E2174 - ASTM E2393

• Inspectors shall
  • **Not supervise or direct FS Contractors**
    • Systems Selection = Supervision
  • Commence reviews at the start of FS installation
  • Review installation based on manufacturers and system requirements
Firestop Inspection Process
ASTM E2174 - ASTM E2393

• Equipment –
  • Tapes
  • Tablets w/Systems
  • Borescope to explore areas that are concealed or partially
  • NOT MICROMETERS
Firestop Evaluation & Repairs

• Installation Evaluations basis…
  • Manufacturers Installation instructions
  • Acceptable methods to review installed systems
  • Listed SYSTEM requirements for installations
  • *IFC Document on Sealant Thickness Measurement, Shrinkage*
Firestop & Inspection

• ASTM E2174 / ASTM E2393 – “Inspection Process”
Firestop Repairs

• Instruction requirements by manufacturer
• Listed systems
• Patch/Infilling
  • Adhesion to Old Sealant
  • F, T, L, M, W Ratings
  • As recommended by MFR
Firestop Inspection Forms & Variance Notices

- Minimum one FS system for each type;
  - Submitted to AA one day after review
  - IBC requires IMMEDIATE NOTICE
- Numbered – Controlled
- Required – During/post construction methods
Firestop Inspection Final Report
ASTM E2174 - ASTM E2393

• Project name and location
• Project team contact info
• Firestops reviewed (inspected)
  • Type and quantity
  • Verification method
  • Percentage of total deficiencies
• All documents submitted to AA
Survey is NOT Inspection

• Visual Building Survey/Inspection….
  • Does the Firestop/Fire-Resistive Joint look like the assembly?
    • Annular Space
    • Visible Breaches, unless listing allows
    • Joint Width
    • Penetrating Item Types, Coverings, #Quantity
    • Penetrations in Joints & Not in System/Listing…
    • Much more…

• Competent Personnel
QUALITY PROCESS

D-DESIGN
Specs, Code, Standards

I-INSTALLATION
MS Programs AND Mfr. Education

BARRIER MANAGEMENT
Fire Codes
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I – INSPECTION
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Questions??