FCIA DIIM & Effective Compartmentation Leading Age Texas…

25 July 2013
Contacts

Firestop Contractors International Association
Hillside, IL – +1-708-202-1108 - office
Bill McHugh – bill @ fcia.org
Learning Objectives

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

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
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
FCIA Members Active…

317 Members…US, Canada, Middle East, Far East

– Accreditation – FM, UL, ULC & IAS

– Technical, Education & Apprenticeship
  • FCIA MOP, UL TFPSS, FCIA Education for Staff, Workers


– Marketing – Relationships, Shows

– Program – Committee work, Education

– Legislative – Track, Advocate

– Standards – ASTM, IAPMO, UL/ULC STP’s
“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
Firestop Maintenance

Barrier Management Symposium

Benefits
Over the past years non-compliance of barrier systems in healthcare buildings has resulted in findings by The Joint Commission. This Symposium was created by the Firestop Contractors International Association, UL and the Joint Commission to provide free education to those responsible for the management of barriers.

Barriers are more than walls. A continuous barrier includes the wall assembly, door/hardware/frames, windows (rated glazing), floors, openings, and penetration and joint systems. Managing the barrier as a continuous system through sound management principles is the goal of this Symposium.

FREE TO ATTENDEES

Program Developers
- The Joint Commission
- Firestop Contractors International Association
- Underwriters Laboratories

Participating Organizations
- AWCI & Gypsum Institute
- American Society for Healthcare Engineering
- Door and Hardware Institute
- Firestop Contractors International Association
- Fire Damper Industry
- Fire Rated Glazing Industry
- The Joint Commission
- National Concrete Masonry Association
- Underwriters Laboratories

The safety and welfare of patients depends on many things, including a healthcare environment that is fire safe.

BARRIER MANAGEMENT SYMPOSIUM
Contact the Joint Commission
ph 630 792 5901 | www.jointcommission.org

Faculty will present a topic based on their expertise

I. Introduction to Fire Safety
II. Design, Testing & Code
III. Installation
IV. Inspection
V. Maintenance
VI. Barrier Management System
VII. Conclusion
There is no cost to attendees

Penetration Firestopping

Design & Installation
- Design of Barrier Systems based on accepted practice and compliance with the National Fire Protection Association codes
- Correct installation of protective systems provides continuity to breached rated barriers

Inspection & Maintenance
- Ensuring the existing barrier is properly protected using commissioning, ongoing survey and documentation
- Maintaining existing barriers is based on sound management strategies, such as restricting access and routine maintenance surveys
We are also considering a requirement for automatic closing doors and sprinkler systems under all Federal programs where funds are made available for nursing homes or similar facilities.
Trends in Long Term Care -
Hearings before Subcommittee on Long Term Care – Mr. Regan - Hamar Fire
1. Failure of Personnel to close door
2. Delayed alarm to FD, Not connected to FD
3. Combustible Carpet
4. Long, undivided Corridors
“DIIM”

• Firestopping for Safety – DCIIMM
  • 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
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”
  - 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
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

• **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*
  
  • 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
  
  – How to Regulate for Unexpected Events?
  – Due Diligence - Review Required by code?
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

New UL test standards for Life Safety Dampers will take effect in July 2002
Fire Resistance Continuity
All Occupancies

- Compartmentation/
  Compartmentalization
  - Education
  - Office
  - Mercantile
  - Multi Family Residential
  - Industrial – Insurance influences
  - Institutional – Healthcare
Buildings are Safe Because….  

• **Total Fire Protection History - 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
  • 85% of Schools 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’
Standards – Codes

– Standards – ASTM & UL Standards

• NFPA 101 = Fire Code, NFPA 5000 Building Code
  – Fire Resistance = Hose Stream Test

• International Fire Code
  – Fire Resistance = Hose Stream Test

• International Building Code
  – Fire Resistance = Hose Stream Test

• National Building Code of Canada
  – Fire Resistance = Mostly Hose Stream
Keys to Safe Buildings Worldwide

Robust Compartmentation Limits Fire Spread

- Compartment of Origin
- Helps Smoke Control System
- Sprinklers add to safety
- Alarms & Occupant Education
Firestopping for Continuity
I – Classified Systems

SECTION A-A

1. Floor or Wall Assembly – Mix 6-1/2 in. thick lightweight or normal weight (1100 to 1200 psi) concrete. All openings must be surrounded by a 6 in. classified concrete block or a 6 in. reinforced concrete block. Board or sheet metal or other non-combustible material must be used to seal all openings.

2. Through Penetration Product – Use a 4 in. diameter (minimum) with a thickness of not less than 3/4 in. and a minimum of 1/2 in. thickness. The metal conduit must be installed at a distance of not less than 1/2 in. from the opening. The wood or metal frame or other non-combustible material must be sealed with a minimum of 1/2 in. thickness.

3. Wall or Floor Assembly – Mix 6-1/2 in. thick lightweight or normal weight (1100 to 1200 psi) concrete. All openings must be surrounded by a 6 in. classified concrete block or a 6 in. reinforced concrete block. Board or sheet metal or other non-combustible material must be used to seal all openings.
Firestopping for Continuity
I – Classified Systems
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, 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
Firestopping for Continuity
Firestop Products

• Firestop Systems Materials

• Pipes – Cables
  – Sealants, Wrap strips, Putties, Prefabricated Kits

• Gaps/Joints/Walltops/Perimeter Joints
  – Sealants – Sprays – Track Systems

• “Backing Material”
  – Mineral Wool, Ceramic Fiber,
  – Backer Rod, Others
D- Design
SYSTEMS SELECTION
Who’s Responsible, How to Choose???

Graphics – STI
Firestopping for Continuity
Products become Systems

• What are Firestop Systems?
• ‘Field Erected Construction…Tested to…’
  – 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…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 DIAMETER OF PIERCED SLEEVE.
Gypsum Wall assembly running up to concrete over metal deck

Fire Stop Technologies, Inc.

HILTI Photos
How do Installers Select Systems?

- 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
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
Engineering Judgments/EFRRRA

• 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 – “EFRRRA”

– Based on engineering, IFC Protocol
INSTALL FIRESTOP SYSTEM

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

1. Pack
2. Apply Sealant
3. Tool/Smooth

Walls - BOTH SIDES

STI Graphic
Properly Tooled/Smoothed Firestop Sealants
Sleeved Pipes
Correct Collar or Sealant Must Be Selected for Combustible Penetrations

- 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
Firestopping for Safety
Unlisted, Untested Firestop Systems

Fire Stop Technologies, Inc.
Joint Compound
Incomplete is ineffective
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
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”
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
Firestop Applications

Floor to Wall

Top of Wall

Fire Stop Technologies, Inc.

Graphics – Firestop Solutions
Joints and Seams
Top of Wall

Graphics – Firestop Solutions, FCIA
Joints and Seams

I-Beam to Fluted Deck
Penetrations with Top of Wall
Unacceptable
Results of Improperly Installed Mineral Wool
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
Firestop Perimeter Fire Containment Systems
Proper Installation of Mineral Wool

- Compressed mineral wool must be inserted perpendicular to the joint to allow for movement between the slab and wall.
Firestop Installed at Perimeter of Floors at Curtainwall
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
Results of NOT USING An Approved / Qualified Contractor??

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

No Single Firestopping Trade means fire & life safety risk…
I- Installation
Who’s Responsible, How to Choose???
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
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

- FCIA 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?

- **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

• **FCIA Member in Good Standing**
  – Two years Continuous Membership
  – FCIA Firestop Manual of Practice

• **FCIA Member, FM 4991, UL Qualified Firestop Contractor**
  – Management System Audited – Office, Jobsite
  – Person appointed DRI –
    • FM or UL Firestop Exam
    • FCIA Firestop Manual of Practice, Systems
Contractor Qualifications
Independent Audited Programs

FM 4991 Standard for the Approval of Firestop Contractors

UL Qualified Firestop Contractor Program
Contractor Qualifications
FM & UL/ULC – 4 Components

1. Office Facility Procedures Audit
2. Field Procedures Audit
3. Employ a person
   – Passes UL/FM Firestop Exam @ 80% +
   – DRI if employed by Approved/Qualified Firm,
     • Designated Responsible Individual (DRI)
   – Maintains CEU’s
4. Annual Audit
1. FM or UL/ ULC Office Audit of Company Management Systems Manual

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

- Contractors Listed  www.fcia.org
2. FM, UL/ULC Jobsite 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
2. Company MS Jobsite Audit by FM, UL/ULC

- Verification of firestop systems Processes
- Verify Management System Works
- Verify Company “communication”
  - Office to field, field to office
- “Culture of Quality…”
3. 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**
4. Annual Audit

FM 4991 UL / ULC Personnel

• Continued satisfactory performance
  • Quality Manual Implementation
• Documented - Archived record keeping
• Employee Training Documentation
• Jobsite Visit
• DRI CEU Verification
• Find @www.fcia.org
Wednesday, February 10, 2010

Mr. Randy Perry
Adler Firestopping Ltd.
#23, 33016 Hwy 60
Acheson, AB T7T 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/energy/solutions/industries/building-materials/qualified-contractor-program/qualified-firestop/.

Moreover, Randy Perry has successfully attended our intensive, two-day FT 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

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QUALIFIED FIRESTOP CONTRACTOR CERTIFICATE

Certificate Number: 1916

Company Name: Adler Firestopping Ltd.
File Number: 20103457
Issued: 2/1/2010
Expires: 2/1/2011

Address: Edmonton Office, #23, 33016 Hwy 60, Acheson, AB T7T 1M9 CANADA
Telephone: (780) 962-4950
Fax: (780) 962-9794
Email Address: randy@adlerfirestopping.com

This company has demonstrated that it complies with ULC’s Qualified Firestop Contractor Program Requirements for Canada. Under this program, 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 their advertising and promotional material in accordance with the marking guidelines provided with this Certificate.

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.

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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 Salinas, Secretary
Scott Rankin, Treasurer
Randall Bussawon, Director
Mike Dominguez, Director
Aclan Gibson, Director
Bob Hasted, Director
I- Inspection
SYSTEMS ANALYSIS

Graphics – STI
Firestop Installation & Inspection

Duct w/Pink FBGL

ST23-8a

ST23-8e
Firestop Installation & Inspection

- ASTM E 2174/ ASTM E 2393 – "Inspection Process"
Firestop Installation & Inspection

- ASTM E 2174/ASTM E 2393 -
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
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 in Codes

- ASTM E 2174 & ASTM E 2393
- **1705.16 Fire-resistant penetrations and joints.** In high-rise buildings or in buildings assigned to *Risk Category III* or IV in accordance with Section 1604.5, special inspections for through-penetrations, membrane penetration firestops, fire resistant joint systems, and perimeter fire barrier systems that are tested and listed in accordance with Sections 714.3.1.2, 714.4.1.2, 715.3 and 715.4 shall be in accordance with Section 1705.16.1 or 1705.16.2.
Inspection in Codes

• ASTM E 2174 & ASTM E 2393
• **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.
Inspection in Codes

- ASTM E 2174 & ASTM E 2393
- 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.
Inspector 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 …
Inspector 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

Optional Inspector 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

Specify IAS, not part of ASTM Standards
Find @ www.fcia.org
Inspection Process
ASTM E 2174 - ASTM E 2393

• Pre Construction Meeting
  – Review Documents – Identify Conflicts
  – Review Materials – SYSTEMS
    • ASTM E 814 or UL 1479- ASTM E 1966, UL 2079,
      ASTM E 2307 Systems

• Inspection Documents”
  – Manufacturer Product Data Sheets
  – Tested and Listed Systems & EJ’s
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, no less than one per floor
    • 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
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 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 Authorizing Agency
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
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 Reference)**
  – 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
  – “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

- Barrier Management Symposium
  - FCIA/UL/ASHE/TJC
Barrier Management Symposium

Keeping the Healthcare Experience Safe for Patients

For Registration information contact The Joint Commission at www.jointcommission.org

Mission Statement
To provide concise, accurate education at no cost to the attendee, resulting in excellent barrier system management in healthcare buildings.

In 2012* three of the Top SIX Most Often Scored Findings included barriers. The standards are LS.02.01.10, LS.02.01.20 & LS.02.01.30.

LS.02.01.10
This standard was scored 46% of the time during all hospital surveys in 2012. This standard addresses General Requirements, including PENETRATIONS and JOINTS in fire rated barriers.

LS.02.01.20
This standard was scored 51% of the time during all hospital surveys in 2012. This standard addresses Means of Egress, including VERTICAL OPENINGS, DOORS.

LS.02.01.30
This standard was scored 39% of the time during all surveys in 2012.

This standard addresses protection, including vertical openings, stairs, doors, and smoke barriers.

* Hospital surveys conducted by The Joint Commission in 2012
Benefits
Over the past years non-compliance of barrier systems in healthcare buildings has resulted in findings by The Joint Commission. This Symposium was created by the Firestop Contractors International Association, UL and the Joint Commission to provide free education to those responsible for the management of barriers.

Barriers are more than walls. A continuous barrier includes the wall assembly, door/hardware/frames, windows (rated glazing), floors, openings, and penetration and joint systems. Managing the barrier as a continuous system through sound management principles is the goal of this Symposium.

FREE TO ATTENDEES

Program Developers
• The Joint Commission
• Firestop Contractors International Association
• Underwriters Laboratories

Participating Organizations
• AWCI & Gypsum Institute
• American Society for Healthcare Engineering
• Door and Hardware Institute
• Firestop Contractors International Association
• Fire Damper Industry
• Fire Rated Glazing Industry
• The Joint Commission
• National Concrete Masonry Association
• Underwriters Laboratories

The safety and welfare of patients depends on many things, including a healthcare environment that is fire safe.

BARRIER MANAGEMENT SYMPOSIUM
Contact the Joint Commission
ph. 630 792 5901 | www.jointcommission.org

Faculty will present a topic based on their expertise
I. Introduction to Fire Safety
II. Design, Testing & Code
III. Installation
IV. Inspection
V. Maintenance
VI. Barrier Management System
VII. Conclusion
There is no cost to attendees

Design & Installation
• Design of Barrier Systems based on accepted practice and compliance with the National Fire Protection Association codes
• Correct installation of protective systems provides continuity to breached rated barriers

Inspection & Maintenance
• Ensuring the existing barrier is properly protected using commissioning, ongoing survey and documentation
• Maintaining existing barriers is based on sound management strategies, such as restricting access and routine maintenance surveys
Barrier Management Symposium Outline

Faculty will present a topic based on their expertise

I. Introduction to Fire Safety
II. Design, Testing & Code
III. Installation
IV. Inspection
V. Maintenance
VI. Barrier Management System
VII. Conclusion

There is no cost to attendees

Penetration Firestopping

The Joint Commission
ASHE
FCIA
UL
RACE

• Rescue
• Alarm
• Confine
• Extinguish
RACE

• Two of four involve Effective Compartmentation
  – Rescue
  – Confine
    • Evacuate – Rated Corridors
    • Rescue – Move behind Doors

• Move patients behind Smoke Barrier
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]
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]
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.
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

• **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
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
Trends for 2013….

- NFPA 101-5000 References – Qualifications, ‘L’
- IBC 2012 Chapter 17 Special Inspection
  - Inspection agencies drives demand for quality installation
  - Results in more FM & UL Contractors.
- FM & UL Contractors in Specifications
- Building Owners and Managers learning DIIM…
- Materials manufacturers systems
  - Reflect what can reasonably be expected to occur … ’
  - Movement, Exposures, etc.
FCIA DIIM & Firestopping @ Leading Age Texas

- Free LSD, Specifications @ FCIA.org,
- FREE FCIA Firestop Manual of Practice

For Specifiers at
Architectural Firms
Building Officials,
Civil Defence, ROP,
Municipal Fire Marshals,
Inspectors
Contacts

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FCIA, DIIM, Firestopping & Compartmentation
Leading Age Texas…

25 July 2013