FCIA DIIM DIIM DIIM Symposium in the UAE
The Yas Hotel - Abu Dhabi

Firestop Contractors International Association
Hillside, IL USA – +1-708-202-1108 - office
FCIA Info – info @ fcia.org
Bill McHugh – bill @ fcia.org
FCIA in UAE

Firestop DIIM & FM, UL Exam Prep

March 24, 25, 2013
FCIA DIIM Symposium @ UAE

- Fire & Emergency Exits
  - Exits
  - Exit Doors to Parking Lot
  - Assembly Point
- Cell Phones
- Luncheon Location
- Rest Rooms
- VISIT SPONSORS!!
FCIA Anti Trust Policy

• Association Do’s and Don’ts – FCIA Outside Counsel
  – DON’T discuss the prices your company will charge customers.

  – DON’T discuss discounts, terms and conditions of sale, warrant terms, profits or profit margins, shares of market, bids or the intent to bid, rejection or termination, of customers, sales territories, or markets.

  – DON’T discuss administration or disciplinary action by the Association against a particular member, or enforcement of the Association’s Code of Ethics, in the absence of specific legal guidance.

  – DON’T propose or discuss any proposal, in the absence of specific legal guidance, that the Association sponsors or engage in any activity which may have the effect of producing an adverse economic impact on some competing companies.
Executive Director Welcome
Bill McHugh, FCIA Executive Director
Greetings from the FCIA 2012-2013 Directors
FCIA DIIM Symposium @ UAE

• Welcome & Thank You!
  – FCIA Members
  – FCIA Guests
    Department of Civil Defence
    Department of Municipal Affairs
    Consultants
    Healthcare Building Engineers
    General Contractors
    Architects, Engineers, Specifiers
  Speakers
  FCIA Sponsors
FCIA DIIM Symposium @ UAE

• Welcome & Thank You!
  – FCIA UAE Planning Committee
    • Mushtaq Ahmed, Shoeb Fire Fighting Equipment
    • Amir Toma, HILTI, Inc.
    • Vidur Berry, FM Approvals
    • Randy Bosscawen, Multicon Fire Containment
    • Ahmed Eldidi, UL
    • Aedan Gleeson, Gleeson-Powers
    • Tom Hottenroth, Firestop Solutions
    • Bill Hoos, JHC Fire Containment Solutions
    • Ravi Subramanyam, Rise & Shine Insulation Co.
    • Charbel Tagher, Tony Abou Rjeily, Fouad Hajj, Specified Technologies, Inc.
    • Saifuddin Taher, Eastern Wings Equipment
FCIA DIIM Symposium @ UAE

• Welcome & Thank You!

—Introductions
FCIA DIIM Symposium @ UAE

• Presentations Outline
  
  – FCIA & DIIM Story - Total Fire Protection & Effective Compartmentation
  
  – Testing, Materials to Meet Code Requirements
  
  – Firestopping Process for Safety
    
    A ‘DIIM’ Management Systems Protocol
    Design
    Installation
    Inspection
    Maintenance & Management
  
  – FCIA Sponsor Tabletop Presentations
  
  – Total Fire Protection Systems Concept...
FCIA DIIM Symposium @ UAE

Learning Objectives

Recognize Firestopping Design/Testing, Installation & Inspection, Maintenance & Management Standards

1. Tested and Listed Systems
2. Understand FM 4991 and UL Qualified Firestop Contractor Programs
3. ASTM E 2174 & ASTM E 2393 Inspection Standards, IAS AC 291 Inspection Agency Accreditation Program
5. Specification Section 07 84 00++
6. Relationships....
FCIA DIIM Symposium @ UAE

• Symposium Speakers
  - Mr. Bill McHugh, FCIA Executive Director
  - Mr. Fouad Hajj, Specified Technologies, Inc
  - Mr. Mark Tyrol, Mr. Vidur Berry, FM Approvals
  - Mr. Romnish Kapoor, Mr. Ahmed Eldidi, Underwriters Laboratories
  - Mr. Bill McHugh, FCIA Executive Director
  - Mr. Sajid Raza, Butler Engineering

- FCIA Sponsors
FCIA Membership Means

– Industry Interest
  • FCIA Symposia
  • FCIA Publications

– Industry Investment
  • FCIA Manual of Practice
  • FCIA Conference Education
  • Committee Membership
    – Return to the industry

– “FCIA Member
  • Specialty Firestop Contractors”
  • Manufacturers, Consultants, Reps, Distributors

– Knowledge, Value, Expertise
FCIA DIIM Symposium @ UAE

- **FCIA Means Firestopping for Safety**
- FCIA – Worldwide Association
- FCIA Website Resources - FREE
- FCIA MOP on PDF FREE to Specifiers, Architects, Engineers with Design Firms, Civil Defence, Municipal Affairs
  - www.fcia.org
FCIA DIIM Symposium @ UAE
Free Hard Copy Subscription for FCIA Members,
Free Access to PDF - UAE Department of Civil Defence, Department of Municipal Affairs, Architects / Engineers with Design Firms
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- FCIA Membership Benefits
  - FCIA Committee Participation
  - FCIA.org Website
    - Member Lists
    - FCIA FM, UL, IAS Member Lists
    - Members Only Access
  - FCIA Life Safety Digest, Enews
  - Management System Manual Template
  - FCIA Manual of Practice Updates
  - Relationships ...
FCIA DIIM Symposium

• Introducing FCIA – History
  – 1999 – 1st FCIA Meeting – UL Chicago
  – 2000 - FCIA Accreditation Committee & FM Approvals Develop FM 4991 – 1st Firestop Exams
  – 2001 - FCIA Code Consultant - Koffel Associates
  – 2003 - FCIA Inspection idea becomes ASTM E 2174
  – 2004 – MasterSpecs, FM 4991
  – 2005 – Life Safety Digest Launches
  – 2007 – FCIA & UL Qualified Firestop Contractor Program – Apprenticeship , UL QFC in Master Specs
  – 2011 – FCIA in Abu Dhabi, FCIA Firestop MOP Updates
  – 2012 – FCIA in Dubai, more MOP Updates, Apprenticeship Videos
  – 2013 – FCIA In Ottawa, Abu Dhabi, Doha, Oman, Denver, ABQ
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• Membership Reflects FCIA’s Activity...
  316 Members...US, Canada, Middle East, Far East
  – Accreditation – FM, UL, ULC & IAS - Reliability
  – Apprenticeship – Workforce Education for Quality
  – Technical & Education – MOP, UL TFPSS
  – Codes – ICC, NFPA, ASTM, IAPMO CAN, UAE
  – Marketing – Relationships, Shows
  – Program – Committee work, Education
  – Legislative – Track, Advocate
  – Standards – ASTM, IAPMO, UL STP’s – For reality and inspection
FCIA Association Report

• Accreditation – FM 4991 & UL-ULC QFC
  – FCIA, FM & UL Discussions
    • How to improve?
    • FCIA FM & UL Firestop Exam Education
    • FCIA at National Specification Agencies
      – USA
      – Canada
      – Middle East Region
FCIA Association Report

• Code
  – FCIA Served on ICC Fire Safety Committee
  – ICC 2018 Cycle
  – NFPA – Adding FM & UL, IAS AC 291 to Appendix
    • Fire Protection Features Committee
  – UAE Fire & Life Safety Code of Practice - Members
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• Standards
  – FCIA Chairs ASTM E 2174, AST> E 2393 Standards
  – FCIA @ UL, ULC Standards Technical Panels
  – FCIA @ ASTM E 814, E 1966, etc.
  – FCIA @ FM 4490

• Standards to meet conditions

  “reasonably forseeable to occur…”
FCIA Association Report

• Marketing
  – Social Media goes LIVE !!
    • Facebook Pages
    • LinkedIn
  – UAE
    • Attendees, 4 years...
      – Municipal Affairs
      – Dubai Municipality
      – Civil Defence
      – Airports
      – Jebel Ali Free Zone Authorities
      – Ras Laffin Industrial City
FCIA Association Report

• FCIA Membership Growth Result of….Teams
  – FCIA Board
  – FCIA Committees
  – FCIA Staff

• Building Reliability of Installed Firestopping through the ‘DIIM’
FCIA DIIM Symposium in Middle East Region

- FCIA Members in Middle East
  - Al Shadid Tech. Cont. – Sharjah UAE
  - Al Swiss Insulation Co., - Sharjah, UAE
  - AWATCO – Abu Dhabi
  - DicoTech, LLC – Abu Dhabi, UAE
  - Doormasters Contracting and Trading WLL
  - Firestop Middle East – Dubai, UAE
  - FSIME Construction, LLC – Dubai, UAE
  - Firestop Insulation Technologies, WLL – Doha, Qatar
  - INTHERPRO, LLC - Dubai
FCIA DIIM Symposium in Middle East Region

- FCIA Members in Middle East
  - Narang Projects, WLL – Doha, Qatar
  - National Fire Fighting FZCO – NAFFCO – Dubai, UAE
  - PROCON Emirates LLC – Dubai, UAE
  - Qatar Construction Technique Company – Doha, Qatar
  - Rise & Shine Insulation Contracting Co. – Sharjah, UAE
  - Rise & Shine Trading & Contracting, – Doha, Qatar
  - Rise & Shine Trading & Contracting, - Muscat, , Oman
  - Shoeb Fire Fighting Equpt. Trdg. – Dubai, UAE
  - Thermofire (Middle East) Limited – Dubai, UAE
  - Vancouver Building Maintenance & Décor – Dubai
FCIA DIIM Symposium in Middle East Region

• **FCIA Inspection Agency Members in UAE**
  – Al Hatimi Technical Services - Sharjay
  – Butler Engineering – Dubai, UAE
  – Thomas Bell Wright Consultants – Dubai/Abu Dhabi

• **FCIA Rep/Distributor Members in UAE**
  – Eastern Wings Equipment – Dubai/Sharjah, UAE
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- UAE, Middle East Region FCIA Efforts
  - FCIA Firestop DIIM 2013 Symposiums – Abu Dhabi, Doha
    - Abu Dhabi
    - Doha
  - FCIA @ ICC Global Council
  - FCIA @ UL’s Fire Council
  - FCIA’s Bill McHugh @ IAS Board of Directors
  - FCIA at WOBO
  - FCIA Meetings at
  - FCIA @ DMA
  - FCIA @ Fire Safe Oman
FCIA DIIM Symposium @ UAE

- Total Fire Protection Stats
- Effective Compartmentation
- FCIA History
- DIIM Story
  - Mr. Bill McHugh, FCIA Executive Director
FCIA DIIM Symposium @ UAE

• “TOTAL FIRE PROTECTION”
  • Detection & Alarm Systems
  • Sprinkler Suppression Systems
  • Education & Egress–
    – Building Managers, Occupants and Firefighters
• Effective Compartmentation /Compartmentalization
  – Fire Barriers, Walls/Floors, Smoke Barriers &
  – Firestopping, Fire Dampers, Swinging and Rolling Fire Doors, Fire Rated Glazing
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- Compartmentation/
  Compartmentalization
  - Education
  - Office
  - Mercantile
  - Multi Family Residential
  - Industrial – Insurance influences
  - Institutional – Healthcare
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• Fire Walls and Floors –
  – *Continuous Fire Resistance Rated Assemblies*
    – Concrete
    – Concrete Block
    – Plaster
    – Gypsum Block
    – Drywall
    – Floor/Ceiling Assemblies
    – Firestop Systems

“Tested & Listed Wall/Floor Systems”
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Effective Compartmentation Features

New UL test standards for Life Safety Dampers will take effect in July 2002
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• **Buildings are Safe Because...**

• Total Fire Protection
  – Detection & Alarms
  – Sprinkler Systems
  – Occupant Education & Egress
  – Compartmentation
    • Fire & Smoke Resistance
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- **Total Fire Protection Role – High Rise North American 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

- **Sprinklers & Alarms Added Later.**
- **UAE Stats later on...**
  » Source, Emporis.com
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- Safer buildings...Total Fire Protection
- Compartmentation
- Sprinklers, Alarms
- Egress Strategies
- Firefighters
- NIST Reports...
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- Safer Buildings - Tamweel Apartment Tower...
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- **Safer Buildings - Tamweel Apartment Tower...**

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

[thenational.ae](http://thenational.ae)
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- Safer buildings...Total Fire Protection
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• NIST Report - World Trade Center 7 Report - Chapter 4, 4.6....

• 4.6, 'Factors that could have mitigated structural collapse'
  – "improved compartmentation in tenant areas to limit the spread of fires"

• ‘But first...DIIM’
FCIA DIIM Symposium @ UAE

- Firestopping for Safety – A DIIM Protocol
  - Properly **Designed** and Specified Firestopping – 07-84-00
  - **Tested and Listed Systems** - ASTM E 814 / UL 1479
    - UL 2079, ASTM E2307
  - Professional **Installation** – FCIA Member, FM 4991 Approved, UL Qualified Contractors
  - Properly **Inspected** - ASTM E 2174 / 2393 Protocol
    - IAS AC 291 Accreditation Criteria for Inspection Agencies
  - **Maintained** (Inspected) Annually - FCIA Members
    International Fire Code 703.1, UAE Fire and Life Safety Code of Practice
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- Compartmentation and Structural Fire Resistance Construction Tested and Listed – Equivalency
- First, a Fire Resistance Rated Assembly
- ICC Chapter 7 & NFPA Chapter 8

\- **ASTM E 119 or UL 263**

\- **Continuity Maintained**
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- Compartmentation Codes - **Fire Resistance** – Time, in minutes or hours that materials or assemblies have withstood a fire exposure as determined by tests, methods based on tests, or this code …. NFPA. **ICC adds... “Systems”**
  - Ch. 7 – IBC - **Fire Barrier** – Hourly Rated – IBC
  - Ch. 7 IBC - **Fire Wall** – Fire rating, structural independence
  - IBC – **Fire Partition** – Rated, not continuous.
  - IBC - NFPA - **Smoke Barrier** – Hourly Rated, continuous...
All Codes - Firestopping for *Continuity, Worldwide*

- International Building Code – US & Middle East
  - **Fire Barrier** – Continuity; **Fire Wall** – Continuity & Independence
  - **Smoke Barrier** – IBC – Continuity - Hourly Rated, “L” Rating
    - <5cfm/sf (IBC 2006)
    - < 100 cfm, 100sf of Wall Area (IBC 2009)
  - NFPA – Similar, no quantified “L” Rating
  - Healthcare Occupancies
  - Building Owner/Manager Preference
- **Fire Partition** – Hourly Rated Assembly
- **Smoke Partition** – “**Common Materials**”
  - IBC – Continuous barrier, not rated...‘retard’.
  - NFPA – Continuous membrane that is designed to form a barrier to limit the transfer of smoke....
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
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• What are Firestop **Systems**?
  – ASTM E814/UL 1479–UL S115 Tested Systems
    • F Rating - Flame
    • T Rating – Temperature
    • H Rating – Hose
    • L Rating – Smoke (UL)
    • W Rating – Water (ULus)
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Hose Stream IS NOT “W” Rating
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- **Sealants**
  - Silicone, Latex, Intumescent

- **Wrap Strips**
  - “Thick, Thin, Wide, Less Wide”

- **Putties**
- **Pillows**
- **Composite Sheets**
- **Bricks / Plugs**
- **Pre Fabricated Kits**
- **Mortar**
- **Spray Products**

Graphics, STI, 3M, AD, HILTI, Nelson
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- **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

Graphics - AD, Nelson, Tremco
Firestopping for Safety

• Effective Compartmentation for Safety
  – *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 Terrorism?
  – Due Diligence
    • Review Required by code?
Firestopping for Safety

- Firestop System Directories – UL, Intertek, FM Approvals

*Systems Selection...Not as easy as it looks...*
Firestopping for Safety

- Firestop System Directories – UL, Intertek, FM Approvals

*Systems Selection...Not as easy as it looks...*
1. **Floor or Wall Assembly** — Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) concrete. Wall may also be constructed of any UL Classified Concrete Blocks*. Max diam of opening is 32 in. (813 mm). See Concrete Blocks (CAZT) category in Fire Resistance Directory for names of manufacturers.

2. **Metallic Sleeve (Optional)** — Nom 32 in. (813 mm) diam (or smaller) Schedule 40 (or heavier) steel pipe cast or grouted into floor or wall assembly, flush with floor or wall assembly.

3. **Through Penetrants** — One metallic pipe or tubing to be installed either concentrically or eccentrically within the firestop system. Pipe or tubing to be rigidly supported on both sides of floor or wall assembly. The annular space shall be min 0 in. (point contact) to max 12 in. (305 mm). When maximum annular space exceeds 2-1/4 in. (57 mm) the F Rating is 2 hr. The following types and sizes of metallic pipes or tubing may be used:

   A. **Steel Pipe** — Nom 20 in. (508 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
   
   B. **Iron Pipe** — Nom 20 in. (508 mm) diam (or smaller) cast or ductile iron pipe.
   
   C. **Conduit** — Nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing or nom 6 in. (152 mm) diam (or smaller) steel electrical metallic tubing or nom 6 in. (152 mm) diam (or smaller) steel conduit.
   
   D. **Copper Tubing** — Nom 6 in. (152 mm) diam (or smaller) Type L (or heavier) copper tubing.
   
   E. **Copper Pipe** — Nom 6 in. (152 mm) diam (or smaller) Regular (or heavier) copper pipe

4. **Firestop System** — The firestop system shall consist of the following:

   A. **Packing Material** — Min 4 in. (102 mm) thickness of min 4 pcf (64 kg/m³) mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top end of sleeve for floors or from both ends of sleeve for walls as required to accommodate the required thickness of fill material.

   B. **Fill, Void or Cavity Material* — Sealant** — Min 1/2 in. (13 mm) thickness of fill material applied within the annulus, flush with the top end of the sleeve for floors, or with both ends of the sleeve for walls. Min 1/2 in. (13 mm) thick bead of all material to be installed around pipe at interface of sleeve for point contact installations.

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**System No. C-AJ-1155**

July 18, 2011

**F Ratings** — 2 and 3 Hr (See Item 3)

**T Rating** — 0 Hr

**L Rating At Ambient** — Less Than 1 CFM/sq ft

**L Rating At 400 F** — 4 CFM/sq ft

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**HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC** — FS-ONE Sealant

Graphics - HILTI
System No. C-AJ-1155
F Ratings — 2 and 3 Hr (See Itie 3)
T Rating — 0 Hr
L Rating At Ambient — Less Than 1 CFM/sq ft
L Rating At 400 F — 4 CFM/sq ft
How Installers Select UL Systems

• Wall or Floor Construction Type
• Wall or Floor Thickness
• Penetrating Item, Coverings
• Size, Type, Thickness
• Annular Space, Joint / Gap Size
• Backing Materials
• Fill Material(s)
Gypsum Wall assembly running up to concrete over metal deck

火隔板 Technologies, Inc. Photos
Firestopping for Safety

• Field or other Variances to Tested and Listed Systems?
  – Annular Space / Gap too large / small
  – Access Impossible
  – Tolerances??
  – No System in Directory?
  – Engineering Judgment
Firestopping for Safety

Graphics – OPL, 3M
FCIA DIIM Symposium @ UAE

- FCIA History & The DIIM Story...
  - Design, Tested and Listed Systems-- *And*
  - Installation -- *And*
  - Inspection -- *And*
  - Maintain – *And*
  - Manage... through Barrier Management Programs

- ...For Reliability and Performance under Fire & Smoke Conditions to protect...

  People, Property, Continuity of Operations
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• The DIIM Story – Design & Standards
  – Focus on Perimeter Fire Containment & ASTM E 2307
  – Mr. Fouad Rajj, Specified Technologies, Inc.
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Firestopping for Safety
II Installation
Who’s Responsible, How do I Choose???

Graphics – STI
Firestopping for Safety
Firestop Contractors & Installation

• Firestopping Industry Installation Methods

• 3 Types
  – All Trades -“He/She who pokes hole, fills hole”
  – Multiple Contracts to Firestop Contractors, Subs, GC/O
  – GC/O - Sub to Single Source Specialty Firestopping Contractor

• Qualifications??
Firestopping for Safety
Firestop Contractors & Installation

• How do I select a specialty firestop contractor?
  – FCIA Member
    • FCIA Firestop Manual of Practice
  – Manufacturer Educated
  – FCIA Member, FM 4991, UL Qualified
Firestopping for Safety

Approved or Qualified – Does the Firestop Contractor understand the ZERO TOLERANCE INSTALLATION PROCESS

- “F” Fire & “T” Temperature, “H” Hose
- “L” Smoke
- “W” Water
- Insulation/Integrity
- Movement Capability
- Annular Space Sizes, Gap Sizes
- SYSTEMS DOCUMENTATION
- FM 4991 Approved or UL Qualified Firestop Contractor
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• The DIIM Story – Installation – FM 4991, Standard for Approval of Firestop Contractors
  – Mr. Vidur Berry
  – Mr. Mark Tyrol
  – FM Approvals
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• Break, Sponsored by FSIME
Break Sponsored by
FSIME Construction, LLC
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• The FCIA DIIM Story – Installation – UL Qualified Firestop Contractor Program
  – Mr. Romnish Kapoor, Mr. Ahmed Eldidi, Underwriters Laboratories, Inc.
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• Sponsor Tabletop Exhibitor Presentations
  – Butler Engineering ME
  – Rise & Shine Insulation
  – Specified Technologies, Inc.
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• Mr. Bill McHugh, FCIA –
  – Task Group Chair, ASTM E 2174 & ASTM E 2393 Standards for the Inspection of Firestop Systems
  – Member, International Accreditation Services Board of Directors
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• ASTM E 2174 & ASTM E 2393 - “Standard Practice for On-Site Inspection of Installed Fire Stops – Penetrations - Joints”

• “Standard Inspection Procedure”
  • Special Inspection Firms
  • Fire Marshals & Code Officials
  • Architects
  • Other Qualified Firms
FCIA DIIM Symposium @ UAE

• ASTM E 2174 & ASTM E 2393 - “Standard Practice for On-Site Inspection of Installed Fire Stops – Penetrations - Joints”

• UAE Life Safety Code of Practice uses DIIM
  – Design – Tested and Listed Systems
  – Installation
  – Inspection
  – Maintenance
FCIA DIIM Symposium @ UAE

• ASTM E 2174 & ASTM E 2393 -
• UAE Life Safety Code of Practice uses DIIM
  – Submittal – Tested and Listed Systems from Product manufacturer AND Installer
    • Manufacturer to Installer
    • Installer to General Contractor
    • Systems, EJ’s
Every application has its own unique tested assembly which specifies:

- Hourly Fire Rating
- Type of Barrier
- Type of Penetrant
- Min/Max Hole/Gap Size
- Firestop Products
ASTM E 2174 & ASTM E 2393

UAE Life Safety Code of Practice uses DIIMM
- Submittal – Product manufacturer AND Installer
  - Engineering Judgments – (EJ) If allowed...
    1. Not used in lieu of tested systems, when available.
       » Manufacturer Researches systems
    2. Manufacturer produces EJ
    3. Registered Engineer, FPE, Independent Testing Agency that provides listing for firestop & Manufacturer
FCIA DIIM Symposium @ UAE

- ASTM E 2174 & ASTM E 2393
- UAE Life Safety Code of Practice uses DIIM
  - Submittal – Product manufacturer AND Installer
    - Engineering Judgments
      - Based on interpolation
      - Communicated actual field conditions
      - ‘Clearly Bracket Conditions’
      - Limited to conditions, configurations
      - Based on ‘reasonable performance expectations’...
      - Jobsite specific
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- ASTM E 2174 & ASTM E 2393
- UAE Life Safety Code of Practice uses DIIM
  - Delivery Storage & Handling of Products
    - Original Containers
    - Storage Conditions
    - Expiration Dates
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- ASTM E 2174 & ASTM E 2393
- UAE Life Safety Code of Practice uses DIIM
  - Examination & Preparation
  - Project Conditions
  - Installation – **Systems**, ASTM E 814, UL 1479, Alt’s.
    - ‘Represent field conditions’
    - Qualifications ??
  - Coordination
  - Inspection
    - ASTM E 2174 & ASTM E 2393
  - Maintenance & Management
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• ASTM E 2174 & ASTM E 2393 - “Standard Practice for On-Site Inspection of Installed Fire Stops – Penetrations - Joints”

– ICC International Building Code 2012 ...
– Department of Municipal Affairs Abu Dhabi 2012
IBC 1705.16 Fire-resistant penetrations and joints. In high-rise buildings or in buildings assigned to *Risk Category III or IV* in accordance with Section 1604.5, special inspections for through-penetrations, membrane penetration firestops, fire resistant joint systems, and perimeter fire barrier systems that are tested and listed in accordance with Sections 714.3.1.2, 714.4.1.2, 715.3 and 715.4 shall be in accordance with Section 1705.16.1 or 1705.16.2.
IBC 1705.16.1 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.
IBC 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.
Firestopping for Safety

• ASTM E 2174 & ASTM E 2393 =
  – IBC Chapter 17 – *Special Inspections*
    • ‘for Buildings 75’ and higher above Fire Department Access’
    • ‘for Occupancy Type III, IV, Chapter 16 Table’
      – Education
      – Healthcare
      – Greater than 500 People
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- ASTM E 2174 & ASTM E 2393 -
- “Standard Inspection Procedure”
  - Special Inspection Agencies
  - Inspection Firms
  - Architects
  - Other Qualified Firms
  - Fire Marshals & Code Officials
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- ASTM E 2174/ASTM E 2393 - “Inspector & Firm Requirements”
  - Reference Documents
    - ASTM E 176 Terminology of Fire Standards
    - E 699 – Practice for Evaluation of Agencies...
    - E 814 – Test Method for Fire Tests of Penetration Firestop Systems
    - UL 1479-94 – Fire Tests of Through-Penetration Fire Stops
    - UL 2079, ASTM E 2307, ASTM E 1966
    - Other Documents – International Building Code
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• ASTM E 2174/ASTM E 2393 - “Inspector & Firm Requirements”
  – Definitions
  – AA – Authorizing Agency –
    • Administrate & Enforce ASTM E 2174/2393
  – Inspection Document – Any info provided inspector by AA
    • Specifications
    • Contract Drawings
    • Listed Designs
    • Judgments (EJ’s)
    • Manufacturerers instructions (Product Data Sheets)
    • Building codes
    • Other documents
• ASTM E 2174/ ASTM E 2393 – “Inspection Process”
  – Pre Construction Meeting
   • Review Documents – Identify Conflicts
   • Materials - ASTM E 814 or UL 1479-S115 Systems
     – “exactly as Identified on inspection documents”
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• ASTM E 2174/ ASTM E 2393 – “Inspection Process”

• Pre Construction Meeting
  – Mock Ups
    • Destructive Testing
    • Installation Measurements
  – Discuss Inspection Method

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

• Post Construction Method –
  – Destructive Testing
    • Minimum 2%, no less than 1, each type per 10,000 SF of floor area
    • If 10% variance per firestop type
      – Inspection stops
      – Installer inspects, repairs
      – Inspector reinspects
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- ASTM E 2174/ ASTM E 2393
  "Inspection Process"
- Inspection Forms
  - One for each type of firestop
  - Submit 1 day after inspection to Authorizing Agency
  - Numbered – Controlled
- Required – During/Post Construction Methods
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• ASTM E 2174/ ASTM E 2393 – “Inspection Process”

• Final Report – During/Post Inspection Method
  – Name, address, location – project, installer, inspector
  – Type and quantity of firestops inspected
  – Verification method
  – Percentage Deviation
  – Copies of all documents sent to Authorizing Agency
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• ASTM E 2174/ASTM E 2393 - “Inspector & Firm Requirements”
  – Inspection firm NOT Related to Installing firm
    • Distributor, Manufacturer, Competitor, Supplier
  – 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 Inspector Personnel / Firm Qualification
  • International Accreditation Services IAS AC 291
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• ASTM E 2174/ASTM E 2393 - Optional..
• IAS Accreditation Criteria AC-291
  – Individual and Company Qualification
    • PASS UL/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
  – PLUS... Audit SIA Management System
  – Must Specify IAS, not part of ASTM Standards
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- Why ASTM E 2174 / E 2393
  - Quality Process – Install, Inspect
  - Verify Field Installations
  - Management - “Service & Testing”

- Qualifications of Inspectors
  - IAS AC 291 – Accreditation Criteria for Special Inspection Agencies
Quality Assurance Specifications – MF 04 - 07 84 00 ...

– 07 84 00 – Both Pens & Joints – FCIA.org, Spec

– Through Penetration Firestop Systems
  • Pipes, cables, ducts, cable trays, MEP&C Systems

– Fire Resistive Joint Systems
  • Top of Wall
  • Fire Resistance Rated Joints – Soft, Metals & Fire Inserts
  • Perimeter Joints (Floor Slab edge/Exterior Wall)

• Systems and product properties spec...
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• Break Sponsored by FCIA
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- The FCIA DIIM Story - Maintenance
- Mr. Bill McHugh, FCIA
- Mr. Sajid Raza, Butler Engineering, ME
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• Firestopping for Safety – A DIIM Protocol
  – Properly **Designed** and Specified Firestopping – 07-84-00
  – **Tested and Listed Systems** - ASTM E 814 / UL 1479
    - UL 2079, ASTM E2307
  – Professional **Installation** – FCIA Member, FM 4991 Approved, UL Qualified Contractors
  – Properly **Inspected** - ASTM E 2174 / 2393 Protocol
    - IAS AC 291 Accreditation Criteria for Inspection Agencies
  – **Maintained** (Inspected) Annually - FCIA Members
    – International Fire Code 703.1
  – UAE Fire and Life Safety Code of Practice - DIIMM
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NFPA 101, 5000 – ICC - UAE
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• Building Life Cycle Means...
  – Changes - New Systems
    • Mechanical
    • Electrical
    • Plumbing
    • Communications
  – Disturbed Firestopping
  – Missing Firestopping
NFPA 101 - 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]
No existing life safety feature shall be removed or reduced where such feature is a requirement for new construction. [101:4.6.12.2]

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]
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.
Chapter 1, Section 21 – Fire Stopping

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.
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• FCIA Recommended Practice for Survey of Existing Buildings –RPP-S -01
  – Visual Survey
  – Seems to Comply
  – Seems Not to Comply

• Who? Contractors, Inspection Agencies
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Existing Buildings??
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...What about existing old buildings...

Hilti Photo
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- IEBC – International Existing Building Code
  - IBC Chapter 34 now incorporated into IEBC
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• High Rise Buildings Need Firestopping
• 1360 Buildings 12 stories + in UAE
  – Firestopping invented 1978
  – Firestopping FM 4991 Contractors – 2004
  – Buildings built prior to 2004?
  – Is Firestopping Correct?
• 4000+ Residential > 2 Stories
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• Building Owner & Manager Strategy?
  – ‘Trained Surveyors’
    • Pass FM 4991 or UL Firestop Exam
    • Experience in Firestop Systems Analysis
    • Insured to climb ladders, survey
    • Company Management System
  – Specialty Firestop Contractors
  – Firestop Inspection Agencies
Existing Buildings – Safety Risk?
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• The FCIA DIIM Story - Summary
  – Mr. Bill McHugh, FCIA Executive Director
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Firestopping for Safety – A DIIM Protocol

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- UAE Fire and Life Safety Code of Practice - DIIMM
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  FCIA Guests
    Department of Civil Defence
    Department of Municipal Affairs
    Consultants
    Architects, Engineers, Specifiers
    Healthcare Building Owners
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• Thank You Symposium Speakers
  - Bill McHugh, FCIA Executive Director
  - Fouad Hajj, Specified Technologies, Inc
  - Vidur Berry & Mark Tyrol, FM Approvals
  - Ahmed Eldidi & Romnish Kapoor, Underwriters Laboratories
  - Sajid Raza, Butler Engineering ME
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- Mushtaq Ahmed, Schoeb Fire Fighting Equipment
- Hani Adnon, Amir Toma, HILTI, Inc.
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• Thank You!

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