FCIA Educational Seminar @ UAE
The Yas Hotel, Abu Dhabi

Firestop Contractors International Association
Hillside, IL – 708-202-1108 - office
FCIA Info – info @ fcia.org

Bill McHugh – bill @ fcia.org

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- Fire & Emergency Exits
  - Exits
  - Exit Doors to Patio
  - Assembly Point
- Cell Phones
- Luncheon Location
- Rest Rooms
- VISIT SPONSORS!!
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• Welcome & Thank You!
  – FCIA Members
  – FCIA Guests
    Department of Civil Defence
    Department of Municipal Affairs
    Consultants
    General Contractors
    Architects, Engineers, Specifiers
  Speakers
  FCIA Sponsors
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• Welcome & Thank You!
  – FCIA UAE Planning Committee
    • Mushtaq Ahmed, Schoeb Fire Fighting Equipment
    • Hani Adnon, Amir Toma, HILTI, Inc.
    • Vidur Berry, FM Approvals
    • Randy Bosscawen, Multicon Fire Containment
    • Ahmed Eldidi, UL
    • Aedan Gleeson, GleesonPowers
    • Tom Hottenroth, Firestop Solutions
    • Bill Hoos, JHC Fire Containment Solutions
    • Raghavan Manohar, 3M Fire Protection Products
    • Kiro Naumov, Firestop Middle East
    • Ravi Subramanyam, Rise & Shine Insulation Co.
    • Charbel Tagher, Specified Technologies, Inc.
    • Saifuddin Taher, Eastern Wings Equipment
  • Introductions
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• Welcome & Thank You!

—Introductions
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• Presentations Outline
  – FCIA & DIIM Story - Total Fire Protection & Effective Compartmentation
  – Testing, Materials to Meet Code Requirements
  – Firestopping Process for Safety
    A ‘DIIM’ Quality Management Protocol
    Design, Installation, Inspection, Maintenance
  – FCIA Sponsor Tabletop Presentations
  – Total Fire Protection Systems Concept...
  – FCIA Education for FM 4991 Approved Contractor or UL Qualified Firestop Contractor Exam
  – Examinations
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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
4. Maintenance Requirements from International Fire Code, Section 703.1
5. Specification Section 07 84 00++
6. Relationships…..
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• Seminar Speakers
  - Bill McHugh, FCIA Executive Director
  - Tony Abou Rjeily, Specified Technologies, Inc
  - Mike Azimi, Mark Tyrol, FM Approvals
  - Ahmed Eldidi, Underwriters Laboratories
  - Amir Toma, HILTI, Inc.
  - FCIA Sponsors
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FCIA Membership Means ..........

– Industry Interest
  • FCIA Seminars
  • 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
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- **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
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Free Hard Copy Subscription for FCIA Members,
Free Access to PDF - UAE 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 ...
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• Introducing FCIA – History
  – 1999 – 1\textsuperscript{st} FCIA Meeting – UL Chicago
  – 2000 - FCIA Accreditation Committee & FM Approvals Develop FM 4991 – 1\textsuperscript{st} 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
  – 2011 – FCIA in Abu Dhabi, FCIA Firestop MOP Updates
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• Membership Reflects FCIA’s Activity...
  290 Members...US, Canada, Middle East, Far East
  – Accreditation – FM, UL, ULC & IAS - Growth
  – Apprenticeship – US Dept. of Labor; CAN Ministry
  – Technical & Education – MOP, UL TFPSS
  – Codes & Standards – ICC, NFPA, ASTM, IAPMO
    UL STP’s
  – Marketing – Relationships, Shows
  – Program – Committee work, Education
  – Legislative – Track, Advocate
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- FCIA Members in UAE
  - Al Shadid Tech. Cont. – Sharjah UAE
  - Al Swiss Insulation Co., - Sharjah, UAE
  - AWATCO – Abu Dhabi, UAE
  - Blue Diamond Fire Protection – Dubai, UAE
  - Chronicle Interiors, LLC – Dubai, UAE
  - DicoTech, LLC – Abu Dhabi, UAE
  - Firestop Middle East – Dubai, UAE
  - FSIME Construction, LLC – Dubai, UAE
  - Firestop Insulation Technologies, WLL – Doha, Qatar
  - INOTHERPRO, LLC - Dubai
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in Abu Dhabi, UAE

• FCIA Members in UAE
  – Narang Projects, WLL – Doha, Qatar
  – N.M. Building Contracting – Ajman, UAE
  – National Fire Fighting FZCO – NAFFCO – Dubai, UAE
  – PROCON Emirates LLC – Dubai, UAE
  – Rise & Shine Insulation Contracting Co. – Sharjah, UAE
  – Rise & Shine Trading & Contracting, WLL – Doha, Qatar
  – Shoeb Fire Fighting Equpt. Trdg. – Dubai, UAE
  – Thermofier (Middle East) Limited – Dubai, UAE
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in Abu Dhabi, UAE

• FCIA Members in UAE
  – Butler Engineering – Dubai, UAE
  – Eastern Wings Equipment – Dubai/Sharjah, UAE

• NEW FCIA Member in UAE
  – Thomas Bell Wright Consultants – Abu Dhabi, UAE
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• Total Fire Protection,
• Effective Compartmentation
• FCIA History
• DIIM Story
  – Mr. Bill McHugh, FCIA Executive Director
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• “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 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
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• Total Fire Protection
  = Safer buildings...

• Compartmentation
• Sprinklers, Alarms,
• Egress Strategies

• NIST Reports...
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• NIST Report - World Trade Center 7 - Chapter 4,
• 4.6, 'Factors that could have mitigated structural collapse'
  – "improved compartmentation in tenant areas to limit the spread of fires"

• ‘But first...DIIMM’
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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 and Managed (Inspected) Annually - FCIA Members – International Fire Code 703.1
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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…
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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....
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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
• **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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**SECTION A-A**

1. Floor or Wall Assembly—Min 1/2 in. thick lightweight or normal weight (1000 to 2000 psf) concrete. Walls shall also be constructed of any UL Classified Concrete Blocks. Beam of concrete through opening in floor or wall assembly to be 1 1/2 in. in 1-1/2 in. longer than door of flexible metal conduit (Item 2) installed through opening. Max diam of opening is 8 in.

See Laminated Block (LAB) category in the Fire Resistance Directory for names of manufacturers.

2. Through Penetrating Product—Min 1/2 in. thick (for a wall) and not more than 3/4 in. thick (for a floor). Protection shall be provided for the following: new or existing flexible metal conduit to be installed near center of circular or oval opening in floor or wall assembly. Flexible metal conduit to be rigidly supported at both sides of floor or wall assembly.

Alliance Cable Corp.

3. Padding Material—Min 1 hr. thickness of ceramic (firebrick slices) fiber blankets or mineral wool insulation. Rigid insulation fitted to opening is a permanent form. Padding material to be renewed every 1 in from top surface of floor or from both surfaces of wall.

4. Fill, Void or Cavity Material—Caulk. Applied to fill the annular space around the flexible metal conduit. In floors, a min 2 in. depth of fill material to be installed flush with top surface of floor. In walls, a min 1 in. depth of fill material to be installed flush with wall surface on both sides of wall assembly.

Minnesota Mining & Mfg. Co.—ITW

*Developing the UL Construction Community*

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

Graphics – 3M
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Hose Stream & “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
• 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
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• FCIA History & The DIIMM 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**
  - Mr. Tony Abou Rjeily, Specified Technologies, Inc.
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• The FCIA DIIM Story - Installation
  – Mr. Bob Azimi, FM Approvals
  – Mr. Mark Tyrol, FM Approvals
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• FCIA Sponsor Tabletop Presentations
  – Butler ME – Mr. Sajid Raza
  – FSIME Construction, LLC – Mr. Sanjay Narang
  – HILTI, Inc. – Mr. Hussam Droubi – Sales Director – Hilti Emirates
  – INTHERPRO, LLC – Mr. Joseph Karkour
  – Rise & Shine Insulation Cont. Co. – Mr. Diwakar Mahadev Badiger
  – Schoeb Firefighting & Equipment Trading
    Mr. Mushtaq Ahmed
  – Specified Technologies, Inc. & Eastern Wings Equipment
    Mr. Tony Abou Rjeily, Mr. Saifuddin Taher
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• The FCIA DIIM Story - Installation
  – Mr. Ahmed Eldidi, Underwriters Laboratories, Inc.
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- “Standard Inspection Procedure”
  - Fire Marshals & Code Officials
  - Inspection Firms
  - Architects
  - Other Qualified Firms
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• 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 DIIMM – Design – Tested and Listed *Systems*
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• ASTM E 2174 & ASTM E 2393 -
• UAE Life Safety Code of Practice uses DIIMM
  – 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
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- ASTM E 2174 & ASTM E 2393
- UAE Life Safety Code of Practice uses DIIMM
  – Submittal – Product manufacturer AND Installer
  - Engineering Judgments
    1. Not used in lieu of tested systems, when available.
       » Manufacturer Researches
    2. Manufacturer
    3. Registered Engineer, FPE, Independent Testing Agency that provides listing for firestop & Manufacturer
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• ASTM E 2174 & ASTM E 2393
• UAE Life Safety Code of Practice uses DIIMM
  – 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 DIIMM
  - Delivery Storage & Handling
    - Original Containers
    - Storage Conditions
    - Expiration Dates
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- ASTM E 2174 & ASTM E 2393
- UAE Life Safety Code of Practice uses DIIMM
  - Examination & Preparation
  - Project Conditions
  - Installation – Systems, ASTM E 814, UL 1479, Alt’s.
    - ‘Represent field conditions’
  - 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 ...
  – 3rd Code Cycle Submission...worked!!
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 =
  - Chapter 17 – *Special Inspections*
    - ‘for Buildings 75’ and higher above Fire Department Access’
    - ‘for Occupancy Type IV, V, Chapter 16 Table’
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• ASTM E 2174 & ASTM E 2393 -
• “Standard Inspection Procedure”
  • Special Inspection Agencies
  • Fire Marshals & Code Officials
  • Inspection Firms
  • Architects
  • Other Qualified Firms
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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
    - 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 - “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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• 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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• ASTM E 2174/ ASTM E 2393 – “Inspection Process”

• During Construction Inspection Method
  – Firestop Installation Start
  – Random witness 10%, each type of Firestop
    • No Less than one
• 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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- Final Report – During/Post Inspection Method
  - Name, address, location – project, installer, inspector
  - Type and quantity of firestops inspected
  - Verification method
  - Percentage Deviation
  - Copies of all documents sent to Authorizing Agency
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• ASTM E 2174/ ASTM E 2393 – “Inspection Process”

• Why Specify ASTM E 2174 / E 2393
  – Quality Process – Install, Inspect
  – Verify Field Installations
  – Management - “Service & Testing”... Demming

• Qualifications of Inspectors
  • IAS AC 291 – Accreditation Criteria for Special Inspection Agencies
Quality Assurance

Specifications— MF 04 - 07 84 00 ... was 07270

- 07 84 00 – Both Pens & Joints – FCIA.org, Spec
- 07 84 10 – Through Penetration Firestop Systems
  - Pipes, cables, ducts, cable trays, MEP&C Systems
- 07 84 20 – Fire Resistive Joint Systems
  - Top of Wall
  - Fire Resistance Rated Joints – Soft, Metals & Fire Inserts
  - Perimeter Joints (Floor Slab edge/Exterior Wall)

• Systems Spec, and product properties spec...
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• The FCIA DIIM - Maintenance
  – Mr. Amir Toma, HILTI, Inc.
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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
  – Properly Design 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
  – **Maintained** (Inspected) Annually - FCIA Members – International Fire Code 703.1
Thank You!

FCIA Members

FCIA Guests

Department of Civil Defence

Department of Municipal Affairs

Consultants

Architects, Engineers, Specifiers
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