FCIA DIIM Educational Symposium in Ottawa, Ontario

Ottawa

Firestop Contractors International Association

Hillside, IL USA – +1-708-202-1108 - office

FCIA Info – info @ fcia.org

Bill McHugh – bill @ fcia.org

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Firestop DIIM & FM, ULC Exam Prep

March 13, 14, 2013

FCIA in Ottawa
FCIA DIIM Symposium @ Ottawa

• Fire & Emergency Exits
  – Exits
  – Exit Doors to Parking Lot
  – Assembly Point
• Cell Phones
• Luncheon Location – HERE
• Tour Location – NRC (Bus, Cars)
• 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 Board
FCIA DIIM Symposium @ Ottawa

• Welcome & Thank You!
  – FCIA Members
  – FCIA Guests
    National Research Council of Canada
    Canadian Forces Fire Marshals
    PSWG
    Consultants
    Architects, Engineers, Specifiers
    Speakers
  - FCIA Sponsors
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• Welcome & Thank You!
  – FCIA Ottawa Planning Committee
    • Ken Slama, National Firestop, LTD
    • Randy Perry, Adler Firestopping
    • Bruce Richards, Global Firestop
    • Michael St. Jean, Interprovincial Insulation
    • Jim Smiley, NexLevel

  – Introductions
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- Welcome & Thank You!

—Introductions
• Agenda Outline

  – FCIA & DIIM Story - Total Fire Protection & Effective Compartmentation

  – Testing, Materials to Meet Code Requirements

  – Firestopping Process for Safety – Firestopping is A Trade ‘DIIM’
    Design
    Installation
    Inspection
    Maintenance

  – FCIA Sponsor Tabletop Presentations

  – Total Fire Protection Systems Concept...
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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/ULC Qualified Firestop Contractor Programs
3. ASTM E 2174 & ASTM E 2393 Inspection Standards, IAS AC 291 Inspection Agency Accreditation Program
4. Maintenance Requirements from National Fire Code of Canada
5. Specification Section 07 84 00++
6. Relationships....
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- Symposium Speakers
  - Rae Dulmage, ULC
  - Jeff Gould, FM Approvals
  - Betsy Titus, UL LLC
  - Stephane Dugas, Hilti
  - Bill McHugh, FCIA
- FCIA Sponsors
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- **FCIA Means Build a Trade through Firestopping for Safety**
  - FCIA – Worldwide Association
  - FCIA Website Resources - FREE
  - FCIA MOP on PDF FREE to Specifiers, Architects, Engineers with Design Firms, Governmental Agencies
  - [www.fcia.org](http://www.fcia.org)
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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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Free Hard Copy Subscription for FCIA Members,
Free Access to PDF – Governmental Agencies,
Building Officials and Fire Marshals, Specifiers,
Architects / Engineers with Design Firms
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FCIA Membership Means ..........

– Industry Interest
  • FCIA Symposiaums
  • FCIA Publications
– Industry Investment
  • FCIA Manual of Practice
  • FCIA Conference Education
  • Committee Membership
    – Return to the industry
– Build a Firestop Trade
– “FCIA Member
  • Specialty Firestop Contractors”
  • Manufacturers, Consultants, Reps, Distributors
– Knowledge, Value, Expertise
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• 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 – FCIA in Toronto; FCIA – CSC & CSI
  – 2005 – Life Safety Digest Launches
  – 2006 – FCIA in Montreal
  – 2007 – FCIA & UL/ULC Qualified Firestop Contractor Program – Apprenticeship Initiatives
  – 2011 – FCIA in Abu Dhabi, FCIA Firestop MOP Updates – FCIA @ ULC
  – 2012 – FCIA in Dubai, more MOP Updates, Apprenticeship Videos – FCIA @ CSC Ottawa, ULC
  – 2013 – FCIA in Canada - @ CSC & 2 CSC Chapters, @ Ottawa, etc., FCIA at Abu Dhabi, UAE and Doha, Qatar, Muscat, Oman
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• **Membership Reflects FCIA’s Activity...**
  316 Members...US, Canada, Middle East, India, Far East
  – **Accreditation** – FM, UL, ULC & IAS - Reliability
  – **Apprenticeship** – Workforce Education for Quality
  – **Technical & Education** – MOP, UL TFPSS
  – **Codes** – ICC, NFPA, ASTM, IAPMO
    National Building / Fire Code of Canada
  – **Marketing** – Relationships, Shows
  – **Program** – Committee work, Education
  – **Legislative** – Track, Advocate
  – **Standards** – ASTM, IAPMO, UL STP’s – For reality and inspection
FCIA Association Report

• Marketing
  – Social Media goes LIVE !!
    • Facebook Pages
    • LinkedIn
  – Ottawa
    • CSC Education
    • ULC Firestop Exams
    • French Specification
FCIA Association Report

• Standards
  – UL/ULC, ASTM Standards – A ‘Field Perspective’
  – ASTM E 2174, ASTM E 2393 Inspection Standards
    • Inspection for FM4991/ULC Qualified
      – 2% Destructive
      – 10% Non Destructive
    • FCIA PROPOSAL out for BALLOT NOW - Inspection for Non FM4991/ULC Qualified – Ask for support!
      – 10% Destructive
      – 25% Non Destructive
FCIA Association Report

• Goal – Build a Firestopping Trade through...
  – Accreditation – FM 4991 & UL-ULC QFC
  – Apprenticeship – Education, Ministry of Labor
  – Technical – MOP
  – Educate – Inspection, Government, Specifiers, Building Owners and Managers, Healthcare
  – Marketing – Relationships
  – And more...
FCIA Association Report

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

• Building a Trade - through the ‘DIIM’

• Build Reliability of Installed Firestopping
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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...DIIM’
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• Firestopping for Safety – A DIIM Protocol
  – Properly **Designed** and Specified Firestopping – 07-84-00
  – Professionally **Installed** – FCIA Member, FM 4991 Approved, UL Qualified Contractors
• 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** – Canada, 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

- ULC S-101, 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 **ULC S-115, ASTM E 814 / UL 1479, UL 2079, ASTM 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**?
  – ULC S115 ASTM E814/UL 1479–Tested Systems
    • F Rating - Flame
    • FT Rating – Temperature
    • FH/FTH Rating – Hose
    • 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
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?
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• FCIA History & The DIIM Story...
  – Design, Tested and Listed Systems-- And
  – Installation -- And
  – Inspection -- And
  – Maintain – And
  – DIIM & M - Manage... through Barrier Management Systems

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

• Build a Trade = Better Reliability for Safe Buildings
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- The DIIM Story – Design & Standards, Code
  - Rae Dulmage, Underwriters Laboratories of Canada
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• The DIIM Story – Design & Standards
  – Testing
    • Penetrations
    • Joints
    • Perimeter Fire Containment & ASTM E 2307
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- Break Sponsored by FCIA
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Installation
Who’s Responsible, How do I Choose???
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Firestop Contractors & Installation

• Firestopping Industry Installation Methods

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

• **Qualifications??**
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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/ULC Qualified
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/ULC Qualified Firestop Contractor
The FCIA DIIM Story - Installation
– Jeff Gould, FM Approvals
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• FCIA Sponsor Tabletop Presentations
  – 3M Fire Protection Products – Nick Brunnet
  – Accredited Firestop – Phil Gauthier
  – Adler Firestopping – Randy Perry
  – Falconer Engineering & Testing – Don Falconer
  – NexLevel Construction Solutions – Jim Smiley
  – RectorSeal – Randy Clark
  – Specified Technologies, Inc. – John Hurley
  – Thermafiber – Daniel Weirauch
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• Break – Sponsored by FCIA
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• The FCIA DIIM Story - **Installation**
  – Betsy Titus, Underwriters Laboratories, Inc.
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• Inspection

• Bill McHugh, FCIA Executive Director
  – Task Group Chair, ASTM E 2174 & ASTM E 2393 Standards for the Inspection of Firestop Systems
  – Member, Board of Directors @ International Accreditation Services
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- “Standard Inspection Procedure”
  - Special Inspection Firms
  - Fire Marshals & Code Officials
  - 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”
  – DIIM
    • Design – Tested and Listed *Systems*
    • Installation
    • Inspection
    • Maintenance
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• ASTM E 2174 & ASTM E 2393 –
  – **Submittal** – Tested and Listed Systems from Testing Laboratory, Product Manufacturer Data Sheets, by Installer
    • Manufacturer to Installer
    • Installer to General Contractor
    • **ULC 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
  - Submittal – Product manufacturer AND Installer
    - Engineering Judgments – (EJ) If allowed...
      1. IFC Protocol - 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
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• ASTM E 2174 & ASTM E 2393
  • Engineering Judgments (FCIA MOP)
    – 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
  – Delivery Storage & Handling of Products
    • Original Containers
    • Storage Conditions
    • Expiration Dates
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• ASTM E 2174 & ASTM E 2393
  – Examination & Preparation
  – Project Conditions
  – Installation – *ULC S-115 Systems*
    • ‘Represent field conditions’
    • Qualifications ??
  – Coordination
  – Inspection
    • ASTM E 2174 & ASTM E 2393
  – Maintenance & Management
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  - 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.
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• **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
    - ULC S-115, 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)
    - Manufacturers instructions (Product Data Sheets)
    - Building codes
    - Other documents
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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 Inspection Firm Qualifications....
  IAS Accreditation Criteria - 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
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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 – “Inspection Process”

• 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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- The FCIA DIIM Story - Maintenance
- Stephane Dugas, Hilti Canada Corporation
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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 **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
  – Ottawa Fire and Life Safety Code of Practice - DIIMM
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• Thank You!
  FCIA Members
  FCIA Guests
FCIA DIIM Symposium @ Ottawa

• Thank You!
  – FCIA Ottawa Planning Committee
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