FCIA DIIM Symposium @ Ottawa

• 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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- Firestopping for Safety – A DIIM Protocol
  - Properly **Designed** and Specified Firestopping – 07-84-00
  - **Tested and Listed Systems** - ULC S-115, ASTM E 814 / UL 1479 - UL 2079, ASTM E2307
  - Professionally **Installed** – 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, National Fire Code of Canada, NFPA 101
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Firestop Contractors, Installation & Inspection

• 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??
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
QUALITY PROCESS

INSTALLATION

MAINTENANCE

INSPECTION
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- “Standard Inspection Procedure”
  - Special Inspection Firms
  - Fire Marshals & Code Officials
  - Architects
  - Other Qualified Firms
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  - 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 –**
    - Administate & 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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  - 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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• Inspection

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