FCIA DIIM & Firestopping
ASTM E 2174 & 2393 Inspection
& ICC’s IBC Chapter 1, 17

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QUALITY PROCESS

- DESIGN
- INSTALLATION
- INSPECTION
- MAINTENANCE
“TOTAL FIRE PROTECTION”

• Effective Compartmentation
  • Fire Barriers, Fire Walls/Floors, Smoke Barriers
  • Firestopping, Fire Dampers, Swinging and Rolling Fire Doors, Fire Rated Glazing

• Detection & Alarm Systems

• Sprinkler Suppression Systems

• Education & Egress–
  • Building Owners & Managers, Building Occupants and Firefighters
“DIIM”

• Firestopping for Safety – DCIIMM
  • Properly *Designed* and Specified Firestopping
    FCIA - 07-84-00 - Specification
  • Professional *Installation* – FCIA Member, FM 4991 Approved, UL Qualified Contractors
  • Properly *Inspected* - ASTM E 2174 / 2393 Protocol by IAS AC 291 Accreditation Criteria for Inspection Agencies, with Individuals who PASS FM or UL Exam
Building & Fire
Code Requirements

• NFPA 5000 – 101- Chapter 8
• National Building Code – Canada – Ch. 3, 4
• UAE Fire and Life Safety Code – Chapter 21
• International Codes –
  • New and Existing Buildings International Building Code – Chapter 7
  • International Fire Code – Chapter 7

• Minimum requirements - Construction & Maintenance
I- Installation
Who’s Responsible, How to Choose???
Installation – Who?

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

Conclusion –
Without Single Firestopping Trade....
fire & life safety risks
3 Firestop Installation Methods

- Each Trade
  - “He/She who pokes hole, fills hole”

- Multiple Contracts
  - Firestop Contractors, Trades

- Single Source Firestop Contractor
  - FCIA Member in Good Standing
  - FM 4991, UL, ULC Qualified
Firestop Contractor Qualifications?

- **Manufacturer Educated**
  - Short Class – 25 - 60 minutes
  - Worker Education at Shop
  - Manufacturer HQ Education
    - 1-2 Days Education
    - Test
    - Not 3rd Party
Firestop Contractor Qualifications
FM & UL/ULC – 4 Components

1. Office Facility Quality Management System Audit
2. Field – Jobsite Audit
3. Employ a person
   • UL/FM Firestop Exam @ 80% or better
   • DRI if employed by Approved/Qualified Firm,
     • Designated Responsible Individual (DRI)
4. Annual Audit
FM, UL/ULC Company Audit of Management System (MS)

- Employee Training & Education
- Systems Selection
- Communicate systems to Field
- Material Controls
- Systems installation “protocol”
- Labeling
- Record keeping - Variance Procedures
- Non-Conformances
- Documentation
- Project closeout
I – Inspection Systems Analysis
Firestop Installation & Inspection

I – Inspection – Options

• **Contractor Self Inspection**
  • Verify Management System validity
  • Not 2%, 10%
  • Required for FM & UL, ULC Contractors

• **Manufacturer Inspection**
  • Does not exist ... Survey, maybe

• **ASTM E 2174 & ASTM E 2393 –**
  • Independent 3rd Party
  • Destructive, Non Destructive
  • Specified Frequency
  • Code Required....
I – Inspection –

• Code Proposals @ www.ICCSAFE.org
  • Codes, Code Development, Monograph
• Committee Action Hearings & CDP Access
• Public Comment
• Webcast Final Action @ www.ICCSAFE.org
• ASTM E 2174/2393
• IBC 2012, 2015
I – Inspection –
Code Requirements

SECTION 104 –
DUTIES AND POWERS OF BUILDING OFFICIAL

[A] 104.1 General. The building official is hereby authorized and directed to enforce the provisions of this code. The building official shall have the authority to render interpretations of this code and to adopt policies and procedures in order to clarify the application of its provisions. Such interpretations, policies and procedures shall be in compliance with the intent and purpose of this code. Such policies and procedures shall not have the effect of waiving requirements specifically provided for in this code.
I – Inspection –
Code Requirements

[A] 110.3 Required inspections. The building official, upon notification, shall make the inspections set forth in Sections 110.3.1 through 110.3.10.

[A] 110.3.6 Fire- and smoke-resistant penetrations. Protection of joints and penetrations in fire-resistance rated assemblies, smoke barriers and smoke partitions shall not be concealed from view until inspected and approved.
I – Inspection –
Code Requirements

[A] 110.4 Inspection agencies. The building official is authorized to accept reports of approved inspection agencies, provided such agencies satisfy the requirements as to qualifications and reliability. [IBC 110.4]

[A] 110.6 Approval required. Work shall not be done beyond the point indicated in each successive inspection without first obtaining the approval of the building official....More. [IBC 110.6]
I – Inspection –
Code Requirements
Definitions

[A] APPROVED AGENCY. An established and recognized agency regularly engaged in conducting tests or furnishing inspection services, when such agency has been approved. [IBC 202. Definitions]

[A] APPROVED. Acceptable to the building official or authority having jurisdiction. [IBC 202 Definitions]
I – Inspection – Code Requirements

**SPECIAL INSPECTOR.** A qualified person employed or retained by an approved agency and approved by the building official as having the competence necessary to inspect a particular type of construction requiring special inspection. [IBC 202. Definitions]
SECTION 1703 APPROVALS

1703.1 Approved agency. An approved agency shall provide all information as necessary for the building official to determine that the agency meets the applicable requirements.
1703.1.1 Independence. An approved agency shall be objective, competent and independent from the contractor responsible for the work being inspected. The agency shall also disclose possible conflicts of interest so that objectivity can be confirmed. [IBC 1703.1.2]

1703.1.2 Equipment. An approved agency shall have adequate equipment to perform required tests. The equipment shall be periodically calibrated. [IBC 1703.1.2]
I – Inspection –
Code Requirements

1703.1.3 Personnel. An approved agency shall employ experienced personnel educated in conducting, supervising and evaluating tests and/or inspections.
[IBC 1703.1.3]
1704.2 Special inspections. Where application is made for construction as described in this section, the owner or the registered design professional in responsible charge acting as the owner’s agent shall employ one or more approved agencies to perform inspections during construction on the types of work listed under Section 1705. These inspections are in addition to the inspections identified in Section 110. [IBC 1704.2]
1704.2.1 Special inspector qualifications. The special inspector shall provide written documentation to the building official demonstrating his or her competence and relevant experience or training. Experience or training shall be considered relevant when the documented experience or training is related in complexity to the same type of special inspection activities for projects of similar complexity and material qualities.

These qualifications are in addition to qualifications specified in other sections of this code. The registered design professional in responsible charge and engineers of record involved in the design of the project are permitted to act as the approved agency and their personnel are permitted to act as the special inspector for the work designed by them, provided they qualify as special inspectors.
I – Inspection –
Code Requirements

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.
I – Inspection –
Code Requirements

• 1705.1.1 Special cases. Special inspections shall be required for proposed work that is, in the opinion of the building official, unusual in its nature, such as, but not limited to, the following examples:
I – Inspection – Code Requirements

• Examples:
  • Construction materials and systems that are alternatives to materials and systems prescribed by this code. [EJ’s]
  • Unusual design applications of materials described in this code. [EJ’s]
  • Materials and systems required to be installed in accordance with additional manufacturer’s instructions that prescribe requirements not contained in this code or in standards referenced by this code.
I – Inspection –
Code Requirements

HIGH-RISE BUILDING. A building with an occupied floor located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access. [IBC 2012]

Category III and IV Buildings in Table 1604.5
Assembly
Education
Healthcare
Larger Buildings
I – Inspection –
Code Requirements

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.

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.
Firestop Systems Inspection
ASTM E 2174 - ASTM E 2393

• “Standard Practice for On-Site Inspection of Installed Fire Stops – Penetrations - Joints”
  • Standard Inspection Procedure
  • Special Inspection Agency Companies
  • Other Qualified Firms
  • Report to Building Owner, Fire Marshals & Code Officials
Inspection in Codes
ASTM E 2174 - ASTM E 2393

• NFPA 101 / 5000 - Chapter 8 - Annex
• 2012 International Building Code
  • CH 17 – Special Inspections
    • Buildings 75’ & higher above Fire Department Access
    • Occupancy Type III, IV, Chapter 16 Table 1604.5
• Abu Dhabi International Building Code
Inspection Firm & Individual Qualifications
ASTM E 2174 - ASTM E 2393

• Inspector Firm & Inspectors
  
  • ‘Independent of, and Divested from’ Installing firm, Distributor, Manufacturer, Competitor, Supplier…
  
  • ‘Not a Competitor’ of the Installer, contractor, manufacturer, or supplier ….
  
  • Submit notarized statements of …
Inspection Firm & Individual Qualifications

ASTM E 2174 - ASTM E 2393

• Inspector Personnel meet at least one criteria.....
  • 2 years experience (Construction, Field), education, and credentials acceptable to AHJ
  • Accredited by AHJ
  • Meet ASTM E699

• NEW Inspection Agency Company Qualification –
• IAS AC 291 – W/Individual Certs.
• Individual
Firm and Individual Qualifications
IAS AC 291

• Inspector Firm shall have at least one staff..
  • PASS UL or FM Firestop Exam
  • 1 year Quality Assurance
    Or...
  • PASS UL/FM Firestop Exam, and PE, FPE, Registered Architect, or
  • PASS UL/FM Firestop Exam, and Education by Certified Agency
Inspection Process
ASTM E 2174 - ASTM E 2393

• Pre Construction Meeting
  • Review Documents – Identify Conflicts
  • Review Materials – SYSTEMS
    • ASTM E 814 or UL 1479, FM 4990, ASTM E 1966, UL 2079, ASTM E 2307 Systems, ULC S-115

• Inspection Documents
  • Manufacturer Product Data Sheets
  • Tested and Listed Systems & EJ’s
  • Safety Data Sheets
Inspection Process
ASTM E 2174 - ASTM E 2393

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

• Meeting Required
  • During/Post Inspection Methods
Inspection Methods
ASTM E 2174 - ASTM E 2393

• During Construction
  • Random witness, Each Floor
    • 10%, each type of Penetration Firestop,
    • 5% of Total Lineal Feet of Fire Resistance Rated Joint System, each type
Inspection Methods
ASTM E 2174 - ASTM E 2393

• Post Construction - Destructive Testing
  • Minimum 2%, no less than 1, each type per 10,000 SF of floor area
  • Minimum 1 / 500 LF of Joint Area, mandatory
  • If 10% variance per firestop type
    • Inspection stops
    • Installer inspects, repairs
    • Inspector reinspects
Inspection Methods
ASTM E 2174 - ASTM E 2393

• Variances....
  
  • ASTM E 2174 & ASTM E 2393
    • One Day Notice after discovery to Contractor
  
  • International Building Code 1704.2.4
    • ‘Brought to IMMEDIATE attention of contractor’
    • ‘If not corrected, Building Official AND RDP... prior to completion of that phase’
Inspection Methods
ASTM E 2174 - ASTM E 2393

• Both Methods...
  • If 10% variance per firestop type
    • Inspection stops
    • Installer inspects, repairs
    • Inspector reinspects
  • Inspector Shall not Supervise Workers...
• Inspect @ Firestop Installation Start
Inspection Forms
ASTM E 2174 - ASTM E 2393

• One for each type of firestop
• Submit 1 day after Inspection to Authorizing Agency
• Numbered – Controlled
• Required – During/Post Construction Methods
1704.2.4 Report requirement. Special inspectors shall keep records of inspections. The special inspector shall furnish inspection reports to the building official, and to the registered design professional in responsible charge. Reports shall indicate that work inspected was or was not completed in conformance to approved construction documents.

Discrepancies shall be brought to the immediate attention of the contractor for correction. If they are not corrected, the discrepancies shall be brought to the attention of the building official and to the registered design professional in responsible charge prior to the completion of that phase of the work.

A final report documenting required special inspections and correction of any discrepancies noted in the inspections shall be submitted at a point in time agreed upon prior to the start of work by the applicant and the building official.
Inspection Final Report
ASTM E 2174 - ASTM E 2393

• Name, address, location – project, installer, inspector
• Type and quantity of firestops inspected
• Verification method
• Percentage Deviation
• Copies of all documents sent to Authorizing Agency
Firestopping & Compartmentation for Safety

- Copies of all documents sent to Authorizing Agency
- Product Data Sheets
- ‘SYSTEMS’, Fire Rated Assemblies = As Built
- Inspection Docs
- Warranty Docs
- Maintenance Requirements
- Letters of Compliance
- FCIA Member in Good Standing Certificate
Firestopping & Compartmentation for Safety
Effective Compartmentation is a SYSTEM
FCIA DIIM & Firestopping
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