And whoever saved one life, it is as though he saved entire mankind

(5:32 – Al Qur’an)
Firestop Inspections?
Fire Statistics at a Glance

Global Data:

- 117 million fires worldwide each year
- 84% deaths are in the residential fires
- 75% of all fire deaths are caused by smoke
- 60% of people killed in fires are not in the room of its origin
- 50% of survivors could not see more than 3½ m

- 1.6 million fires in America alone
- At least 5,350 major fires → 15 every day
- 4,510 fire deaths → 1 every 120 minutes (all fires)
- 2,755 fire deaths → 1 every 200 minutes (structural fires)
- 25,775 civilian injuries → 1 every 20 minutes
- $97 billion direct property damages
Why Inspections?

- To ensure compliance to project specifications
- To minimize insurance premium
- To safeguard owner’s interest
Code Requirement?

UAE Fire & Life Safety Code of Practice 2011 (Annexure A.1.21)

6.12. Inspection

6.12.1. In Firestopping installations, inspection of through penetration firestop systems through fire rated floor and wall assemblies shall be in accordance with ASTM E 2174, Standard Practice for On-Site Inspection of Installed Fire Stops.

6.12.2. Fire resistive joint systems and Perimeter fire barriers - Inspection of fire resistive joints and perimeter barriers shall be in accordance with ASTM E 2393, Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers.
Code Requirement?

UAE Fire & Life Safety Code of Practice 2011 (Annexure A.1.21)

6.12. Inspection

6.12.3. Inspection of the cladding, roofing and glazing systems shall be carried out in each phase of the installation progress, ensuring the appropriate implementation of the Manufacturer’s recommendations.

6.12.4. Work shall not be certified as completed unless approved by the inspecting agency.

6.12.5. Inspector Qualification
Inspection Agency shall be accredited to IAS AC 291 criteria of International Accreditation Service acceptable to Civil Defence Authority.
Code Requirement?

2012 International Building Code

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 fire-stops, 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.
Code Requirement?

2012 International Building Code

1705.16.1 Penetration fire-stops

Inspections of penetration firestop systems that are tested and listed in accordance with Sections 714.3.1.2 ‘Through-penetration firestop system’ and 714.4.1.2 ‘Membrane penetrations’ 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 ‘Fire-resistant joint systems’ and 715.4 ‘Exterior curtain wall/floor intersection’ shall be conducted by an approved inspection agency in accordance with ASTM E 2393.
Who does Inspections?

IAS AC 291
Special Inspection Agency
UAE Fire & Life safety Code of Practice 2011
Abudhabi International Building Code (AD-IBC)
How to do Inspections?

ASTM E-2174
Standard Practice for On-Site Inspection of Penetration Firestopping

ASTM E-2393
Standard Practice for On-Site Inspection of Fire Resistive Joints and Perimeter Fire Barriers

Spec Section 07 84 00
Firestopping
IAS AC 291 Criteria
Scope

- Directly under the jurisdiction of Committee E06 on "Performance of Building"
- Establish Procedures for Inspection
- Address all types of installed fire-stops
- Provide Methods of Field Verification
Basic Terminology

- **AA – Authorizing Authority:**
  Responsible Architect, Engineer, owner or their representative

- **AHJ – Authorizing Having Jurisdiction:**
  The designated authority charged with local codes like Civil Defense

- Inspection documents – Basis for the inspection process

- Inspection Form – to record information

- Inspector – Performs the inspection

- Judgment (EJ) – Evaluation of a field condition which doesn’t conform to an existing system
Summary of Practice

- Minimum Inspection Requirements to ensure compliance
- Minimum Reporting Requirements
- Standard Inspection Form
- Standard Report Format

Significance & Use

This practice is intended to provide

- Standard set of Guidelines
- Means to verify Compliance
Inspection Documents

- Must be acceptable to AA & AHJ
- AA to provide following documents to Inspector
  - Project specifications
  - Contract drawings
  - Listed designs
  - Engineering Judgments (EJs)
  - Manufacturer’s installation instructions
  - Building codes
- Inspector to review all the documents

Materials

Inspector shall verify compliance in accordance with E 814 or UL 1479 to ensure that all materials are listed & labeled for intended use
Inspection Schedule

- Inspector and Installer agree on schedule at a pre-construction conference
- Notification of changes within 01 working day

Inspector

An individual meeting the qualifications to perform the inspection. He should be;

- Accredited as per AC 291 credentials
- Meets the criteria contained in E 699
- Accepted by the AA & AHJ
Inspection Process

- Submittal Review
- Review of project documents
- General Review
- Mock-up Review
- Observation Review i.e. In-progress Inspection
- Post installation Inspection i.e. Destructive Testing
- Final Inspection & Certification – Compliance to project specs
Inspection Frequency

Through Penetrations Fire stop Systems;

- Randomly witness minimum 10% of each type
  or
- Destructive Type Verification (Removal and Repair).
  Min 2% of each type per floor or for each area of 10,000 Sq. Ft.
  or
- The AA shall approve frequency
Inspection Frequency

Fire-resistive Joint Systems;

- Randomly witness a minimum of 5% of total linear feet of each type
  or
- Post Installation Review of One Sampling Per 500 Lineal Feet of Each Type
  - Destructive type verification and repair
  - Disassembly, Verification and Reinstallation
  - Visual Inspection of Full Installations
- The AA shall approve frequency
The final report shall contain –

I. A cover page with;
   - The project name, location & Ref. no.
   - The name and address of Installer, AA AHJ and Inspector

II. A summary page with;
   - Types and quantity
   - Verification method
   - Percentages of deficiencies
     - □ For Each Type
     - □ Total Fire-stops inspected

The Final Report shall also contain copies of all
   - Correspondences submitted to AA
   - Inspection forms arranged chronologically
Why Inspections

Situations – Mockery of fire-stop installation!
Why Inspections

Leading the standards of Life-safety and Property-protection...
Why Inspections
Why Inspections
Why Inspections
Why Inspections

Leading the standards of Life-safety and Property-protection...
Why Inspections
Leading the standards of Life-safety and Property-protection...
Butler Engineering (ME)

The outcome of compromise!

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The outcome of compromise!

Leading the standards of Life-safety and Property-protection...
Do it right the first time

Result of

In-progress Inspection…….
Leading the standards of Life-safety and Property-protection...
Leading the standards of Life-safety and Property-protection...
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Butler Engineering (ME)

Leading the standards of Life-safety and Property-protection...
Maintenance & Management
Code Requirement?

UAE Fire & Life Safety Code of Practice 2011 (Annexure A.1.21)


6.14.1. Provide protection and maintain conditions during and after installation that ensure installed fire stopping, curtain-wall, cladding, roofing and glazing systems are without damage or deterioration at the time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated systems immediately and install new materials.
Code Requirement?

2011 UAE Fire & Life Safety Code of Practice & Annexure A.1.21


6.14.2. The condition 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.

6.14.3. Any new openings made therein for passage of through penetrants shall be protected with approved firestop system to comply with applicable codes as per the guidelines of Civil Defense.
Code Requirement?

2012 International Fire Code (IFC)

703.1 Maintenance

The required fire-resistance rating of fire-resistance-rated construction (including walls, firestops, shaft enclosures, partitions, smoke barriers, floors, fire-resistive coatings and sprayed fire-resistant materials applied to structural members and fire-resistant 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...
Code Requirement?


4.5.8 Maintenance
Whenever or wherever any device, equipment, system, condition, arrangement, level of protection, or any other feature is required for compliance with the provisions of this Code, such device, equipment, system, condition, arrangement, level of protection, or other feature shall thereafter be maintained, unless the Code exempts such maintenance.
Code Requirement?


4.6.13 Maintenance, Inspection, and Testing.

4.6.13.1 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. Maintenance shall be provided in accordance with applicable NFPA requirements or requirements developed as part of a performance-based design, or as directed by the AHJ.

4.6.13.2 No existing life safety feature shall be removed or reduced where such feature is a requirement for new construction.

4.6.13.3* Existing life safety features obvious to the public, if not required by the Code, shall be either maintained or removed.
Code Requirement?


4.6.13 Maintenance, Inspection, and Testing.

4.6.13.4 Any device, equipment, system, condition, arrangement, level of protection, fire-resistive construction, or any other feature requiring periodic testing, inspection, or operation to ensure its maintenance shall be tested, inspected, or operated as specified elsewhere in this Code or as directed by the AHJ.

4.6.13.5 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.
Thank you!

Questions?

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