

DIIM & Firestopping

Firestopping Joints

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Presented By:

Firestop Contractors International Association

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Outline

- FCIA – A Trade Association
 - Total Fire Protection & Effective Compartmentation
 - Specs, Codes, Testing, Products - Design
 - Installation
 - Inspection
 - Maintenance
 - Firestopping for Safety – A Quality Protocol
 - DIIM

FCIA – Firestop Contractors International Association

- FCIA Members
 - Firestop Contractors
 - Firestop Manufacturers
 - Firestop Consultants
 - Firestop Distributors, Reps, Friends
- FREE MOP/Spec - Specifiers @ AE, Independent
- FREE Life Safety Digest
- 3rd Party Contractor/Inspection Company Accreditation Programs
- Chair, ASTM Inspection Standards
- Tools for Specifiers

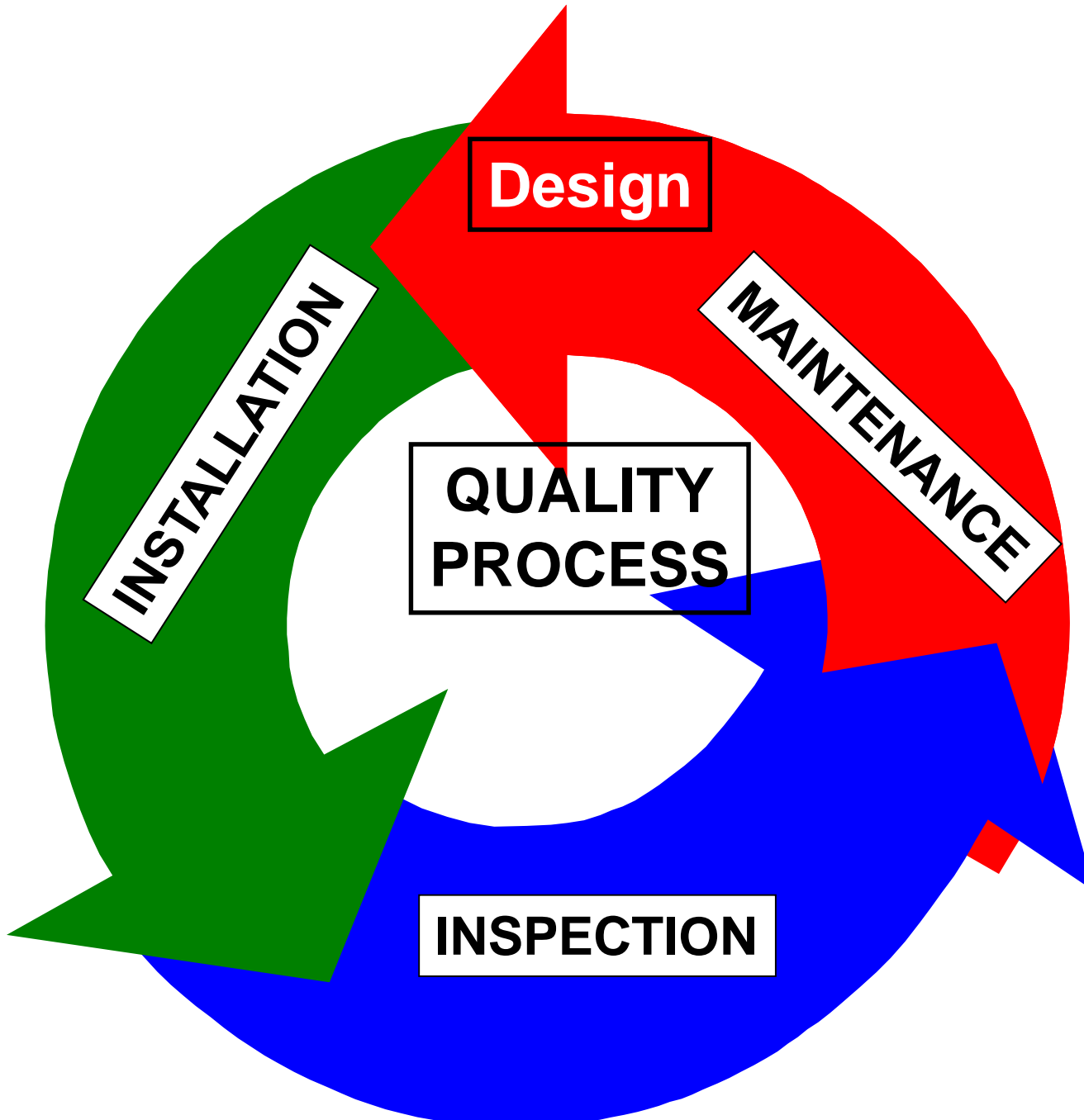


FCIA – Firestop Contractors International Association

- FCIA Member Firestop Contractors
 - 3rd Party Company Accreditation Programs
 - ULC Qualified Firestop Contractors
 - FM 4991 Approved Firestop Contractors
- FCIA Member Inspection Agencies
 - IAS AC 291 Accredited Special Inspection Agencies

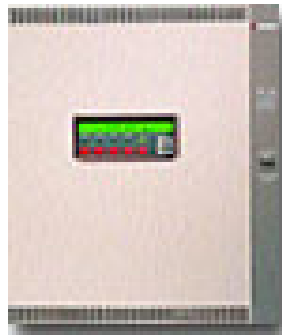
“DIIM”

- Firestopping for Safety – DIIM
 - Properly *Designed* and Specified Firestopping
FCIA - 07-84-00 - Specification
 - *Tested and Listed Systems* - ASTM E 814 / UL 1479 - **UL 2079**, FM 4990, **ULC-S-115**, ASTM **E2837**, **E2307**, E3037, E3038, more...
 - Professional *Installation* – FCIA Member, FM 4991 Approved, UL/ULC Qualified Contractors
 - Properly *Inspected* - ASTM E 2174 / 2393
Protocol by IAS AC 291 Accreditation Criteria
for Inspection Agencies
 - *Maintained & Managed* (Annually - FCIA
Members – NFPA 101, International Fire Code



“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



Building & Fire Code Requirements

- NFPA 5000 – 101- Chapter 8
- National Building Code – Canada
- UAE Fire and Life Safety Code – Chapter
- International Codes –
 - New and Existing Buildings International Building Code – Chapter 7
 - International Fire Code – Chapter 7
- *Minimum requirements - Construction & Maintenance*

Building & Fire Code Requirements

- Compartmentation Codes – US –
 - *Exterior Walls*
 - *Fire Walls*
 - *Fire Barriers*
 - *Fire Partitions (Not NFPA)*
 - *Smoke Barriers*
 - *Smoke Partitions*
- *Penetrations, Joints, Perimeter Interior
Fire Containment Systems*

Firestop Joint Systems & IBC

Chapter 2, Definition

[BS] JOINT. The opening in or between adjacent assemblies that is created due to building tolerances, or is designed to allow independent movement of the building in any plane caused by thermal, seismic, wind or any other loading.

Firestop Joint Systems & IBC

SECTION 715

FIRE-RESISTANT JOINT SYSTEMS

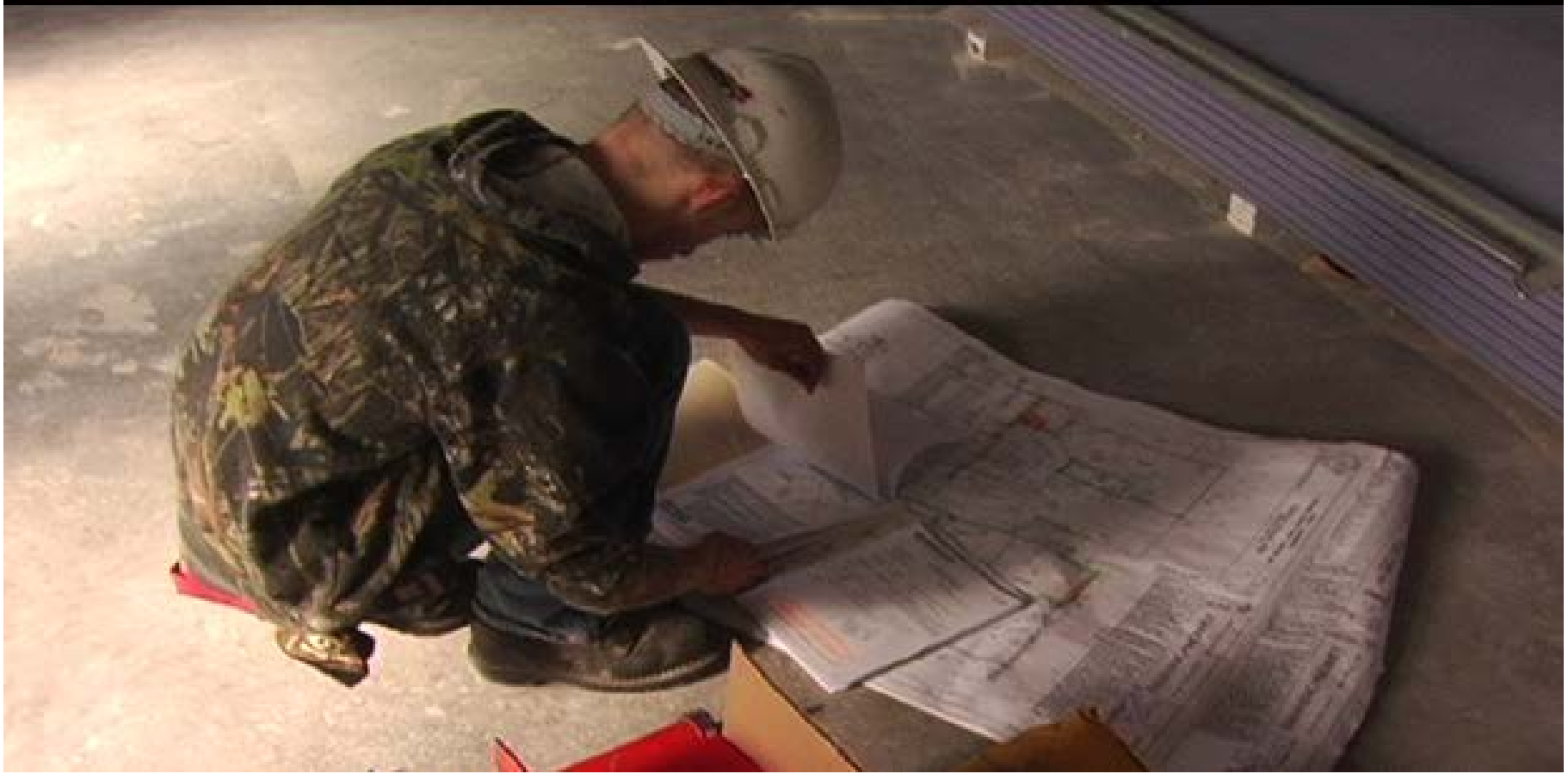
715.1 General. Joints installed in or between fire-resistance rated walls, floor or floor/ceiling assemblies and roofs or roof/ceiling assemblies shall be protected by an approved *fire-resistant joint system* designed to resist the passage of fire for a time period not less than the required *fire-resistance rating* of the wall, floor or roof in or between which the system is installed. *Fire-resistant joint systems* shall be tested in accordance with Section 715.3.

Firestop Joint Systems & IBC

715.3 Fire test criteria. *Fire-resistant joint systems* shall be tested in accordance with the requirements **of either ASTM E1966 or UL 2079.** Nonsymmetrical wall joint systems shall be tested with both faces exposed to the furnace, and the assigned *fire-resistance rating* shall be the shortest duration obtained from the two tests. Where evidence is furnished to show that the wall was tested with the least fire-resistant side exposed to the furnace, subject to acceptance of the *building official*, the wall need not be subjected to tests from the opposite side.

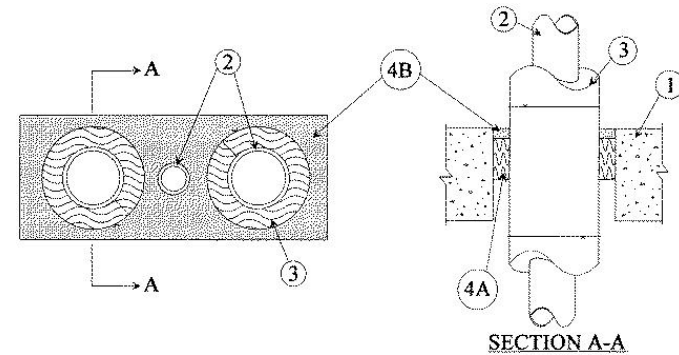
Exception: For *exterior walls* with a horizontal *fire separation distance* greater than 10 feet (3048 mm), the joint system shall be required to be tested for interior fire exposure only.

Firestopping for Continuity Listed Systems



Firestopping for Continuity

- **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 / FM 4990, **ULC-S-115, UL 2079, E-2307 E-2837**, as the test method...”
 - **Testing = Suitability statement for use of a firestop product in a specific system application**



Firestop Joint Systems Definition

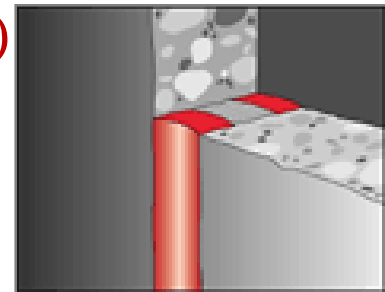
- UL 2079, ASTM E 1966, ULC-S-115
 - “A joint system is a **specific construction** consisting of adjacent **wall and floor assemblies**, *and* the materials designed to prevent the spread of fire through a linear opening between the wall and / or floor assemblies”
 - Definitions
 - Joint - Defined
 - Breach?
 - Opening?
 - Gap?



Firestopping for Safety

- **Firestop Joint Systems – UL 2079**
- Min. Positive Pressure – .01 Water, 12” below assy.
 - Movement Cycling
 - Class I – min. 500 cycles, min. 1 cycle / minute
 - Class II- min. 500 cycles, min. 10 cycles / minute
 - Class III-min 100 cycles, min. 30 cycles / minute
 - Fire Tested at Maximum Joint Width
 - No Load Bearing Characteristics, unless noted
 - Hose Stream Test
 - **L Rating <math><5\text{cfm/LF}</math> @.30”WC, 75 (UL ONLY)**
 - W Ratings

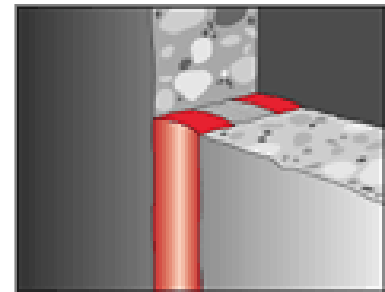
HILTI Graphic



Firestopping for Safety

- **Joint Systems – ASTM E 1966**
 - Min. Positive Pressure – .01 Water, 12” below assy.
 - Movement Cycling
 - Type I – Thermal Sway – Min. 1 CPM, 500 Cycles
 - Type II – Wind Sway – Min. 10 CPM, 500 Cycles
 - Type III – Seismic – Min. 30 CPM, 100 Cycles
 - Type IV – Combined Mvt. – Min. 30 CPM, 100 Cycles, followed by 10 CPM, 400 Cycles.
 - Fire Tested at Maximum Joint Width
 - No Load Bearing Characteristics, unless noted
 - Hose Stream Test

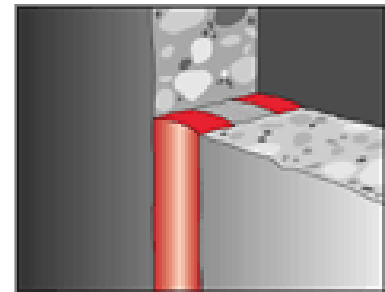
HILTI Graphic



Firestopping for Safety

- Joint Systems – C719 NOT = E1966 & UL 2079
- 10 CPM, at 1/8” per hour
- NO Min. Positive Pressure – .01 Water, 12” below assy.
 - LESS Movement Cycling – 10 CPM
 - NOT Fire Tested at Maximum Joint Width
 - NOT Load Bearing Characteristics, unless noted
 - NO Hose Stream Test

HILTI Graphic



Products become Systems

Hose Stream = Shock Test



Firestopping for Continuity

Firestop Products

- **D – Dynamic Joints**
- **S – Static Joints**
- **Sealants**
 - Silicone
 - Latex
 - Intumescent Silicone, Latex
 - Urethane
- **Mortar**
- **Spray Products**
- **Mechanical Expansion Joints**
 - **Insulation Fire Barriers Under as SYSTEM**
 - **Wall & Horizontal Assemblies – Head of Wall**
- **Integral Foams**

Building & Fire Code Requirements

- Compartmentation Codes – US
 - **Smoke Barrier – Firestopping for Continuity**
 - IBC – Hourly Rated, “L” Rating
 - <5cfm/sf (IBC 2006)
 - < 50 cfm, 100sf of Wall Area (IBC 2009)
 - **NFPA – ... ‘restricting the passage of smoke’ ...
no quantified “L” Rating ... YET**
 - Continuous, Barrier to Barrier, ... through concealed spaces,
 - Not always fire resistance rated.
 - **Smoke Partition**
 - IBC – Continuous barrier, not rated...’retard’.
 - NFPA – Continuous membrane that is designed to form a barrier to *limit the transfer of smoke*....

Building & Fire Code Requirements

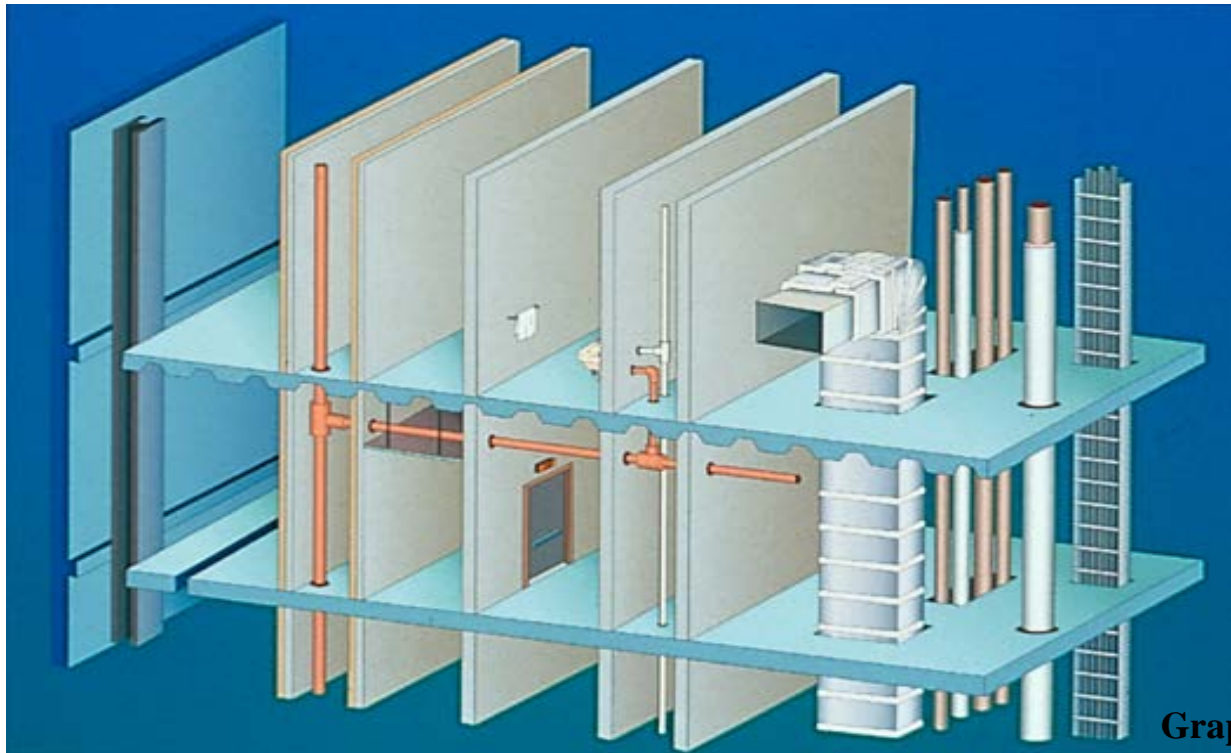
- *Chemical, Biological, Radiation, Explosion, etc.*
 - Standards? Nope, Check with ...
 - R - Nuclear Power Plant Standards
 - E – Blast Strength? Manufacturer & IBC..
 - C – Which Chemicals? Manufacturer
 - B – Which Agents? Manufacturer
 - G – Germ – Manufacturer & industrial hygeneist

D- Design

SYSTEMS SELECTION

SYSTEMS ANALYSIS

Who's Responsible, How to Choose???

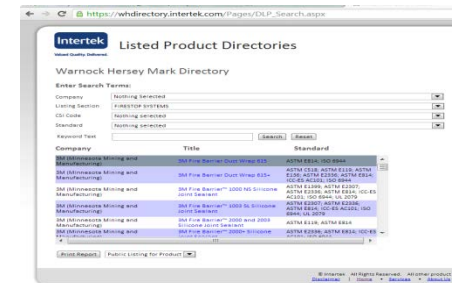


Graphics – STI

Firestopping for Continuity Products become Systems

- **Firestop Systems Directories –**
 - UL
 - Intertek
 - FM Approvals

Systems Selection & Analysis...Not as easy as it looks...



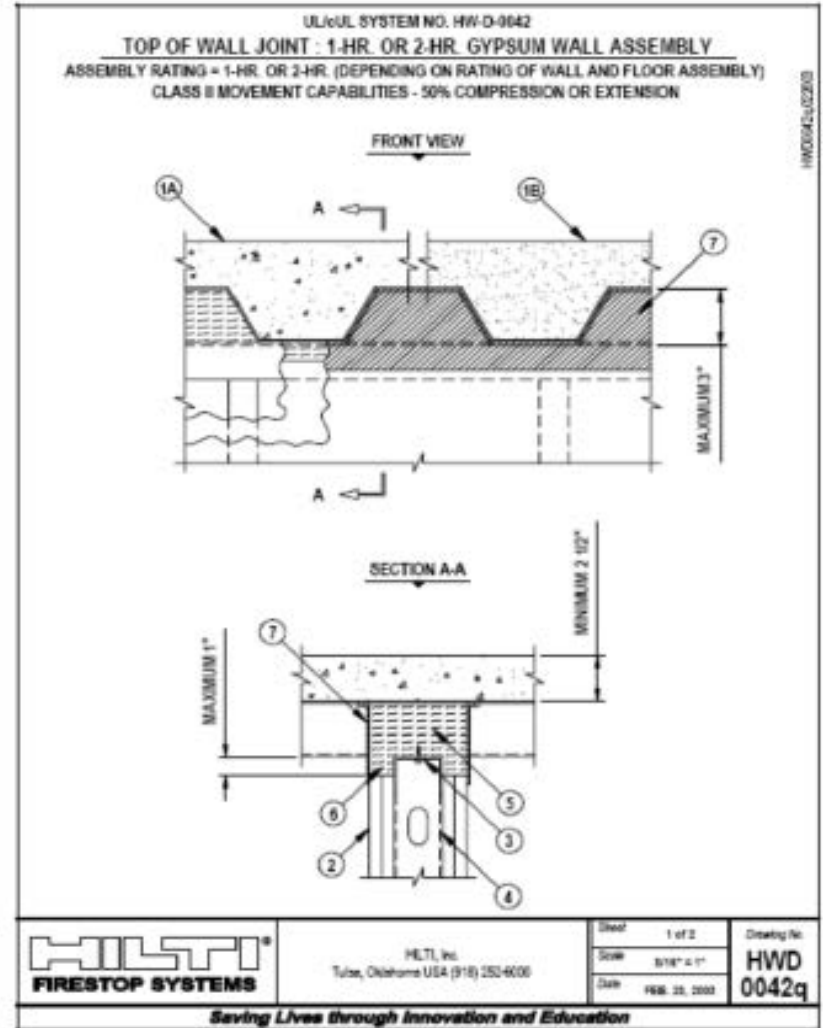


Fire Stop Technologies, Inc.



Fire Stop Technologies, Inc.

Gypsum Wall assembly running up to concrete over metal deck



How do Contractors Select Systems & Inspection Agencies Analyze?

- Wall or Floor Construction Type, Rating
- Wall or Floor Thickness
- Penetrating Item, Coverings
- Size, Type, Thickness
- Annular Space Sizes
- **Joint / Gap Sizes**
- Backing Materials
- Fill Material(s)

= Rated Firestop System



Engineering Judgments/EFRRA

- Field or other Variances to Tested and Listed Systems?
 - No System Exists
- Why???
 - Lack of Planning
 - Unique Conditions

Engineering Judgments/EFRRA

- Variances to Systems at Site ? – Now What...
 - **First Action in Process**
 - **Find another system** – Same Manufacturer
 - **Find another system** – Different Manufacturer
 - **If no system exists in either case....**
 - **Second Action** –
 - *Engineering Judgment* – “EJ”
 - *Equivalent Fire Resistance Rated Assembly* – “EFRRA”
 - *Based on engineering, IFC Protocol*

IFC Guidelines for Evaluating Engineering Judgment Guidelines

‘Construction industry professionals, building officials, fire officials, firestop contractors and other stakeholders need appropriate guidelines for evaluating and using such judgments.

As such, IFC developed *Recommended IFC Guidelines for Evaluating FireStop Systems in Engineering Judgments*.

IFC recommends that these guidelines be considered when evaluating whether any firestop system engineering judgment meets minimal requirements. Questions concerning the EJ request should be addressed to the initiator of the judgment.

Firestop Applications

Floor to Wall



Head of Wall

**Fire Stop
Technologies,
Inc.**



Graphics – Firestop Solutions

Head of Wall & Wall/Beam Joint

I-Beam to Fluted Metal Deck



Graphics – Firestop Solutions

NOTE: Beam is now a WALL=T-Rating

Firestop Perimeter Interior Fire Containment Systems

- **715.4 Exterior curtain wall/floor intersection.** Where fire resistance-rated floor or floor/ceiling assemblies are required, voids created at the intersection of the exterior curtain wall assemblies and such floor assemblies shall be sealed with an *approved* system to prevent the interior spread of fire. Such systems shall be securely installed and tested in accordance with **ASTM E2307** to provide an *F rating* for a time period not less than the *fire-resistance rating* of the floor assembly. Height and *fire-resistance* requirements for curtain wall spandrels shall comply with Section 705.8.5. [2018 IBC, 715.4]
- **Exception** –E-119 for Floor to Ceiling Glass

Firestop Perimeter Fire Containment Systems

715.4.1 Exterior curtain wall/non fire-resistance-rated floor assembly intersections. Voids created at the intersection of exterior curtain wall assemblies and non fire resistance-rated floor or floor/ceiling assemblies shall be sealed with an *approved* material or system to retard the interior spread of fire and hot gases between *stories*.

Firestop Perimeter Fire Containment Systems

715.4.2 Exterior curtain wall/vertical fire barrier intersections. Voids created at the intersection of non fire-resistance-rated exterior curtain wall assemblies and *fire barriers* shall be filled. An approved material or system shall be used to fill the void and shall be securely installed in or on the intersection for its entire length so as not to dislodge, loosen or otherwise impair its ability to accommodate expected building movements and to retard the passage of fire and hot gases.

Firestop Perimeter Interior Fire Containment Systems

- Firestop Perimeter Interior Fire Containment Systems – **ASTM E 2307**
 - “A Perimeter Fire Containment System is **a specific field erected construction** consisting of a floor with a fire resistance rating, and an exterior curtainwall with no hourly resistance rating, and the fill material installed between the floor and the curtain wall to prevent the vertical spread of fire in a building.”



Graphic - Superl

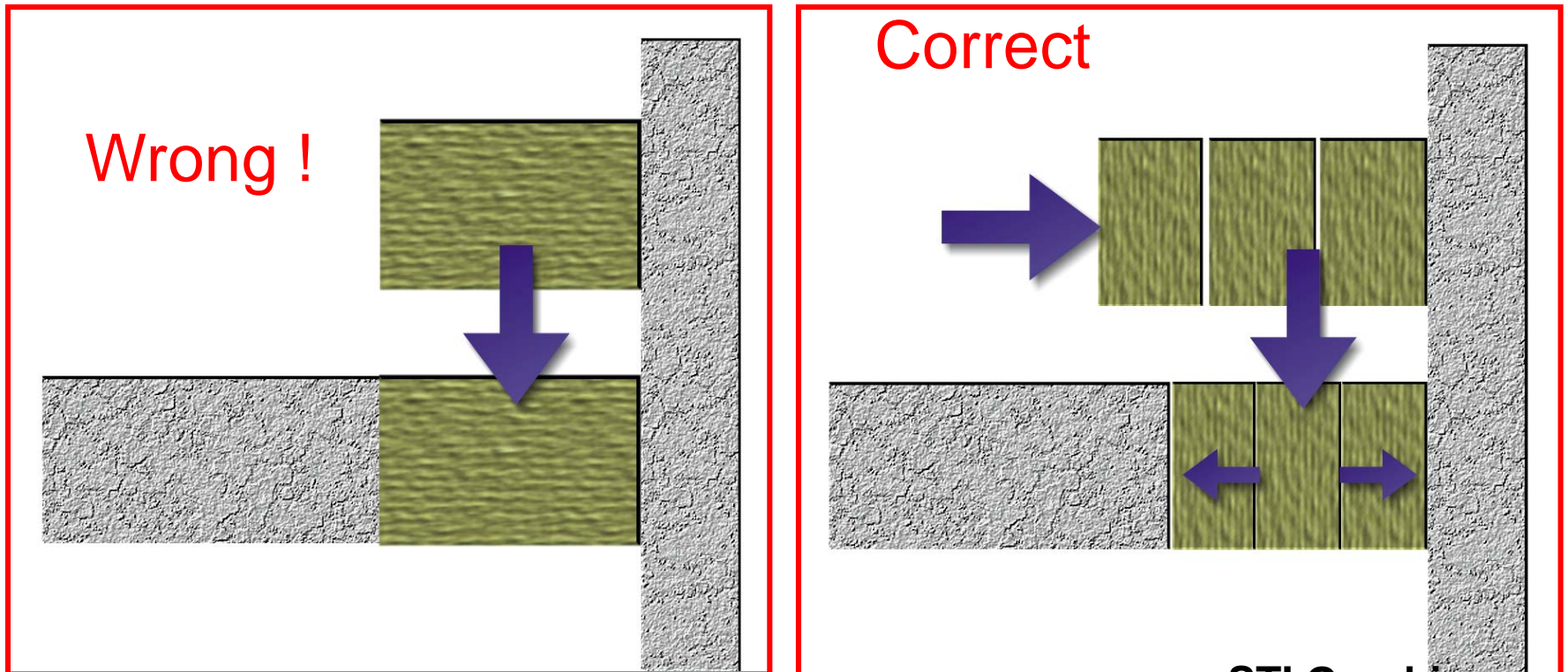
Firestop Perimeter Fire Containment Systems



Graphic – Intertek

Proper Installation of Mineral Wool

- Compressed mineral wool must be inserted perpendicular to the joint to allow for movement between the slab and wall.





STI Graphic

Firestop Products Become Systems when Installed to SYSTEM



Tamweel Towers, Dubai

Perimeter Fire Protection

Gulf News: A discarded cigarette ???



NFPA 285 & ASTM E 2307?



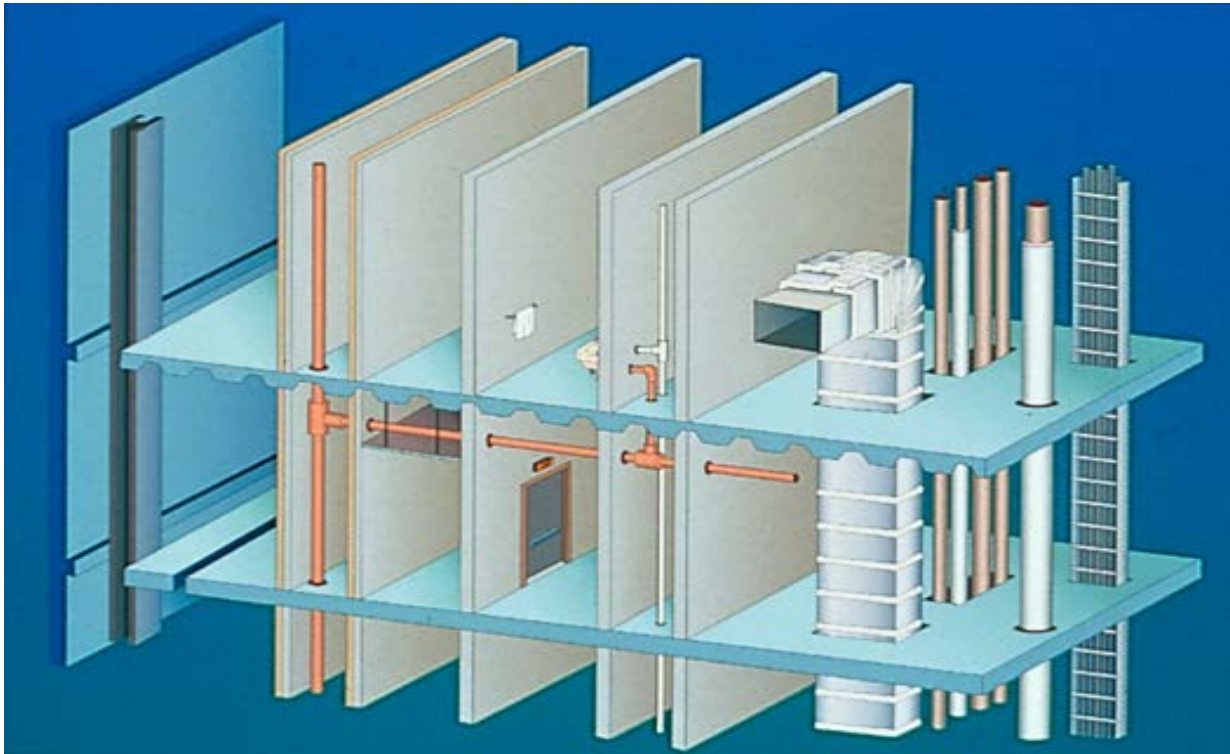
Intertek Image



Thomas Bell-Wright International Consultants

I- Installation

Who's Responsible, How to Choose???



Graphics – STI

Installation – Who?

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

Conclusion –

Without Single Firestopping Trade....

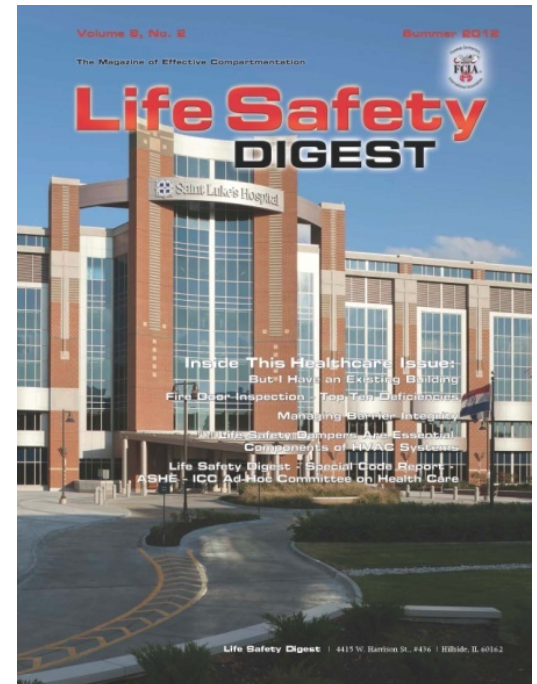
fire & life safety risks

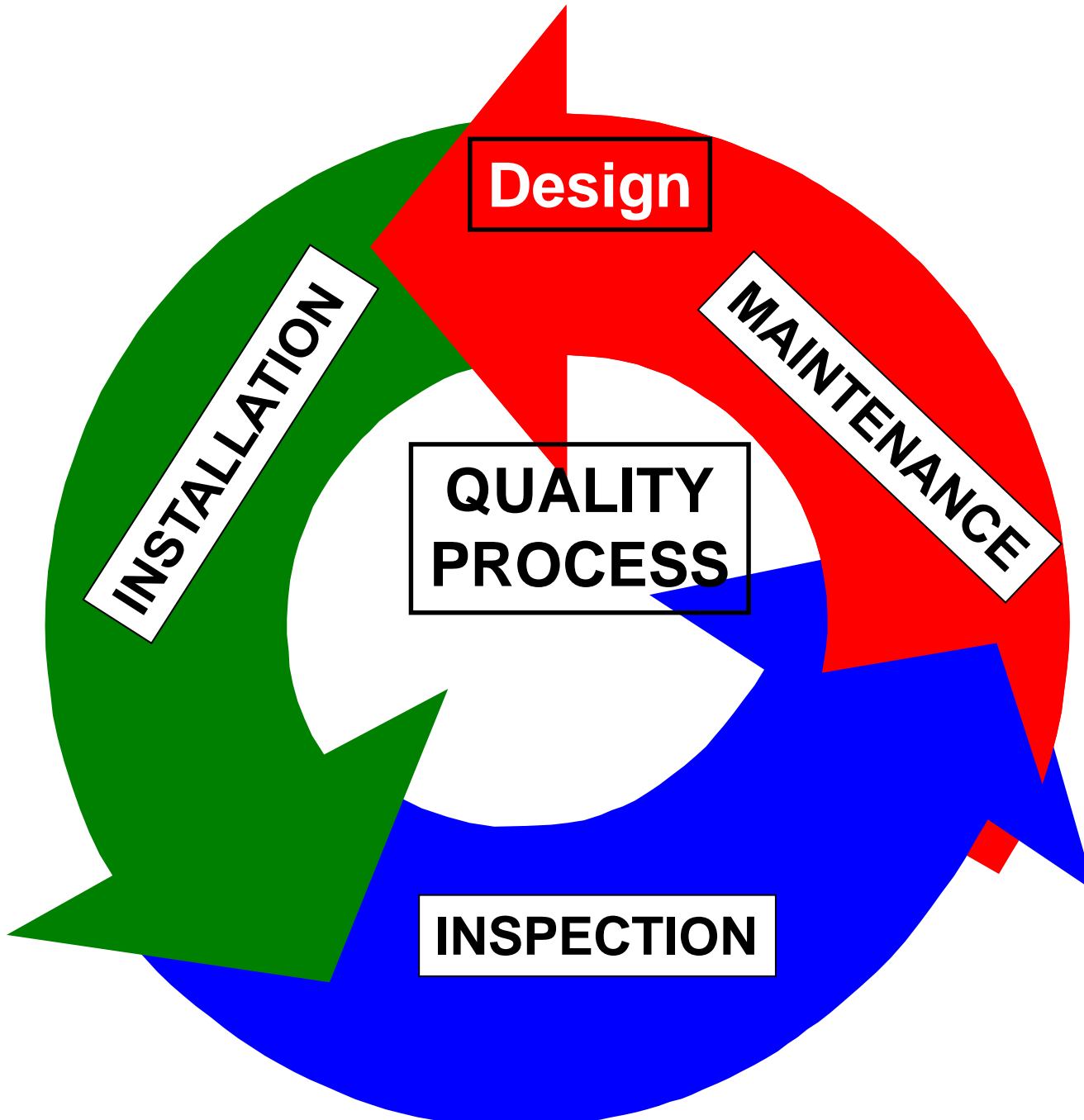


Adler Photo

FCIA DIIM & Firestopping I & I - Inspection Webinar

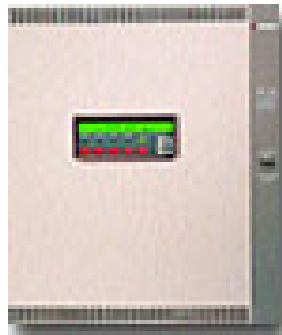
- Free Subscription to Life Safety Digest
- Specifications @ FCIA.org,





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