IBC's Chapter 7 – Fire-Resistance & YOU "Fire and Smoke Protection Features"

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Today's Slides @ www.FCIA.org

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 – FM 4991, UL QFCP, IAS AC291
- Chair, ASTM Inspection Standards
- Tools for Specifiers

FCIA.org Member Lists

FCIA Knows Firestop Systems

Design, Installation, Inspection, Maintenance & Management

The FCIA's mission is for member organizations to be recognized throughout the construction industry as preferred quality contractors of life safety firestop systems. JOIN FCIA TODAY!

Looking for a Firestop Professional? For the best Firestop Contractors, Associates, Manufacturers, Consultants, Distributors, Reps and more, FCIA.org Member List is the place for you. From Firestopping Contractors to Special Inspection Agencies, Firestop System Manufacturers to Firestop product Distributors, FCIA Members have the expertise you need. Also, check out the FM 4991 Approved & UL Qualified/Firestop Contractors Map.

FCIA Barrier Management Services Member Lists

Barrier Management Services, Alphabetical Listing

Building Owners and Managers are required by the International Fire Code, NFPA 101, NFPA 1, the National Fire Code of Canada, UAE Fire and Life Safety Code, and other codes to maintain all types of fire protection in buildings. They are also required to maintain the fire-resistance rated construction and smoke resistant assemblies for the life of the building. The FCIA Barrier Management Services contractors, inspection agencies, manufacturers, distributors and software vendors provide tools for the building owner and manager to meet code requirements. Whether small or large repairs and major renovations, FCIA Barrier Services Section keeps buildings safe. **Members who offer these specialized services can register for inclusion in these lists.**

Member's first letter 1 2 3 A B C D E F G H I J K L M N O P Q R S T U V W X Z

Sort by Company	Sort by State	
Aecon Industrial Western Inc. (Barrier Management Services) Jeff Leddy *Member Since February 28, 2012*	Sherwood Park AB	(780) 416-5700
Airseal Insulation Systems (Barrier Management Services) Abba Kloc	Brooklyn NY	(718) 821-6800

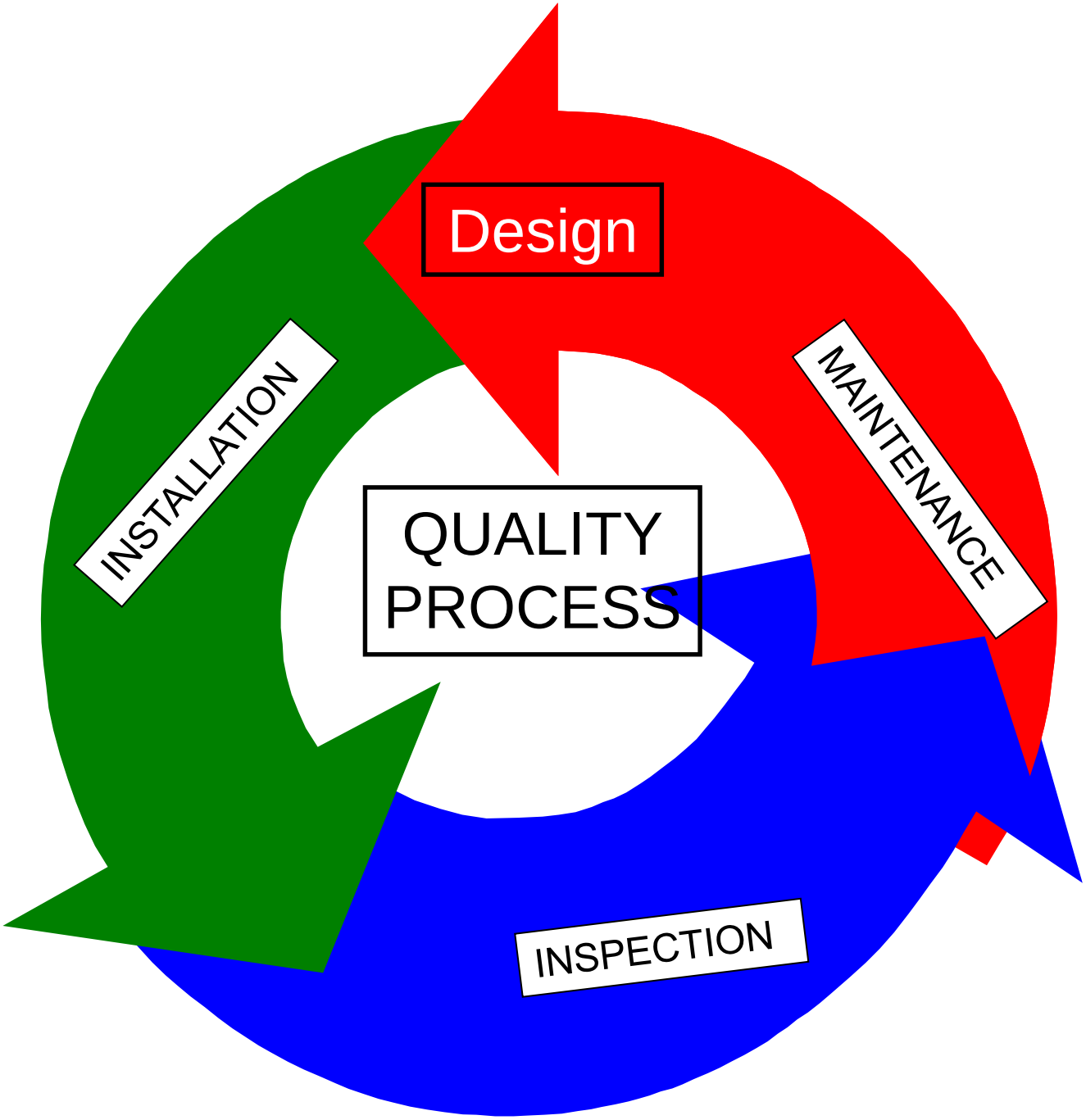
Contractors Offering Barrier Management Services
By home state

All Barrier Management Services
Firestopping
Fire Dampers
Fire Doors (Rolling and Swinging)
Fire-rated Glazing
SFRM and IFRM Fireproofing
Barrier Repairs
Barrier Surveys
Barrier Management Software

Operating US-wide
Operating in Canada
Operating in Middle East
Operating worldwide

Manufacturer Members
Firestopping
Fire Dampers
Fire Doors (Rolling and Swinging)
Fire-rated Glazing
SFRM and IFRM Fireproofing
Barrier Management Software

Associate Members
Firestopping


Design
MAINTENANCE
INSPECTION
INSTALLATION
QUALITY
PROCESS

“TOTAL FIRE PROTECTION” & IBC’s Ch. 7 - Fire Resistance

- Structural Fire Resistance
  - Beams, Columns, Assemblies
- 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 – Ingress/Egress

"TOTAL FIRE PROTECTION"
Balanced Design?

- Structural Fire Resistance
  - Beams, Columns, Assemblies
- 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–
  - Specifiers, Building Owners & Managers, Building Occupants and Firefighters – Ingress/Egress

Charging Language - General

701.1 Scope. The provisions of this chapter shall govern the materials, systems and assemblies used for structural *fire resistance* and fire-resistance-rated construction separation of adjacent spaces to safeguard against the spread of fire and smoke within a building and the spread of fire to or from buildings. **[IBC 2018 701.1]**

Fire-Resistance Ratings & Tests

703.2 Fire-resistance ratings. The *fire-resistance rating* of building elements, components or assemblies shall be determined in accordance with the test procedures set forth in ASTM E119 or UL 263 or in accordance with Section 703.3. The *fire-resistance rating* of penetrations and *fire-resistant joint systems* shall be determined in accordance Sections 714 and 715, respectively. **[IBC 2018 703.2]**

Restrained Classifications

703.2.3 Restrained classification. Fire-resistance-rated assemblies tested under ASTM E119 or UL 263 shall not be considered to be restrained unless evidence satisfactory to the *building official* is furnished by the *registered design professional* showing that the construction qualifies for a restrained classification in accordance with ASTM E119 or UL 263. **Restrained construction shall be identified on the *construction documents*.** **[IBC 2018 703.2.3]**

Methods for Determining Fire-Resistance

703.3 Methods for determining fire resistance. The application of any of the methods listed in this section shall be based on the fire exposure and acceptance criteria specified in ASTM E119 or UL 263. The required *fire resistance* of a building element, component or assembly shall be permitted to be established by any of the following methods or procedures:

1. *Fire-resistance* designs documented in approved sources.

2. Prescriptive designs of fire-resistance-rated building elements, components or assemblies as prescribed in **Section 721.**

3. Calculations in accordance with Section 722.

4. Engineering analysis based on a comparison of building element, component or assemblies designs having *fire-resistance ratings* as determined by the test procedures set forth in ASTM E119 or UL 263.

5. Alternative protection methods as allowed by **Section 104.11**.

6. *Fire-resistance* designs certified by an **approved agency.**

[IBC 2018 703.3]

Automatic Sprinklers

703.4 Automatic sprinklers. Under the prescriptive fire resistance requirements of this code, **the *fire-resistance rating*** of a building element, component or assembly shall be established **without the use of *automatic sprinklers* or any other fire suppression system being incorporated as part of the assembly** tested in accordance with the fire exposure, procedures and acceptance criteria specified in ASTM E119 or UL 263. However, this section shall not prohibit or limit the duties and powers of the *building official* allowed by Sections 104.10 and 104.11.

[IBC 2018 703.4]

Fire-Resistance Requirement

703.7 Marking and identification. ***Fire walls, fire barriers,*** *fire partitions, smoke barriers and smoke partitions or any* other wall required to have protected openings or penetrations shall be effectively and permanently identified with signs or stenciling. Such identification shall:

1. Be located in accessible concealed floor, floor-ceiling or *attic spaces;*

2. Be located within 15 feet (4572 mm) of the end of each wall and at intervals not exceeding 30 feet (9144 mm) measured horizontally along the wall or partition; and

3. Include lettering **not less than 3 inches (76 mm) in height with a minimum 3/8 inch (9.5 mm) stroke** in a contrasting color incorporating the suggested wording.

“FIRE AND/OR SMOKE BARRIER—PROTECT ALL OPENINGS”

or other wording.

Exception: Walls in Group R-2 occupancies that do not have a removable decorative ceiling allowing access to the concealed space.

Structural Elements

704.1 Requirements. The *fire-resistance ratings* of structural members and assemblies shall **comply with this section and** the requirements for the type of construction as specified in **Table 601.** The *fire-resistance ratings* shall be not less than the ratings required for the fire-resistance-rated assemblies supported by the structural members. **[IBC 2018 704.1]**

Structural Elements – Columns

- 704.2 - Protection for Fire-Resistance-Rating
  - **Entire Column, individual encasement, all sides, full height**
  - Connections
  - Continuous – Foundation Top through Floor/Ceiling Assembly, to Top of Column.

[IBC 2018 704.2]

Structural Elements – Primary Structural Frame, other than Column

704.3 Protection of the primary structural frame other than columns. Members of the primary structural frame other than columns that are required to have protection to achieve a *fire-resistance rating* and support more than two floors or one floor and roof, or support a load-bearing wall or a non-load-bearing wall more than two stories high, shall be provided individual encasement protection by protecting them on all sides for the full length, including connections to other structural members, with materials having the required *fire-resistance rating*.

[IBC 2018 704.3]

Structural Elements – Primary Structural Frame, other than Column

- FS8-18 - Proponent Crystal Sujeski (crystal.sujeski@fire.ca.gov)requests

- 704.6.1 Secondary attachments to structural members. Where primary and secondary structural members require fire protection, secondary **tubular steel attachments** to those structural members shall be protected with the same fire resistive material and thickness as required for the structural member. The protection shall extend away from the structural member a distance of not less than 12 inches, or shall be applied to the entire length when the attachment is less than 12 inches long. When an attachment is hollow and the ends are open, the fire resistive material and thickness shall be applied to both the exterior and interior of the tubular hollow steel attachment.

[IBC 2021 NEW]

Structural Elements

704.9 Impact protection. Where the fire protective covering of a structural member is subject to impact damage from moving vehicles, the handling of merchandise or other activity, the fire protective covering shall be protected by corner guards or by a substantial jacket of metal or other noncombustible material to a height adequate to provide full protection, but not less than 5 feet (1524 mm) from the finished floor.

[IBC 2018 704.9]

Fire-Resistance - Barriers

- Exterior Walls
- Fire Walls
- Fire Barriers
- Fire Partitions (not in NFPA)
- Smoke Barriers
- Smoke Partitions

Koffel Slide

Fire-Resistance – Barriers, SFRM & IFRM

- Tested and Listed Assemblies
  - ASTM E119/UL 263
  - Resist Fire, Heat, Smoke/Hot Gasses
  - Structural Integrity during Fire Test
  - Hose Stream Test Survival
    - (Barriers & Walls Only)

Fire-Resistance - Barriers

- Fire Resistance Rating
- Continuity
- Openings & Penetrations
- Types of Materials
- Structural Robustness
- Supporting Construction
- Assembled
  - Listing
  - Manufacturers installation instructions

Koffel Slide

Fire-Resistance – Fire Barriers

- Fire area separations
- Mixed Occupancy Separations
- Incidental use areas
- Hazardous area separations
- Exit enclosures
- Shaft enclosures
- Horizontal exits
- Corridor Walls (NFPA only)

Koffel Slide

Fire-Resistance – Smoke Barriers

- Occupancy Groups
  - Institutional 2
  - Institutional 3
  - Areas of Refuge
  - Other
  - Above code…specified

Fire-Resistance – Smoke Barriers

- Minimum 1 hour fire-resistance
- Continuous, floor/ceiling to deck…
- Supporting construction = rating, ex..
- Smoke Resistant ‘Features’

Fire-Resistance – Smoke Partitions

- Corridor Walls - Institutional 2 – IBC Only
- Sprinkler protected hazardous areas, NFPA
  - '0' hour fire-resistance
  - Not always continuous…
    - Tight to underside of ceiling membrane in ceiling membrane designed to limit the passage of smoke
    - Ceiling Tiles differ – NFPA/IBC
- No Supporting construction rating

706 - Fire-Walls

- Hourly Fire-Resistance-Rated
- Structural Independence
- One Side Collapses, Other Side Intact
- Continuous
  - Foundation through floor/ceilings, roof to 3’ above roof…exception.

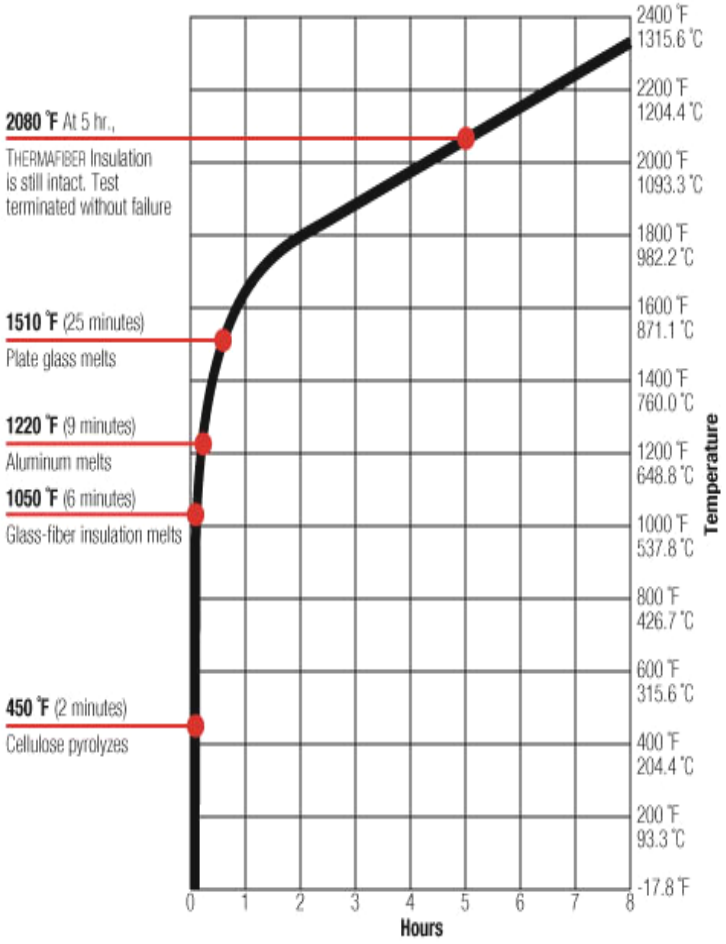
705 - Fire-Resistance – Exterior Walls

- Hourly Fire-Resistance-Rated
  - Table 601, 602, separation distances…
  - >10’ – resist from inside only
  - <=10’ – resist on both sides
- Continuous
  - Foundation through floor/ceilings, roof to 3’ above roof…exception.

IBC – Chapter 7

703.2 Fire-resistance ratings. The *fire-resistance rating* of building elements, components or assemblies shall be determined in accordance with the test procedures set forth in **ASTM E119 or UL 263** or in accordance with Section 703.3. The *fire-resistance rating* of penetrations and *fire-resistant joint systems* shall be determined in accordance Sections 714 and 715, respectively.

[IBC 2018 703.2]

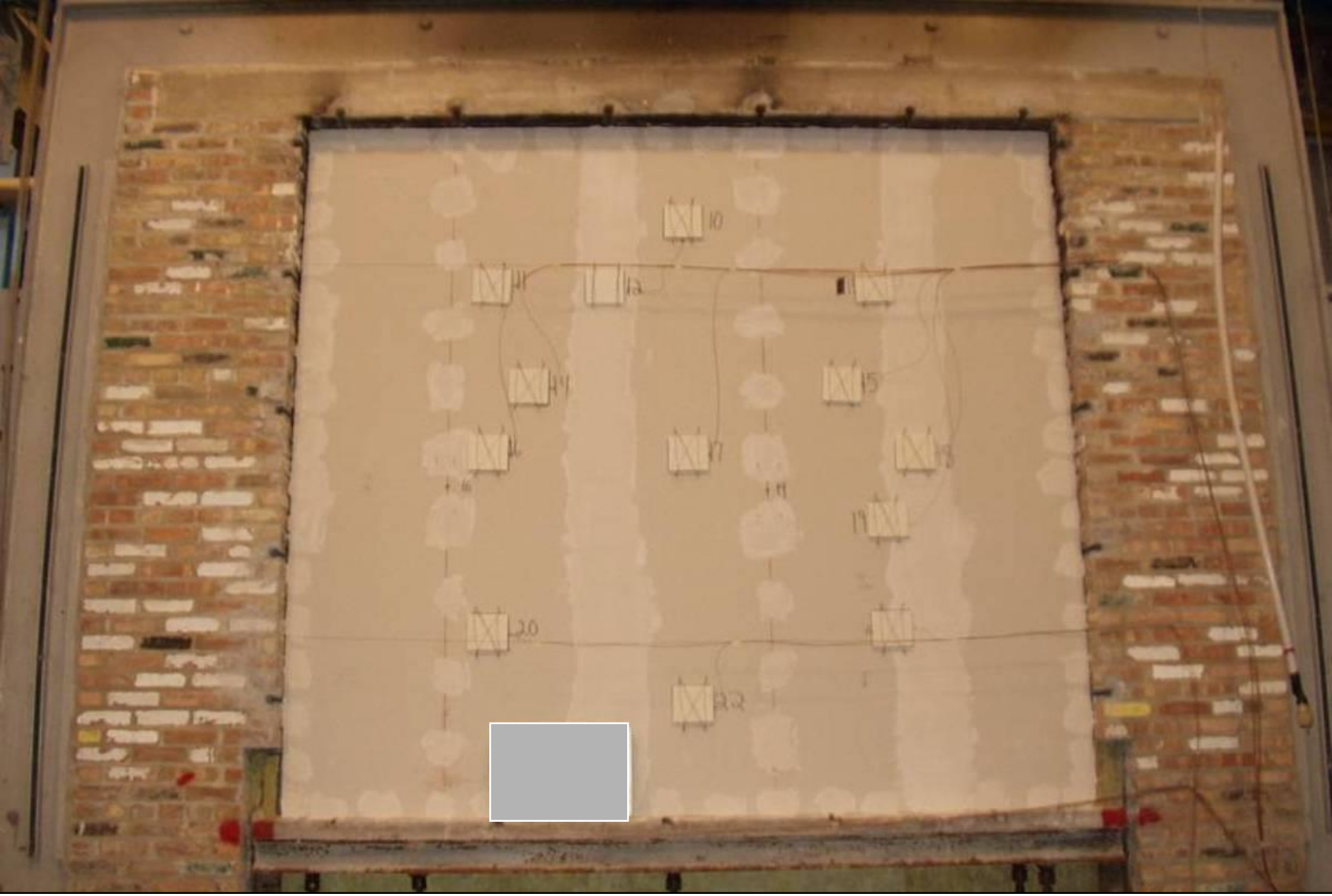


Thermafiber Image

Fire Testing

- ANSI/UL 263 or ASTM E119
  - Large Scale
  - Small Scale
  - Hourly = Time
  - 30 minutes – 4 hours
  - Restrict Temperature Rise of **Structural Element**
  - Compartmentation / Containment

UL Slide



UL Slide

UL Slide

Fire Resistance SYSTEMS

- **Products Become Systems Through….**
- **Test Standard References**
  - **Structural Elements & Assemblies**- ASTM E 119, UL 263
  - **Fire & Smoke Barriers** - ASTM E 119, UL 263
  - **Firestopping** - ASTM E 814 / UL 1479, ULC-S-115**,** UL 2079, E-1966, E-2307, **E-2837, …**test method…"
  - **Fire/Smoke Dampers** - UL 555, UL 555S
  - **Swing/Rolling Fire Doors** - UL 10B, 10C
  - **Fire Rated Glazing -** UL 9, NFPA 252
- **SYSTEM Testing = Suitability statement for use of a product in a specific *system/*design application**

Firestopping for Continuity Products become SYSTEMS … post installation

- **'Field Erected Construction…Tested to…'**
  - Standards - ASTM E814/UL 1479–UL 2079, ASTM E 1966, ASTM E 2307, ULC S-115, FM 4990
  - **F Rating - Flame**
  - T Rating – Temperature
  - H Rating – Hose
  - **L Rating – Smoke**
  - W Rating – Water

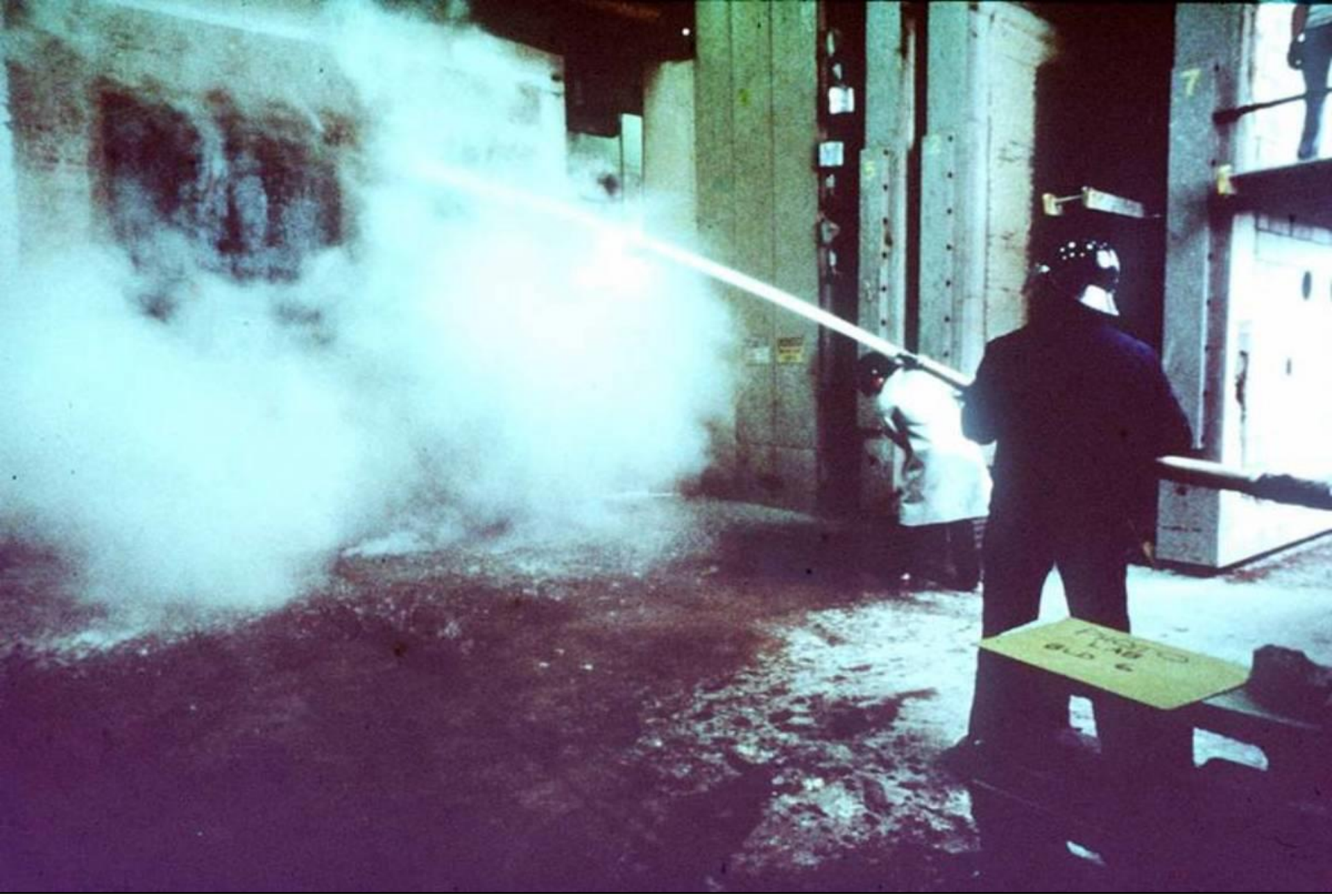
Graphics – 3M

Fire-Resistance Products … Systems
Hose Stream = Shock Test for All

Through- and Membrane-Penetration Firestop Systems

UL Slide

UL Slide

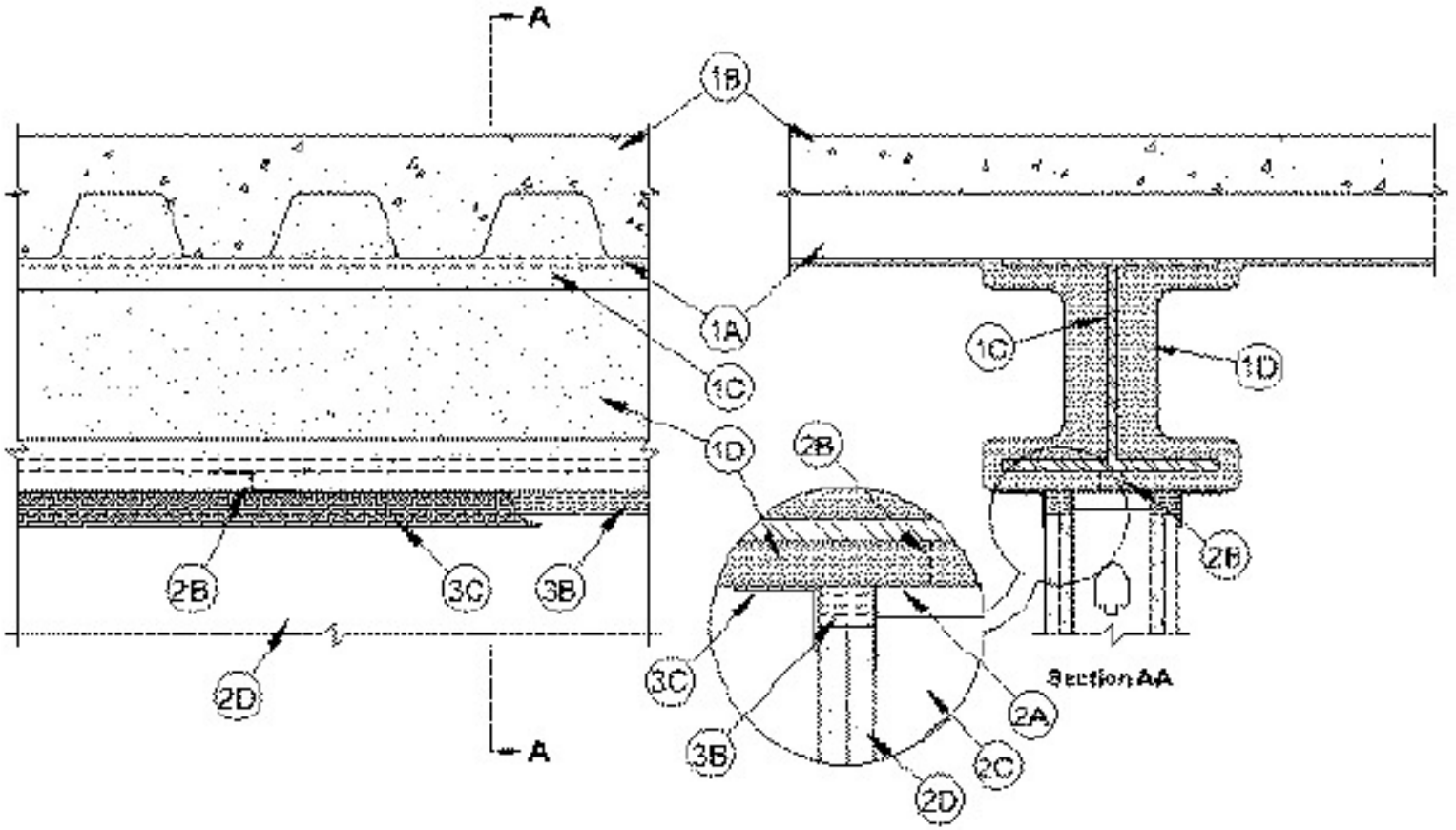


UL Slide

Wall Fire-Testing Characteristics

- ASTM E119, UL 263
- No Flame passage to Unexposed Side
- Temperature Rise, unexposed side
  - 250ºF / 325ºF
- Support loads
- Hose stream test

Fireproofing Issue
Beam acting as a Wall



1. **Floor Assembly** — The fire-rated fluted steel deck/concrete floor assembly shall be constructed of the materials and in the manner described in the individual D700, D800, or D900 Series Floor-Ceiling Design in

National Fireproofing Contractors Association

Fireproofing Issue…Beam as a Wall Extension

HW to Beam Systems

System No. HW-D-0252

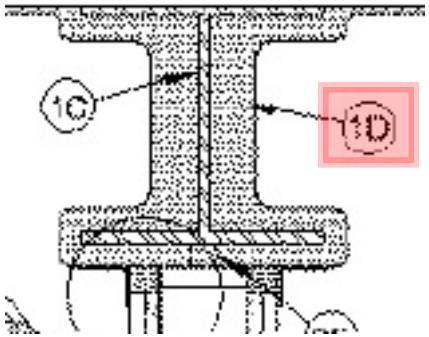
April 08, 2015

ANSI/UL2079	CAN/ULC S115
Assembly Ratings — 1 and 2 Hr (See Item 1)	F Ratings — 1 and 2 Hr (See Item 1)
Nominal Joint Width - 3/4 or 1-1/2 in. (See Item 3).	FT Ratings — 1 and 2 Hr (See Item 1)
Class II Movement Capabilities — 50% or 100 % Compression or Extension (See Item 3)	FH Ratings— 1 and 2 Hr (See Item 1)
L Rating At Ambient — Less Than 1 CFM/sq ft	FTH Ratings — 1 and 2 Hr (See Item 1)
L Rating At 400 F — Less Than 1 CFM/sq ft	Nominal Joint Width - 3/4 or 1-1/2 in. (See Item 3)
	Class II Movement Capabilities — 50% or 100 % Compression or Extension (See Item 3)
	L Rating At Ambient — Less Than 1 CFM/sq ft
	L Rating At 400 F — Less Than 1 CFM/sq ft

Falconer Slide

Fireproofing Issues…
- Codes, Tests and Applications

HW to Beam Systems



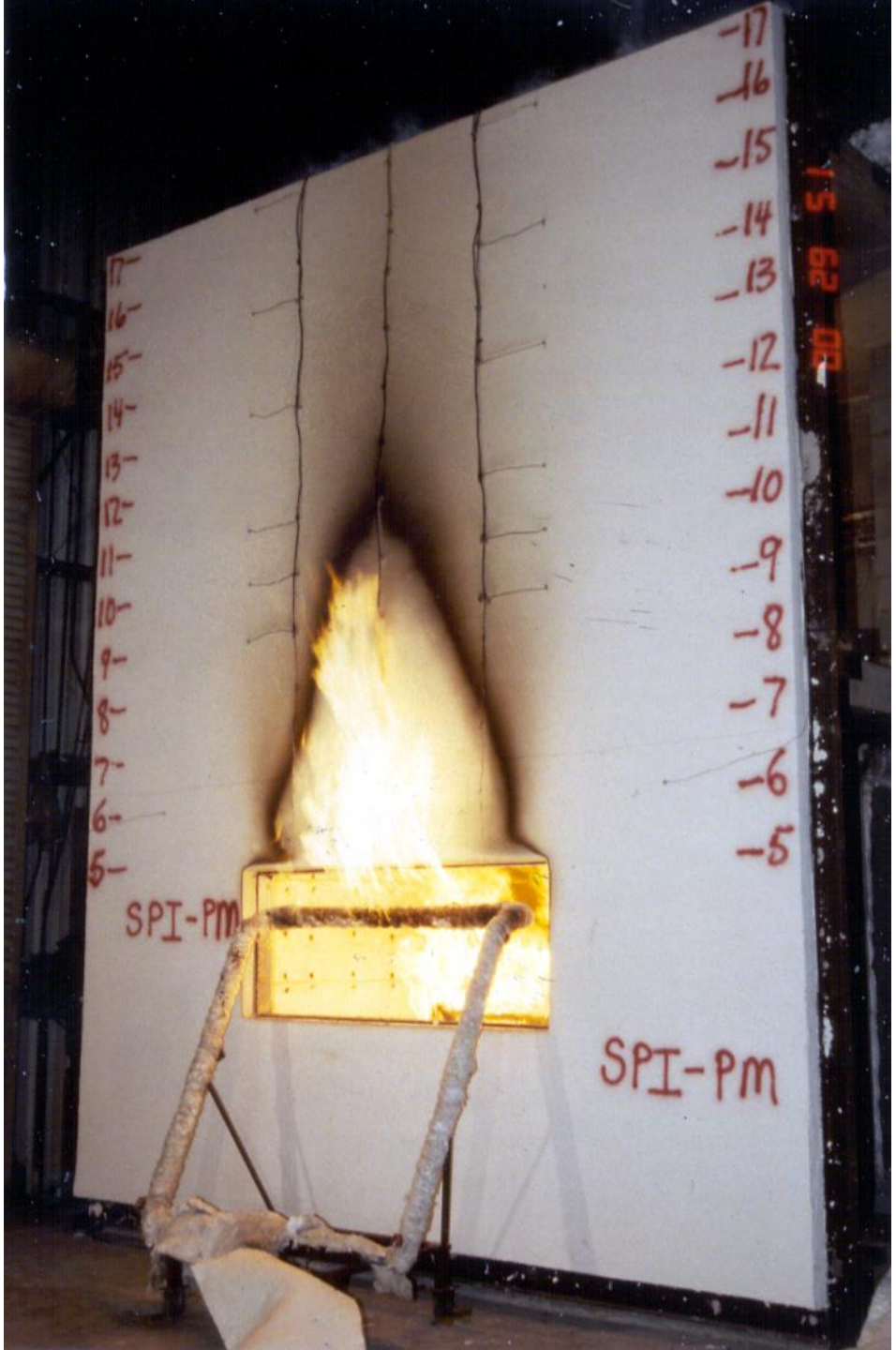
D. Spray-Applied Fire Resistive Material* — After installation of the steel attachment clips (Item 2B), steel floor units and structural steel support to be sprayed with the min thickness of material specified in the individual D700, D800, or D900 Series Design. The flutes of the steel floor units are to be filled with material across the entire top flange of the steel beam. **Additional material shall be applied to the web of the steel beam on each side of the wall. For a 1 hr Assembly Rating, the thickness of material applied to each side of the steel beam web shall be 13/16 in. (21 mm). For a 2 hr Assembly Rating, the thickness of material applied to each side of the steel beam web shall be 1-3/8 in. (35 mm).**

SOUTHWEST FIREPROOFING PRODUCTS CO — Type 5, Type 5GP

Falconer Slide

W R GRACE & CO - CONN — Type MK-6/HY

Other Issues: NFPA 285 Testing



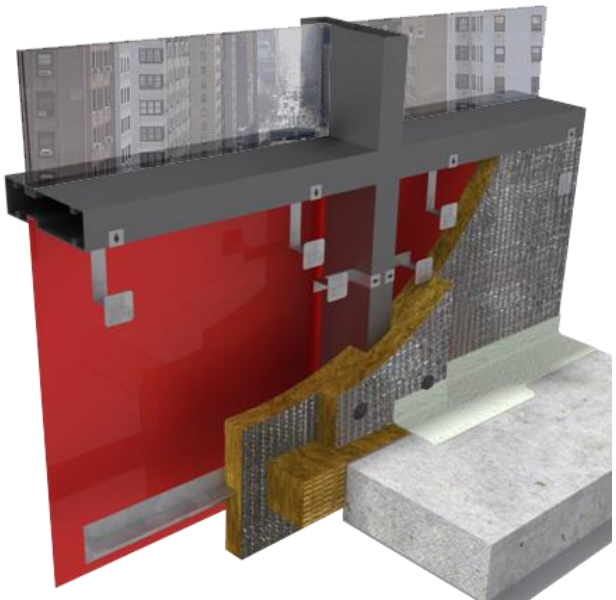
Doug Evans Slide

IBC & Curtain Walls

ASTM E 2307

Prevent Fire Spread – Interior Safing Slot

- **Interior Flame**
- **Exterior Flame Plume from Window**
- **Time & Temperature**
- **Tested Systems….**



Thermafiber Image

NFPA 285 & ASTM E 2307?

Intertek Image

Thomas Bell-Wright International Consultants

International Building Code (IBC)
SFRM & IFRM Special Inspection
Firestopping Special Inspection

- Chapter 17
- Fireproofing
- Firestopping

NFCA Proposals

S14-18 - Revise as follows:

[BF] 1705.14 Sprayed fire-resistant materials. *Special inspections* and tests of sprayed fire-resistant materials applied to floor, roof and wall assemblies and structural members shall be performed in accordance with Sections 1705.14.1 through 1705.14.6. *Special inspections* shall be based on the fire-resistance design as designated in the *approved construction documents*. The tests set forth in this section shall be based on samplings from specific floor, roof and wall assemblies and structural members. *Special inspections* and tests shall be performed **during construction with an additional visual inspection after** the rough installation of electrical, automatic sprinkler, mechanical and plumbing systems and suspension systems for ceilings, **and before concealed,** where applicable. **The required sample size shall not exceed 110% of that specified by the referenced standards in Sections 1705.14.4.1 through 1704.14.4.9. [IBC 2021]**

APPROVED AS SUBMITTED

NFCA Proposals

S19-18; Revise as follows:

[BF] 1705.15 Mastic and intumescent f ire-resistant coatings. *Special inspections* and tests for mastic and intumescent fire-resistant coatings applied to structural elements and decks shall be performed in accordance with AWCI 12-B. *Special inspections* and tests shall be based on the fire-resistance design as designated in the *approved construction documents*. Special Inspections and tests shall be performed ~~after~~ before the rough installation of electrical, automatic sprinkler, mechanical and plumbing systems and suspension systems for ceilings, and before concealed, where applicable.

IBC Special Inspection

APPROVED AGENCY. An established and recognized agency regularly engaged in conducting tests or furnishing inspection services, when such agency has been *approved* by the *building official*.

[IBC 2015, 202.2 Definitions]

APPROVED. Acceptable to the *building official* or authority having jurisdiction.

[IBC 2015, 202.2 Definitions]

IBC Special Inspection

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 2015, 202.2 Definitions]

IBC Special Inspection

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 2015, 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 2015, 1703.1.2]

IBC Special Inspection

1704.2.1 Special inspector qualifications. Prior to the start of construction, the ***approved agencies*** shall provide written documentation to the *building official* **demonstrating his or her competence and relevant experience or training of the *special inspectors*** who will perform the *special inspections* and tests during construction. Experience or training shall be considered relevant when the documented experience or training is **related in complexity to the same type of *special inspection* or testing activities for projects of similar complexity and material qualities**. These qualifications are in addition to qualifications specified in other sections of this code. Continued…..

[IBC 2015, 1704.2.1]

IBC Special Inspection

1704.2.1 Special inspector qualifications. …..

….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.

[IBC 2015, 1704.2.1]

IBC Special Inspection INSPECTOR

1704.2.1 Special inspector qualifications.

How?

- **Competency**
  - **ICC Fireproofing Exam**
  - **NFCA Fireproofing Exam**
- **Demonstrate Experience**
  - **Type of Structure**
  - **Complexity of Inspection**
  - **Material Quantity**
  - **Documented Experience**

Special Inspection Agency Approvals -Firm and Individual Qualifications - IAS AC 291

- **AC 291 Inspection Agency Accreditation**
  - Company Management System Manual
    - (ISO 17020 'lite')
  - Audit by IAS
  - Ongoing Audits by IAS
  - Individual Competencies in Fireproofing
- **Inspection Firm shall have staff..**
  - PASS ICC Fireproofing Inspector Exam or
  - ICC Fire Inspector I
  - FM, UL or IFC Firestop Exam

IBC Special Inspection - Reports

1704.2.4 Report requirement. *Approved agencies* shall keep records of special inspections and tests. The *approved agency* shall submit reports of *special* inspections and tests to the *building official* and to the *registered design professional in responsible charge*. Reports shall indicate that work inspected or tested 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 tests, and correction of any discrepancies noted in the inspections or tests, shall be submitted at a point in time agreed upon prior to the start of work by the owner or the owner's authorized agent to the *building official*.

[IBC 2015, 1704.2.4 – emphasis added]

SFRM IBC 1705.14
Special Inspection

1705.14 Sprayed fire-resistant materials. *Special inspections* and tests of sprayed fire-resistant materials applied to floor, roof and wall assemblies and structural members shall be performed in accordance with Sections 1705.14.1 through 1705.14.6.

Special inspections shall be **based on the fire-resistance design** as designated in the *approved construction documents*.

The tests set forth in this section shall be based on samplings from specific floor, roof and wall assemblies and structural members.

Continued…..
[IBC 2015, 1704.14]

IBC SFRM & IFRM Special Inspection

1705.14.1 Physical and visual tests. The *special inspections* and tests shall include the following to demonstrate compliance with the listing and the *fire-resistance rating*:

1. Condition of substrates.
2. Thickness of application.
3. Density in pounds per cubic foot (kg/m_3).
4. Bond strength adhesion/cohesion.
5. Condition of finished application.

[IBC 2015, 1704.14.1]

SFRM Required Inspections

- **1705.14.2 Structural member surface conditions.** The surfaces shall be prepared in accordance with the ***approved*** **fire-resistance design and the written instructions of** ***approved*** **manufacturers**.

  The prepared surface of structural members to be sprayed shall be inspected by the special inspector before the application of the sprayed fire resistant material. **[IBC 2015 1705.14.2]**

- **Sec. 1704.12.2 - 2009** – Structural Member Surface Conditions
  - Surfaces prepared in accordance with the approved design and approved manufacturer's instructions.
  - Prepared surface to be inspected before application of SFRM or intumescent.

SFRM IBC 1705.14.4.1 Special Inspection

- **1705.14.4.1 Minimum allowable thickness.** For design thicknesses 1 inch (25 mm) or greater, the minimum allowable individual thickness shall be the design thickness minus 1/4 inch (6.4 mm). For design thicknesses less than 1 inch (25 mm), the minimum allowable individual thickness shall be the design thickness minus 25 percent. **Thickness shall be determined in accordance with ASTM E 605.** Samples of the sprayed fire-resistant materials shall be selected in accordance with Sections 1705.14.4.2 and 1705.14.4.3. **[IBC 2015 1705.14.4.1]**

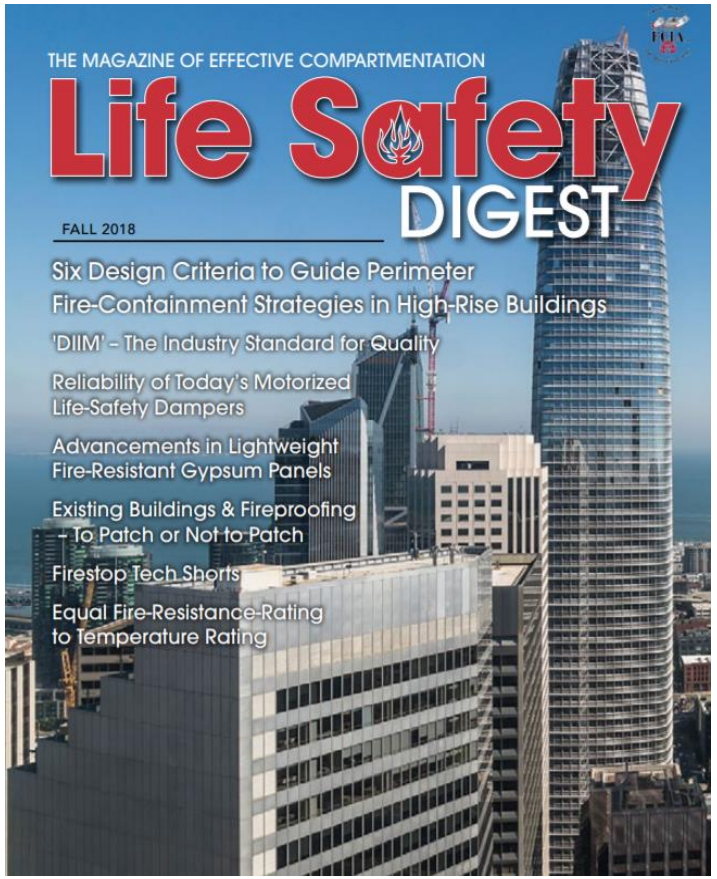
- **And, there's a lot more….**
- **ASTM Work Item – Fireproofing Inspection vs. IBC**

I – Inspection

- **Special Inspection – 1705.1-1705.12**
  - Schedule of Special Inspections - Division 1
  - Independent 3rd Party
  - Destructive, Non Destructive, Specified Frequency
  - **Firestopping–** ASTM E2174, E2393
    - Inspection Agency Accreditation – IAS AC 291
    - Inspector Competence – FM, UL or IFC Firestop Exams
  - **Fireproofing** – IBC Ch. 17, ASTM E605, E736, AWCI 12B
  - **Dampers** – NFPA 80, at Commx'g, yr. 1, yr. 4 or 6.
  - **Doors** – Annual Visual Inspection
  - **Walls?**
  - **Horizontal Assemblies**
    - Steel, Concrete, Wood @ Chapter 17

Patching SFRM & IFRM

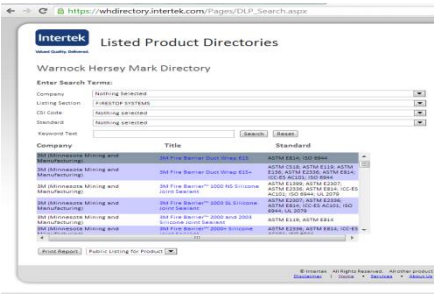
- Contact the Fireproofing Installer….
  - Original Material - Same Material from Listing & Specs
  - If not known, same Type of Material, if not known
  - Fall 2018 Issue



- **Fire-Resistance Systems Directories –**
  - **UL**
  - **Intertek**
  - **FM Approvals**

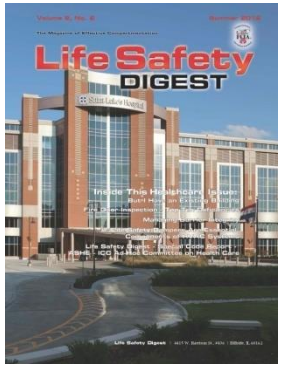
Systems/Listing Selection & Analysis…

Not as easy as it looks…



S-Specs – Fire Resistance

- **NEW Buildings –**
- **Part I – Focus on**
  - **Systems Designs & Listings**
  - **Not Products**
  - **Manufacturers Installation Instructions**

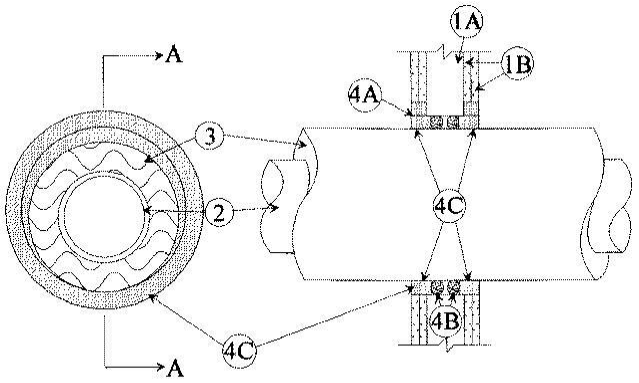


S-Specs

- **NEW Buildings –**
  - **www.FCIA.org**
  - **www. NFCA-online .org**
- **Part II – Qualifications – Contractor Programs**
  - **NFCA Accredited Contractor**
  - **UL Qualified Fireproofing Contractor Program**
  - **FM 4991, Standard for the Approval of Firestop Contractors**
  - **UL Qualified Firestop Contractor Program**
  - **AND**
  - **Manufacturer Accredited, Approved, Trained**

FM 4991, 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



CONFIGURATION A

Why Contractor Qualifications?

- **Built right the first time…Start a Trend…**
- **SYSTEMS Selection, Analysis, As-Built Inventory**
  - **Applied Fireproofing – Listings, Manufacturers Instructions**
  - **F, T, L, W Rated Firestop Systems**
  - **Tolerances - Annular Space Sizes**
  - **Angles @ Dampers**
  - **Door Gap Sizes - Undercuts - Framing**
  - **Door Frame Anchors - Spacing**
  - **Door Closers - Activation Sensors**
  - **Door Hardware**
  - **Damper Breakaway Connections**
  - **Wall fastener Patterns, Stud Spacing**
  - **Horizontal Assembly Construction**

Greenheck Photo

S-Specs – Applied Fireproofing

- **NEW Buildings**
- **www. NFCA-online .org**
- **www. FCIA. org**
- **Part II – Qualifications – Special Inspection**
  - **Special Inspection Agency –**
    - **IAS AC 291 Accredited Special Inspection Agencies**
  - **Special Inspector Qualifications - Competence**
    - **Fireproofing**
      - **NFCA SFRM & IFRM Fireproofing Exams**

      AND
      - **UL SFRM Fireproofing Exam**
      - **ICC Exams**
    - **Firestopping**
      - **FM, UL, AND IFC Firestop Exams**

Master Audit Certificate of Compliance Program

A Jobsite Specific Management System Audit – Our audit provides verified processes were followed to properly installed firestop systems.

A Renewable Jobsite Specific Certificate – After completion of a successful audit, we issue a jobsite specific certificate that is **renewable** for the building owner.

Improved Firestop Systems Documentation – The MACC certificate in conjunction with the firestop systems documentation, builds the fire-resistance inventory required by the 2018 International Fire Code for fire and smoke protection features

Qualified Firestop Contractor Program

Master Audit

Certificate of Compliance

Certificate Number: 1000-0001

Audit Date: 08/03/2018

Expiration Date: 12/31/2019

This certificate reports the findings of an audit by UL to the management system requirements of the Qualified Firestop Contractor Program. The audit was conducted to the requirements specified in the Qualified Firestop Contractor Program requirements. The UL qualified contractor was found to be in compliance with the requirements at the time of the site audit.

Structure Name: Underwriters Laboratories
Job Number: 0001
Address: 333 Pfingsten Rd.
Northbrook, IL 60062

Qualified Contractor: FCIA
Address: 4415 W. Harrison Street, Suite 540
Hillside, IL 60162

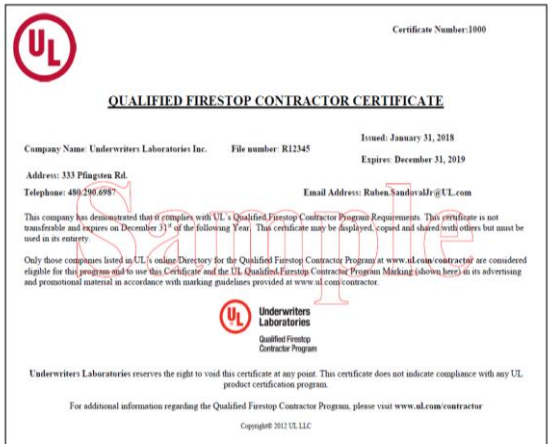
Qualified Contractor Scope of Work:

For Project # 0001 Firestopping Head and Bottom of Interior Fire Walls and all Trade Penetrations / Except Cable Tray

UL LLC makes no representations or warranties, expressed or implied, that the installed firestop system will prevent any loss or damage in the event of a fire or similar event, or that the system will in all cases provide the protection for which it is installed or intended. The certificate is evidence that the installing contractor's management system was in compliance with the applicable requirements of the Qualified Firestop Contractors Program.

UL LLC is not an insurer and does not assume any obligation or undertake to discharge any liability of the Qualified Installing Contractor, or any other party for any loss, which may result in failure, incorrect installation, non-conformity to requirements, cancellation of this certificate, or withdrawal by the Qualified Installing Contractor from the Qualified Firestop Contractor Program.

Any modification to any firestop system of the structure will affect the complete firestopping system and may render protection afforded by the system ineffective. Any changes will invalidate this certificate earlier than the expiration date. It is the building owners' responsibility for an annual visual inspection of the inventory of fire-resistance-rated and smoke-resistant assemblies as required by the International Fire Code or other adopted codes. Please contact your local UL Qualified Firestop Contractor or visit www.UL.com/firestopcontractor for a complete list of qualified contractors.



Certificate Number:1000

QUALIFIED FIRESTOP CONTRACTOR CERTIFICATE

Company Name: Underwriters Laboratories Inc. File number: R12345

Issued: January 31, 2018

Expires: December 31, 2019

Address: 333 Pfingsten Rd.

Telephone: 480.290.6987 Email Address: Ruben.SandovalJr@UL.com

This company has demonstrated that it complies with UL's Qualified Firestop Contractor Program Requirements. This certificate is not transferable and expires on December 31st of the following Year. This certificate may be displayed, copied and shared with others but must be used in its entirety.

Only those companies listed in UL's online Directory for the Qualified Firestop Contractor Program at www.ul.com/contractor are considered eligible for this program and to use this Certificate and the UL Qualified Firestop Contractor Program Marking (shown here) in its advertising and promotional material in accordance with marking guidelines provided at www.ul.com/contractor.

Underwriters Laboratories
Qualified Firestop Contractor Program

Underwriters Laboratories reserves the right to void this certificate at any point. This certificate does not indicate compliance with any UL product certification program.

For additional information regarding the Qualified Firestop Contractor Program, please visit www.ul.com/contractor

UL Slide

S-Specs –

- **NEW Buildings –**
- **Part III – Execution**
  - **Special Inspection – IBC Chapter 17**
    - **SFRM - ASTM E605, E736**
    - **IFRM - AWCI 12-B**
    - **Firestopping – ASTM E2174, E2393**

S-Specs - Contractor Qualifications DIIM In Other Industries?

- **Fireproofing**
  - **NFCA Contractor Accreditation Program**
  - **UL Qualified Fireproofing Contractor Program & MACC**
- **Firestopping –**
  - **FM 4991 Standard for the Approval of Firestop Contractors**
  - **UL Qualified Firestop Contractor Program & MACC**
- **Dampers –**
  - **Accreditation for Sheet Metal Union Signatory Contractor**
- **Doors –**
  - **Fire Door Assembly Inspectors – DHI, Others**
- **Walls ?**
  - **AWCI's Education Academies**
- **Horizontal Assemblies?**
- **Glazing ?**

I – Inspection

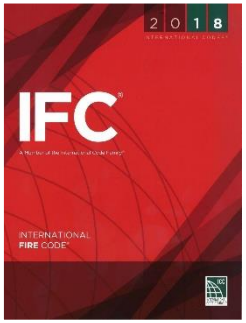
- **Special Inspection – 1705.1-1705.12**
  - Schedule of Special Inspections - Division 1
  - Independent 3rd Party
  - Destructive, Non Destructive, Specified Frequency
  - **Firestopping–** ASTM E2174, E2393
    - Inspection Agency Accreditation – IAS AC 291
    - Inspector Competence – FM, UL or IFC Firestop Exams
  - **Fireproofing** – IBC Ch. 17, ASTM E605, E736, AWCI 12B
  - **Dampers** – NFPA 80, at Commx'g, yr. 1, yr. 4 or 6.
  - **Doors** – Annual Visual Inspection
  - **Walls?**
  - **Horizontal Assemblies**
    - Steel, Concrete, Wood @ Chapter 17

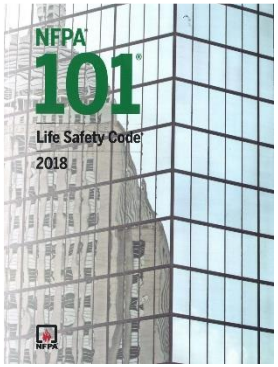
Fire Codes Require Maintenance

- **NFPA 101**
- **NFPA 1**
- **International Fire Code**

- **Minimum Requirements Stated**

- **Frequency**





National Fire Protection Association - NFPA 101

- **4.6.12 Maintenance, Inspection, and Testing.**
  4.6.12.1 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…* in accordance with *applicable NFPA requirements* ….
- **[NFPA 101:4.6.12.1, emphasis added]**

National Fire Protection Association - NFPA 101

- **4.6.12.2** No existing life safety feature *shall be removed or reduced* where such feature is a requirement for new construction.
- **4.6.12.3*** Existing life safety features obvious to the public, if not required by the Code, *shall be either maintained or removed*.
- [101:4.6.12.3]

National Fire Protection Association - NFPA 101

- **4.6.12.4** 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.

National Fire Protection Association - NFPA 101

- **4.6.12.5** 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.

National Fire Protection Association - NFPA 1-2018

- **12.2* Construction.**
- 12.2.2 Fire safety construction features for new and existing occupancies shall comply with **this Code and the referenced edition of NFPA 101.**
- **12.3 Fire-Resistive Materials and Construction.**
- 12.3.1 The design and construction of fire walls and fire barrier walls that are required to separate buildings or subdivide a building to prevent the spread of fire shall comply with Section 12.3 and NFPA 221.

National Fire Protection Association - NFPA 1-2018

- 12.3.3* Maintenance of Fire-Resistive Construction, Draft-Stop Partitions, and Roof Coverings.

12.3.3.1 Required fire-resistive construction, including fire barriers, fire walls, exterior walls due to location on property, fire-resistive requirements based on type of construction, draftstop partitions, and roof coverings, *shall be maintained and shall be properly repaired, restored, or replaced where damaged, altered, breached, penetrated, removed, or improperly installed.*

National Fire Protection Association - NFPA 1-2018

- 12.3.3.2 Where required, **fire-rated gypsum wallboard** walls or ceilings that are damaged to the extent that through openings exist, the damaged gypsum wallboard shall be **replaced or returned to the required level of fire resistance using a listed repair system or using materials and methods equivalent to the original construction.**
- **12.3.3.3 Where readily accessible, required fire-resistance rated assemblies in high-rise buildings shall be visually inspected for integrity at least once every 3 years.**

National Fire Protection Association - NFPA 1-2018

- 12.3.3.3.1 The person responsible for conducting the visual inspection shall demonstrate appropriate **technical knowledge and experience in fire-resistance-rated design and construction** acceptable to the AHJ.
- **12.3.3.3.2 A written report prepared by the person responsible for conducting the visual inspection shall be submitted to the AHJ documenting the results of the visual inspection.**

2015 International Fire Code Maintenance

SECTION 703
FIRE-RESISTANCE-RATED CONSTRUCTION

703.1 Maintenance. The required *fire-resistance rating* of fire-resistance-rated construction, including, but not limited to, 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 where damaged, altered, breached or penetrated**. **Records** of inspections and repairs shall be maintained..

2015 International Fire Code Maintenance

SECTION 703
FIRE-RESISTANCE-RATED CONSTRUCTION

703.1 Maintenance. (continued) Where concealed, such elements shall not be required to be visually inspected by the *owner* unless the concealed space is accessible by the removal or movement of a panel, access door, ceiling tile or similar movable entry to the space. Openings made therein for the passage of pipes, electrical conduit, wires, ducts, air transfer openings and holes made for any reason shall be protected with *approved* methods capable of resisting the passage of smoke and fire. Openings through fire-resistance-rated assemblies shall be protected by self- or automatic-closing doors of *approved* construction meeting the fire protection requirements
for the assembly.

2018 International Fire Code

- ***701.1 Scope.*** The provisions of this chapter shall govern the **inspection and maintenance of the materials, systems and assemblies used for *structural fire resistance*, *fire-resistance rated* construction separation of adjacent spaces** and construction installed to resist the passage of smoke to safeguard against the spread of fire and smoke within a building and the spread of fire to or from buildings. New buildings shall comply with the *International Building Code*. **[IFC 2018]**

2018 International Fire Code

- ***701.2 Fire-Resistance Rated Construction***
  - **Structural Members**
  - **Exterior Walls**
  - **Fire Walls, Fire Barriers, Fire Partitions**
  - **Horizontal Assemblies**
  - **Shaft Enclosures**

2018 International Fire Code

- **701.6 Records of inspections and repairs** shall be maintained. Where concealed, such elements shall not be required to be visually inspected by the *owner* ***unless the concealed space is accessible by the removal or movement of a panel, access door, ceiling*** **tile** or similar movable entry to the space.

[IFC 2018]

2018 International Fire Code INVENTORY REQUIRED…

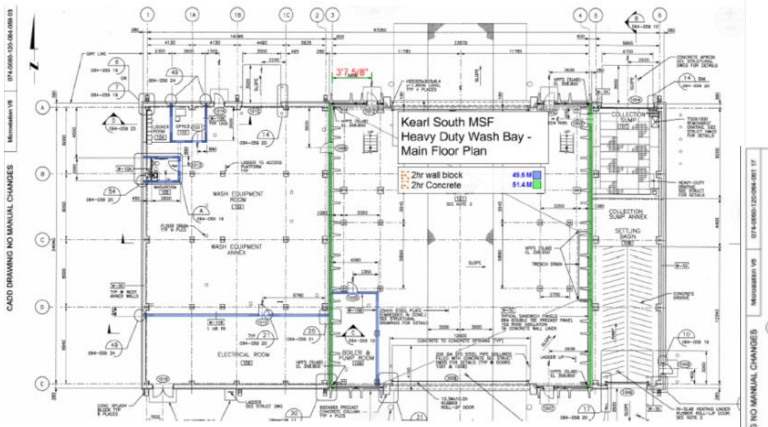
- **701.6 Owner's responsibility. The owner shall maintain an inventory of all required *fire-resistance-rated and smoke resistant*** construction, and the construction included in Sections 703 through 707 and such construction shall be visually inspected by the *owner annually and properly repaired, restored or replaced where damaged, altered, breached or penetrated.*

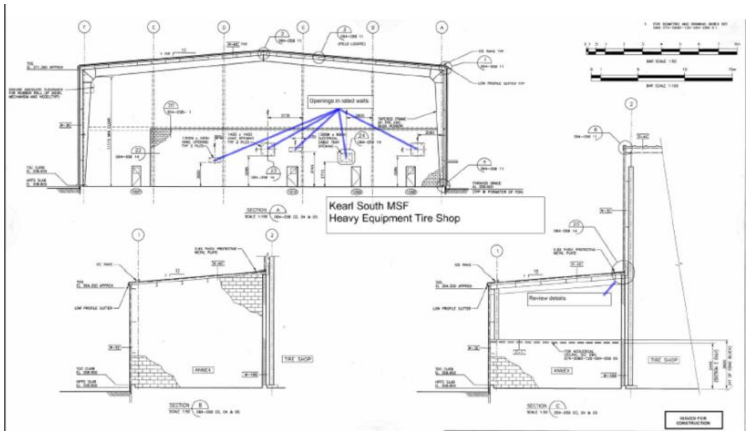
[IFC 2018]

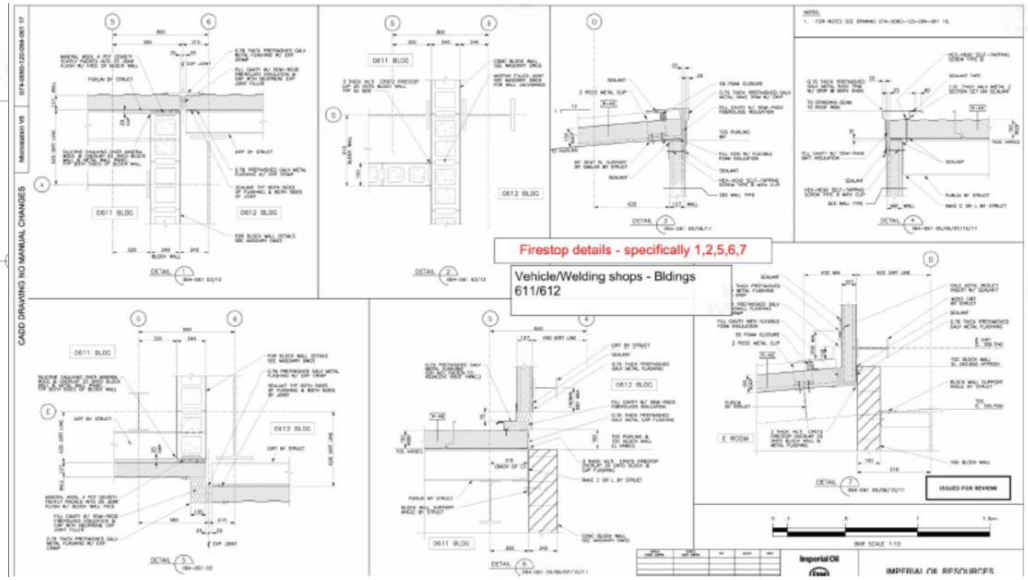
Fire-Resistance & Barrier Management Systems Policy Topics

- **Inventory – What's That?**
  - **Life Safety Drawings**
  - Designs, Systems and Assemblies - **Listings**
  - **Manufacturers Installation and Maintenance Instructions**
  - Paper & Files
  - Spreadsheets
  - Software

Firestopping & Compartmentation for Safety







S-Specs

- **Division 1 - General Requirements for "Operations & Maintenance"**
  - **Repair, Rehabilitation, Replacement, Restoration**
  - **Refer over to Sections in Div. 02-49**
  - **COORDINATE with Sections in Related Divisions**
  - **Fire-Resistance Divisions**

S-Specs

- **Reference 01-78-00 Closeout Submittals**
  - **O&M Manuals**
  - **Project Record Documents**
  - **General Requirements**
  - **BACK TO INDIVIDUAL SECTIONS….**
- **Why Not 01-90-00?**
  - **Commissioning not for all Fire-Resistance**

2018 International Fire Code (IFC) Means D-1 Specs, Fire-Resistance

- **IFC 701 – "Annual Visual Inspection, Repair, Replace, where breached, penetrated, damaged"….**
- **IFC 702 – Structural Elements, Components, Assy's.**
  - **Walls –**
    - **09-21-00 – Plaster and Gypsum Board Assemblies**
      - **GA225 – Patching Fire-Resistance Gypsum Board**
      - **Patch to original assembly.**
    - **04-20-00 – Unit Masonry…**
      - **Patch to original assembly**
  - **Horizontal Assy's**
    - **03-00-00 – Concrete**
      - **Patch to original assembly**
    - **06-00-00 – Wood**
      - **??**
  - **Structural SFRM/IFRM – 07-81-00**
    - **Patch to Manufacturers Installation Instructions & Listings**

2018 International Fire Code Means D1 Specs, Fire-Resistance

- **IFC 703–Penetrations & 704 Joints, Voids- 07-84-00**
  - **Annual Patch to Listing, Manufacturers Instructions**
- **IFC 705 – NFPA 80 - Door and Window Openings**
  - **Doors and Frames - 08-10-00**
  - **Hardware – 08-70-00**
  - **Glazing – 08-80-00**
- **IFC 706–Duct and Air Transfer Openings–23-30-00**
  - **NFPA 80**
  - **Fire Dampers – 23-33-13.16**
  - **Smoke Dampers – 23-33-13.39**

Greenheck Image

Door Safety, LLC Image

Built Right = Maintain Right Starts with SPECS

- **Reference 01-78-00 Closeout Submittals**
  - **01 78 13 Completion and Correction List**
  - **01 78 19 Maintenance Contracts**
    - **Annual Survey (Visual Inspection)??**
  - **01 78 23 Operation and Maintenance Data**
    - **Manufacturers Instructions & Listings**
  - **01 78 23.13 Operation Data**
  - **01 78 23.16 Maintenance Data**
    - **Doors – How many cycles before replacement? (08-01-10)**
    - **Dampers – When to replace?**
    - **Firestop Systems?**
    - **Patching requirements for Fire-Resistance-Rated Assemblies?**
  - **01 78 23.19 Preventative Maintenance Instructions**

Firestop Southwest Photo

Built Right = Maintain Right WHEN SPECIFIED

- **Reference 01-70-00 Closeout Submittals**
  - **01 78 29 Final Site Survey**
  - **01 78 33 Bonds**
  - **01 78 36 Warranties**
  - **01 78 39 Project Record Documents (INVENTORY)**
  - **01 78 43 Spare Parts**
  - **01 78 46 Extra Stock Materials**
  - **01 78 53 Sustainable Design Closeout Documentation**

M–Barrier Management Systems

- **Why Manage Barriers & Structural Elements?**
  - **International Fire Code**
  - **International Property Maintenance Code**
  - **NFPA 101**
  - **NFPA 1**
- **It makes Fire and Life Safety Sense**

M–Barrier Management Systems Policy Topics

- **Advise Clients – Create a Budget to Meet Code Requirements**
- **Inventory – What Info?**
- **Implement Fire Resistance Management**
  - **In House (Rules)**
  - **Outside Contractor (Rules)**
- **Monitor Process**

“TOTAL FIRE PROTECTION” & IBC’s Ch. 7 - Fire Resistance

- Structural Fire Resistance
  - Beams, Columns, Assemblies
- 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 – Ingress/Egress

IBC's Chapter 7 - Fire-Resistance "Fire and Smoke Protection Features"

Bill McHugh, FCIA Executive Director

bill@fcia.org – 708-202-1108

Today's Slides @ www.FCIA.org