

# Fire Codes, Specs, & Existing Building Requirements

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CREATIVE TECHNOLOGY INC.  
FIRE PROTECTION  
CONSULTING AND TRAINING



# Outline

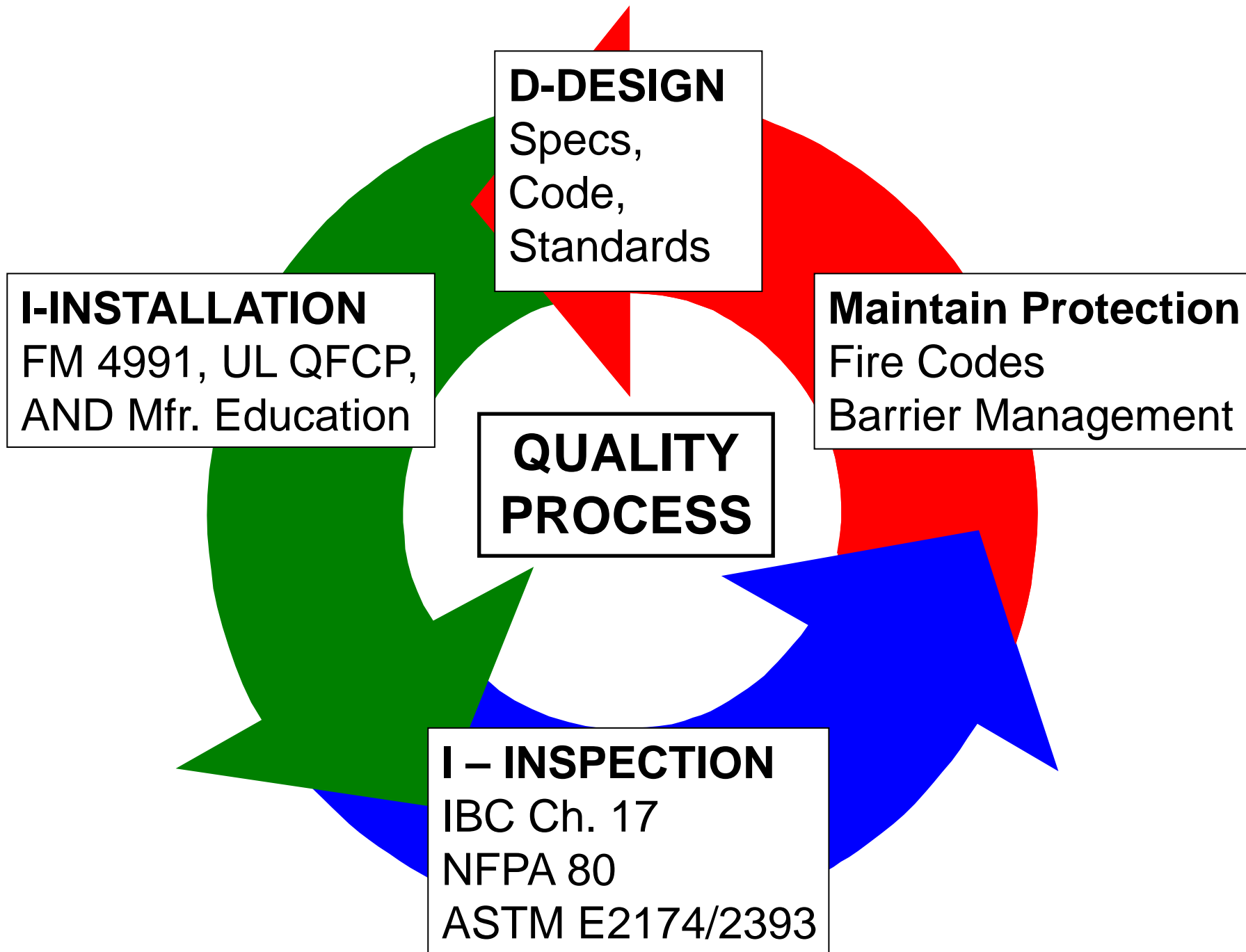
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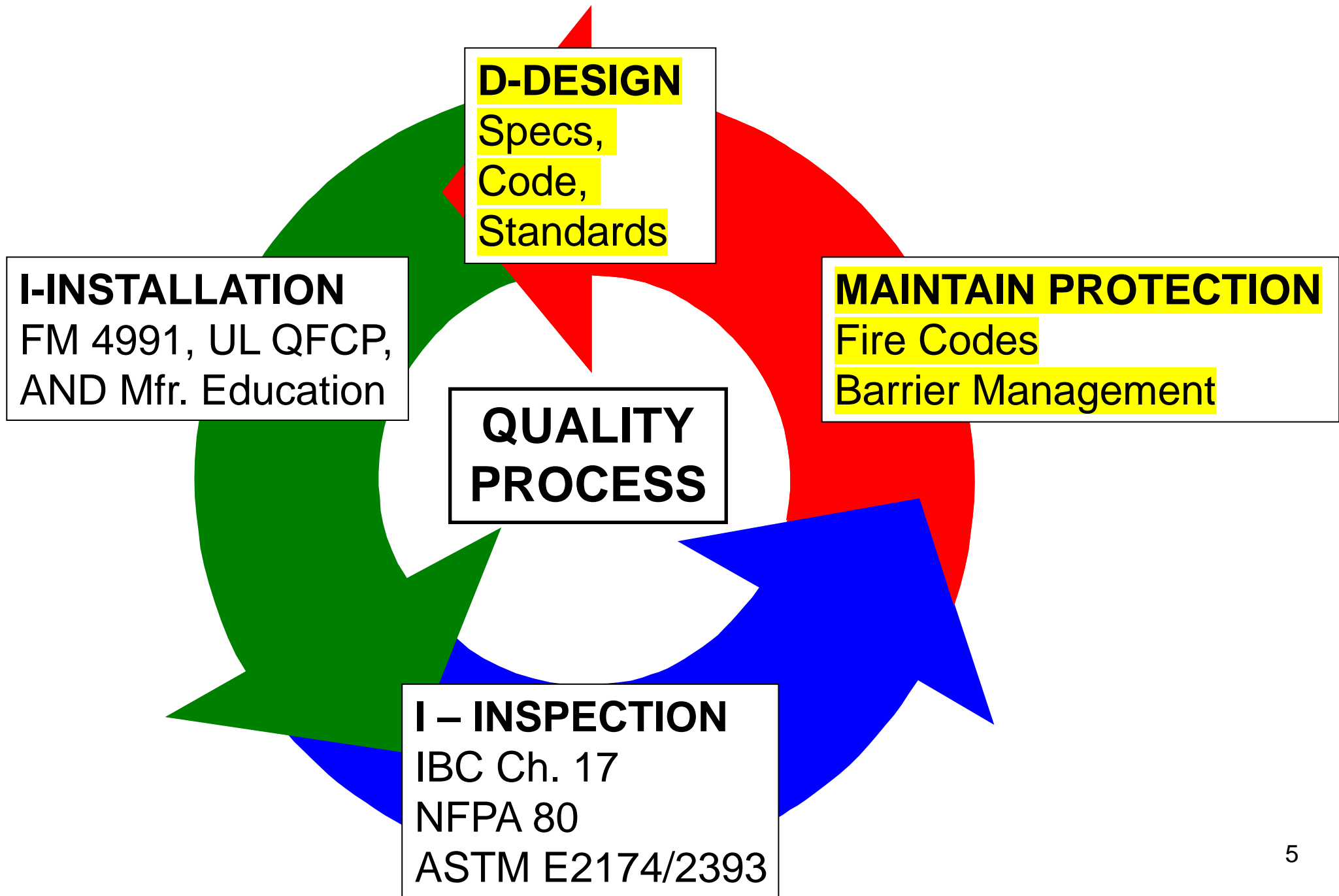
- FCIA – DIIM – Firestopping
  - Design – Specs, Codes, Testing, Products
  - Installation –
    - FM 4991, UL/ULC Qualified Firestop Contractor Programs
  - Inspection –
    - ASTM E2174 / E2393 Inspection Standards
    - IAS AC 291, Inspector Qualifications
  - Maintenance – Fire Codes; Barrier Management
  - Firestopping for Safety –
    - Repairs??

# “TOTAL FIRE PROTECTION”

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- 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

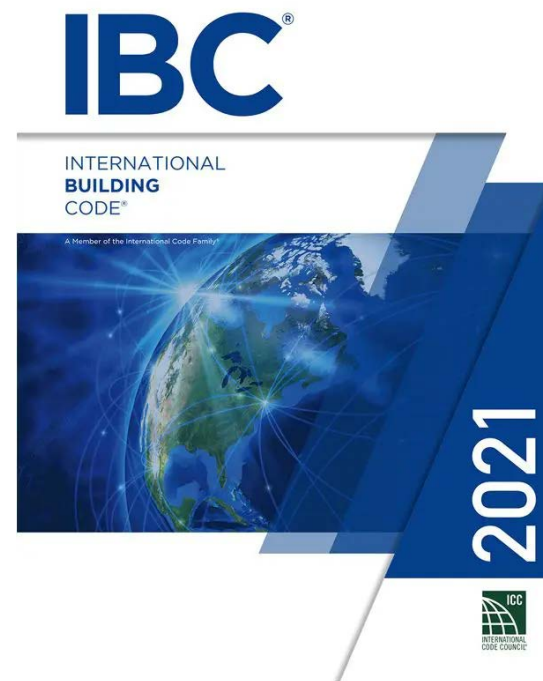




# Existing Buildings? Did you know...

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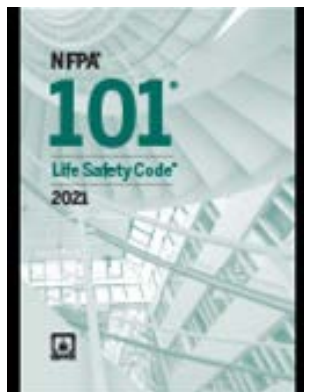
- **Fire, existing building codes have existed for decades**
- Fire Codes dictate maintaining protection of structural fire-protection and fire-resistance-rated compartmentation



# Existing Buildings? Educate

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- NFPA 1, NFPA 101, IFC – Decades in place.
- **New IFC “maintaining protection” requirements**
  - Inventory of fire-resistance-rated assemblies?
- **What’s inventory?**
  - Life Safety Drawings with Fire-Resistance Ratings
  - Tested and Listed Systems Designs
  - Manufacturers Instructions/Product Data Sheets
- **What’s risk –**
  - Fire and Smoke Spread means life, property, continuity of operations losses



# Where is Firestopping & Fire-Resistance Needed Most to Protect??

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- Hospitals, nursing homes
- Apartments, Condos
- Universities
- Warehousing
- Manufacturing – Paper, others
- More .....



# Fire Resistance Barrier SYSTEMS

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- **Products Become Systems Through....**
- **Test Standard References**
  - **Structural Elements & Assemblies** – ASTM E119, UL 263
  - **Fire & Smoke Barriers** – ASTM E119, UL 263
  - **Firestopping** – ASTM E814 / UL 1479, ULC-S115, UL 2079, ASTM E1966, E2307, E2837, E3037, ...test method...”
  - **Fire/Smoke Dampers** – UL 555, UL 555S, UL 555C
  - **Swinging/Rolling Fire Doors** – UL 10B, 10C, NFPA 257
  - **Fire Rated Glazing** – UL 9, NFPA 252
- **SYSTEM Testing = Suitability statement for use of a product in a specific system/design application**

# Firestopping / Barrier Management for Safety “DIIM”

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- Properly **Designed** and Specified Firestopping
  - FCIA – 07-84-00 - Specification
- **Tested and Listed Systems** – ASTM E814 / UL 1479, ASTM E1966 / UL 2079, FM 4990, ULC-S115, ASTM E2837, E2307, E3037, more
- Professional **Installation** – FCIA Member, FM 4991 Approved, UL/ULC Qualified Contractors
- Properly **Inspected** – ASTM E2174 / 2393 Processed by IAS AC 291 Accredited Inspection Agencies, Inspectors w/FM, UL, ULC,IFC Exam Success
- **Maintained & Managed** – Annually – FCIA Members – NFPA 1, 101, International Fire Code

# Building & Fire Code Requirements

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- International Codes –
  - New and Existing Buildings – International Building Code – Chapter 7
  - **International Fire Code – Chapter 7**
- NFPA 5000 / 101 – Chapter 8
- National Building Code of Canada
- UAE Fire and Life Safety Code
- **Many other Country Codes...**
- ***Minimum Requirements – Construction & Maintenance***

# Fire Resistance

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**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]

# Building & Fire Code Requirements

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- Fire-Resistance Rated Barriers – Defined Terms
  - *Exterior Walls*
  - *Fire Walls*
  - *Fire Barriers*
  - *Fire Partitions (Not NFPA)*
  - *Smoke Barriers*
  - *Smoke Partitions*
  - *Archaic Assemblies*

# Existing Buildings

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- **Archaic Assemblies**
  - **Clay Tile Block**
  - **Gypsum Block**
  - **Plaster**
  - **Clay Tile/Concrete**
  - **Unidentified Assemblies**
- **Tested ... Calculated ... Prescriptive**

# Smoke Barriers & Firestopping

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- Smoke Barriers differ from Smoke Partitions?
  - **Smoke Barrier** –
    - **IBC** – Hourly Rated, Quantified Firestop “L” Rating
      - < 5cfm/sf (IBC 2006)
      - < 50 cfm, 100 sf of Wall Area (IBC 2009)
    - **NFPA** – ... ‘restricting the passage of smoke’...
      - Hourly Rated, Quantified Firestop L Rating Chapter 8
      - NO quantified “L” Rating ... Healthcare Chapter
      - Continuous, Barrier to Barrier, ... through concealed spaces
      - Not always fire-resistance-rated
  - **Smoke Partition** –
    - **IBC** – Continuous barrier, not fire rated... ‘retard’
    - **NFPA** – Continuous membrane that is designed to form a barrier to *limit the transfer of smoke*....

# Fire Resistance Barrier SYSTEMS

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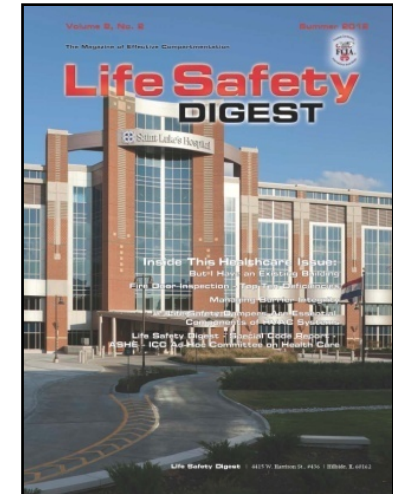
- **Products Become Systems Through....**
- **Test Standard References**
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- **SYSTEM Testing = Suitability statement for use of a product in a specific system/design application**



# M-Barrier Management Systems Starts @ NEW CONSTRUCTION

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- **NEW Buildings – 07-84-00 Specs**
  - [www.FCIA.org](http://www.FCIA.org)
- **Part I – Focus on**
  - **Systems (See previous Slide)**
  - **Not Products**
  - **Manufacturers**
- **“Single Manufacturer to the greatest extent possible” – EJ’s**



# M–Barrier Management Systems Starts with CONSTRUCTION

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- **NEW Buildings – 07-84-00 Specs**
  - **www. FCIA .org**
- **Part II– Contractor [Installer] Qualifications**
  - **FCIA Member in Good Standing, AND**
  - **FM 4991, Standard for the Approval of Firestop Contractors, OR**
  - **UL Qualified Firestop Contractor Program**
    - **AND**
  - **Manufacturer Accredited, Approved, Trained**

# M–Barrier Management Systems Starts with CONSTRUCTION

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- **NEW Buildings – 07-84-00 Specs**
  - **www. FCIA .org**
- **Part II – Qualifications – Special Inspection**
  - **AHJ Approves SIA/SI**
  - **Special Inspection Agency (SIA)**
    - **IAS AC 291 Accredited Special Inspection Agencies**
  - **Special Inspector Qualifications (SI)**
    - **FM Firestop Exam**
    - **UL Firestop Exam**
      - **AND**
    - **IFC Exam**

# M-Barrier Management Systems Starts with CONSTRUCTION

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- **NEW Buildings – 07-84-00 Specs**
- **Part III – Execution**
  - **Special Inspection – SPECIFY TO COMPLY**
    - **ASTM E2174 - Penetrations**
    - **ASTM E2393 - Joints**

# Built Right = Maintain Right WHEN SPECIFIED

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

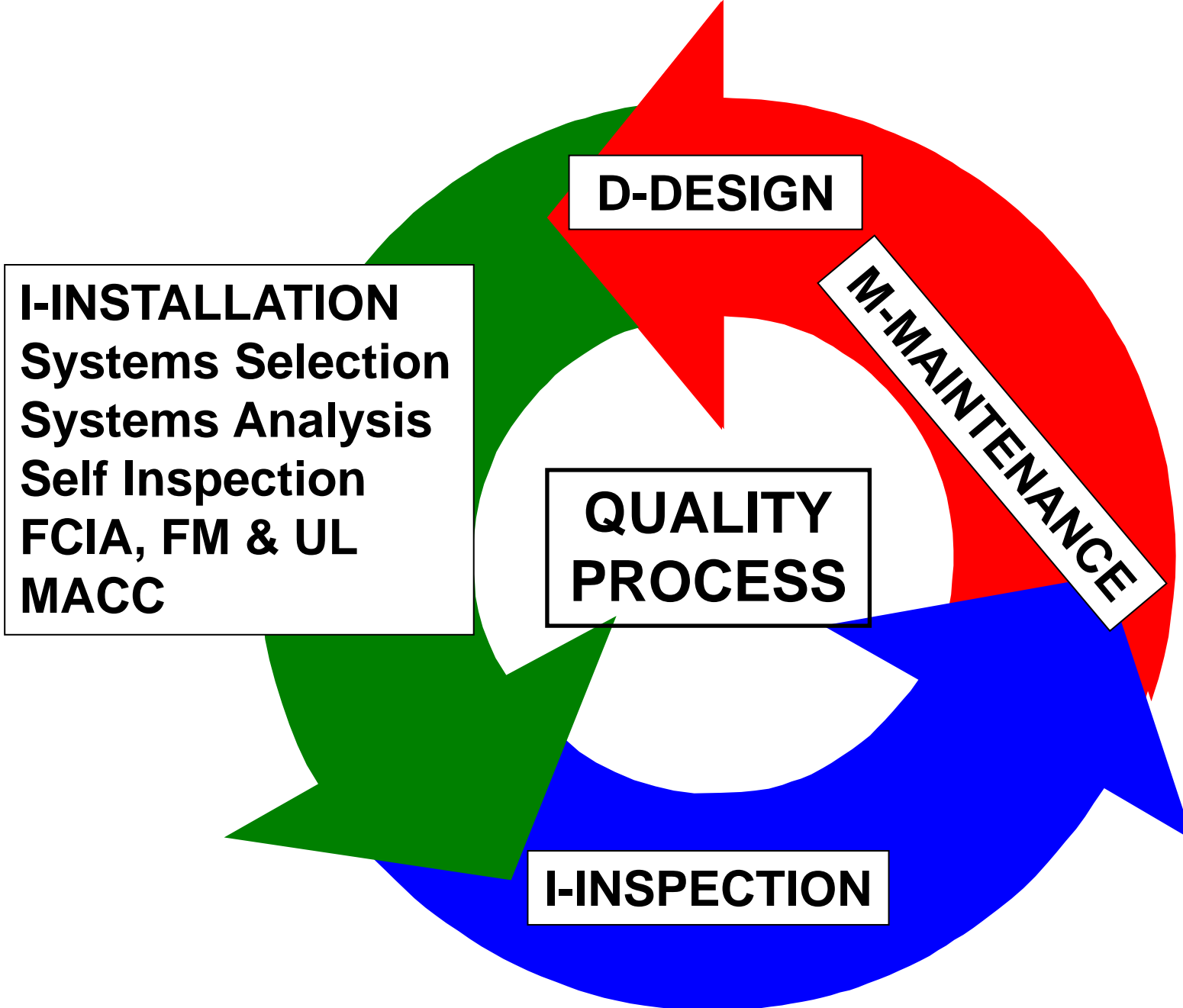
# Firestop Repairs

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- Repairs
  - Instruction requirements by manufacturer
  - Listed systems
  - Patching
    - Systems.....
    - Adhesion
    - Movement
    - T, L, W Ratings
    - ***As recommended by MFR***

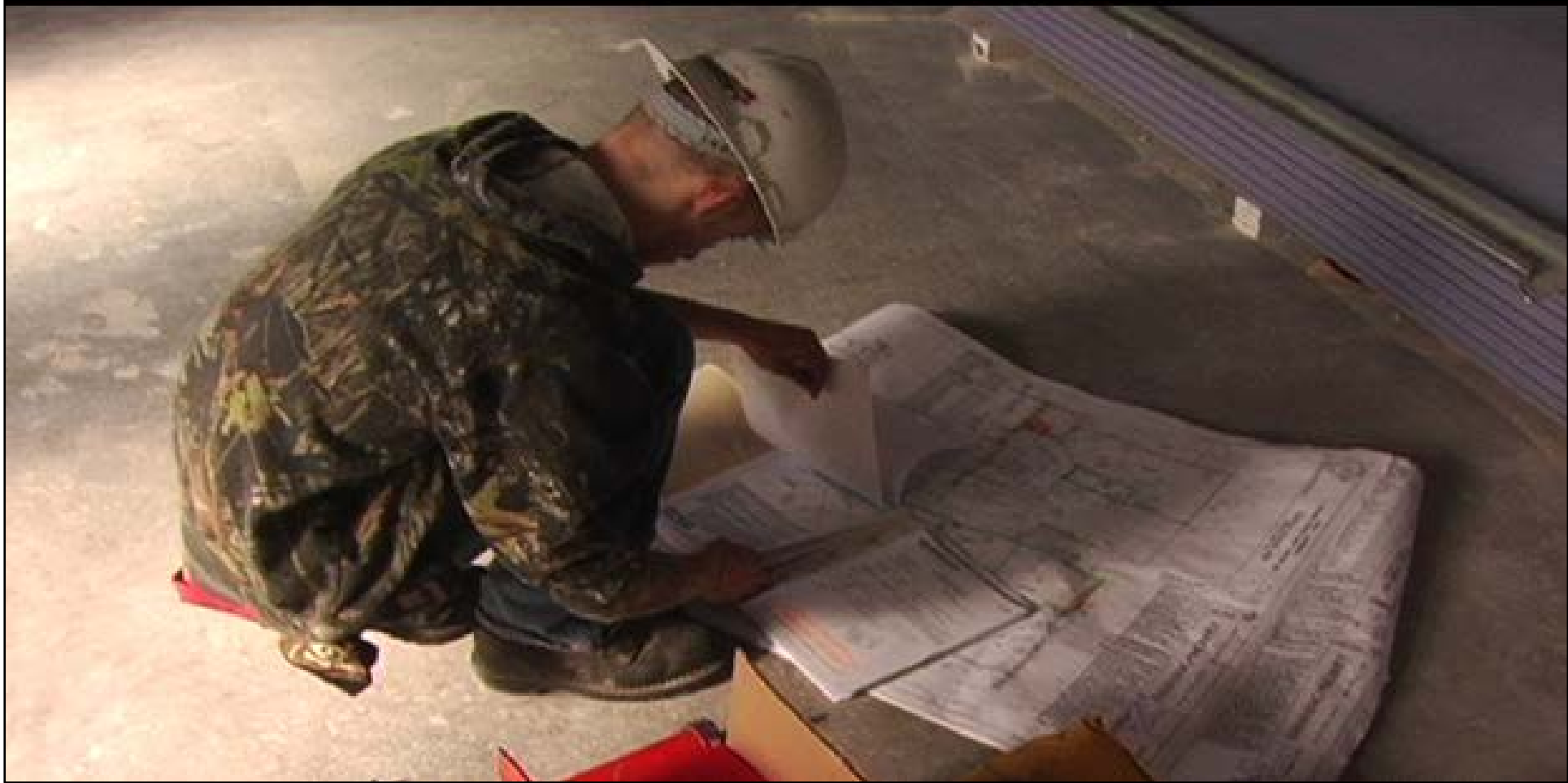


Affinity Firestop Photo



# Firestopping for Continuity I – Listed Systems

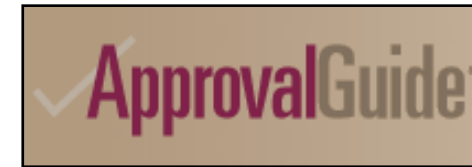
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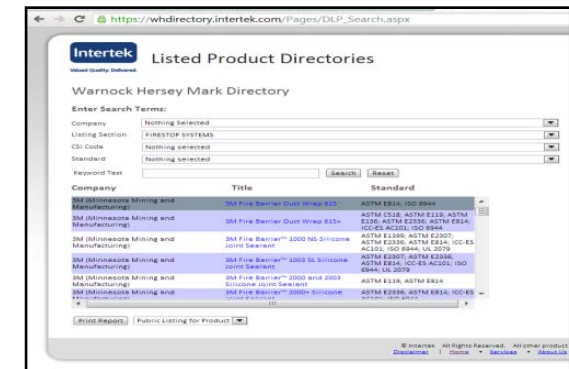


# Firestopping for Continuity Products Become Systems

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



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



# How do Contractors Select/Analyze Systems & Inspection Agencies Analyze?

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- 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***



STI Graphic

# Engineering Judgments/EFRRA

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



J. Sharp – ProFirestop Photo



C. Zussman – Pepper Photo

# Engineering Judgments/EFRRA

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- **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*
- *Inspection Agency?*

# Firestop Contractor Qualifications

## FM & UL/ULC – 4 Components

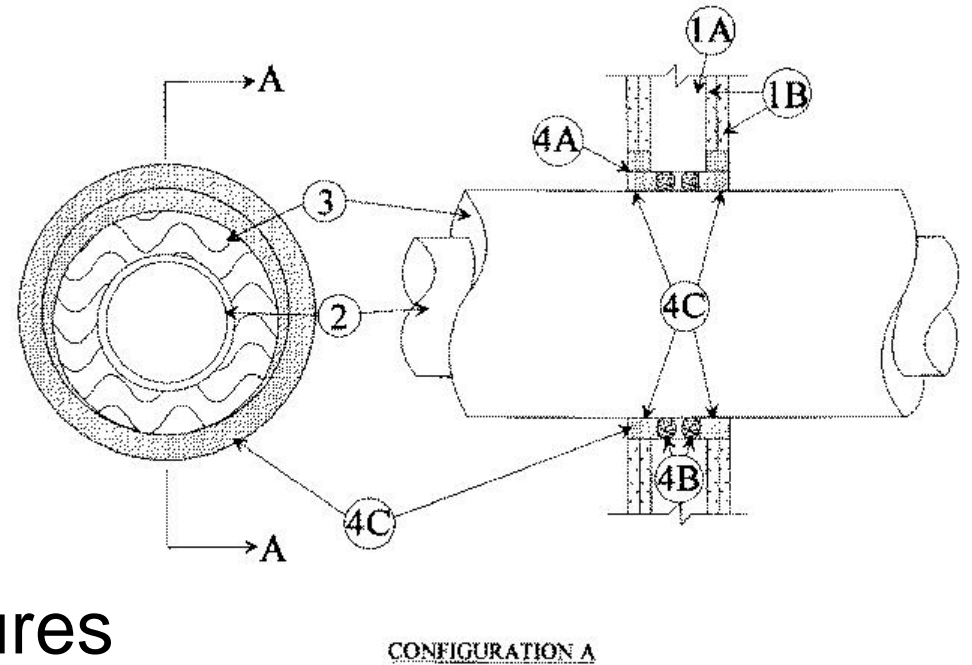
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1. Office Facility Quality Management System Audit
2. Field – Jobsite Audit
3. Employ a person
  - UL/FM Firestop Exam @ 80% or better
  - DRI if employed by Approved/Qualified Firm
    - ***Designated Responsible Individual (DRI)***
4. Annual Audit



# 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



# Master Audit Certificate of Compliance Program

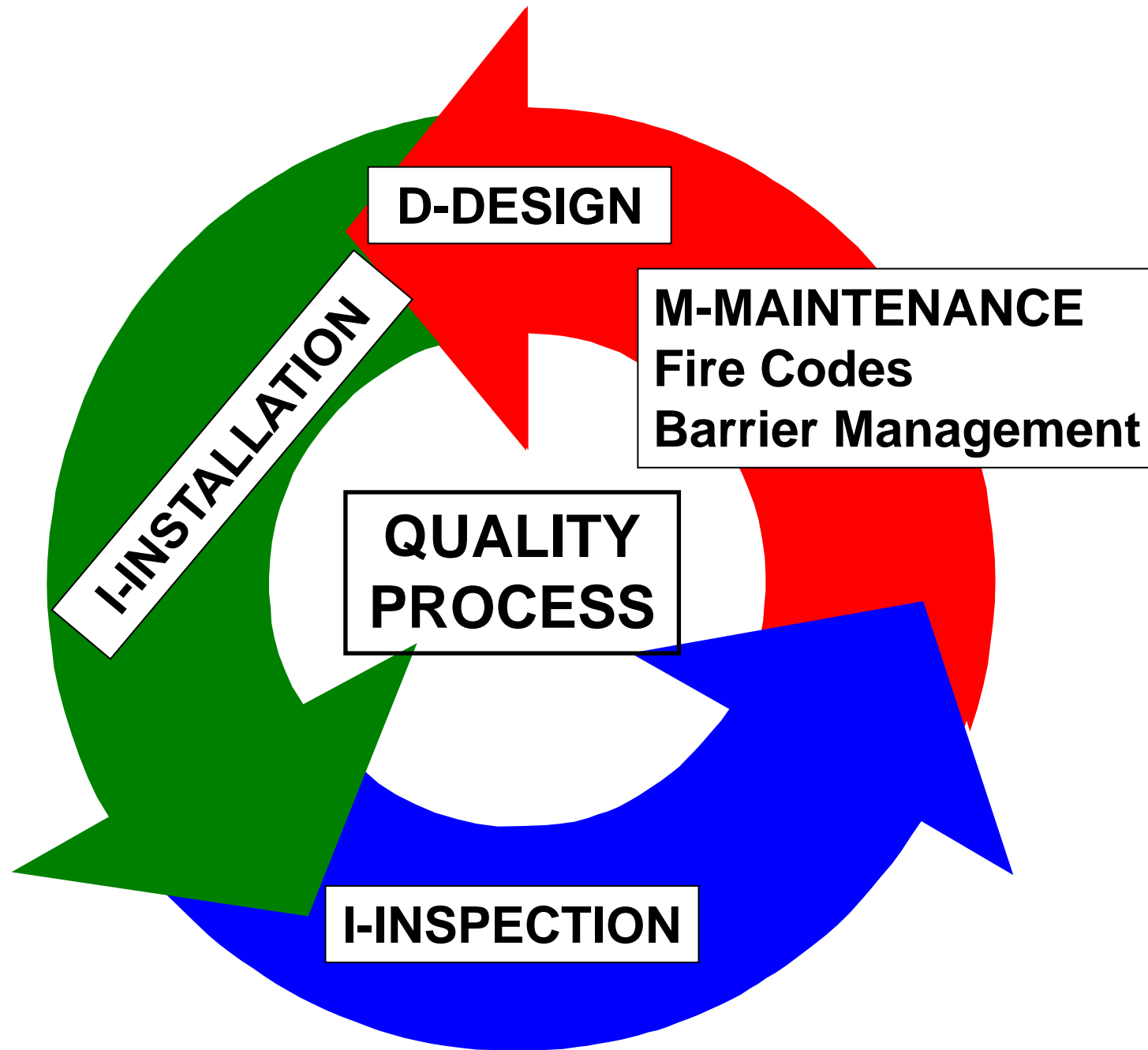
A **Jobsite Specific Management System Audit** – Our audit provides verified processes were followed to properly installed firestop systems.

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.

UL Slide



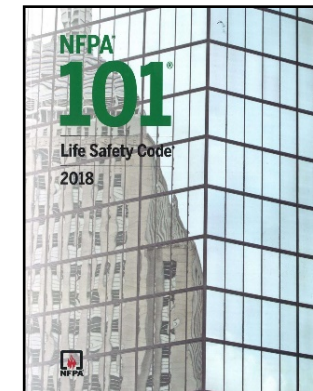
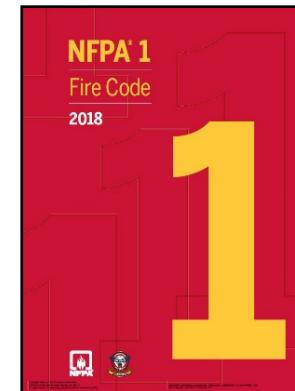
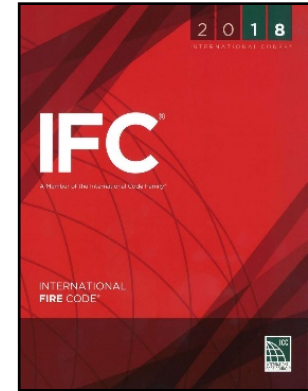




# Fire Codes Require Maintenance

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- NFPA 101
- NFPA 1
- International Fire Code
  - Minimum Requirements Stated
  - Frequency
  - **What really happens?**



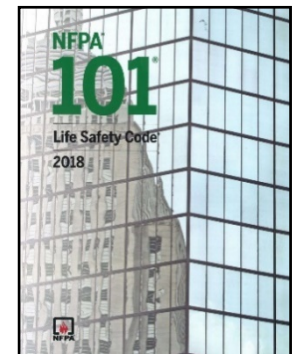
# National Fire Protection Association

## NFPA 101 – 2018

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- **SECTION 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 or requirements developed as part of a performance-based design, or as directed by the AHJ.

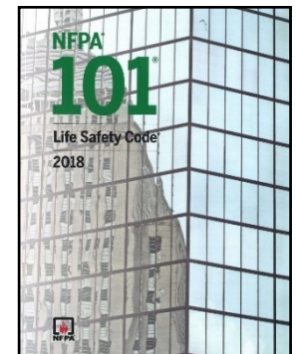


# National Fire Protection Association

## NFPA 101 – 2018

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- 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.**
- 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.
- 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

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- **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

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- **12.3.2\*** **Quality Assurance for Penetrations and Joints.** In **new buildings** three stories or greater in height, a **quality assurance program** for the installation of devices and systems installed to protect penetration and joints shall be prepared and monitored by the **RDP** responsible for design. Inspections of firestop systems and fire-resistive joint systems shall be in accordance with 12.3.2.1 and 12.3.2.2.



# National Fire Protection Association

## NFPA 1 – 2018

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- 12.3.2.1 ... Penetrations ... shall be inspected in accordance with **ASTM E2174 ...**
- 12.3.2.2 ... Joint systems ... shall be inspected in accordance with **ASTM E2393 ...**
- FCIA INTIATIVE WITH KOFFEL ASSOC....**



# National Fire Protection Association

## NFPA 1 – 2018

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- **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

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- 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

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- 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.



# 2009 International Fire Code Maintenance

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## SECTION 703

### FIRE-RESISTANCE-RATED CONSTRUCTION

- **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. ...

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. ...



# 2018 International Fire Code Maintenance

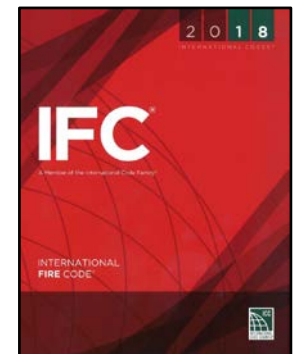
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## SECTION 701

### GENERAL

- **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 *IBC*.

[IFC 2018, 701.1]



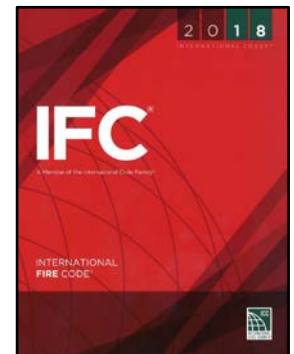
# 2018 International Fire Code Maintenance

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## SECTION 701

### GENERAL

- **701.2 Fire-resistance-rated construction.** The *fire-resistance rating* of the following *fire-resistance-rated* construction shall be maintained:
  1. Structural members
  2. *Exterior walls*
  3. *Fire walls, fire barriers, fire partitions*
  4. *Horizontal assemblies*
  5. Shaft enclosures[IFC 2018, 701.2]



# 2018 International Fire Code Maintenance

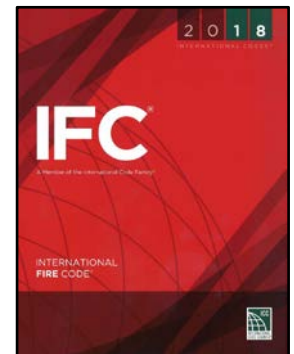
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## SECTION 701

### GENERAL

- **701.3 Smoke barriers.** The *fire-resistance rating* and smoke-resistant characteristics of smoke barriers shall be maintained.
- **701.4 Smoke partitions.** The smoke-resistant characteristics of smoke partitions shall be maintained.

[IFC 2018, 701.3, 4]



# 2018 International Fire Code Maintenance

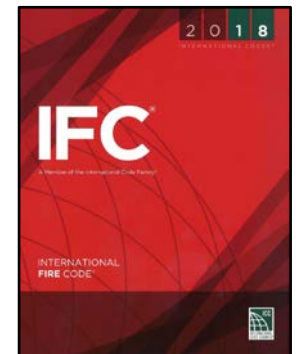
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## SECTION 701

### GENERAL

- **701.5 Maintaining protection.** Materials, systems and devices used to repair or protect breaches and openings in **fire-resistance-rated construction** and construction installed to resist the passage of **smoke** shall **be maintained** in accordance with Sections 703 through 707.

[IFC 2018, 701.5]



# 2018 International Fire Code Maintenance

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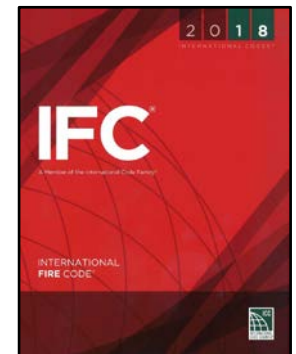
## SECTION 701

### GENERAL

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

- **FCIA Initiative with Koffel Assoc. – 'Inventory'...**

[IFC 2018, 701.6]



# 2018 International Fire Code Maintenance

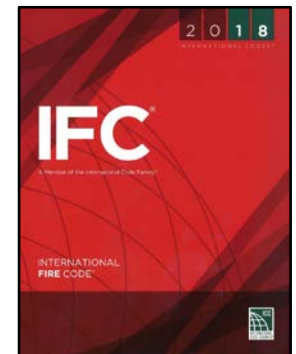
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## SECTION 701

### GENERAL

- **701.6 Owner's responsibility Cont. 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, 701.6]





# 2018 International Fire Code Maintenance

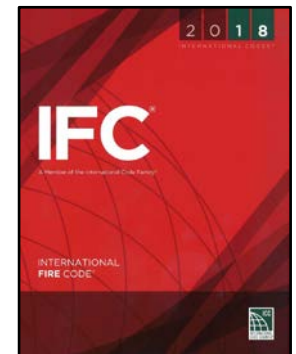
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## SECTION 701

### GENERAL

- **701.7 Unsafe Conditions.** Where **any components in this chapter are not maintained and do not function as intended** or do not have the *fire-resistance* or the resistance to the passage of smoke required by the code under which building was constructed, remodeled or altered, **such component(s) or portions thereof shall be deemed an unsafe condition in accordance with Section 111.1.1.**

[IFC 2018, 701.7]



# 2018 International Fire Code Maintenance

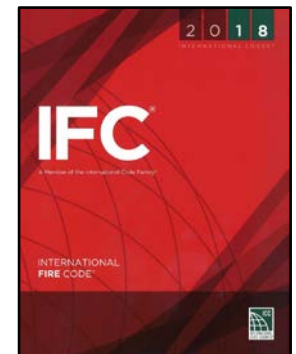
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## SECTION 701

### GENERAL

- **701.7 Unsafe Conditions Cont.** Components or portions thereof determined to be unsafe shall be repaired or replaced to conform to the code under which building was constructed, remodeled or altered, as deemed appropriate by the *fire code official*. Where the condition of components is such that any building, structure or portion thereof presents an imminent danger to the occupants of the building, structure or portion thereof, the *fire code official* shall act in accordance with Section 111.2.

[IFC 2018, 701.7]

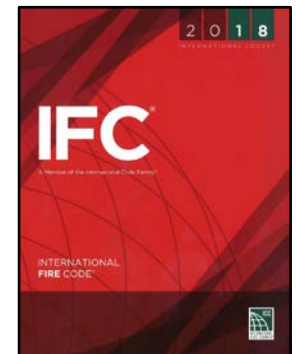


# 2018 International Fire Code Maintenance

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## SECTION 703 PENETRATIONS

- **703.1 Maintaining protection.** Materials and firestop systems used to protect membrane and through penetrations in *fire-resistance-rated* construction and construction installed to resist the passage of smoke shall be maintained.
- [IFC 2018, 703.1]



# 2018 International Fire Code Maintenance

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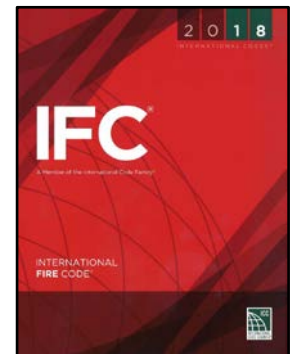
## SECTION 703 PENETRATIONS

- **703.1 Maintaining protection cont.** The materials and firestop systems shall be **securely attached** to or bonded to the construction being penetrated **with no openings visible** through or into the cavity of the construction. **Where the system design number is known, the system shall be inspected to the listing criteria and manufacturer's installation instructions.**

- **FCIA Initiative...** "Where the system design number is known" ...

[IFC 2018, 703.1]

FCIA Added Emphasis



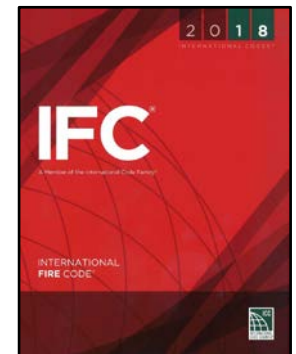
# 2018 International Fire Code Maintenance

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## SECTION 704

### JOINTS AND VOIDS

- **704.1 Maintaining protection.** Where required when the building was originally constructed, materials and systems used to protect joints and voids in the following locations shall be maintained. The materials and systems shall be securely attached to or bonded to the adjacent construction, without openings visible through the construction.
- [IFC 2018, 704.1]



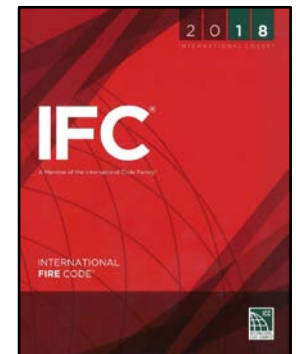
# 2018 International Fire Code Maintenance

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## SECTION 704 JOINTS AND VOIDS

- **704.1 Maintaining protection cont.**
  - Subparagraphs 1 through 7 detail the types of joints and voids required to be maintained. This list corresponds to joints and voids which are required to be protected by the 2018 IBC.
- **Unprotected joints and voids do not need to be protected where such joints and voids were not required to be protected when the building was originally constructed.**

[IFC 2018, 704.1]



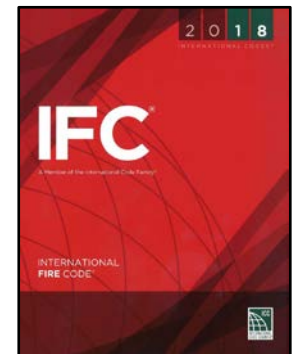
# 2018 International Fire Code Maintenance

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## SECTION 705

### DOOR AND WINDOW OPENINGS

- **705.1 Maintaining protection.** Where required when the building was originally constructed, opening protectives installed in *fire-resistance-rated* assemblies, *smoke barriers* and *smoke partitions* shall be inspected and maintained in accordance with this section.
  
- [IFC 2018, 705.1]



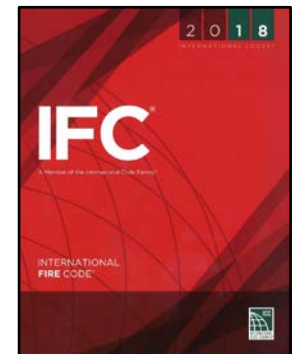
# 2018 International Fire Code Maintenance

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## SECTION 705

### DOOR AND WINDOW OPENINGS

- **705.2 Inspection and maintenance.** *Opening protectives* in *fire-resistance-rated* assemblies shall be inspected and maintained in accordance with NFPA 80. *Opening protectives* in *smoke barriers* shall be inspected and maintained in accordance with NFPA 80 and NFPA 105. *Openings* in *smoke partitions* shall be inspected and maintained in accordance with NFPA 105.
- [IFC 2018, 705.2]





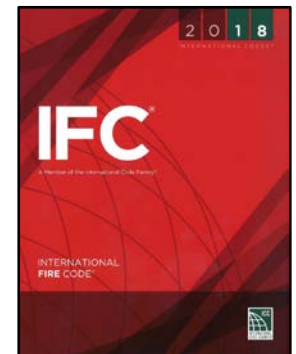
# 2018 International Fire Code Maintenance

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## SECTION 705

### DOOR AND WINDOW OPENINGS

- **705.2 Inspection and maintenance cont.** **Fire doors and smoke and draft control doors shall not be blocked**, obstructed, or otherwise made inoperable. Fusible links shall be replaced promptly whenever fused or damaged. **Opening protectives and smoke and draft control doors shall not be modified.**
- [IFC 2018, 705.2]



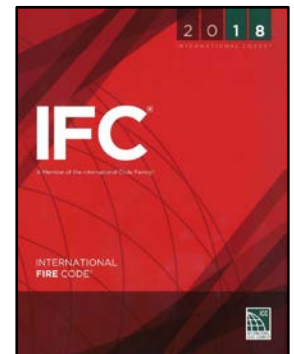
# 2018 International Fire Code Maintenance

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## SECTION 705

### DOOR AND WINDOW OPENINGS

- **705.2.1 Labeling requirements.** Where approved by the *fire code official*, the application of field-applied labels associated with the maintenance of *opening protectives* shall follow the requirements of the *approved* third-party certification organization accredited for *listing* the opening protective.
- [IFC 2018, 705.2.1]



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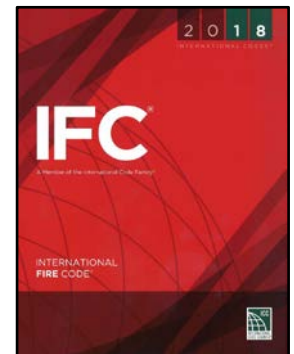
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## SECTION 705

### DOOR AND WINDOW OPENINGS

- **705.2.2 Signs.** Where required by the *fire code official*, a sign shall be permanently displayed on or near each *fire door* in letters not less than 1 inch (25 mm) high to read as follows:
  1. For doors designed to be kept normally open: FIRE DOOR—DO NOT BLOCK.
  2. For doors designed to be kept normally closed: FIRE DOOR—KEEP CLOSED.

[IFC 2018, 705.2.2]



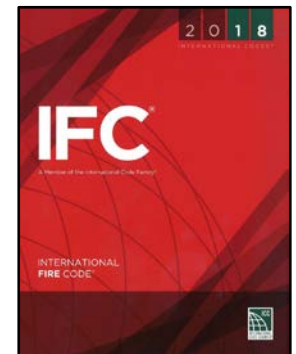
# 2018 International Fire Code Maintenance

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## SECTION 705

### DOOR AND WINDOW OPENINGS

- **705.2.3 Hold-open devices and closers.** Hold-open devices and automatic door closers, where provided, shall be maintained. During the period that such device is out of service for repairs, the door it operates shall remain in the closed position.
- [IFC 2018, 705.2.3]



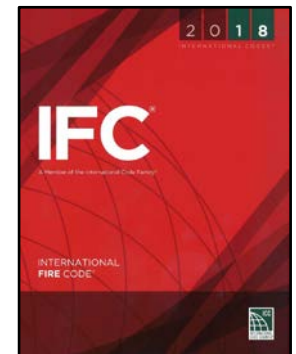
# 2018 International Fire Code Maintenance

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## SECTION 705

### DOOR AND WINDOW OPENINGS

- **705.2.4 Door operation.** *Swinging fire doors shall close from the full-open position and latch automatically.*
- **705.2.5 Smoke- and heat-activated doors.** *Smoke-activated doors shall be maintained to self-close or automatically close upon detection of smoke.* Existing fusible-link type automatic door-closing devices are permitted if the fusible link rating does not exceed 135°F (57°C).
- [IFC 2018, 705.2.4,5]



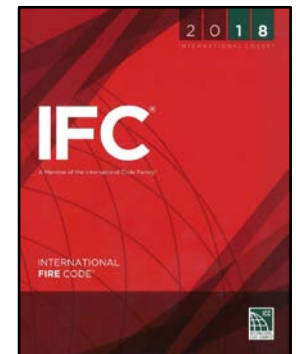
# 2018 International Fire Code Maintenance

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## SECTION 705

### DOOR AND WINDOW OPENINGS

- **705.2.6 Testing.** Horizontal and vertical sliding and rolling *fire doors* shall be inspected and tested annually to confirm proper operation and full closure. Records of inspections and testing shall be maintained.
- [IFC 2018, 705.2.6]



# 2018 International Fire Code Maintenance

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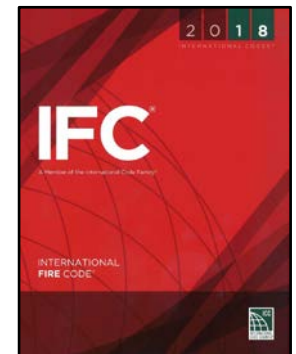
## SECTION 706

### DUCT AND AIR TRANSFER OPENINGS

- **706.1 Maintaining protection.** **Dampers** protecting ducts and air transfer openings **shall be inspected and maintained in accordance with NFPA 80 and NFPA 105.** Other products or materials used to protect the openings for ducts and air transfer openings shall be securely attached to or bonded to the construction containing the duct or air transfer opening, without visible openings through or into the cavity of the construction.

**Any damaged products or materials protecting duct and air transfer openings shall be repaired, restored or replaced.**

[IFC 2018, 706.1]



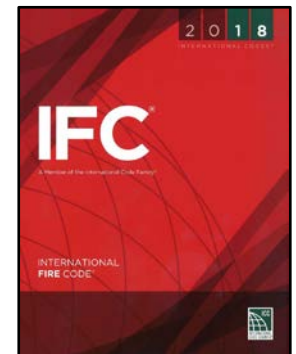
# 2018 International Fire Code Maintenance

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## SECTION 706

### DUCT AND AIR TRANSFER OPENINGS

- **706.2 Unprotected openings.** Unprotected duct and air transfer openings in *fire-resistance-rated* construction and construction installed to resist the passage of smoke shall be protected so as to comply with requirements that were in effect when the building was constructed.
- [IFC 2018, 706.2]



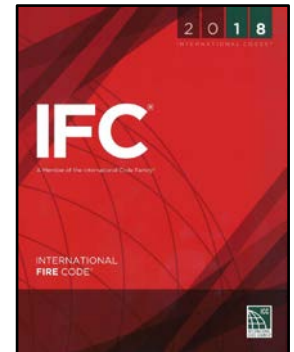


# 2018 International Fire Code Maintenance

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## SECTION 707 CONCEALED SPACES

- **707.1 Fireblocking and draftstopping.** *Required fireblocking and draftstopping* in combustible concealed spaces *shall be maintained* to provide continuity and integrity of the construction.
- [IFC 2018, 707.1]

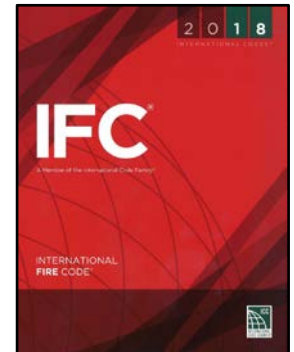


# 2018 International Fire Code

## Owner's Responsibility

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- **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.*
- **FCIA Initiative with Koffel Associates**



# 2018 International Fire Code Fire-Resistance Inventory Explained

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- **Life Safety Drawings**
- Designs, Systems and Assemblies – **Listings**
- **Manufacturers Installation and Maintenance Instructions**
- How?
  - Paper & Files
  - Spreadsheets
  - Software
- **INVENTORY**



Adler Photo

# International Property Maintenance Code

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## 2018 IPMC SECTION 703

- **703.1 Fire-resistance-rated assemblies.** The required fire-resistance rating of fire-resistance-rated walls, firestops, shaft enclosures, partitions and floors shall be maintained.
- **703.2 Opening protectives.** Required opening protectives shall be maintained in an operative condition. Fire and smokestop doors shall be maintained in operable condition. Fire doors and smoke barrier doors shall not be blocked or obstructed or otherwise made inoperable.

# Compartmentation Codes – NBC Smoke Resistance Importance...

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## Compartmentation Codes

### **NBCC - 3.1.8.1.(1)(b) Barrier to Control Smoke Spread.**

Although a fire separation is not always required to have a fire-resistance rating, the **fire separation** should act as a **barrier to the spread of smoke and fire** until some response is initiated.

***NEW:** When choosing products for fire stopping, the physical characteristics of the material used at the joints as well as the nature of the assembly and its potential movement should be taken into consideration.*

**If the fire-resistance rating of a fire separation is waived** on the basis of the presence of an automatic **sprinkler system**, it is intended that the **fire separation will be constructed so that it will remain in place and act as a barrier against the spread of smoke for a period of time** until the sprinklers have actuated and controlled the fire.

- **CAN/UL-S115** Listed Systems –

# National Fire Code of Canada

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## National Fire Code of Canada

- *Division B – Part 2, Building and Occupant Fire Safety*

**2.2.1.2 – Damage to Fire Separations** – Where fire separations are damaged so as to affect their integrity, they shall be repaired so that the integrity of the *fire separation* or *fire resistance rating* of the element of construction is maintained...

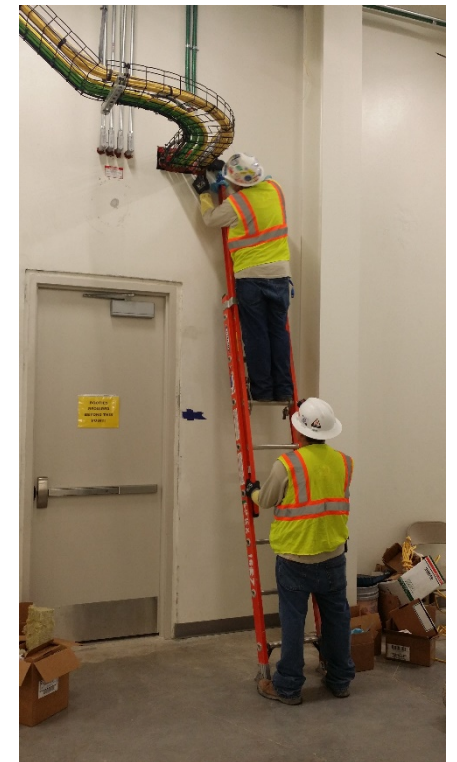
Thanks Andre Laroche!



# M-Barrier Management Systems

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- **Visual Building Survey/Inspection....**
  - **Does it look like the SYSTEM Assembly?**
    - Annular Space
    - Visible Breaches, unless listing allows
    - Joint Width
    - Penetrating Item Types, Coverings
    - # Penetrating Items, Types
    - Penetrations in Joints & Not in System/Listing...
    - Much more...
  - **Competent Personnel, SYSTEMS**



Apex Photo

# How do Contractors Select/Analyze Systems & Inspection Agencies Analyze?

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- 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***



STI Graphic





Apex Photo

C-AJ-5209??



DO NOT REMOVE  
IF THIS SEALING REQUIREMENTS ARE VIOLATED OR IS DAMAGED

Affinity Firestop Photo



Heckler Photo



Heckler Photo



Heckler Photo



Affinity Firestop Photo



Falconer Photo



Heckler Photo



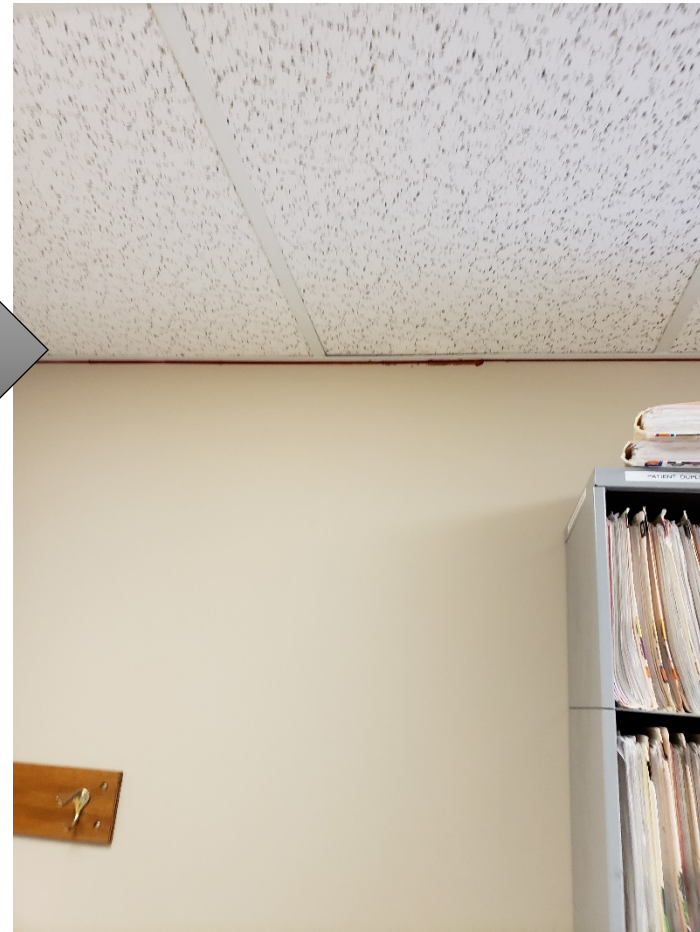
Heckler Photo



J Sharp Photo



Affinity Firestop Photo  
Patches & Tape?  
Really?



Chiangi Photo  
Firestop Grid??

# M–Barrier Management Systems

## Building Owner’s Policy Topics

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- ***WHICH CONDITIONS ARE IN THE BUILDING ?....***
- **Create a Budget to Meet Code Requirements**
- **Inventory – What Info?**
  - Life Safety Drawings
  - Manufacturers Instructions
  - Tested and Listed Systems (Listings)
- **Implement Fire Resistance Management**
  - In House Policy
  - Outside Contractor Policy
- **Monitor Process**
- **Annual Visual Inspection & Keep Records**
- **Show Fire Marshal....Insurance Company**

# M–Barrier Management Systems

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- **Electronic Best Practice Elements**
  - **Action Oriented**
    - Projects - Specifications
    - Ongoing Surveys – FCIA RPPS 2010-1
  - **Action Reminders**
  - **In Process Status**
  - **Record Retrieval**
- **Software Programs**
  - **Contractor Programs**
  - **Custom Programs**

# M-Barrier Management Systems

- Visual Building Survey/Inspection....
- Tested and Listed Systems (Listings)
- Manufacturer's installation instructions



### PRODUCT DATA SHEET

#### SpecSeal<sup>®</sup> SSS Intumescent Sealant

SpecSeal<sup>®</sup> SSS Sealant is a latex based, high solids firestop compound. This material is used to seal penetrations through fire-rated walls, floors and ceilings. It is applied in a single step application against the annulus of the penetrator, fire pipe and/or cable.

SpecSeal<sup>®</sup> SSS Sealant features 100% patented and proprietary low-organic volatile hydrocarbon. When exposed to high temperatures or fire, this material expands aggressively in a highly controlled fashion to quickly close off voids left by the burning or melting of penetrator materials.

SpecSeal<sup>®</sup> SSS Sealant's unique multi-resin formula provides a single component sealant that has excellent caulking properties as well as high load-bearing on wet or cured surfaces. The single component sealant may be pumped, coated, troweled, or bulk loaded, hot-dip, hot-dip, or applied. SpecSeal<sup>®</sup> SSS Sealant does not require POCs or solvents.

SpecSeal<sup>®</sup> SSS Sealant is a storage stable, yellow colored sealant. It is not intended for use in applications where the manufacturer's recommendations and will not degrade nor discolor when used in applications as recommended by the manufacturer.

#### INSTALLATION INSTRUCTIONS

##### Through Penetration Sealants

SpecSeal<sup>®</sup> Series SSS Intumescent Sealant, SpecSeal<sup>®</sup> Series LCI Intumescent Sealant, SpecSeal<sup>®</sup> Series LC Endothermic Firestop Sealant, SpecSeal<sup>®</sup> SL Silicone Firestop Sealant

### Installation Guide

August 2015

#### 3M<sup>®</sup> FireDam<sup>™</sup> 2000 Coating

#### SAFETY DATA SHEET

##### 1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND

**IDENTIFICATION OF THE MIXTURE**  
TRADE/COMMON NAME: SpecSeal<sup>®</sup> SSS  
RELEVANT USES OF THE SUBSTANCE: Firestop sealant  
RELEVANT MANUFACTURER'S NAME: 3M  
BUSINESS PHONE: (800) 526-8000  
EMERGENCY PHONE: (800) 526-8000

##### 2. HAZARD IDENTIFICATION

CLASSIFIED FOR GHS (GHS 05) CORN (2.1) - CORROSIVE AND IRRITANT  
Classification: Corrosive Category 2, Eye Irritation Category 2A, Specific Target Organ Toxicity (Inhalation-Respiratory Irritant) Single Exposure Category 3  
Signal Phrase: Irritant

### High-performance intumescent firestop sealant FS-ONE MAX

Applications:

- For effectively sealing most common through penetrations in a variety of basic materials.
- For use on concrete, masonry and drywall
- Round and multiple penetrations
- Metal pipe penetrations: copper, steel and EMT
- Insulated metal pipe penetrations: steel and copper
- Plastic pipe penetrations: closed or vented

Advantages:

- US produced, "Buy American" compliant
- One product for a variety of common through penetrations
- Cost effective, easy-to-use solution
- Water-based and parietal
- Industry leading VOC results
- Ethylene glycol-free

Technical data	Water-based acrylic dispersion
Appearance	Off-white
Color	Off-white
Application temperature range	41 - 104 °F
Approx. cure time	4 min/2 days
Temperature resistance range	14 to 212 °F
Mold and mildew resistance	Class 2 (ASTM G21 - 96)
Mold and mildew resistance	Yes
Surface bonding characteristics (UL 793 (ASTM E84))	Flame spread 0 Smoke developed 0
Tested in accordance with	UL 145, ASTM E84, ASTM E813, ASTM E119, ASTM G21, ASTM G22, ASTM G23, ASTM G24, ASTM G25, ASTM G26, ASTM G27, ASTM G28, ASTM G29, ASTM G30, ASTM G31, ASTM G32, ASTM G33, ASTM G34, ASTM G35, ASTM G36, ASTM G37, ASTM G38, ASTM G39, ASTM G40, ASTM G41, ASTM G42, ASTM G43, ASTM G44, ASTM G45, ASTM G46, ASTM G47, ASTM G48, ASTM G49, ASTM G50, ASTM G51, ASTM G52, ASTM G53, ASTM G54, ASTM G55, ASTM G56, ASTM G57, ASTM G58, ASTM G59, ASTM G60, ASTM G61, ASTM G62, ASTM G63, ASTM G64, ASTM G65, ASTM G66, ASTM G67, ASTM G68, ASTM G69, ASTM G70, ASTM G71, ASTM G72, ASTM G73, ASTM G74, ASTM G75, ASTM G76, ASTM G77, ASTM G78, ASTM G79, ASTM G80, ASTM G81, ASTM G82, ASTM G83, ASTM G84, ASTM G85, ASTM G86, ASTM G87, ASTM G88, ASTM G89, ASTM G90, ASTM G91, ASTM G92, ASTM G93, ASTM G94, ASTM G95, ASTM G96, ASTM G97, ASTM G98, ASTM G99, ASTM G100, ASTM G101, ASTM G102, ASTM G103, ASTM G104, ASTM G105, ASTM G106, ASTM G107, ASTM G108, ASTM G109, ASTM G110, ASTM G111, ASTM G112, 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