

Barrier Management Symposium



MISSOURI SOCIETY FOR HEALTHCARE ENGINEERING
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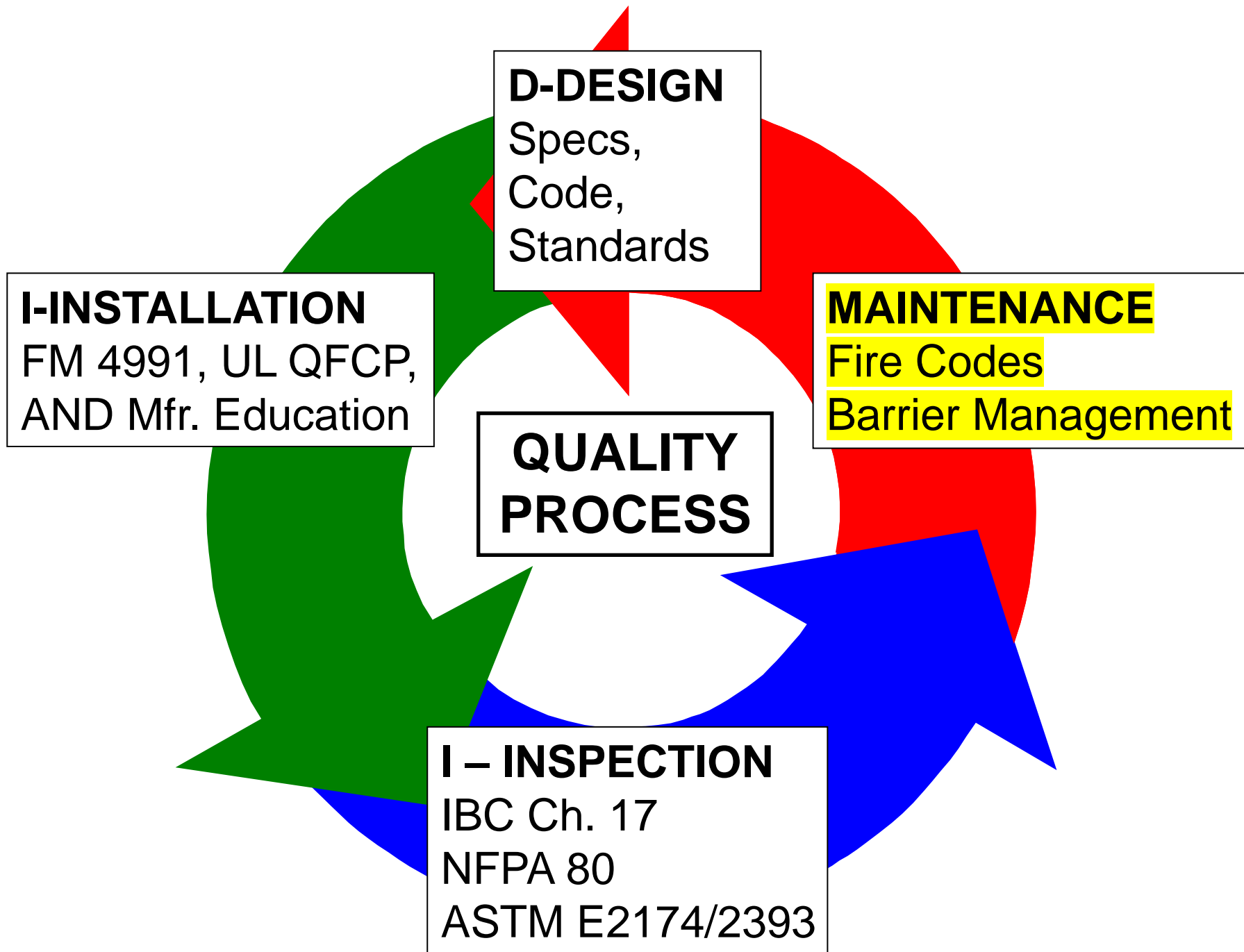


Firestop Contractors International Association

Barrier Management Systems

Best Practices

Bill McHugh



Building & Fire Code Requirements

- Fire Compartments
 - *Exterior Walls*
 - *Fire Walls (IN-Fire Wall or Fire Separating Wall)*
 - *Fire Compartment*
 - *Fire Barrier (IN-Fire Resisting Barrier)*
 - *Fire Partitions (Not in NFPA)*
 - *Fire Separations (CAN)*
 - *Smoke Barriers*
 - *Smoke Partitions*
 - *Archaic Assemblies*

Building & Fire Code Requirements

Similar Fire Test Time-Temperature Curves

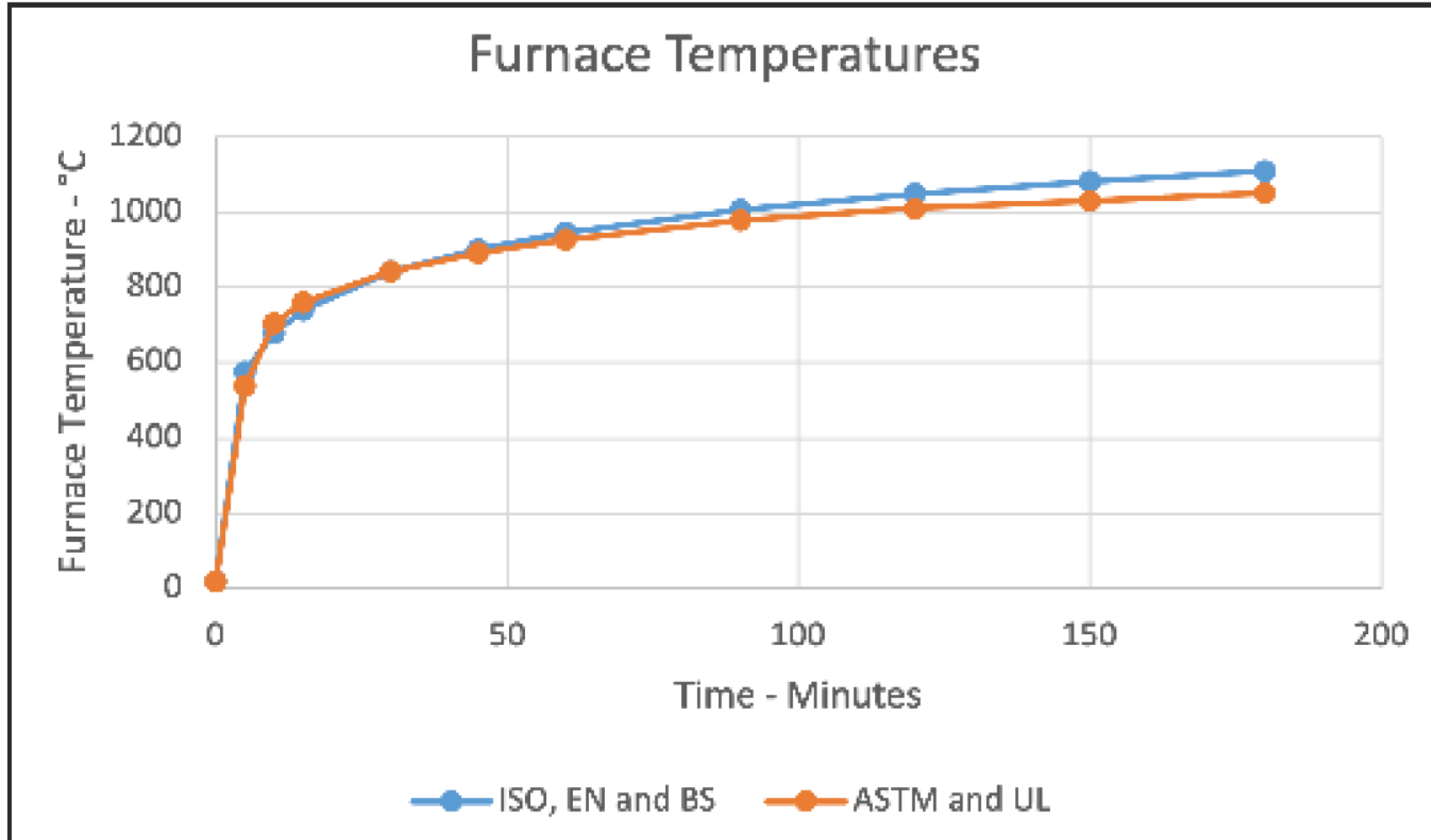


Figure 1 - Comparison of furnace temperatures, the time/temperature curve
Berhinig Image

Existing Buildings

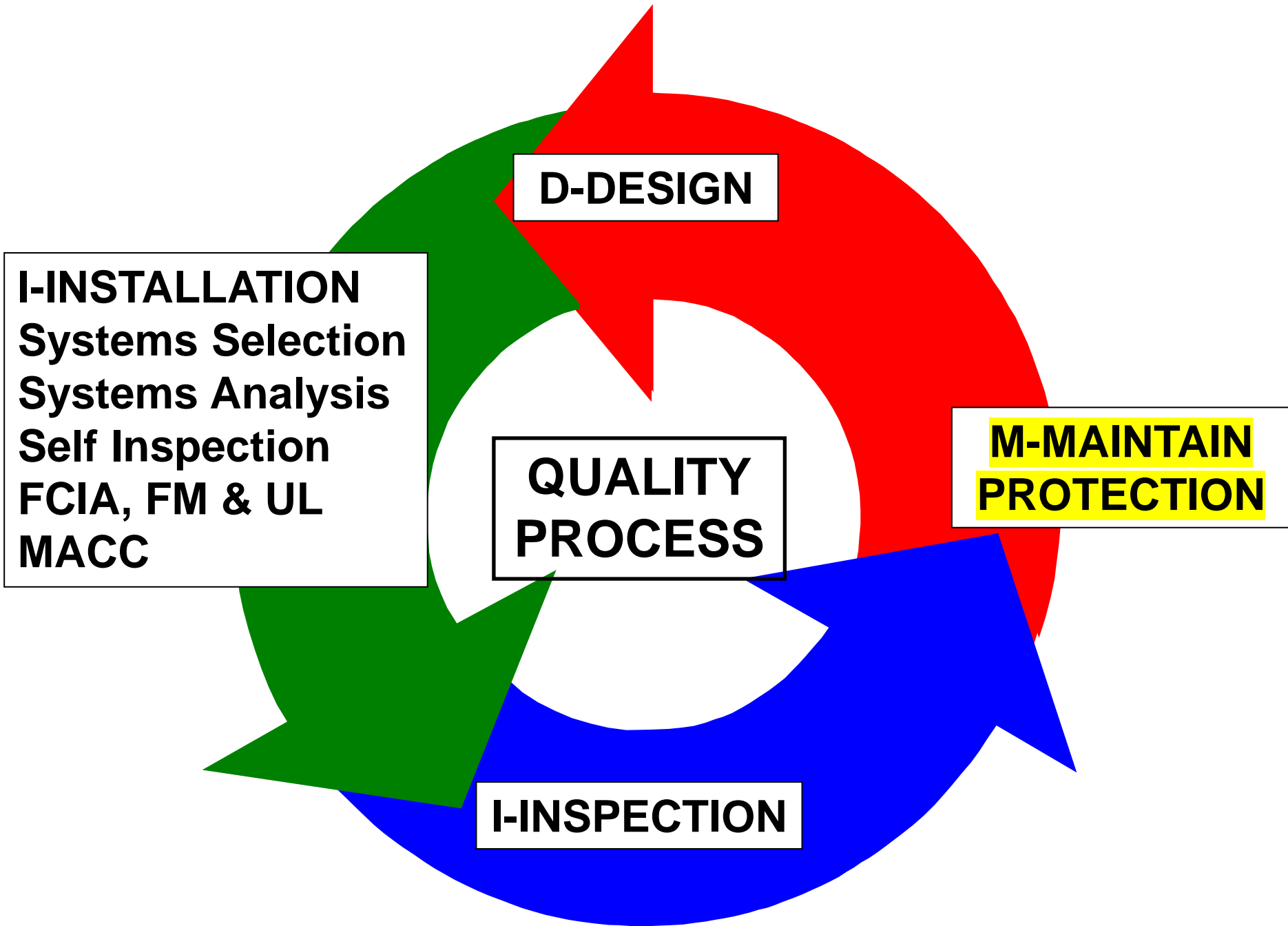
- **Archaic Assemblies**
 - **Clay Tile Block**
 - **Gypsum Block**
 - **Plaster**
 - **Clay Tile/Concrete**
 - **Unidentified Assemblies**
- **Tested ... Calculated ... Prescriptive**

Great Installation / Inspection starts @ SPEC...

New & Existing Buildings - Maintain Protection

- **NEW Buildings – 07-84-00 Specs**
 - **www.FCIA.org & FCIA MOP**
- **Part I – Products...but**
- **Part II– Installation Contractor/Inspection Qualifications**
- **Part III – Execution – Inspection REFERENCE**
- **DIVISION 1 – 01-78-39**





Systems & Materials....



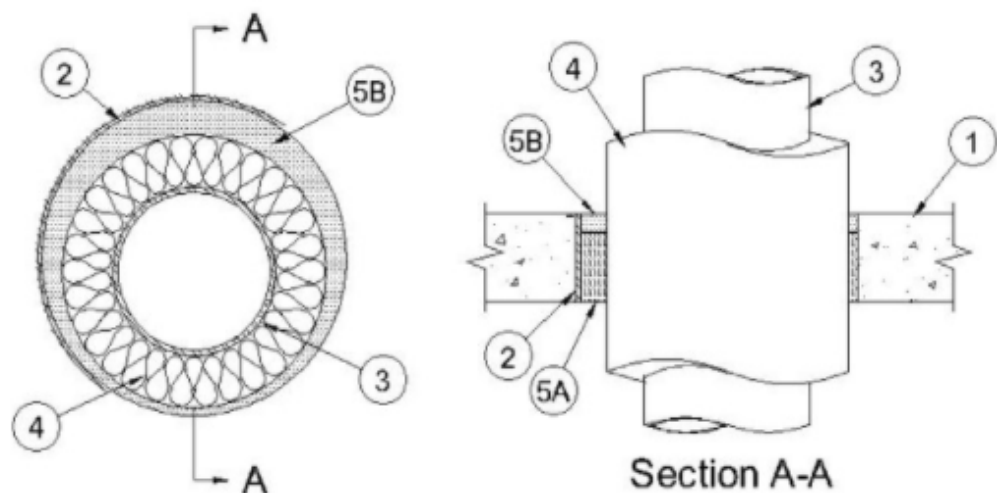


**Possible UL
System Nos.:
C-AJ-5138,
C-AJ-5209,
W-J-5091,
Etc.**

Affinity Firestop Photo

F Ratings — 1 and 2 Hr (See Item 3)

T Ratings — 0, 3/4 and 1 Hr (See Item 4)



1. **Floor or Wall Assembly** — Min 2-1/2 in. (64 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m³) concrete floors or min 3 in. (76 mm) thick reinforced lightweight or normal weight concrete walls. Wall may also be constructed of any UL Classified **Concrete Blocks***. Max diam of opening 9 in. (229 mm).

See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.

2. **Steel Sleeve** — (Optional) - Nom 9 in. (229 mm) diam (or smaller) Schedule 10 (or heavier) steel sleeve cast or grouted into floor or wall assembly. Steel sleeve may be installed flush or may project max 2 in. (51mm) beyond the floor or wall surfaces. As an alternate, nom 9 in. (229 mm) diam (or smaller) sleeve fabricated from nom 0.019 in. (0.48 mm) thick galv steel cast or grouted into floor or wall assembly flush with floor or wall surfaces.

3. **Through Penetrants** — One metallic pipe to be installed concentrically or eccentrically within opening. Penetrant to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of metallic pipes may be used:

A. **Steel Pipe** — Nom 4 in. (102 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.

B. **Iron Pipe** — Nom 4 in. (102 mm) diam (or smaller) cast or ductile iron pipe.

C. **Copper Tubing** — Nom 2 in. (51 mm) diam (or smaller) Type L (or heavier) copper tubing.

D. **Copper Pipe** — Nom 2 in. (51 mm) diam (or smaller) Regular (or heavier) copper pipe.

F Rating is 2 Hr for Penetrants A and B. F Rating is 1 Hr for Penetrants C and D.

4. **Pipe Covering*** — Nom 1-1/2 in. (38 mm) thick (or less) hollow cylindrical heavy density glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory-applied self-sealing lap tape. Transverse joints secured with metal fasteners or with butt tape supplied with product. Annular space between the pipe covering and periphery of opening or sleeve shall be min 1/2 in. to max 1 in. (13 mm to 25 mm).

See **Pipe and Equipment Covering - Materials** - (BRGU) category in the Building Materials Directory for names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a smoke Developed Index of 50 or less may be used.

T Rating is 3/4 Hr for nom 1-1/2 in. (38 mm) thick pipe covering for penetrants A and B. T Rating is 1 Hr for nom 1-1/2 in. (38 mm) thick pipe covering for Penetrants C and D. T Rating is 0 Hr for all Penetrants when pipe coverings less than nom 1-1/2 in. (38 mm) thick.



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

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

= *Rated Firestop System*

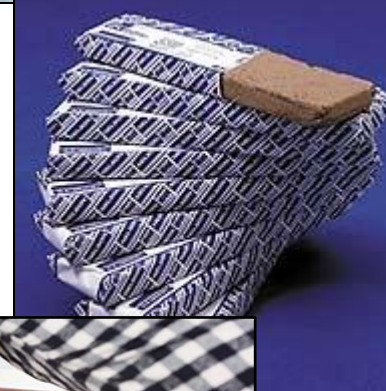
Manufacturers Instructions, Tested and Listed Designs



STI Graphic

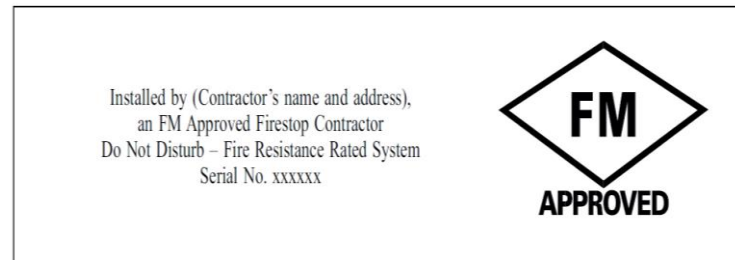
Firestopping for Continuity – Firestop Products

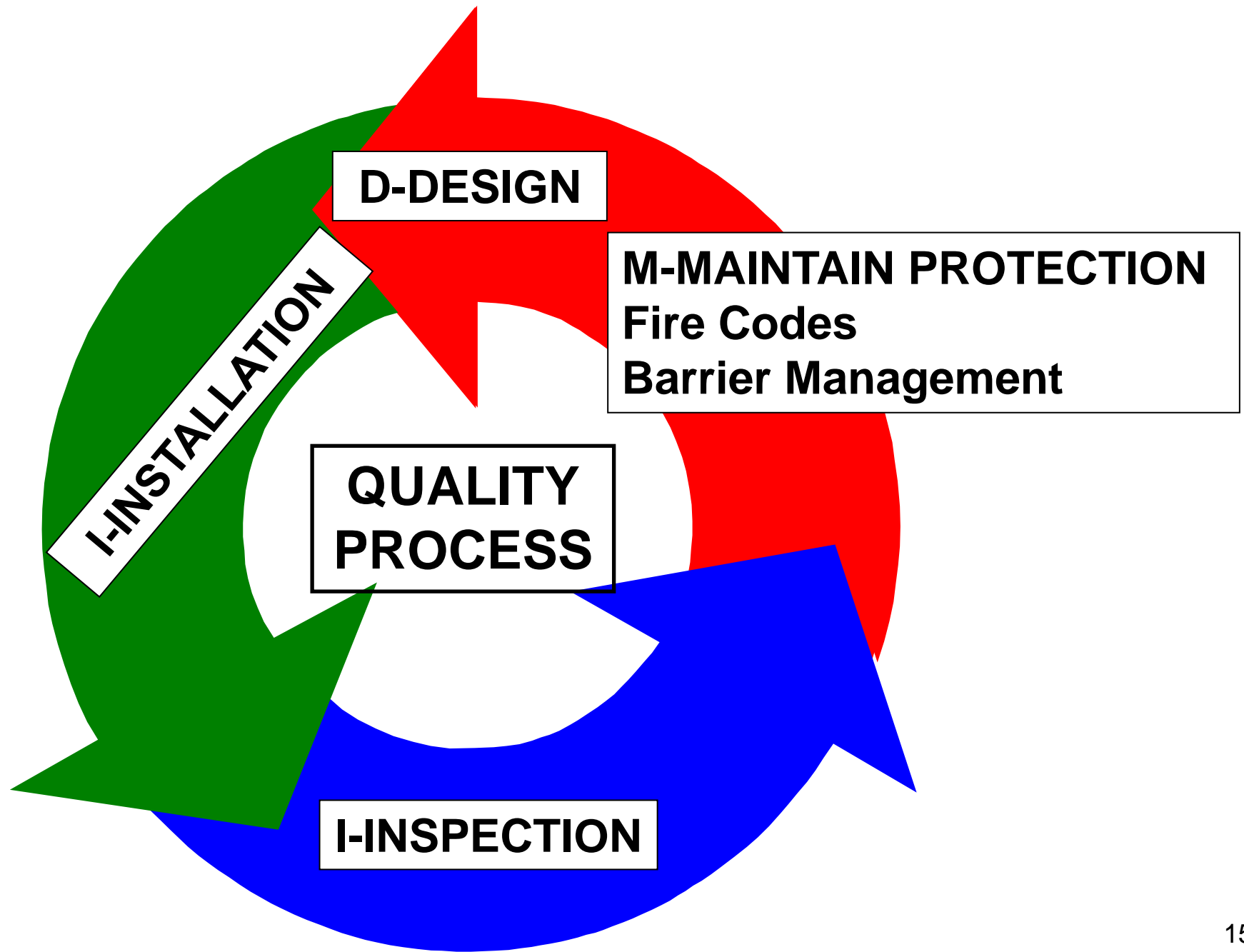
- Sealants
 - Silicone, Latex, Intumescent
- Wrap Strips
 - “Thick, Thin, Wide, Less Wide”
- Putties
- Pillows
- Composite Sheets
- Bricks / Plugs
- Pre Fabricated Kits
- Mortar
- Spray Products
- Tapes



Protection Maintained Faster with Labels...

- Identification Systems (Labels)
 - Firestop Contractor Installed
 - Speeds System Evaluation

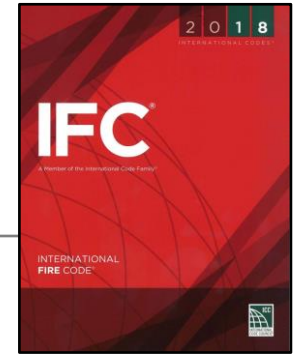




M–Barrier Management Systems

- **Visual Building Survey/Inspection....**
 - **Does it look like the 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**

2018 International Fire Code Maintenance



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'...**

FCIA Added Emphasis

M–Barrier Management System for Building Owners INVENTORY OPTIONS

- Life Safety **Drawings**
- Tested and Listed **Systems** (Listings), if not incorporated in the
- Manufacturers **Installation, Maintenance and Repair Instructions**
- Manufacturers **Product Data Sheets**
- **Manufacturers Safety Data Sheets.**

M-Barrier Management System for Building Owners

- Build an Action oriented **‘visual inspection’**, survey schedule.
- **Assign someone** – a fire-resistance/smoke resistant **champion** - to manage, and be responsible that inspections, repairs and recordkeeping take place on a timely basis.
- **Train** the inspection and repair staff.
- **FREE Barrier Management Symposium online is a start. Check it out at www.FCIA.org**

M-Barrier Management System for Building Owners

- **Keep easily retrievable fire-resistance INVENTORY records,** records of inspections and repairs for AHJ's...
 - Paper
 - Spreadsheets
 - Custom Software
- **Repeat the process, for the life of the building.**

M–Barrier Management Systems

- **Visual Building Survey/Inspection....**
 - Tested and Listed Systems (Listings)
 - Manufacturers installation instructions
- Get a ladder – look up, look down!

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

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

= *Rated Firestop System*



STI Graphic

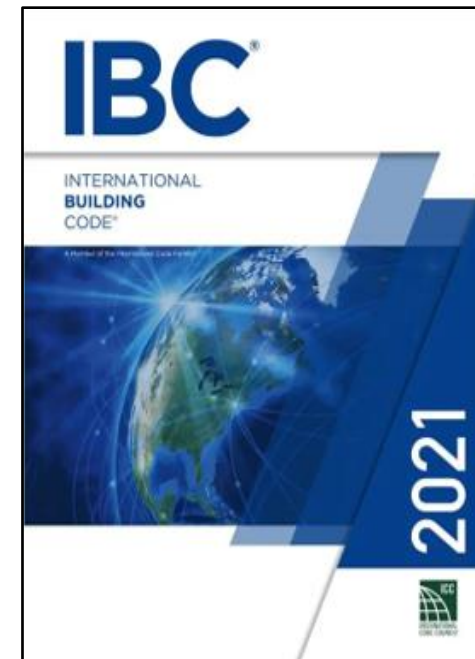
M–Barrier Management Systems

Building Owner’s Policy Topics

- **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**

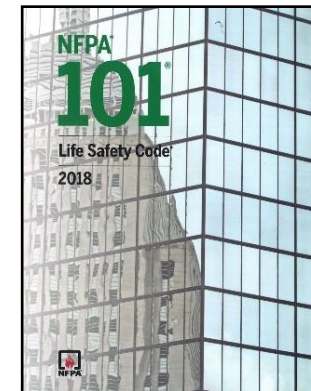
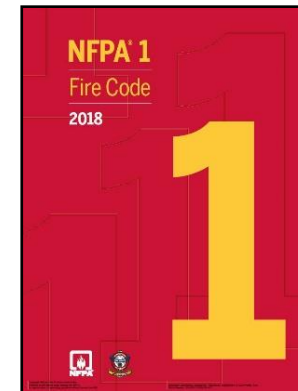
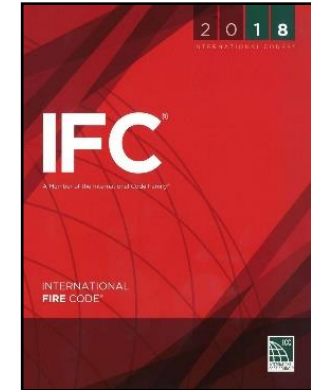
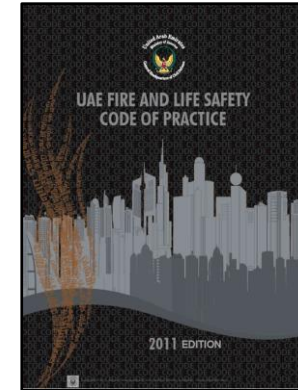
Existing Buildings? Did you know...

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



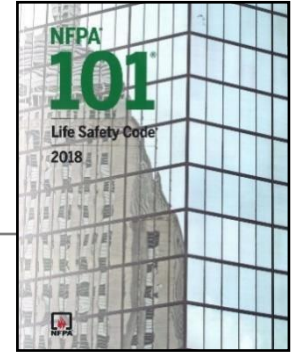
Fire Codes Require Maintenance

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



National Fire Protection Association

NFPA 101 – 2018



- **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 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.*

FCIA Added Emphasis



National Fire Protection Association

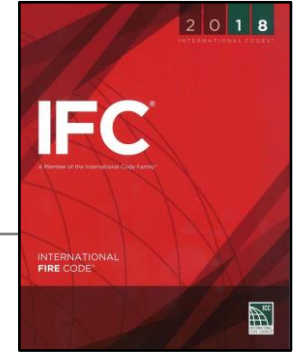
NFPA 1 – 2018

- 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.

FCIA Added Emphasis



2018 International Fire Code Maintenance

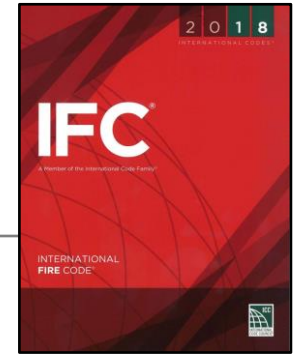


SECTION 701 GENERAL

- **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*.

FCIA Added Emphasis

2018 International Fire Code Maintenance

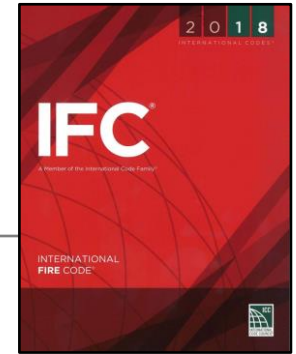


SECTION 701 GENERAL

- **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'...**

FCIA Added Emphasis

2018 International Fire Code Maintenance



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.

FCIA Added Emphasis

International Property Maintenance Code

[F] 703.1 Fire-resistance-rated assemblies. The required fire-resistance rating of fire-resistance-rated walls, fire stops, shaft enclosures, partitions and floors shall be maintained.

[F] 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.

703.3 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 joint systems, shall be maintained. Such elements shall be visually inspected annually by the owner and repaired, restored or replaced where damaged, altered, breached or penetrated. Records of inspections and repairs shall be maintained. [IPMC 2018, 703]

National Fire Code of Canada

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* is maintained...

- **FCIA Manual of Practice – Appendix, Maintenance**

FCIA recommends Barrier Management for Effective Compartmentation and Structural Protection



UAE Fire and Life Safety Code of Practice

Maintenance & Management

21.15.2 The required fire resistance rating of installed firestop systems shall be **visually inspected by the owner or owner's inspection agency annually.** Damaged, altered or breached firestop systems shall be properly repaired, restored or replaced to comply with applicable codes as per the guidelines of Civil Defense.

21.15.3 Any new **Openings** made therein for the passage of through penetrants, **shall be protected with approved firestop system** to comply with applicable codes as per the guidelines of Civil defense.

3.7.2. The condition of installed firestop systems shall be visually inspected by the owner or owner's representative annually. Damaged, altered or breached firestop systems shall be properly repaired, restored or replaced to comply with applicable codes as per the guidelines of Civil Defense.

[UAE Fire and Life Safety Code of Practice]

In Saudi Arabia, Section 107.1, Maintenance states;

UAE Fire & Life Safety Code of Practice

3.7. Maintenance & Management

3.7.1. Provide protection and maintain conditions during & after installation that ensure installed firestop systems are without damage or deterioration at the time of Substantial Completion. If, despite such protection, damage or deterioration occurs, damaged/deteriorated systems shall be removed and replaced with new ones.

UAE Fire & Life Safety Code of Practice

3.7. Maintenance & Management

3.7.2. The condition of installed firestop systems shall be visually inspected by the owner or owner's representative annually. Damaged, altered or breached firestop systems shall be properly repaired, restored or replaced to comply with applicable codes as per the guidelines of Civil Defense.

Fire Codes Require Maintenance - INDIA

- 9 BUILDING MAINTENANCE – METHODS AND MANAGEMENT
- 9.1 General – “Any building (including its services) when built has certain objectives and during its total economic life, it has to be maintained in proper condition to meet those objectives. Maintenance is a continuous process requiring a close watch and taking immediate remedial action. It is interwoven with good quality of housekeeping. It is largely governed by the quality of original construction. The owners, engineers, constructors, occupants and the maintenance agency are all deeply involved in this process and share a responsibility.....”.

Saudi Arabia Fire Code

SECTION 107 MAINTENANCE

107.1 Maintenance of safeguards. Where any device, equipment, system, condition, arrangement, level of protection, or any other feature is required for compliance with the provisions of this code, or otherwise installed, such device, equipment, system, condition, arrangement, level of protection, or other feature shall thereafter be continuously maintained in accordance with this code and applicable referenced standards.

C-AJ-8XXXX???

See Tag/Label
Identification
System



Affinity Firestop Photo

C-AJ-???



Affinity Firestop Photo

C-AJ-5209



Affinity Firestop Photo

C-AJ-8XXX?



Affinity Firestop Photo

W-L-2XXX???
NOPE!!



Affinity Firestop Photo

W-L-2XXX
Wallboard
Patch??

NO!!



Affinity Firestop Photo

Good Luck!

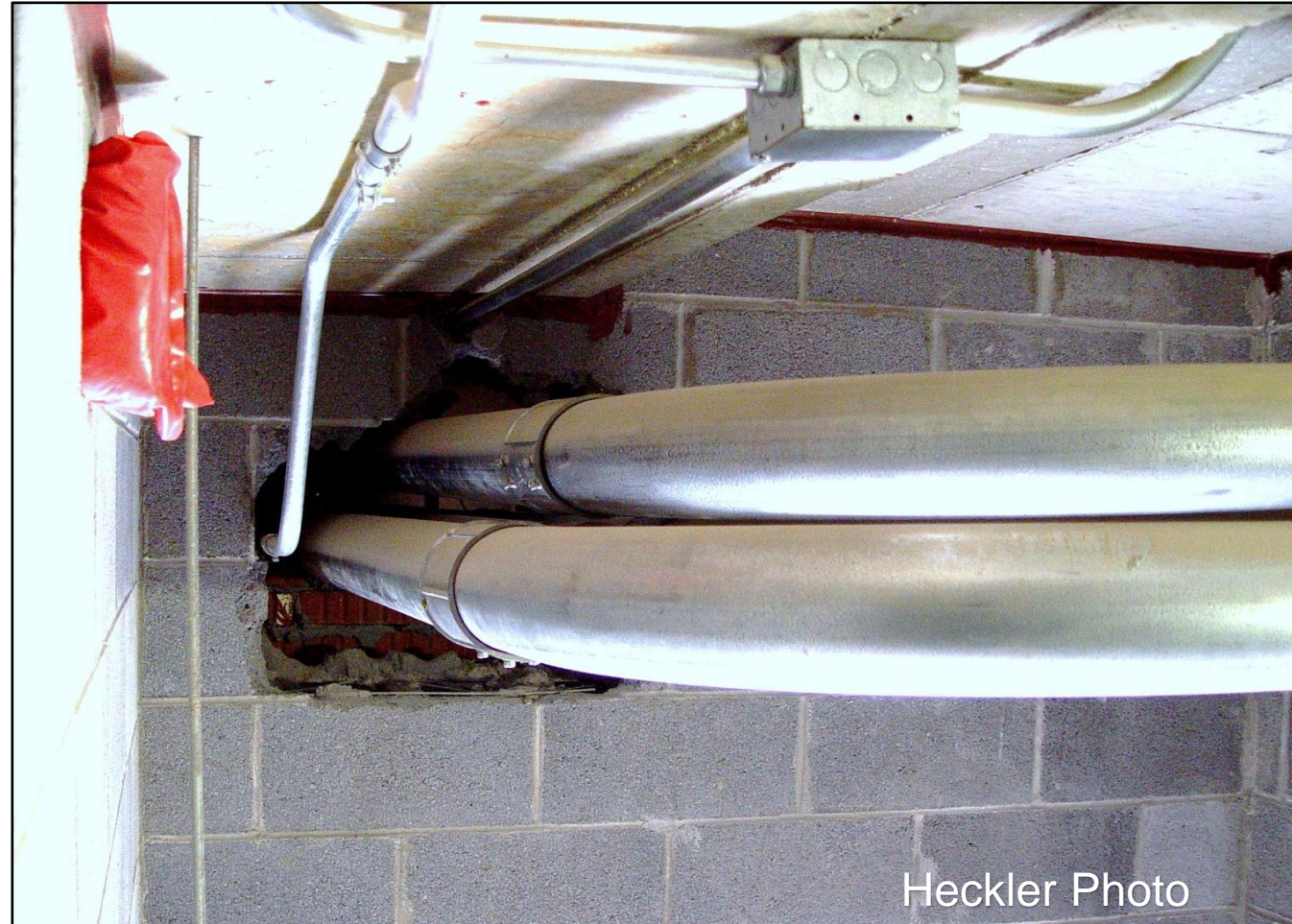


Affinity Firestop Photo

Firestop & Inspection & Survey



Firestop & Inspection & Survey



Firestop & Inspection & Survey



Heckler Photo

Firestop & Inspection & Survey



Heckler Photo

Firestop Repairs

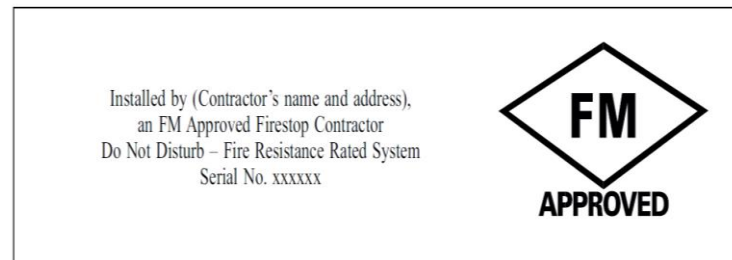
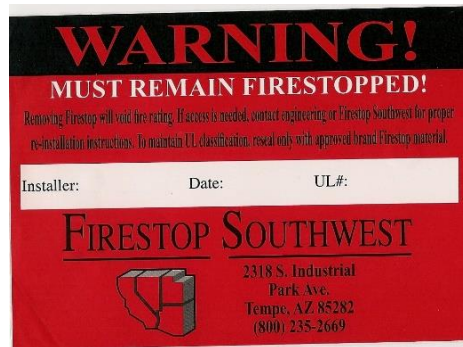
- Repairs
 - Instruction requirements by manufacturer
 - Listed systems
 - Patching
 - Systems.....
 - Adhesion
 - Movement
 - T, L, W Ratings
 - ***As recommended by MFR***



Affinity Firestop Photo

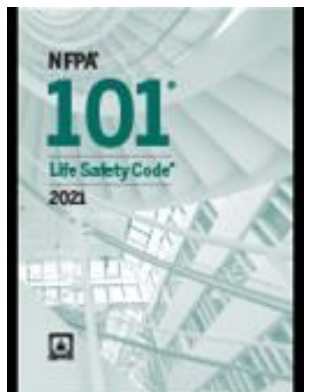
Repairs Simplified with Labels...

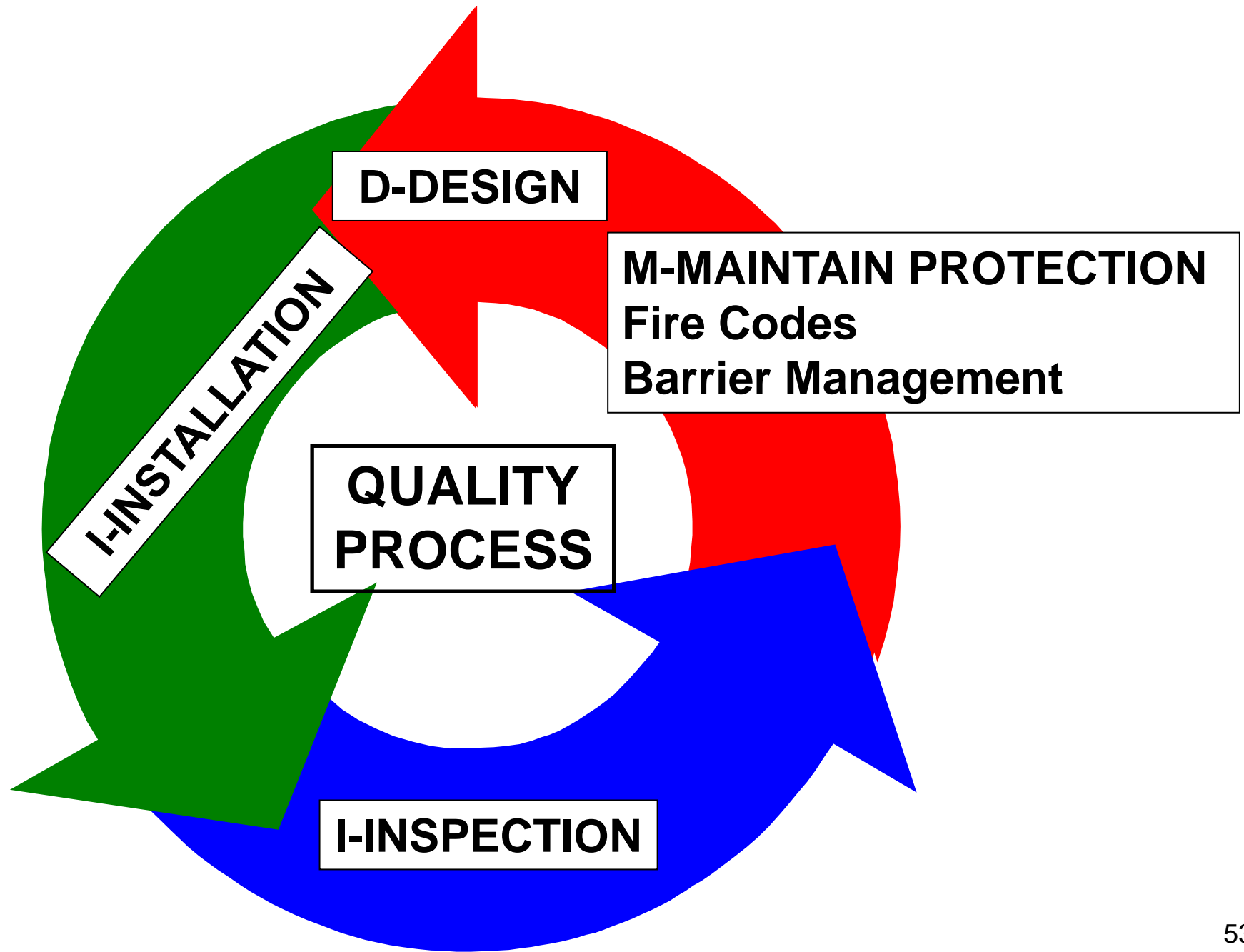
- Identification Systems (Labels)
 - Firestop Contractor Installed
 - Speeds System Evaluation



Existing Buildings? Educate

- **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





Barrier Management Symposium



MISSOURI SOCIETY FOR HEALTHCARE ENGINEERING

Member of ASHE since 1972

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Firestop Contractors International Association

Barrier Management Systems Best Practices

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Thanks for Attending!!!

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