

Welcome to the

2018 Annual Conference Educational Sessions

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Fire & Smoke Protection Features & the New 2018 International Fire Code 701 Requirements

**Bill McHugh
FCIA Executive Director**

Bill@FCIA.org

Slides – www.FCIA.org



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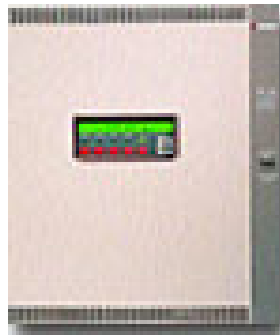
FCIA – Firestop Contractors International Association

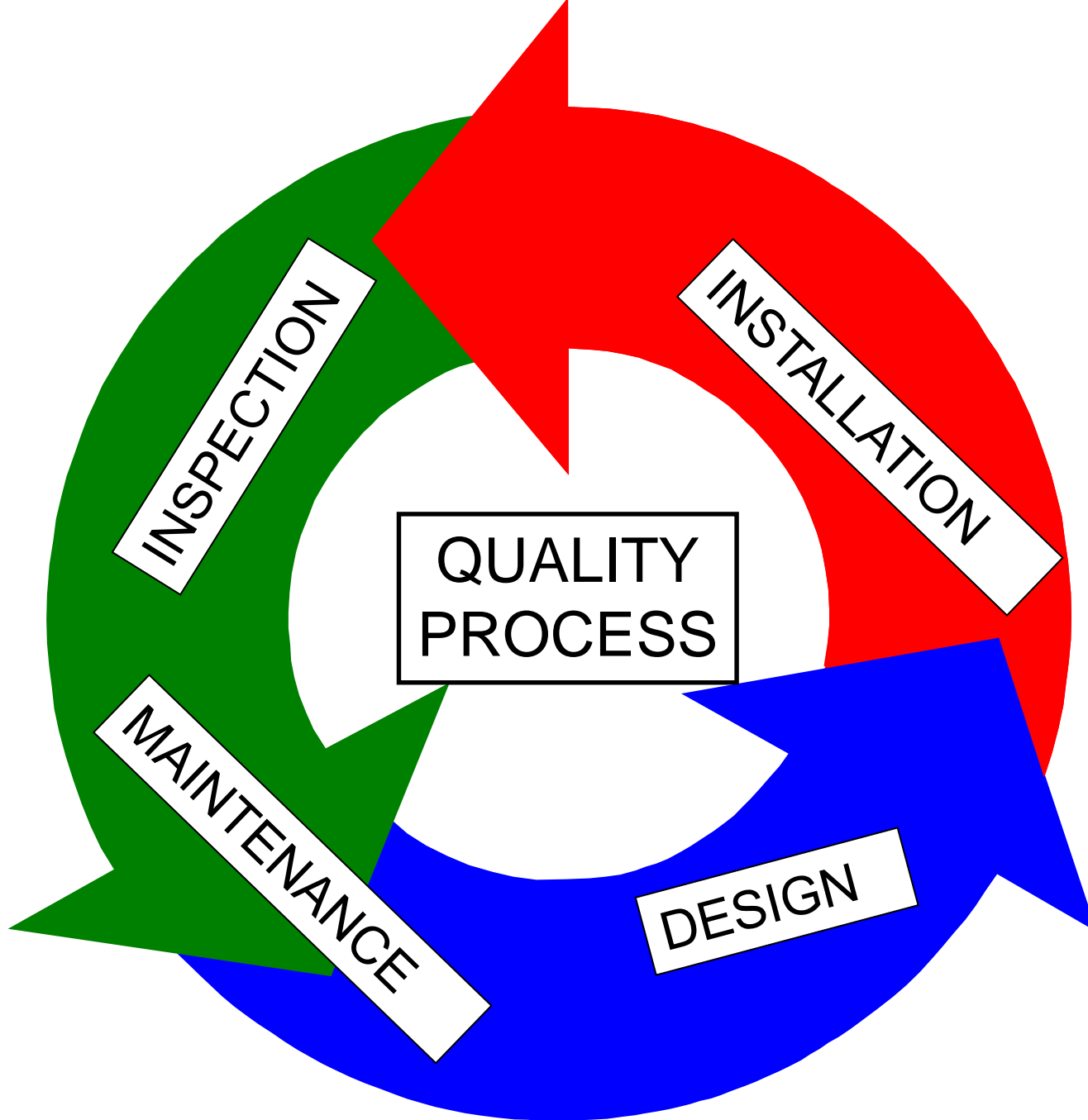
- FCIA Members
 - Firestop Contractors
 - Firestop Manufacturers
 - Firestop Consultants
 - Firestop Distributors, Reps, Friends
- FREE MOP/Spec - Specifiers @ AE, Independent
- FREE Life Safety Digest
- 3rd Party Contractor/Inspection Company Accreditation Programs
- Chair, ASTM Inspection Standards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



“TOTAL FIRE PROTECTION”

- Effective Compartmentation
 - Fire Barriers, Fire Walls/Floors, Smoke Barriers
 - Firestopping, Fire Dampers, Swinging and Rolling Fire Doors, Fire Rated Glazing
- Detection & Alarm Systems
- Sprinkler Suppression Systems
- Education & Egress—
 - Building Owners & Managers, Building Occupants and Firefighters





Building & Fire Code Requirements

- NFPA 5000 – 101- NFPA 1
- National Building Code – Canada
- UAE Fire and Life Safety Code – Chapter
- International Codes –
 - New and Existing Buildings International Building Code – Chapter 7
 - International Fire Code – Chapter 7
- ***Minimum requirements - Construction & Maintenance***

Building & Fire Code Requirements

- Terminology - Definitions
 - **Ch. 8 – NFPA & Ch. 7 IBC**
 - *IBC & NFPA - ASTM E 119, UL 263 - Fire-resistance-ratings*
 - IBC Ch. 7 - **Fire Barrier** – Hourly Rated
 - IBC Ch. 7 - **Fire Wall** – Fire Rating, structural independence
 - Ch. 7 IBC – **Fire Partition** – Rated, not continuous.
 - Ch. 8 NFPA/NFPA 221–**High Challenge Fire Walls**

Building & Fire Code Requirements

- Fire Barriers
 - Fire Area Separations
 - Mixed Use Occupancies
 - Incidental Uses
 - Hazardous Area Separations
 - Exit Enclosures
 - Shaft enclosures
 - Horizontal Exits
 - Corridor Walls - NFPA

Building & Fire Code Requirements

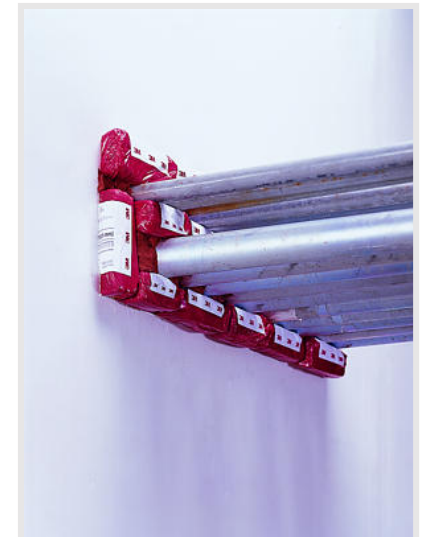
- Compartmentation Codes – US
 - **Smoke Barrier – Firestopping for Continuity**
 - IBC – Hourly Rated, “L” Rating
 - <5cfm/sf (IBC 2006)
 - < 50 cfm, 100sf of Wall Area (IBC 2009)
 - NFPA – ... ‘restricting the passage of smoke’...
Quantified “L” Rating ... no Occupancy Chapters
 - Continuous, Barrier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

Building & Fire Code Requirements

- ***Build it Right***
 - **Walls / Horizontal Assemblies – Continuity**
 - Firestop Products Become Firestop Systems
 - Penetrations
 - Joints – Head /Bottom of Wall – Perimeter Joints
 - Fire & Smoke Damper Duct Systems
 - Fire Doors and Hardware Systems
 - Rolling & Swinging
 - Fire Rated Glazing

Continuity

Effective Compartmentation Features



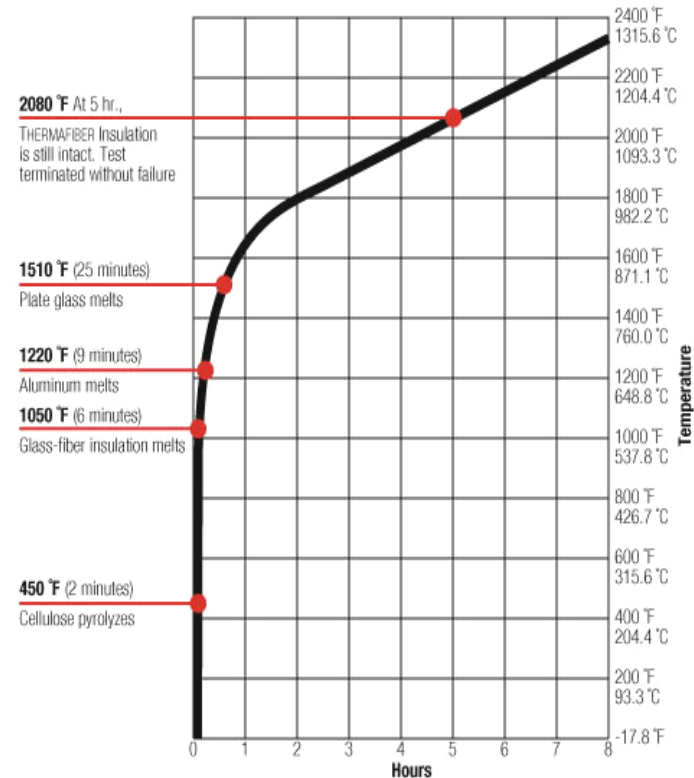
Facility Budget Line Item?

- Fire-Sprinklers, Pumps, etc...YES
- Fire-Detection & Alarms...YES
- Barriers & Structural Fire Resistance??
 - Structural Elements, Components, Assemblies
 - Penetrations, Doors, Dampers, Glazing, Walls/Floors
 - In-House Staff?
 - Fireproofing & Barriers Services Contractor?

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-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.



Barrier Continuity SYSTEMS

- **Products Become Systems Through....**
- **Test Standard References**
 - **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 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

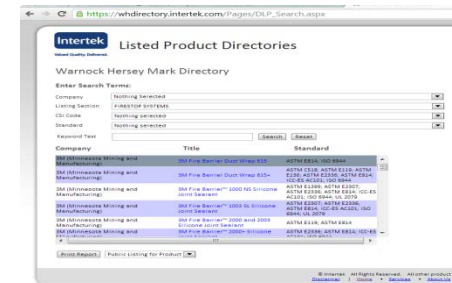
Hose Stream = Shock Test for All



Barrier Continuity Products become SYSTEMS

- Fire Rated Systems Directories –
 - FM Approvals
 - Intertek
 - UL Fire Resistance Directory

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



Engineering Judgments/EFRRRA

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

IFC Guidelines for Evaluating Engineering Judgment Guidelines

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

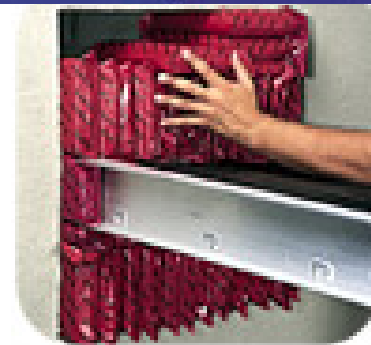
As such, IFC developed *Recommended IFC Guidelines for Evaluating FireStop Systems in Engineering Judgments.*

NOT ALL DISCIPLINES HAVE EJ's/EFRRAs.....

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**



S-Specs – Firestopping – One Section

- **NEW Buildings – 07-84-00 Specs**
 - www.FCIA.org
- **Part I – Focus on**
 - **Systems & Listings**
 - **Not Products**
 - **Manufacturers Installation Instructions**
- **“Single Manufacturer to the greatest extent possible” – EJ’s**

S-Specs

- **NEW Buildings – 07-84-00 Specs**
 - **www. FCIA .org**
- **Part II – 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**

S-Specs

- **NEW Buildings – 07-84-00 Specs**
 - www.FCIA.org
- **Part II – Qualifications – Special Inspection**
 - **Special Inspection Agency –**
 - **IAS AC 291 Accredited Special Inspection Agencies**
 - **Special Inspector Qualifications - Competence**
 - **FM Firestop Exam**
 - **UL Firestop Exam**
 - **AND**
 - **IFC Exam – ASTM E 3038**

S-Specs

- **NEW Buildings – 07-84-00 & Other Specs**
- **Part III – Execution**
 - **Special Inspection – IBC Chapter 17**
 - ASTM E 2174 - Penetrations
 - ASTM E 2393 – Joints
 - **Special Inspection**
 - SFRM - ASTM E605, E736
 - IFRM - AWCI 12-B
 - SOON, ASTM WK 54597

S-Specs Contractor Qualifications

- **FM 4991 – Standard for the Approval of Firestop Contractors**
- **UL Qualified Firestop Contractors**
- **FM 4991 Approved**
- ***FM & UL/ULC CONTRACTORS UNDERSTAND SYSTEMS & DOCUMENTATION***
- **UL's Master Certificate of Compliance UL QFC's**
- **Other Protectives?**

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: FCTA
Address: 4413 W. Harrison Street, Suite 540
Hitler, 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. This certificate is evidence that the working contractor's management system was in compliance with the applicable requirements of the Qualified Firestop Contractor Program.

UL LLC is not an insurer and does not assume any obligation or undertake to discharge any liability of the Qualified Building Contractor, or any other party for any loss, which may result in future, insurance settlements, non-compliance or requirements, cancellations of this certificate, or withdrawal by the Qualified Building Contractor from the Qualified Firestop Contractor Program.

Any modification to any firestop system of the structure will affect the complete firestop system and may require protection offered by the system indicators. Any changes will invalidate this certificate earlier than the expiration date. It is the building owner's responsibility for an annual visual inspection of the integrity of the fire-resistance rated and smoke-resistance rated 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.

UL and the UL Logo are Trademarks of UL LLC © 2018
Unauthorized reproduction or modification to this certificate constitutes fraud.
This certificate is for reference use only.
To verify Site Audit Certificate or Audit Requirements, please refer to website:
www.ul.com/firestopcontractor



Certificate Number: 1000

QUALIFIED FIRESTOP CONTRACTOR CERTIFICATE

Company Name: Underwriters Laboratories Inc. File number: R12345 Issued: January 31, 2019
Address: 333 Pfingsten Rd. Expires: December 31, 2019
Telephone: 480.790.6985 Email Address: Ramon.SandovalJr@UL.com

This company has demonstrated that it complies with UL's Qualified Firestop Contractor Program Requirements. This certificate is not transferrable and requires an On-Site Audit by the end 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

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UL Slide

S-Specs - Contractor Qualifications

DIIM In Other Industries?

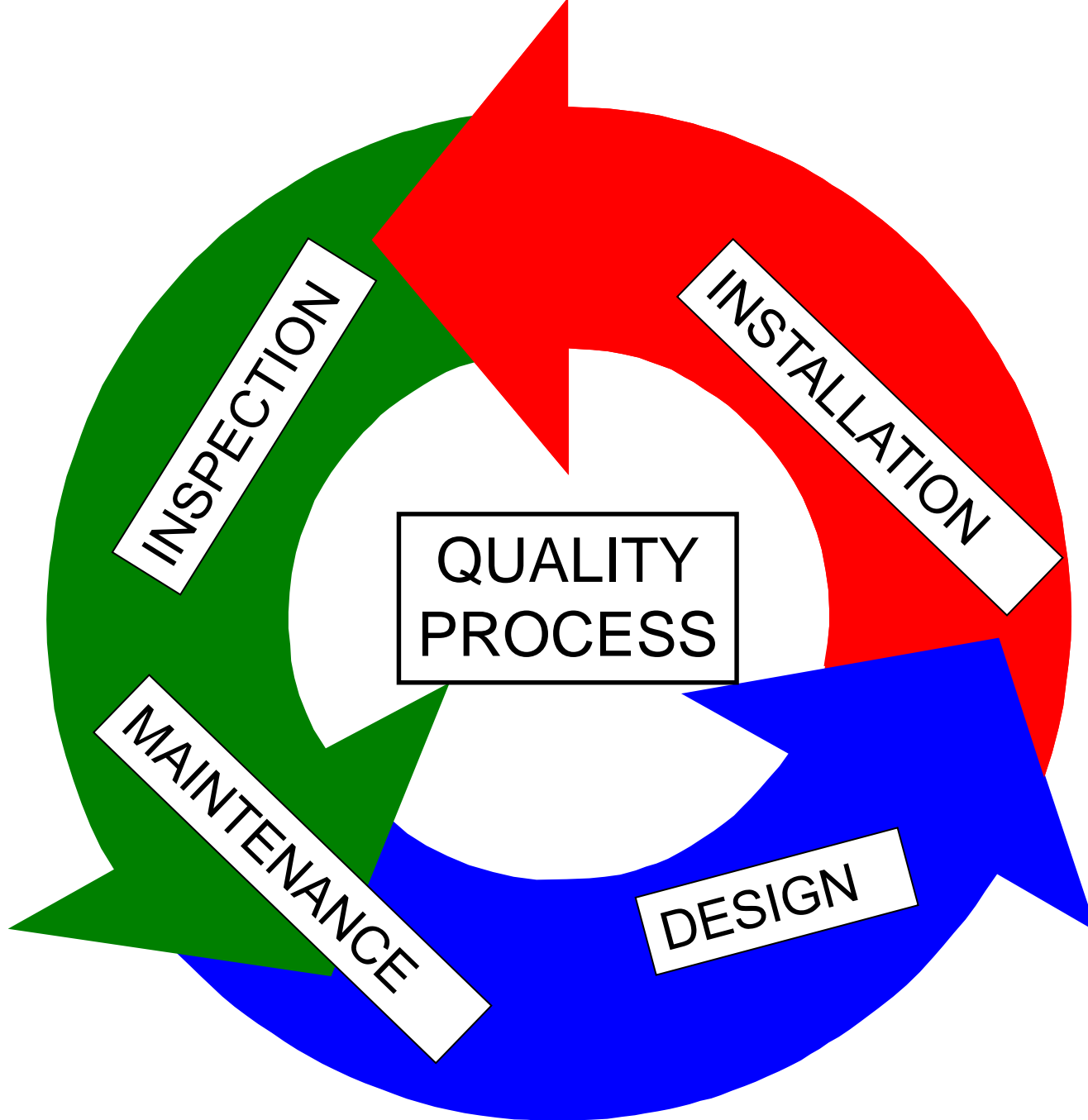
- **Dampers –**
 - **Accreditation for Sheet Metal Union Signatory Contractor**
- **Doors –**
 - **Fire Door Assembly Inspectors – DHI, Others**
- **Walls ?**
 - **AWCI's Education Academies**
- **Horizontal Assemblies ?**
- **Glazing ?**

Why Contractor Qualifications?


- Built right the first time...Start a Trend...
- **SYSTEMS** Selection, Analysis, As-Built **Inventory**
 - 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



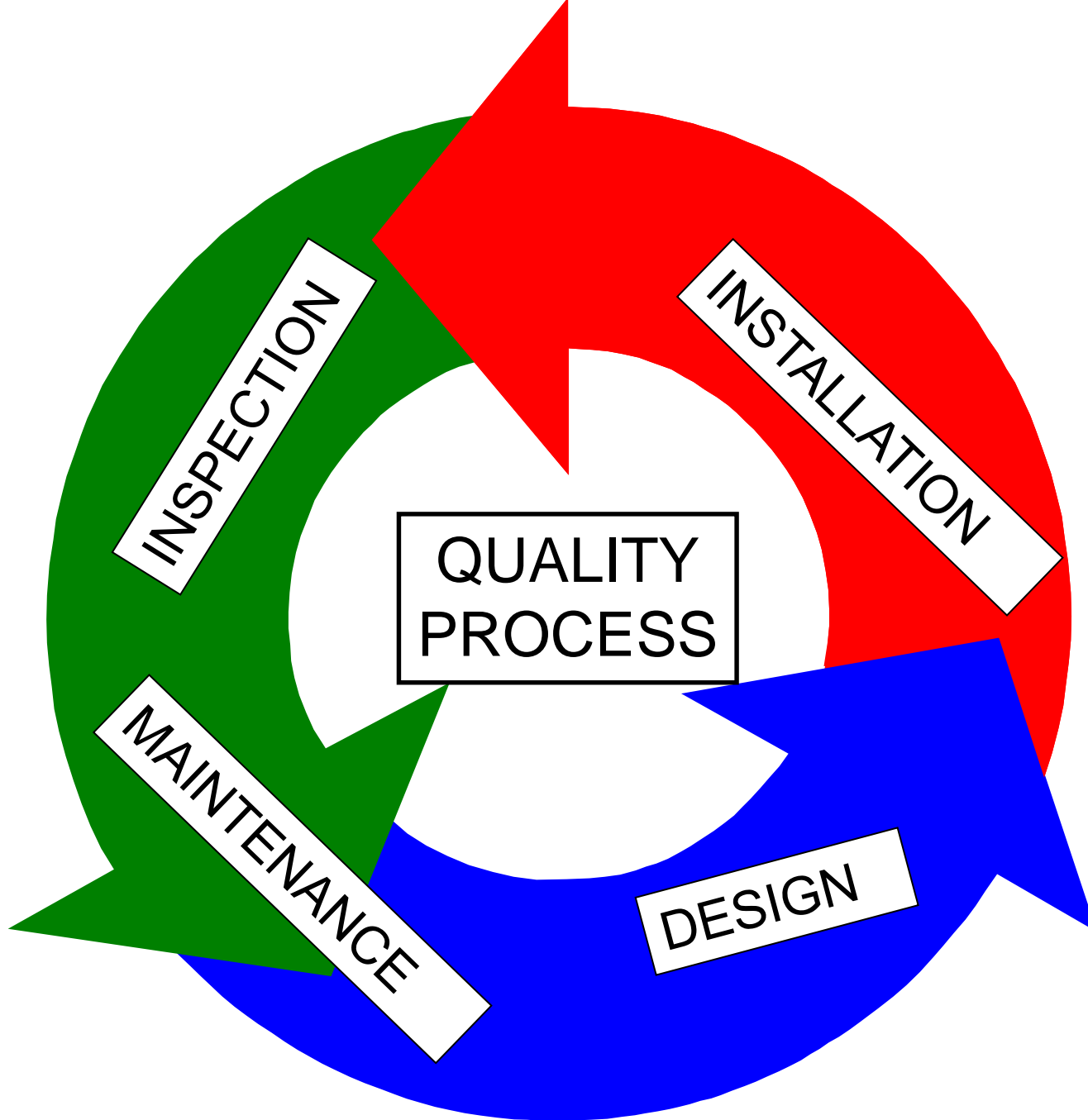
I – Inspection – Options

- **Contractor Self Inspection**
 - Verify Management System validity
 - **Manufacturer Inspection?**
 - Does not exist ... Survey, maybe
 - **Independent Inspection?**
 - IBC 1705
 - Labels Speed Process
- 

<h1 style="margin: 0;">FIRESTOP CONTRACTOR</h1> <p style="margin: 0;">(204) 555-0101</p>														
<h2 style="margin: 0;">WARNING</h2>														
<p>This is an approved Firestop System and shall NOT be disturbed except by Authorized Personnel.</p>														
Wall Plate Penetration No.: <u>W-21061-1</u>	Fire Rating Required: <u>1.0 F</u>													
Floor Level: <u>LEVEL 200</u>	Room No.: <u>201</u>													
Installer's Name: <u>JOHN SMITH</u>	Product: <u>FS-GNE</u>													
Installation Date: <u>APRIL 1, 2013</u>	System Design No.: <u>CS-AJ-1022a</u>													
<p>Re-penetrated by:</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 33%; text-align: left; padding: 5px;">Company</th> <th style="width: 33%; text-align: left; padding: 5px;">Installer</th> <th style="width: 33%; text-align: left; padding: 5px;">Date</th> </tr> </thead> <tbody> <tr> <td style="border-bottom: 1px solid black; height: 20px;"></td> <td style="border-bottom: 1px solid black; height: 20px;"></td> <td style="border-bottom: 1px solid black; height: 20px;"></td> </tr> <tr> <td style="border-bottom: 1px solid black; height: 20px;"></td> <td style="border-bottom: 1px solid black; height: 20px;"></td> <td style="border-bottom: 1px solid black; height: 20px;"></td> </tr> <tr> <td style="border-bottom: 1px solid black; height: 20px;"></td> <td style="border-bottom: 1px solid black; height: 20px;"></td> <td style="border-bottom: 1px solid black; height: 20px;"></td> </tr> </tbody> </table>			Company	Installer	Date									
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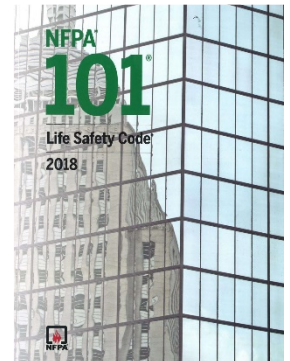
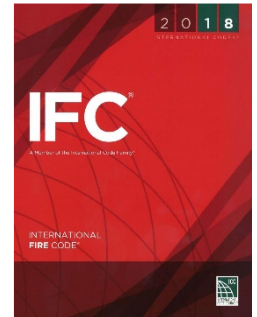
I – Inspection

- **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

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

NASFM's Post 9/11 Building Survey



MEMORANDUM

To: Partnership for Safer Buildings Date: 27 February 2003

From: Walter Smittle III, Chairman *on behalf of the On-Site Inspections Subcommittee*

Re: Initial Findings of the On-Site Inspections Subcommittee

In October 2002, the Codes Assessment Subcommittee (CAS) issued its preliminary report, which identified several areas of concern with regard to the fire protection provisions of the *International Building Code*®(IBC).¹ The On-Site Inspections Subcommittee (OSIS) was then charged with conducting site visits to determine whether the problems identified by the CAS related to hazards in the real world or whether additional concerns relevant to Partnership objectives could be identified.² Members of the subcommittee worked in cooperation with the chief of code enforcement at the New Hampshire State Fire Marshal's office to establish a list of criteria for the inspections. The checklist served as a "basic protocol" for the inspections since the OSIS conducted site visits in several different states and jurisdictions. The *Inspection Checklist* is attached to this memo.

We ask that the Partnership keep the following points in mind when reading this report:

- The purpose of this exercise was to inspect buildings to determine whether implementation of the codes, as currently written, allowed for situations that might endanger both building occupants and first responders should there be a fire. Therefore, the OSIS did *not seek to identify actual code violations*.
- While a criteria checklist was drafted to keep the inspection focused on the issues identified in the CAS report, the OSIS was also asked to report *any additional safety issues* that might be uncovered during the course of the inspection.
- The site visits were organized by type of occupancy. Buildings were chosen for the inspection based upon the categories determined during the first Partnership meeting. A

¹ Note: At the time of the Codes Assessment Subcommittee's original inquiry, the other major building code, NFPA 5000 *Building Construction & Safety Code*™, had not been published. Therefore, the CAS report dealt solely with the IBC. The CAS is now in the process of conducting a similar investigation of the NFPA code.

² Note: While the CAS report examined the IBC, the site inspections were not necessarily conducted on buildings built to this code since it is relatively new. However, since the IBC tends to be a compilation of the least restrictive elements of each of the three model codes, problems in buildings built to any of these codes might also exist in the IBC.



Slide #3



Slide #4



Slide #7



Slide #8



Slide #9



Slide #10

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...D1

- **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.*

M–Barrier Management Systems

ICC's IPMC

IPMC SECTION 703

[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.

International Existing Building Code

UAE Fire and Life Safety Code of Practice

Maintenance & Management

Chapter 1, SECTION 21 Firestopping

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.

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

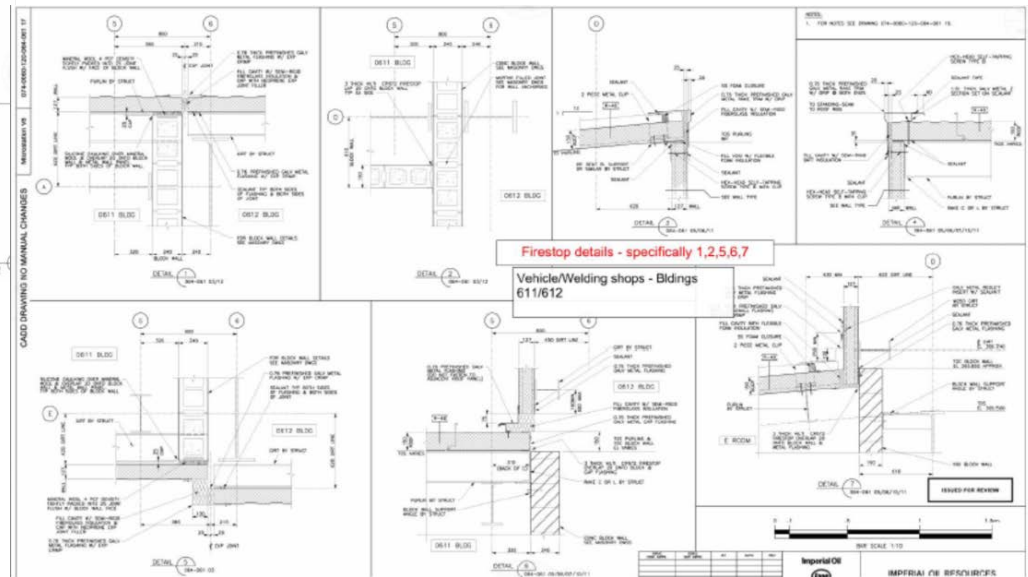
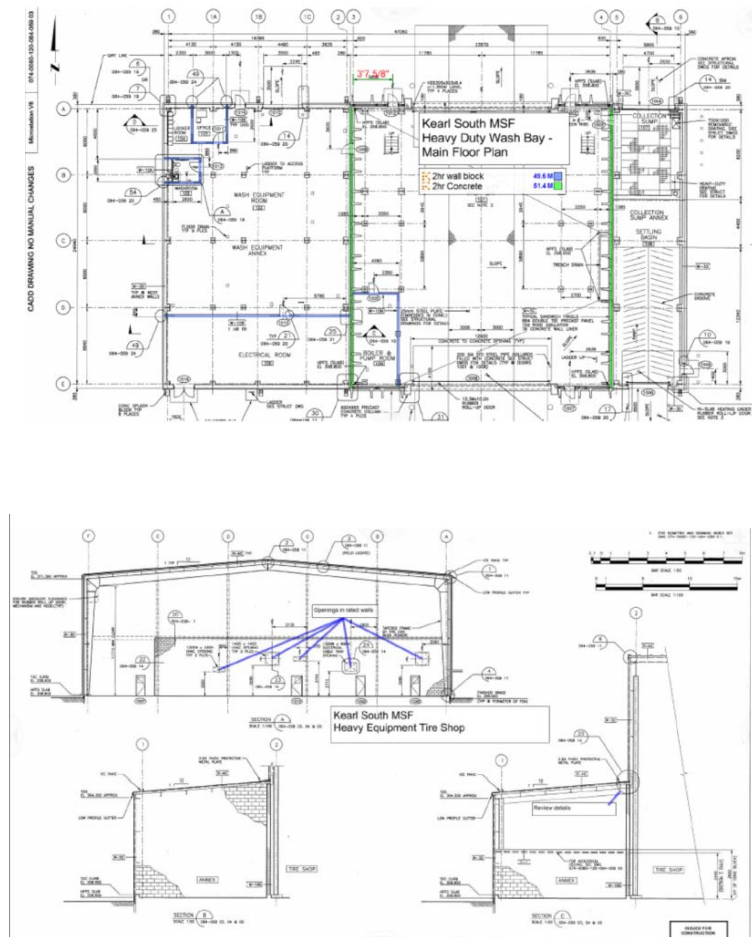


Fire-Resistance & Barrier Management Systems Policy Topics

- **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

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 – Door and Window Openings – NFPA 80**
 - 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



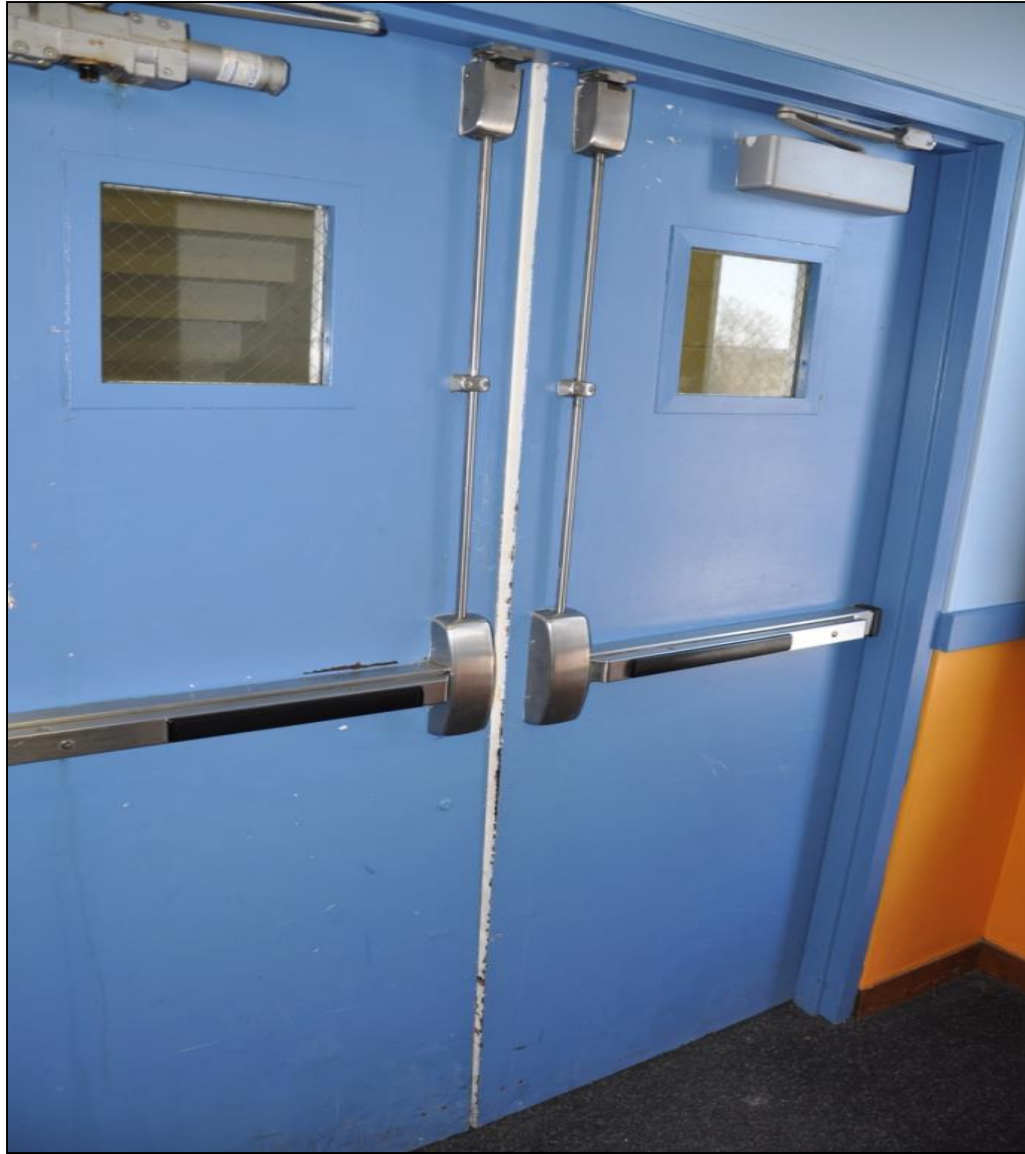
Door Safety, LLC Image

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



Door Safety Security Foundation, DHI Photo

Built Right = Maintain Right WHEN SPECIFIED

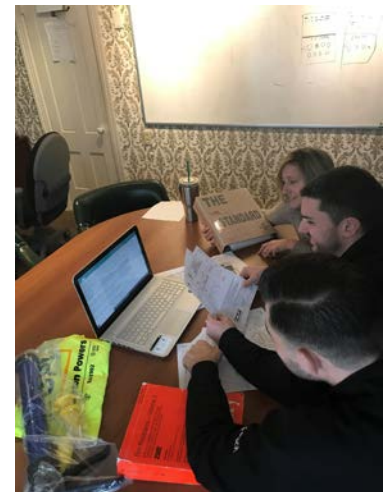
- **Reference 01-70-00 Closeout Submittals**
 - 01 78 29 Final Site Survey
 - 01 78 33 Bonds
 - 01 78 36 Warranties
 - **01 78 39 Project Record Documents (INVENTORY)**
 - 01 78 43 Spare Parts
 - **01 78 46 Extra Stock Materials**
 - 01 78 53 Sustainable Design Closeout Documentation

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 Specs & Client Advise

- **Specifiers –**
 - Advise Client to Create a Budget to Meet Code Requirements
 - **Inventory – What Info?**
 - Barrier & Above Ceiling Permits
 - Implement Fire Resistance Maintenance
 - Manage & Monitor Process



Fire-Resistance Maintenance Programs – Another Day...

- **Maintenance**
 - Code Required
 - How??
- **How to keep Track – Barrier Management Initiative**
 - Paper
 - Software
 - Labeling



Demo Hospital

Permit No.: 2011-005

Area (*): 3C1/3L1

Side 1: 3C1

Side 2: 3L1

LSR ID: LST-B1-03-007

Compliance Status: ● Non-compliant

Survey ID:

LSR Group:

Life Safety Details Surveys Photos Floor Plan Diagrams

LSR Deta...	Status	Latest Ph...	Detail Description	Life Safety T...	Life Safety Sub ...	Letters	Numbers	LSR Count	Notes
> 001	● Non-com...		Firestopping Through Wall Penetration - Firestop	Firestopping	Through Wall Pe...	WL	1000-1999	1	
002	● Compliant		Firestopping Through Wall Penetration - Firestop	Firestopping	Through Wall Pe...	WL	1000-1999	0	
003	● Compliant		Firestopping Through Wall Penetration - Firestop	Firestopping	Through Wall Pe...	WL	5000-5999	1	
004	● Compliant		Firestopping Through Wall Penetration - Firestop	Firestopping	Through Wall Pe...	WL	3000-3999	1 EZ Path	

Add New Life Safety Detail Entry

Edit Selected Life Safety Detail Entry

Edit

Save

Save & Add Another

Save & Close

Delete Record

Cancel

Edit Selected Permit

Delete Selected Row

/view/Print Permi

Close Form

Document Fire-Resistance Rated & Smoke Resistant Barriers, Structural

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

Mark Fire-Resistance Rated Barriers

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.

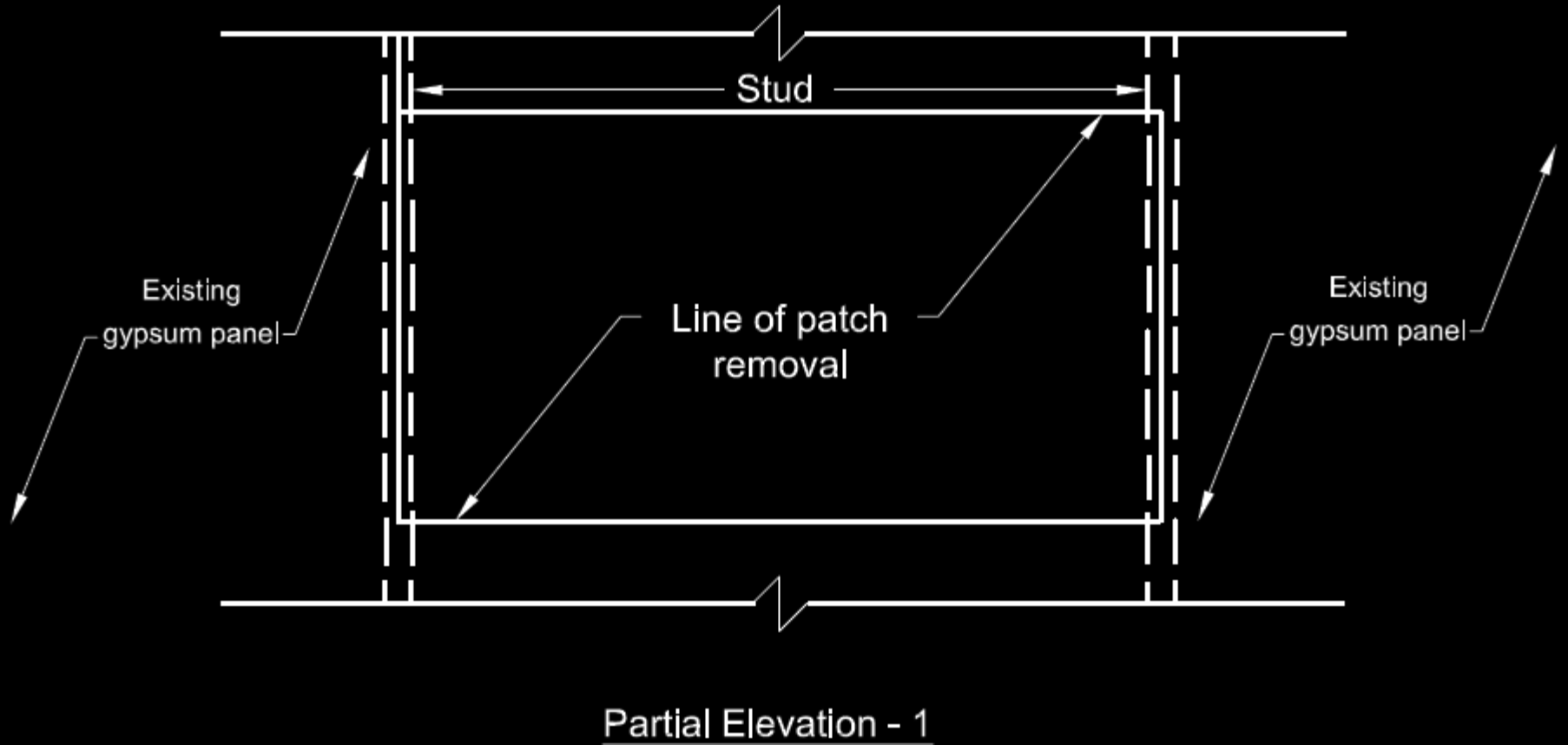
“FIRE AND/OR SMOKE BARRIER—PROTECT ALL OPENINGS”

or other wording.

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



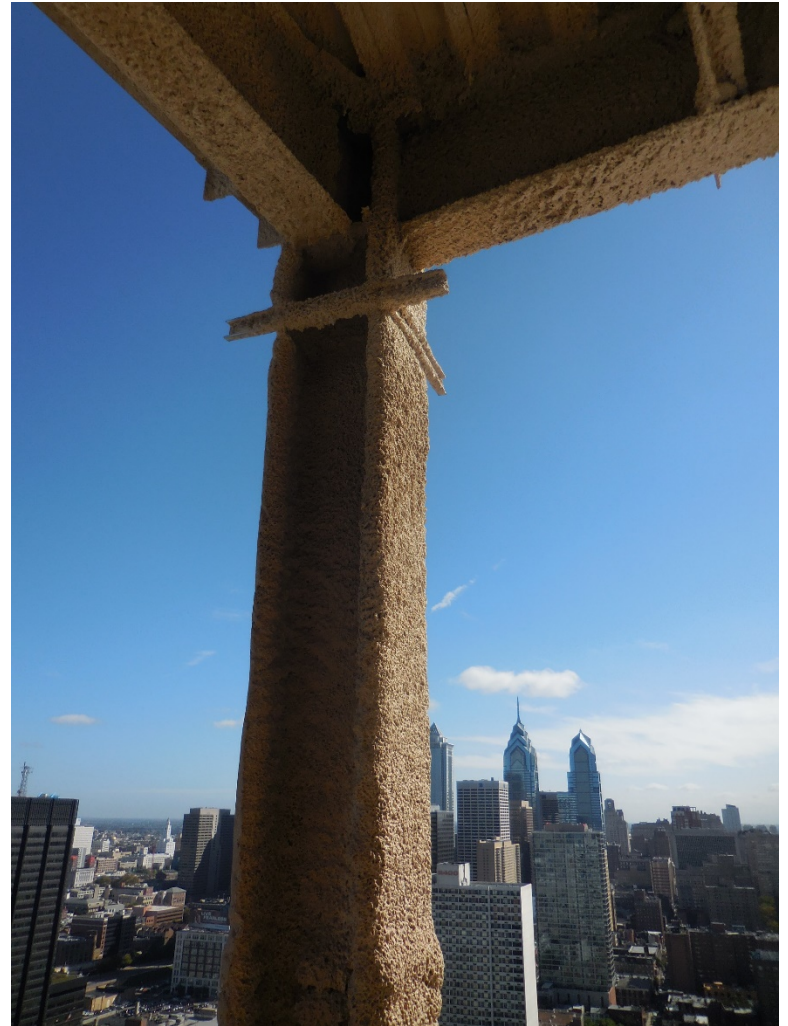
Gypsum Wallboard Repair Large Holes



Repairs of SFRM

General:

- All patching and repairs should be carried out with the same material applied to the assembly
- SFRM manufacturers require original product (or an approved equal – **the same type**) must be used for repairs



CARBOLINE PHOTO, CARBOLINE SLIDE FROM
NFCA STAFF ARTICLE, LIFE SAFETY DIGEST

Repairs of SFRM

If material can be identified, Fireproofing contractor should:

- Identify the material / element protected, via
 - field inspection,
 - specs/drawings,
 - markings, etc.
- Invite manufacturer rep along for possible field identification
- If identified, locate the fire test design (Listing) to determine thickness
- Repair in accordance with the manufacturers repair/installation instructions & listing

Repairs of SFRM

If material cannot be identified, fireproofing contractor should:

- Invite manufacturer rep for field ID
- Send samples manufacturer labs for analysis
- If manufacturer cannot be identified, identify type
 - ✓ SFRM (gypsum, fiber, Portland (low medium, high density))
- Repair with like 'type' to a listing that closely approximates the assembly listing
- AHJ must approve

Repairs of IFRM

General:

- All patching and repairs should be carried out with the same material applied to the assembly
- IFRM manufacturers require original product (or an approved equal – the same type) must be used for repairs



**CARBOLINE PHOTO, CARBOLINE SLIDE FROM
NFCA STAFF ARTICLE, LIFE SAFETY DIGEST**

Repairs of IFRM

If material can be identified, Fireproofing contractor should:

- Identify the material / element protected, via field inspection, specs/drawings, markings, etc.
- Invite manufacturer rep along for possible field identification
- If identified, locate the fire test design to determine thickness
- Repair in accordance with the manufacturers repair/installation instructions

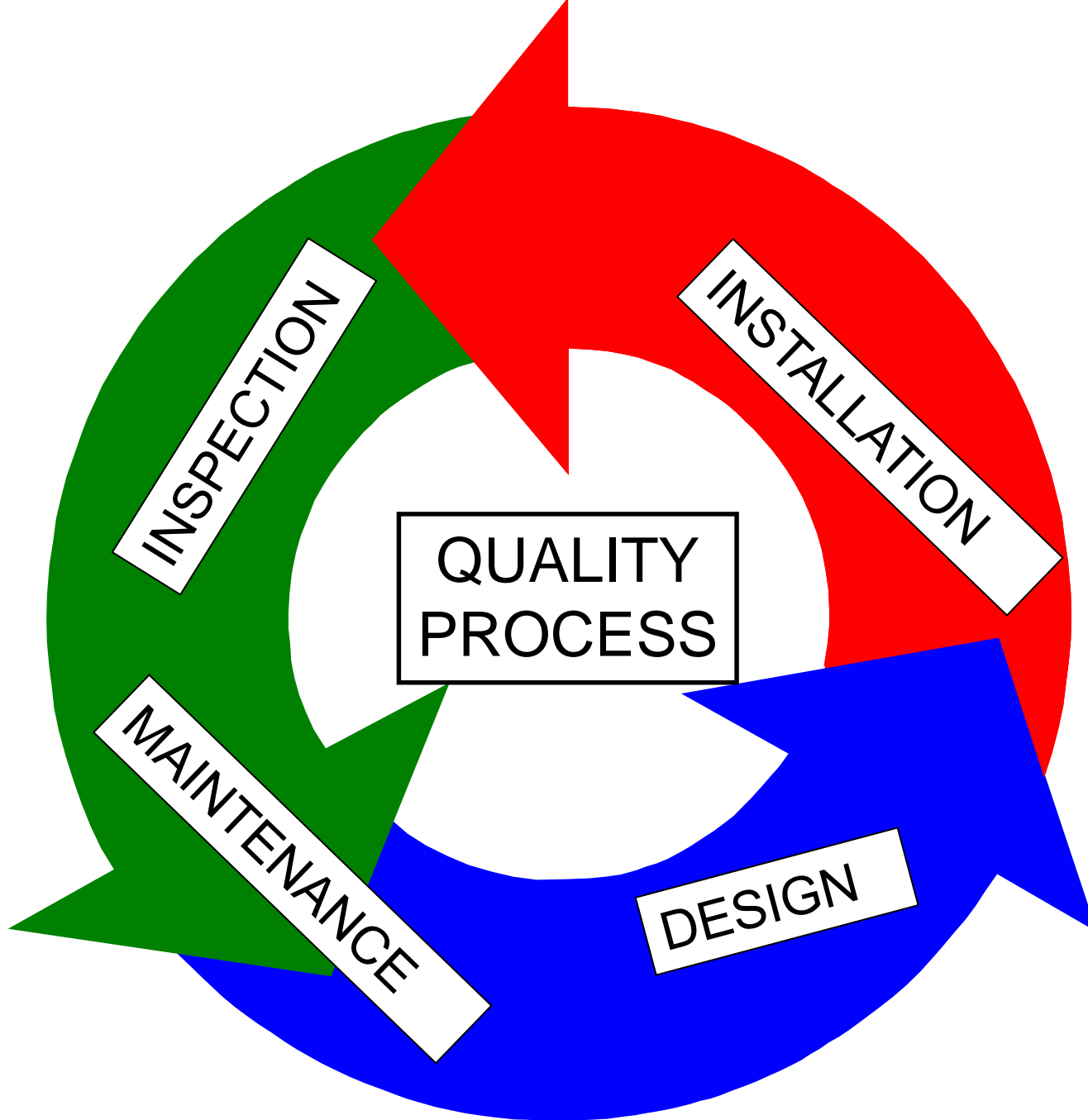
Repairs of IFRM

If material cannot be identified, fireproofing contractor should:

- Invite manufacturer rep for field ID
- Send samples manufacturer labs for analysis
- If manufacturer cannot be identified, identify type
 - ✓ IFRM (Solvent, Water, Epoxy)
- Repair with like 'type' to a listing that closely approximates the assembly listing
- AHJ must approve

“DIIM”

- Barriers are for Safety – DIIM
 - Properly **Designed** and Specified
 - **Tested and Listed Systems** – Directories,
 - Professional **Installation** - Companies
 - Properly **Inspected** – Commissioned
 - **Maintained** - Annually –
 - NFPA 101, NFPA 1
 - International Fire Code
 - International Property Maintenance Code



FCIA – Firestop Contractors International Association

- FREE MOP/Spec - Specifiers @ AE, Independent
- FREE Life Safety Digest
- FREE Spec @ www.FCIA.org
- Presentation @ www.FCIA.org
- Tools for Specifiers



Fire & Smoke Protection Features & the New 2018 International Fire Code 701 Requirements

**Bill McHugh
FCIA Executive Director**

Bill@FCIA.org

Slides – www.FCIA.org



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