



# FCIA Webinar – Gypsum Wall Patching

Firestop Contractors International  
Association

Hillside, IL – +1-708-202-1108 - office

Bill McHugh – bill @ fcia.org

Nestor Sanchez, USG Corp.

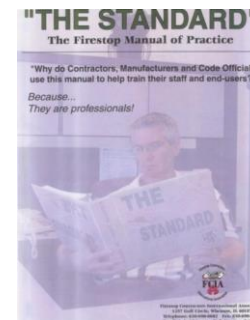
nsanchez@usg.com

# “DIIM”

- Firestopping & Fire Resistance for Safety – DIIM....
  - Properly **Designed** and Specified Firestopping FCIA - 07-84-00 - Specification
  - **Tested and Listed Systems** - ASTM E 814 – ASTM E 1966, ASTM E2307, UL1479, UL2079, FM 4990, ULC-S-115
  - Professional **Installation** – FCIA Member, FM 4991 Approved, UL/ULC Qualified Contractors
  - Properly **Inspected** - ASTM E 2174 / 2393 Protocol by IAS AC 291 Accredited Agencies
  - **Maintained & Managed** - Annually - FCIA Members – NFPA 101, International Fire Code

# Firestop Contractors International Association

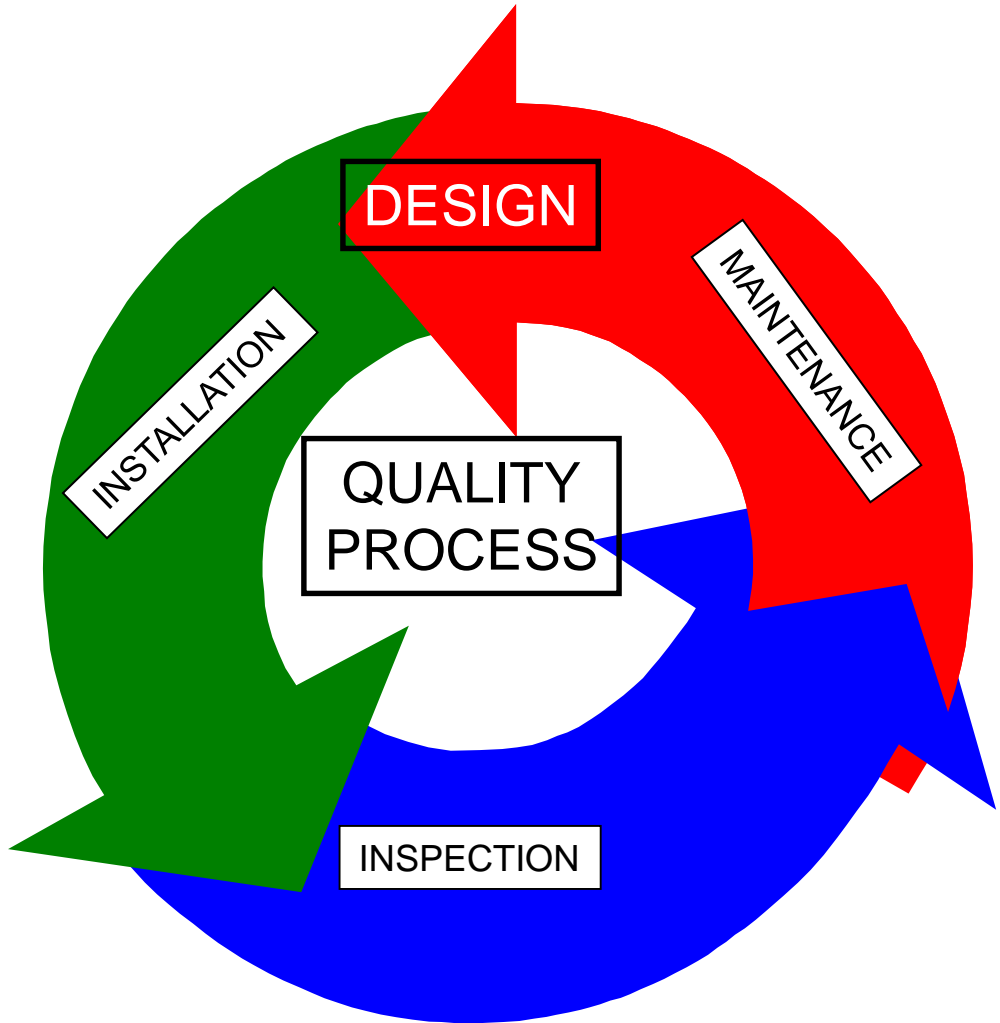
- FCIA – Worldwide Association
- Firestop Contractors, Manufacturers, Consultants, Reps, Distributors,
- Life Safety Digest
- FCIA Website Resources - FREE
- FCIA MOP on PDF FREE to Specifiers, Architects, Governmental Bldg./Fire Officials, worldwide..
  - [www.fcia.org](http://www.fcia.org)



# “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





DESIGN

MAINTENANCE

QUALITY  
PROCESS

INSPECTION

INSTALLATION

# Building & Fire Code Requirements

- NFPA 5000 – 101- Chapter 8
- National Building & Fire Code of Canada
- UAE Fire and Life Safety Code – Chapter 21
- International Codes –
  - New and Existing Buildings
    - International Building Code – Chapter 7
    - International Fire Code – Chapter 7
- ***Minimum requirements - Construction & Maintenance***



# Building & Fire Code Requirements

- Compartmentation Codes – US –
  - **Fire Resistance** – Time, in minutes or hours that materials or assemblies have withstood a fire exposure as...
    - **Determined by tests,**
    - **Methods based on tests, or**
    - **This code .... Section 722**
  - NFPA, Ch 8. **ICC adds... “Systems”**

# Fire Resistance - WALLS ONLY TODAY

**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 E 119 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.

[UL Guide Information]



# Fire Resistance

**703.3 Methods for determining fire resistance.** The application of any of the methods listed in this section shall be based on the fire exposure and acceptance criteria specified in ASTM E 119 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 E 119 or UL 263.
5. Alternative protection methods as allowed by Section 104.11.
6. Fire-resistance designs certified by an approved agency.

[IBC 2015, 703.3]

# Fire Resistance

## 705. Exterior Walls

**705.9 Joints.** Joints made in or between *exterior walls* required by this section to have a *fire-resistance rating* shall comply with Section 715.

**Exception:** Joints in *exterior walls* that are permitted to have unprotected openings.

**705.9.1 Voids.** The void created at the intersection of a floor/ceiling assembly and an exterior curtain wall assembly shall be protected in accordance with Section 715.4.

[IBC 2015, 703.3]

# Fire Resistance

## 706 Fire Walls

**706.5 Horizontal continuity.** *Fire walls* shall be continuous from *exterior wall* to *exterior wall* and shall extend not less than 18 inches (457 mm) beyond the exterior surface of *exterior walls*.

### Exceptions:

1. *Fire walls* shall be permitted to terminate at the interior surface of combustible exterior sheathing or siding provided the *exterior wall* has a *fire-resistance rating* of not less than 1 hour for a horizontal distance of not less than 4 feet (1220 mm) on both sides of the *fire wall*. Openings within such *exterior walls* shall be protected by opening protectives having a *fire protection rating* of not less than 3/4 hour.
2. *Fire walls* shall be permitted to terminate at the interior surface of noncombustible exterior sheathing, exterior siding or other noncombustible exterior finishes provided the sheathing, siding or other exterior noncombustible finish extends a horizontal distance of not less than 4 feet (1220 mm) on both sides of the *fire wall*.
3. *Fire walls* shall be permitted to terminate at the interior surface of noncombustible exterior sheathing where the building on each side of the *fire wall* is protected by an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2.

[IBC 2015, 703.3]

# Fire Resistance

## 706 Fire Walls

**706.5 Horizontal continuity.** *Fire walls* shall be continuous from *exterior wall* to *exterior wall* and shall extend not less than 18 inches (457 mm) beyond the exterior surface of *exterior walls*.

### Exceptions:

1. *Fire walls* shall be permitted to terminate at the interior surface of combustible exterior sheathing or siding provided the *exterior wall* has a *fire-resistance rating* of not less than 1 hour for a horizontal distance of not less than 4 feet (1220 mm) on both sides of the *fire wall*. Openings within such *exterior walls* shall be protected by opening protectives having a *fire protection rating* of not less than 3/4 hour.
2. *Fire walls* shall be permitted to terminate at the interior surface of noncombustible exterior sheathing, exterior siding or other noncombustible exterior finishes provided the sheathing, siding or other exterior noncombustible finish extends a horizontal distance of not less than 4 feet (1220 mm) on both sides of the *fire wall*.
3. *Fire walls* shall be permitted to terminate at the interior surface of noncombustible exterior sheathing where the building on each side of the *fire wall* is protected by an *automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2.

[IBC 2015, 703.3]

# Fire Resistance

## 706 Fire Walls

**706.6 Vertical continuity.** *Fire walls* shall extend from the foundation to a termination point not less than 30 inches (762 mm) above both adjacent roofs.

### Exceptions:

1. Stepped buildings in accordance with Section 706.6.1.
2. Two-hour fire-resistance-rated walls shall be permitted to terminate at the underside of the roof sheathing, deck or slab, provided:
  - 2.1. The lower roof assembly within 4 feet (1220 mm) of the wall has not less than a 1-hour *fire-resistance rating* and the entire length and span of supporting elements for the rated roof assembly has a *fire-resistance rating* of not less than 1 hour.
  - 2.2. Openings in the roof shall not be located within 4 feet (1220 mm) of the *fire wall*.
  - 2.3. Each building shall be provided with not less than a Class B roof covering.
3. Walls shall be permitted to terminate at the underside of noncombustible roof sheathing, deck or slabs where both buildings are provided with not less than a Class B roof covering. Openings in the roof shall not be located within 4 feet (1220 mm) of the *fire wall*. .... MORE EXCEPTIONS....

**[IBC 2015 706.6]**

# Fire Resistance

## 706 Fire Walls

**706.9 Penetrations.** Penetrations of *fire walls* shall comply with Section 714.

**706.10 Joints.** Joints made in or between *fire walls* shall comply with Section 715.

**[IBC 2015 706.9]**

# Fire Resistance

## 707 Fire Barriers

**707.5 Continuity.** *Fire barriers* shall extend from the top of the foundation or floor/ceiling assembly below to the underside of the floor or roof sheathing, slab or deck above and shall be securely attached thereto. Such *fire barriers* shall be continuous through concealed space, such as the space above a suspended ceiling. Joints and voids at intersections shall comply with Sections 707.8 and 707.9

**707.7 Penetrations.** Penetrations of *fire barriers* shall comply with Section 714.

**707.7.1 Prohibited penetrations.** Penetrations into enclosures for *exit access stairways* and *ramps*, *interior exit stairways* and *ramps*, and *exit passageways* shall be allowed only where permitted by Sections 1019, 1023.5 and 1024.6, respectively.

**[IBC 2015 707.7]**

# Fire Resistance

## 707 Fire Barriers

**707.8 Joints.** Joints made in or between *fire barriers*, and joints made at the intersection of *fire barriers* with underside of a fire-resistance-rated floor or roof sheathing, slab or deck above, and the exterior vertical wall intersection shall comply with Section 715.

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

**[IBC 2015 707]**



# Fire Resistance

## 708 Fire Partitions

**708.4 Continuity.** Fire partitions shall extend from the top of the foundation or floor/ceiling assembly below to the underside of the floor or roof sheathing, slab or deck above or to the fire-resistance-rated floor/ceiling or roof/ceiling assembly above, and shall be securely attached thereto. In combustible construction where the *fire partitions* are not required to be continuous to the sheathing, deck or slab, the space between

the ceiling and the sheathing, deck or slab above shall be fireblocked or draftstopped in accordance with Sections 718.2 and 718.3 at the partition line. The supporting construction shall be protected to afford the required *fire-resistance rating* of the wall supported, except for walls separating tenant spaces in *covered and open mall buildings*, walls separating *dwelling units*, walls separating *sleeping units* and *corridor* walls, in buildings of Type IIB, IIIB and VB construction.

**[IBC 708, Fire Partitions]**

# Fire Resistance

## 708 Fire Partitions

**Exception:** *Smoke-barrier* walls are not required in interstitial spaces where such spaces are designed and constructed with ceilings or *exterior walls* that provide resistance to the passage of fire and smoke equivalent to that provided by the *smoke-barrier* walls.

**709.4.1 Smoke-barrier walls separating smoke compartments.** *Smoke-barrier* walls used to separate smoke compartments shall form an effective membrane continuous from outside wall to outside wall.

**709.4.2 Smoke-barrier walls enclosing areas of refuge or elevator lobbies.** *Smoke-barrier* walls used to enclose areas of refuge in accordance with Section 1009.6.4, or to

enclose elevator lobbies in accordance with Section 405.4.3, 3007.6.2, or 3008.6.2, shall form an effective membrane enclosure that terminates at a *fire barrier* wall having a level of *fire protection rating* not less than 1 hour, another *smoke barrier* wall or an outside wall. A smoke and draft control door assembly as specified in Section 716.5.3.1 shall not be required at each elevator hoistway door opening or at each exit doorway between an area of refuge and the exit enclosure.

**708.7 Penetrations.** Penetrations of *fire partitions* shall comply with Section 714.

**708.8 Joints.** Joints made in or between *fire partitions* shall comply with Section 715.

[IBC 708, Fire Partitions]

# Fire Resistance

## 709 Smoke Barriers

**709.3 Fire-resistance rating.** A 1-hour *fire-resistance rating* is required for *smoke barriers*.

**Exception:** *Smoke barriers* constructed of minimum 0.10-inch-thick (2.5 mm) steel in Group I-3 buildings.

**709.4 Continuity.** *Smoke barriers* shall form an effective membrane continuous from the top of the foundation or floor/ceiling assembly below to the underside of the floor or roof sheathing, deck or slab above, including continuity through concealed spaces, such as those found above suspended ceilings, and interstitial structural and mechanical spaces. The supporting construction shall be protected to afford the required *fire-resistance rating* of the wall or floor supported in buildings of other than Type IIB, IIIB or VB construction. *Smoke barrier* walls used to separate smoke compartments shall comply with Section 709.4.1. *Smoke-barrier* walls used to enclose areas of refuge in accordance with Section 1009.6.4 or to enclose elevator lobbies in accordance with Section 405.4.3, 3007.6.2, or 3008.6.2 shall comply with Section

709.4.2.

**709.6 Penetrations.** Penetrations of *smoke barriers* shall comply with Section 714.

**709.7 Joints.** Joints made in or between *smoke barriers* shall comply with Section 715.

**[IBC 709, Smoke Barriers]**

# Fire Resistance

## 710 Smoke Partitions

**710.3 Fire-resistance rating.** Unless required elsewhere in the code, smoke partitions are not required to have a *fire-resistance rating*.

**710.4 Continuity.** Smoke partitions shall extend from the top of the foundation or floor below to the underside of the floor or roof sheathing, deck or slab above or to the underside of the ceiling above where the ceiling membrane is constructed to limit the transfer of smoke.

**710.6 Penetrations.** The space around penetrating items shall be filled with an *approved* material to limit the free passage of smoke.

**710.7 Joints.** Joints shall be filled with an *approved* material to limit the free passage of smoke.

**[IBC 710, Smoke Partitions]**

# Fire Resistance

## 711 Horizontal Assemblies

**711.2.4 Fire-resistance rating.** The *fire-resistance rating* of *horizontal assemblies* shall comply with Sections 711.2.4.1 through 711.2.4.6 but shall be not less than that required by the building type of construction.

**711.2.4.4 Separating smoke compartments.** Where the *horizontal assembly* is required to be a *smoke barrier*, the assembly shall comply with Section 709.

**[IBC 711, Horizontal Assemblies]**

# Fire Resistance

## 712 Vertical Openings

**712.1 General.** Each vertical opening shall comply in accordance with one of the protection methods in Sections 712.1.1 through 712.1.16.

**712.1.4 Penetrations.** Penetrations, concealed and unconcealed, shall be permitted where protected in accordance with Section 714.

**712.1.5 Joints.** Joints shall be permitted where complying with Section 712.1.5.1 or 712.1.5.2, as applicable.

**[IBC 712, Vertical Openings]**

# Fire Resistance

## 712 Vertical Openings

**712.1.5.1 Joints in or between horizontal assemblies.** Joints made in or between *horizontal assemblies* shall comply with Section 715. The void created at the intersection of a floor/ceiling assembly and an exterior curtain wall assembly shall be permitted where protected in accordance with Section 715.4.

**712.1.5.2 Joints in or between nonfire-resistance rated floor assemblies.** Joints in or between floor assemblies without a required *fire-resistance rating* shall be permitted where they comply with one of the following:

1. The joint shall be concealed within the cavity of a wall.
2. The joint shall be located above a ceiling.
3. The joint shall be sealed, treated or covered with an *approved* material or system to resist the free passage of flame and the products of combustion.

**Exception:** Joints meeting one of the exceptions listed in Section 715.1.

**[IBC 712, Vertical Openings]**

# Building & Fire Code Requirements

- Compartmentation Codes – US –
  - *Fire Resistance Continuity*
  - *Breaches - Openings & Penetrations*
  - *Robustness*



# 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

- Smoke Barriers
  - Healthcare
  - Other Occupancies
- IBC – Quantified L Rating for Firestops
- NFPA 101 - no quantified L Rating for Firestops

# Building & Fire Code Requirements

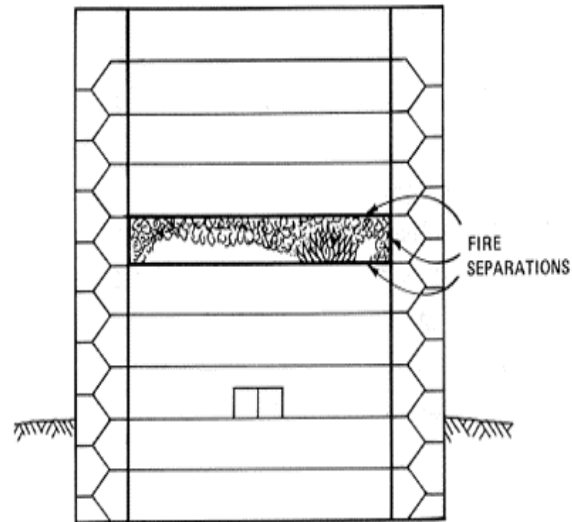
- **Compartmentation Codes – Breaches & Smoke**
  - **Smoke Barrier – Firestopping for Continuity**
    - IBC – Hourly Rated, “L” Rating
      - <5cfm/sf (IBC 2006)
      - < 50 cfm, 100sf of Wall Area (IBC 2009)
    - **NFPA – ... ‘restricting the passage of smoke’ ...  
no quantified “L” Rating**
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

# Building & Fire Code Requirements

- ***Continuous Fire Resistance***
  - **Walls / Horizontal Assemblies – Continuity**
    - Products Become Firestop Systems
    - Breaches in Fire Resistance for:
      - Penetrations
      - Joints – Head /Bottom of Wall – Perimeter Joints
      - Fire & Smoke Damper Duct Systems
      - Fire Doors and Hardware Systems
        - Rolling & Swinging
      - Fire Rated Glazing

# Fire Resistance Continuity All Occupancies

- Effective Compartmentation
  - Education
  - Office
  - Mercantile
  - Multi Family Residential
  - Industrial – Insurance influences
  - Institutional – Healthcare



# Buildings are Safe Because....

- ***Total Fire Protection Stats - North American High Rise***
  - ***11,025 Tall Buildings - 20 + stories***
  - ***70% in NY, SF, LA, CHI, HI, Toronto...***
    - ***2/3 Canada's high rise built before 1985***
- = *Compartmentation Primary in Older Structures***
- ***Chicago, NY, Toronto – Older stock of buildings***
  - ***SF, LA, HON – Earthquakes***

• *Source, Emporis.com*



# Buildings are Safe Because....

- ***Total Fire Protection***  
***= Safer buildings...***
- ***Compartmentation***
- ***Sprinklers, Alarms,***
- ***Egress Strategies***
- ***NIST Reports...***



# Continuity – Barriers, Walls & Horizontal Assemblies

- Fire Walls and Floors –
  - *Continuous Fire Resistance Rated Assemblies*

- Concrete
- Concrete Block
- Plaster
- Gypsum Block
- Gypsum Board / 'Drywall'
- Floor/Ceiling Assemblies

*"Tested & Listed Wall/Floor Systems"*





# Continuity

## Effective Compartmentation Features



New UL test standards for Life Safety Dampers will take effect in July 2002



# Firestopping for Continuity Products become SYSTEMS

- **F Rating - Flame**
  - T Rating – Temperature
  - H Rating – Hose
  - **L Rating – Smoke**
  - W Rating – Water



Products become Systems  
Hose Stream = Impact/Shock Test





# Fire Resistance - Patching

- ***Firestop Systems for Archaic Assemblies***
  - ***Identify the Assembly***
  - ***Visit Chapter 7, Section 722 to find fire resistance***
  - ***Patch with***
    - ***Same Material – Manufacturer recommendations***
    - ***Firestop System EJ***

# Engineering Judgments/EFRRA

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

## **IFC Guidelines for Evaluating Engineering Judgment Guidelines**

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

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

# **IFC EJ Guidelines - Engineering Judgments for firestop systems should:**

- 1. Not be used in lieu of tested systems when available;**
- 2. Be issued only by a firestop manufacturer's qualified technical personnel or in concert with the manufacturer by a knowledgeable registered Professional Engineer, Fire Protection Engineer, or an independent testing agency that provides listing services for firestop systems;**
- 3. Be based upon interpolation of previously tested firestop systems that are either sufficiently similar in nature or clearly bracket the conditions upon which the judgment is to be given.**

**Additional knowledge and technical interpretations based upon accepted engineering principles, fire science and fire testing guidelines (e.g. ASTM E 2032 – Standard Guide for Extension of Data from Fire Endurance Tests, ULC Subject C263E – Criteria for Use in Extension of Data from Fire Endurance Tests, or ASTM E2750 – Standard Guide for Extensions of Data for Penetration Seals) may also be used as further support data;**



# IFC EJ Guidelines

Engineering Judgments for firestop systems should:

- 4. Be based upon full knowledge of the elements of the construction to be protected, the understanding of the probable behavior of that construction and the recommended firestop system protecting it were they to be subjected to the appropriate Firestop Standard Fire Test method for the rating indicated on the Engineering Judgment;**
- 5. Be limited only to specific conditions and configurations upon which the engineering judgment was rendered and should be based upon reasonable performance expectations for the recommended firestop system under those conditions;**
- 6. Be accepted only for a single, specific job and project location and should not be transferred to any other job or project location without thorough and appropriate review of all aspects of the next job or location's circumstances.**

# **IFC EJ Guidelines - Basic Presentation Requirements**

**Proper EJ's should:**

- 1. Be presented in appropriately descriptive written form with or without detail drawings where appropriate;**
- 2. Clearly indicate that the recommended firestop system is an EJ;**
- 3. Include clear directions for the installation of the recommended firestop system;**
- 4. Include dates of issue and authorization signature as well as the issuer's name, address and telephone number;**
- 5. Reference tested system(s) upon which design (EJ) is based on;**
- 6. Identify the job name, project location and firm EJ is issued to along with the non-standard conditions and rating supported by the EJ;**

# IFC EJ Presentation Guidelines – What’s Seen?

7. Have proper justification (i.e. UL, Intertek or other independent laboratory system(s) and or opinions);
8. Provide complete descriptions of critical elements for the firestop configuration. These should include, but not be limited to the following:

## a. Basic, Common

- Type(s) of assembly used or being penetrated;
- Rating supported by the EJ.

## b. Through Penetrations

- Penetrating item(s) (type, size, etc.);
- Annular space requirements, (minimum, maximum, actual, nominal, etc.)
- Opening size;
- Firestop product(s) to be used, type and amount (thickness if applicable);
- Accessory items(s) (i.e. anchors, backing material, etc.)

## c. Joints

- Joint Width (installed width, nominal)
- Movement Capability;
- Movement Class (thermal wind sway, seismic);
- Accessory item(s) (i.e. insulation type, thickness and compression, etc.)

# IFC EJ Presentation Guidelines – What’s Seen?

**d•Duct Enclosure Systems – SEE [www.Firestop.org](http://www.Firestop.org)**

**e• Firestop System – annular space dimensions, floor/wall construction, design number, components, installed thickness.**

**f. Perimeter Fire Barrier Systems –**

- **Type(s) of assembly used or being penetrated;**
- **Hourly Rating required**
- **Closest Listed System upon which the EJ is based**
- **Joint Width**
- **Static or Dynamic**
- **Safing Insulation Types), thickness and compression, etc.**
- **Five Basic Principles**
  - 1. Mechanical Attachment of the Spandrel Insulation**
  - 2. Protection of the Mullions**
  - 3. Compression Fitting and Orientation of the Safing Insulation**
  - 4. Installation of a Reinforcement Member(s), stiffener, at the safe-off area behind the spandrel insulation.**
  - 5. Firestop Coating, type, thickness,**

# IFC EJ Presentation Guidelines – What's Seen?

## *f• Continuity Head-of-Wall Joints*

- Joint Width, (installed width, nominal)*
- Movement Capability*
- Movement Class – (thermal, wind sway, seismic)*
- Accessory Item(s) (i.e. insulation type, thickness, compression, etc.)*

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

***FCIA NOTE: Request manufacturer statement that they believe the EJ/EFRRRA shall pass a Fire Test to ASTM E-814,E-1966, UL 1479, UL 2079, ASTM E 2307...***



**GYPSUM ASSOCIATION**

6525 BELCREST ROAD, #480 HYATTSVILLE, MD 20782

## **REPAIR OF FIRE-RATED GYPSUM PANEL PRODUCT SYSTEMS**

(GA-225-15)

Fire-rated gypsum panel product systems may be damaged during the life cycle of buildings. To maintain the required fire-rated separation between occupancies or areas, damaged systems must be repaired so that they are restored to their original fire-resistive condition. The repair must follow procedures dictated by the severity of the damage.

Small holes (such as those caused by a door-knob) can be repaired by patching. To maintain the integrity of the surface membrane, a gypsum panel product patch must be mechanically secured in the diaphragm; attachment with joint compound material only is not acceptable. The patching material should be cut from type X or proprietary type X gypsum panel product of a thickness equal to the original materials so that the patching material is in the same geometric shape as, but slightly larger than, the damaged area. The damaged area is then further enlarged to match exactly the size of the patching material. Use caution when cutting or fastening into stud cavities to avoid electrical shock or water leaks. Thermal insulation, if present, must be restored. Metal runner track is secured to the inside edges of the damaged area. The patching material is screw attached to the exposed face of the runner track with fasteners a maximum of 8 in. (200 mm) apart. The patch should be treated with tape and joint compound to restore appearance, fire resistance qualities, and acoustical performance.

**NOTE:** Overlapping of joint tape can result in finishing problems.

Several alternative proprietary clip products are available which provide mechanical support for patching. Manufacturers of these products should be contacted for information.

If mechanically or environmentally caused damage covers more than 100 in<sup>2</sup> (700 cm<sup>2</sup>) in 100 ft<sup>2</sup> (10 m<sup>2</sup>) of wall or ceiling area, all materials in the damaged area back to the original framing must be removed to make the repair. Framing in the area to be repaired should be inspected and replaced if necessary without increasing original framing spacing. Replacement material should be cut to fill the opening and mechanically attached to the framing. Ends and edges of the board that are not backed by framing materials should be supported with metal runner track. The repaired area should be finished with tape and joint treatment compound as necessary.

Multiple-layer systems typically require that joints be staggered between layers. Proper repair of multiple-layer systems requires that face layers of board be removed beyond the base layer joint so as to retain the staggered joint feature.

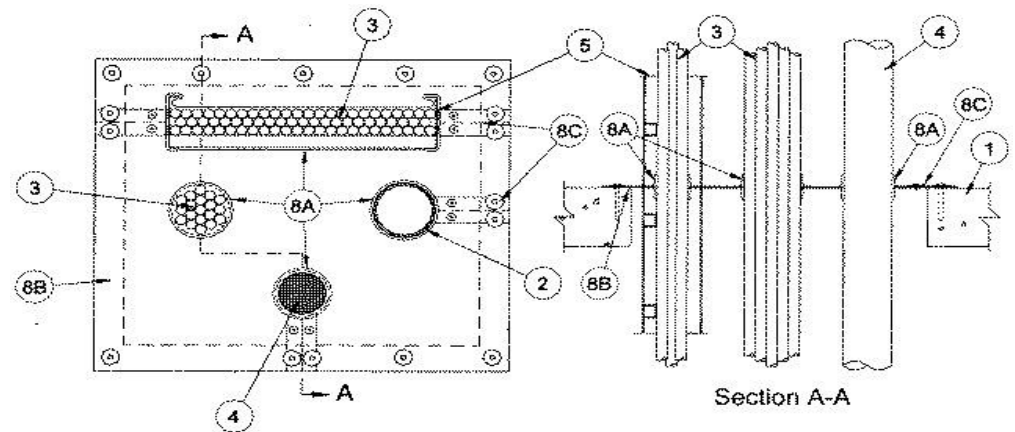
To improve the appearance of large areas that are in structurally sound, but aesthetically unacceptable condition, a new layer of regular or type X gypsum board may be attached to the existing surface with adhesive or mechanical fasteners without adversely affecting the fire resistance rating or acoustical performance.

# Fire Resistance - Patching



UL Systems  
HILTI, 3M, STI, photos

# Fire Resistance - Patching



UL Systems  
3M, STI, FCIA photo



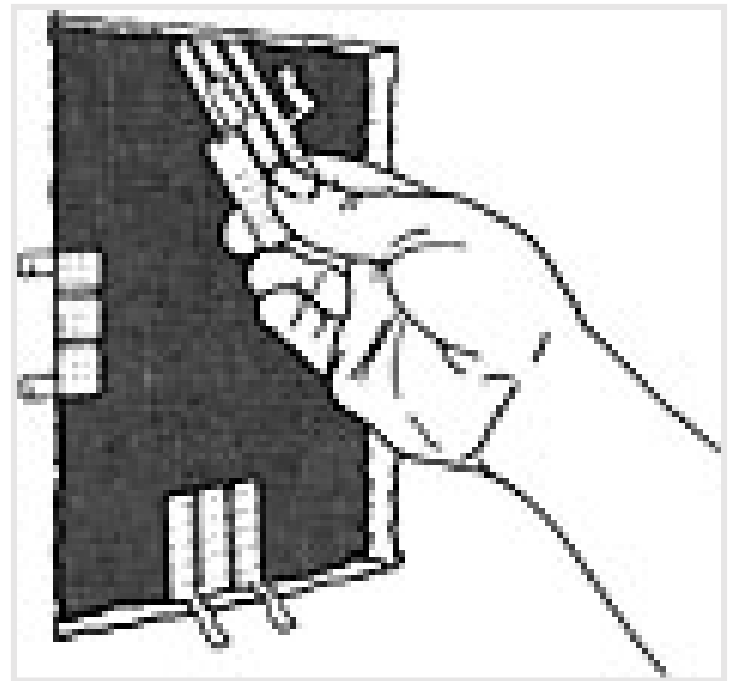
# Fire Resistance - Patching



UL Systems & EJ's  
AD photo

# Fire Resistance - Patching

- Fire Resistance Rated Patching Systems
- Gypsum Drywall Assembly





**GYPSUM ASSOCIATION**

6525 BELCREST ROAD, #480 HYATTSVILLE, MD 20782

## **REPAIR OF FIRE-RATED GYPSUM PANEL PRODUCT SYSTEMS**

(GA-225-15)

Fire-rated gypsum panel product systems may be damaged during the life cycle of buildings. To maintain the required fire-rated separation between occupancies or areas, damaged systems must be repaired so that they are restored to their original fire-resistive condition. The repair must follow procedures dictated by the severity of the damage.

Small holes (such as those caused by a door-knob) can be repaired by patching. To maintain the integrity of the surface membrane, a gypsum panel product patch must be mechanically secured in the diaphragm; attachment with joint compound material only is not acceptable. The patching material should be cut from type X or proprietary type X gypsum panel product of a thickness equal to the original materials so that the patching material is in the same geometric shape as, but slightly larger than, the damaged area. The damaged area is then further enlarged to match exactly the size of the patching material. Use caution when cutting or fastening into stud cavities to avoid electrical shock or water leaks. Thermal insulation, if present, must be restored. Metal runner track is secured to the inside edges of the damaged area. The patching material is screw attached to the exposed face of the runner track with fasteners a maximum of 8 in. (200 mm) apart. The patch should be treated with tape and joint compound to restore appearance, fire resistance qualities, and acoustical performance.

**NOTE:** Overlapping of joint tape can result in finishing problems.

Several alternative proprietary clip products are available which provide mechanical support for patching. Manufacturers of these products should be contacted for information.

If mechanically or environmentally caused damage covers more than 100 in<sup>2</sup> (700 cm<sup>2</sup>) in 100 ft<sup>2</sup> (10 m<sup>2</sup>) of wall or ceiling area, all materials in the damaged area back to the original framing must be removed to make the repair. Framing in the area to be repaired should be inspected and replaced if necessary without increasing original framing spacing. Replacement material should be cut to fill the opening and mechanically attached to the framing. Ends and edges of the board that are not backed by framing materials should be supported with metal runner track. The repaired area should be finished with tape and joint treatment compound as necessary.

Multiple-layer systems typically require that joints be staggered between layers. Proper repair of multiple-layer systems requires that face layers of board be removed beyond the base layer joint so as to retain the staggered joint feature.

To improve the appearance of large areas that are in structurally sound, but aesthetically unacceptable condition, a new layer of regular or type X gypsum board may be attached to the existing surface with adhesive or mechanical fasteners without adversely affecting the fire resistance rating or acoustical performance.

# Fire Resistance - Patching

- To Nestor Sanchez .....

# “DIIM”

- Firestopping for Safety – DIIM
  - Properly **Designed** and Specified Firestopping  
FCIA - 07-84-00 - Specification
  - **Tested and Listed Systems** - ASTM E 814 – ASTM E 1966, ASTM E2307, UL1479, UL2079, FM 4990, ULC-S-115
  - Professional **Installation** – FCIA Member, FM 4991 Approved, UL/ULC Qualified Contractors
  - Properly **Inspected** - ASTM E 2174 / 2393 Protocol by IAS AC 291 Accredited Agencies
  - **Maintained & Managed** - Annually - FCIA Members – NFPA 101, International Fire Code



## Contacts

Firestop Contractors International  
Association

Hillside, IL – +1-708-202-1108 - office

Bill McHugh – bill @ fcia.org