Maintenance of Fire Separations – Fire Resistance & Smoke Resistant Systems
DIIM&M – Maintenance (& Management)
• 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...

Includes Fire Dampers, Fire Doors...and Continuity
Firestop & Fire / Smoke Resistance
Fire Code

• What’s required?
• Maintenance
  – National Fire Code of Canada
    • Integrity Maintained
  – NFPA 101
    • Chapter
  – ICC’s IFC
    • 703.1 Requires
    • 703.1 Compliance??
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...

  NFC yes…but First, NBC...

  Includes Fire Dampers, Fire Doors…and Continuity
Compartmentation Codes – NBC

• Division A:1.4.1.2, NBCC 2010

• *Fire separation* means a construction assembly that acts as a barrier against the spread of fire. See Appendix A.

• *A fire separation* may or may not have a fire-resistance rating.
Compartmentation Codes – NBC

- Division A, 1.4.1.2
- Fire resistance rating means the time in minutes or hours that a material or assemblies of materials will withstand the passage of flame and the transmission of heat when exposed to fire under specified conditions of test and performance criteria, or as determined by extension or interpretation of information derived therefrom as prescribed in this Code.

- CAN/UL-S101 - Standard Methods of Fire Endurance Tests of Building Construction Materials
Compartmentation Codes – NBC

• **Division A, 1.4.1.2**

• **Fire-protection rating** means the time in minutes or hours that a **closure** will withstand the passage of flame when exposed to fire under specified conditions of test and performance criteria, or as otherwise prescribed in this Code.

• **Flame-spread rating** means an index or classification indicating the extent of spread-of-flame on the surface of a material or an assembly of materials as determined in a standard fire test as prescribed in this Code.
3.1.7.5. Rating of Supporting Construction

1) Except as permitted by Sentence (2) and by Articles 3.2.2.20. to 3.2.2.88. for mixed types of construction, all loadbearing walls, columns and arches in the storey immediately below a floor or roof assembly required to have a fire-resistance rating shall have a fire-resistance rating not less than that required for the supported floor or roof assembly.
A-2.2.6.2.(1) **Information Required on Drawings and Specifications.**
Examples of information that should be shown on architectural drawings and drawings for heating, ventilating and air-conditioning systems are..

*(n) the location and fire-resistance rating of required fire separations.*

**NOTE:** This is the root of the National Fire Code Change...
• **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...

*Includes Fire Dampers, Fire Doors...and Continuity*
National Fire Code of Canada

- **Division B – Part 2, Building and Occupant Fire Safety**
- **Fire Separation Integrity Maintained - How Often?**
  - Yearly?
  - Weekly?
  - Monthly?
  - Maintain Integrity
  - Not Specific Means ALWAYS...

- **Fire Separation Repaired with what?**
  - Original Construction Code?
  - Current Technology?
  - Mud and Tape? Non Firestop Foam?
  - Systems...or to as originally permitted.
National Fire Code of Canada

- Division B – Part 2, Building and Occupant Fire Safety
- Fire Separation & Features of Protection
- Gypsum Wallboard, Concrete Block, Concrete, Other Assemblies
- Fire Dampers
- Fire Rated Swinging & Rolling Doors
- Fire Rated Glazing
- Firestopping
SECTION 4.5.8 Maintenance, Inspection, and Testing.

4.5.8.1 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. [NFPA 101-2012:4.6.12.1]
NFPA 101-2012

4.5.8.2 No existing life safety feature shall be removed or reduced where such feature is a requirement for new construction. [101:4.6.12.2]

4.5.8.3* 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]

4.5.8.4 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. [101:4.6.12.4]

4.5.8.5 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. [NFPA 101-2012:4.6.12.5]
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.
Firestop & Fire / Smoke Resistance Maintenance – How?

• Records of Inspections
  – Life Safety Drawings?
  – “Replaced when Damaged…”
    • Tested and Listed systems and manufacturers installation instructions?
    • Generic Materials?
Firestop & Fire / Smoke Resistance Maintenance – How?

• **Records of Repairs**
  – Tested and Listed systems
  – Manufacturers installation instructions.
  – Contractor
  – Checklist
    • Electronic APPS
    • Paper
    • Spreadsheets
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.
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.
SECTION 703 - FIRE-RESISTANCE-RATED CONSTRUCTION

703.1 Maintenance. (continued) 703.1.1 Fireblocking and draftstopping. Required Fireblocking and draftstopping in combustible concealed spaces shall be maintained to provide continuity and integrity of the construction.

703.1.2 Smoke barriers and smoke partitions. Required smoke barriers and smoke partitions shall be maintained to prevent the passage of smoke. Openings protected with approved smoke barrier doors or smoke dampers shall be maintained in accordance with NFPA 105.

703.1.3 Fire walls, fire barriers and fire partitions.
Required fire walls, fire barriers and fire partitions shall be maintained to prevent the passage of fire. Openings protected with approved doors or fire dampers shall be maintained in accordance with NFPA 80.
Fire Code Action Committee
F113 Proposal

701.2 Fire-resistance-rated construction. The fire-resistance rating of the following fire-resistance-rated construction shall be maintained:

1. Structural members.
2. Exterior walls.
3. Fire walls, fire barriers, fire partitions.
4. Horizontal assemblies.
5. Shaft enclosures
701 General – ALL Fire Resistance
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.
• **701.6, Continued...PC2**

• **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.
• 703.1 ... Continued. PC 1
The materials and firestop systems shall be securely attached to or bonded to the construction being penetrated with no openings visible through or into the cavity of the construction. Where the system design number is known, the system shall be inspected to the listing criteria and manufacturer's installation instruction.
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

- **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
Barrier Management Begins when new construction ends...
M–Barrier Management Systems

• NEW Buildings – 07-84-00 Specs (CAN/US)
  – SYSTEMS Expectations
  – As Built SYSTEMS
  – SYSTEMS from Testing Labs, MANUFACTURERS
  – Installation to SYSTEMS
  – Inspection to SYSTEMS
  – REFERENCE MF 2016 – DIVISION 1, SYSTEMS
    • AS BUILT DOCUMENTATION REQUIRED
M–Barrier Management Systems

• Hospitals
• Nursing Homes?
• High Rise Construction?
• Dorms & Educational Buildings?
• Apartments and Condos?
• Assembly?
• Control ‘Holemakers’?
Barrier Management HUB

• A HUB must control all Action
  – C-Suite Execs
  – Construction – In House & Outside
  – I-T Department – In House & Outside

• The HUB is
  – Facility Director
  – Risk Management

• Safer Buildings
  – Purchaser/Renter of Space
M–Barrier Management Systems

• Barrier Management Policy - Controls
  – In House Construction
    • Electricians
    • I-T Crews
    • Plumbing & HVAC
    • Others
  – Outside Contractors
    • I-T Crews, Electricians, Plumbing & HVAC
    • Firestop Contractors
M–Barrier Management Systems

• **Barrier Management Policy - Process**
  – In House Crews and Outside Contractors
    • Above Ceiling Permit Application
    • Firewall and Fire Separation Permit Application
      – Barriers to be Breached
      – Statement of Barrier Conditions
      – Systems, Manufacturers Installation Instructions
    • Permit Granted – Visible Markings in Work Area
      – Workers
      – Ladders, Armbands, etc.
  • **Completion Procedure**
    – Inventory
    – Documentation
  • **Permit Expiry Date**
Barrier Management
Policy = Tool

• Facility Management Communicates...
  – Rules of Engagement in Contracts
    • Internal Contracts
    • External Contracts
  – Pre Construction Meetings
  – Barrier Warnings - Markings
  – Violation Consequences
  – Ongoing Management
  – Staff Education & Incentives
Barrier Management
Policy = Tool

• Facility Management Communicates:
  – Rules of Engagement in Contracts
    • Internal Contracts
    • External Contracts
  – Pre Construction Meetings
  – Barrier Warnings - Markings
  – Violation Consequences
  – Ongoing Management
  – Staff Education & Incentives
Barrier Management Policy Tool

– Rules of Engagement in Contracts

• Internal Contracts -
  – In House Departments similar to Outside Contractors

• External Contracts
  – GC Contracts
  – Marked Fire - Smoke Barrier - Actions
  – Barrier Permits
  – Documentation
  – Report
M–Barrier Management Systems

• Common Elements
  – Life Safety Drawings, Fire Separation Inventory
  – Existing Conditions Documented
  – Ongoing Survey Records
  – Deficiency Reports
  – Systems Documentation Control, Retrieval
M–Barrier Management Systems

• Document & Control

• Fire Resistance Rated & Smoke Resistant
  – Barrier Walls, Floors
  – Firestop Systems - Penetrations & Joints
  – Fire Doors – Rolling & Swinging
  – Fire Rated Glazing
  – Fire/Smoke, Combination Dampers
Repair Small Holes

USG Photo
Repair Large Holes

Partial Elevation - 1
Firestop & Fire / Smoke Resistance Maintenance – How?

• Tracking – Barrier Management Initiatives
  – Paper – Files, pictures, manually track.
  – Software – Spreadsheets, Software Systems
  – APPS – Access by mobile
  – Labeling – Key to Barrier Management Systems
M–Barrier Management Systems

• Electronic Best Practice Elements
  – Action Oriented
    • Projects - Specifications
    • Ongoing Surveys – FCIA RPPS 2010-1
  – Action Reminders
  – In Process Status
  – Record Retrieval
Sample Permit – Area

Gleeson Powers Graphic
## Life Safety Details

<table>
<thead>
<tr>
<th>LSR Data</th>
<th>Status</th>
<th>Latest Photo</th>
<th>Detail Description</th>
<th>Life Safety Test</th>
<th>Life Safety Sub-Test</th>
<th>Letters</th>
<th>Numbers</th>
<th>LSR Count</th>
<th>Notes</th>
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</thead>
<tbody>
<tr>
<td>001</td>
<td>Non-compliant</td>
<td><img src="image1.jpg" alt="image" /></td>
<td>Firestopping Through Wall Penetration - Firestop</td>
<td>Firestopping</td>
<td>Through Wall Penetration</td>
<td>WL</td>
<td>1000-1999</td>
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<td>002</td>
<td>Compliant</td>
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<td>Firestopping</td>
<td>Through Wall Penetration</td>
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<td>Compliant</td>
<td><img src="image3.jpg" alt="image" /></td>
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<td>Firestopping</td>
<td>Through Wall Penetration</td>
<td>WL</td>
<td>5000-5999</td>
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<td>EZ Path</td>
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<td>004</td>
<td>Compliant</td>
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<td>Through Wall Penetration</td>
<td>WL</td>
<td>3000-3999</td>
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</table>
## Corrective Action Report

**Building/Floor/Area:** Building 1 \ 3rd Floor \ 3C1/3L1  
**LSR # - Detail #:** LST-B1-03-007 - 001

<table>
<thead>
<tr>
<th>Life Safety Type</th>
<th>Firestopping</th>
<th>Life Safety Sub Type</th>
<th>Through Wall Penetration - Firestop Systems</th>
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</thead>
<tbody>
<tr>
<td>Penetration Type</td>
<td>EVT or Conduit</td>
<td>Penetration Size</td>
<td>Max 1”</td>
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<tr>
<td>Wall Rating Type</td>
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<td>Annular Space</td>
<td>MIN: 0 to .50”, MAX:</td>
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<td>Date Completed</td>
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<td>Classified System</td>
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<td>Deficiency Description</td>
<td>No firestopping</td>
<td>Survey #</td>
<td>Survey</td>
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<tr>
<td>Survey Notes</td>
<td>CA Notes:</td>
<td>Survey Date:</td>
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<tr>
<td>Suggested CA Notes</td>
<td>Install UL Listed Firestopping System at penetration/joint</td>
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<td></td>
</tr>
</tbody>
</table>

### Survey Photos

**Side: 1: 3C1**  
Photo ID: 37296  
Photo Notes:  
Survey Photo

**Side: 2: 3L1**  
Photo ID: 37297  
Photo Notes:  
Survey Photo

### Corrective Action Photos

**Side: 1: 3C1**  
Photo ID: 37298  
Photo Notes:  
Corrective Action Photo

**Side: 2: 3L1**  
Photo ID: 37299  
Photo Notes:  
Corrective Action Photo
Barrier Management Policy Tool

• Pre Construction Meetings - Education
  – Barrier Markings Mean...
  – Actions when at Barriers Required...
    • Permit required – Above Ceiling, Barrier Hole...
    • Infection Control Rules
    • Healthcare facility Rules
Barrier Management Policy Tool

– Barrier Warnings on ASSEMBLIES
Barrier Management Policy
= Tool to Comply w/NFC

• “Integrity Maintained…..”
  – Building Owner and Manager Responsibility
  – Continuous Maintenance
  – Manage Holes in Fire Separations
  – Barriers - Fire Separation Permits?
Barrier Management
Policy = Tool
Barrier Management Policy Tool

• Control Access to Fire Separation Work

  – In House –
  • Carpenters, Electricians, Plumbing/HVAC

  – Outside Contractors
  • Carpenters, Electricians, Plumbing/HVAC
  • Firestop Contractors
Barrier Management Policy Tool

**Process**
- Apply to perform work at barriers.
- Permits by Project, Area, Building
- Permit reviewed:
  - Service compliance
  - Fire Resistance compliance
- Permit Granted
  - Sleeve Band on people
  - Ladder Stickers
  - Paper
  - Electronic Files
- Notify Area of Work to commence/finish
- Permit Expiration Dates
Barrier Management Policy Tool

• Violation Consequences
  – In House –
    • 2 strikes & work reassignment to cleaning...
    • Others...
  – Outside Contractors
    • 2 strikes & not allowed to work above ceilings
    • Others...
Barrier Management Policy Tool

• Ongoing Management
  – Engineering Staff Reviews
  – User Staff Reviews
  – Inside Construction
  – Outside Contractor
M–Barrier Management Systems Policies

• **Barrier Management Policy**
  – **Inventory**
  – **Monitor**
  – **Permits**
  – **Management**
  – **Request Budget to Meet Code Requirements**
  – **Implement Maintenance**
    • **In House (Rules)**
    • **Outside Contractor (Rules)**
M–Barrier Management Systems
Policies

• Barrier Management Policy
  – Inventory - Items to Survey
  – Fire-Resistance-Rated Walls and Floors
    • Breaches for Penetrations, Joints, Doors, etc.
    • Wall not completed at new construction?
    • Wall removed above ceiling?
  – Treat the breach, intersection, joint, gap, void, space, contact areas...
M–Barrier Management Systems
Starts with CONSTRUCTION

• **Fire-Resistance-Rated Walls & Floors**
  – Walls - U, V 400, 900 Designs
  – Floors – P Designs
  – Calculated Fire Resistance
  – Code Defined Fire Resistance - 720
    • Firestop Systems
    • Fire & Smoke Dampers
    • Fire Rated Rolling & Swinging Doors
    • Fire Rated Glazing
M–Barrier Management Systems Operations

• Items to Survey
  • Fire-Rated Doors – Annually – NFPA 80
    – Close and Latch
    – Holes
    – Attach at Frame
    – Undercut & Astragals
    – Labels Legible
    – Labels recertified, requirements of 3rd party certification agency
M–Barrier Management Systems Operations

• **Firestop Systems – Not Concealed Only**

• **Through & Membrane Penetrations**
  – Joints
    • Wall to Wall
    • Floor to Floor
    • Head – Bottom of Wall
    • Continuity Head of Wall
  – Perimeter Fire Containment
M–Barrier Management Systems
Operations

• Firestop Systems – SYSTEMS
  – Visibly Comply with System
  – Visibly ‘sealed’
  – Without openings
  – Firestop Materials & Systems
  – Securely Attached
M– Barrier Management Systems

Items to Survey

Fire & Smoke, Ceiling, Radiation Dampers

• NFPA 80 –
• Initial Installation
• At 1 year, each 4 years,
• 6 years healthcare
  • Fire Dampers
  • Smoke Dampers
  • Combination Fire/Smoke Dampers
  • Ceiling Dampers
M–Barrier Management Systems
Items to Survey

• **Fire Rated Glazing**
  – Verify it’s still fire rated
  – Glazing / Frame Attachment
  – Frame attached to wall
  – Glazing Marking as Built
Barrier Management
Policy Tool

• Education - Healthcare Staff – Simple??
  – Fire Doors & Hardware – Simple things...
    • Close & Latch
    • Holes in Door
  – Ladder = ?? Permit Sticker?
  – Fire Rated Walls - Holes
    • Accidental
    • Workers
Built Right = Maintain Right
WHEN SPECIFIED

• Why Specifications Division 01-78-00?

  – **Fire Resistance Inventory REQUIRED** -
    • Fire Rated Walls & Floors
    • Firestop Systems
    • Fire & Smoke Dampers
    • Fire Rated Rolling & Swinging Doors
    • Fire Rated Glazing
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...

Includes Fire Dampers, Fire Doors...and Continuity
“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
QUALITY PROCESS

- Inspection
- Installation
- Maintenance
- Design
Effective Compartmentation is a SYSTEM
“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
Proper ‘DCIIIM’ Means Reliable Systems...

- Properly Designed - A/E - Consultant
  - Tested and Listed Systems, FCIA Member Mfr’s., Compartments to IBC, NFPA, NBC, Local Codes, SUBMITTALS....Specified (CCS, CDT, RSW)

- Properly Coordinated & Installed
  - FCIA Member, FM 4991, or UL Qualified Contractors

- Properly Inspected
  - ASTM E 2174 & ASTM E 2393,
  - Inspectors, who Passed the FM or UL Firestop Exam, IFC
  - IAS AC 291 Accredited Inspection Firms

- Properly Maintained & Managed –
  - FCIA Member, FM 4991, or UL-ULC Qualified Firms
  - Surveys by FCIA Member, FM, UL Qualified, IAS Accredited
Effective Compartmentation is a SYSTEM

New UL test standards for Life Safety Dampers will take effect in July 2002
FCIA Canada Symposium
Fire Separations – Fire Resistance & Smoke Resistant Systems