AIA25

Barrier Management for Compliance in Healthcare Facilities

Course Number: BMP-25

Friday, June 6th 10:30am-11:00am

Learning Units: 1 LU/HSW

1

AIA25 Conference on Architecture & Design

Keep space clear for closed captioning

2

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Questions related to specific products and services may be addressed at the conclusion of this presentation.

3

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About the Presenter

John Zalepka

Director of Training & Industry Engagements, Specified Technologies Inc.

- Over a decade of experience in firestopping, specification support, and industry education
- Leads STI's accredited training programs, reaching 20,000+ professionals annually
- Regular speaker at national events including AIA, CSI, and ASHE conferences
- Chair of the Communication/Education Committee for the International Firestop Council
- Developed dozens of AIA-approved courses focused on life-safety and code compliance
- Passionate about helping architects reduce liability and design for performance

4

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Course / Learning Objectives

- Recognize the importance of a preconstruction risk assessment and the IBC special inspection for firestopping requirement prior to construction.
- Discuss the process used to ensure fire and smoke rated barrier compliance during safety inspection commissioning.
- Differentiate between common fire protection and life safety code sections in the IBC (Division 7) and NFPA 101.
- Discuss procedures that can be implemented to assist with fire and smoke barrier compliance during the preconstruction stage.
- Summarize what a solid Standard Operating Practice (SOP) for passive fire protection should consist of.
- Identify tools, best practices and procedures to achieve life safety code compliance in fire, smoke, and acoustical assemblies during all phases of the buildings life cycle.

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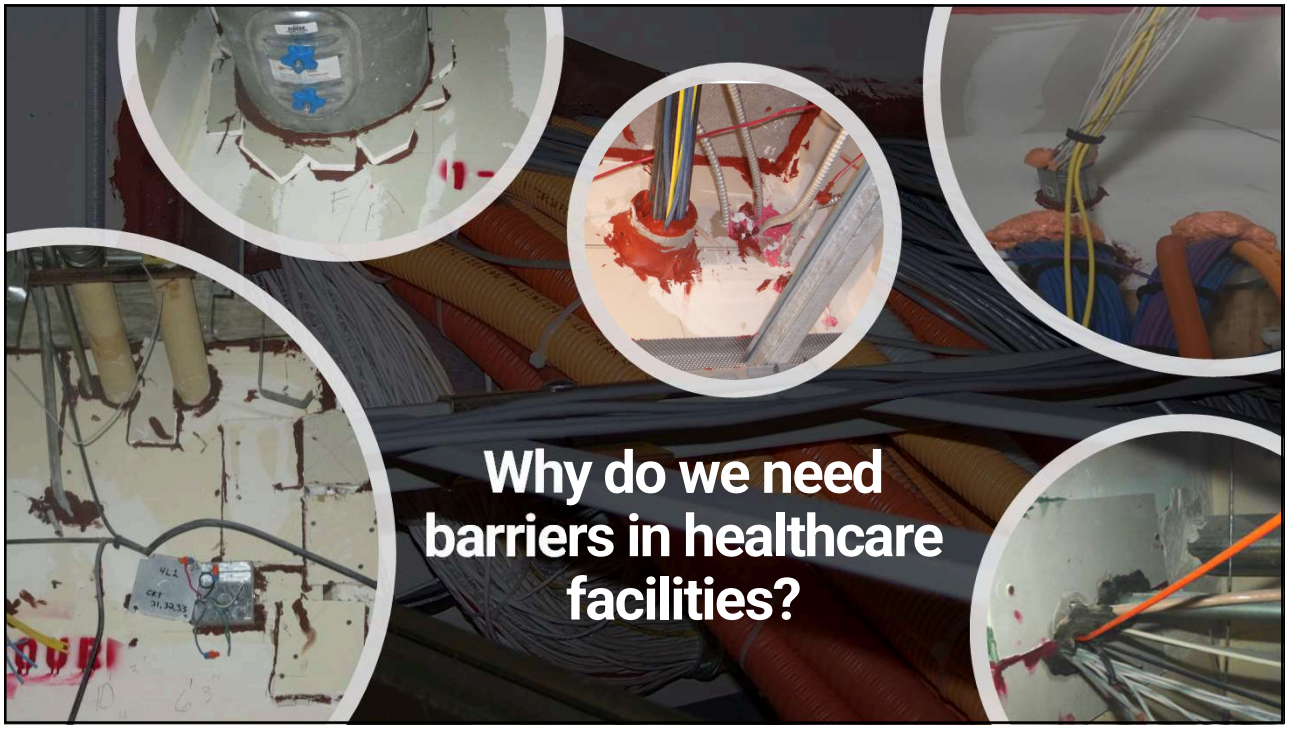


6

Why do we need barriers in healthcare facilities?

Defend-in-Place Fire Strategy *(NFPA 101)*

- **Fire Containment**: Limits the spread of flames, protecting patients and staff.
- **Smoke Control**: Prevents toxic smoke from spreading, ensuring safer egress.

Patient Privacy *(HIPAA)*

- **Sound Attenuation**: Reduces noise transmission, protecting patient privacy and promoting a healing environment.

Air Pressure Management *(NFPA 99 / ANSI/ASHRAE/ASHE Standard 170)*

- Helps control airflow in critical spaces like operating rooms (positive) and isolation rooms (negative), reducing contamination risks.

7

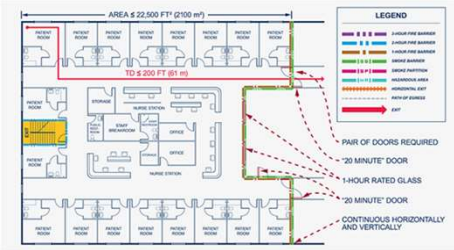
Key Principles of Balanced Fire Protection

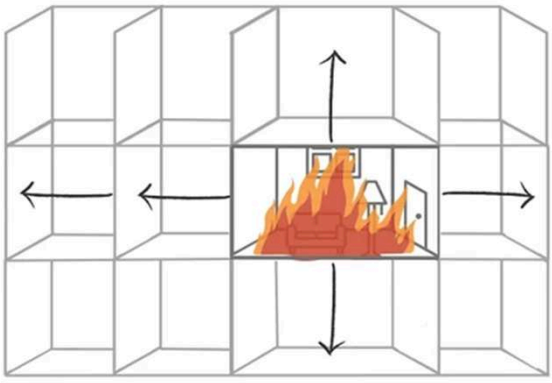
1. Early **Detection**
   - Smoke, Heat, and CO Detectors
   - Fire Alarm and Monitoring Systems
2. Active **Suppression**
   - Sprinkler Systems
   - Portable Fire Extinguishers
3. Passive **Containment**
   - Compartmentalization
   - Fire-Rated Walls & Floors
   - Smoke Barriers & Partitions
   - Doors, Windows, Dampers, etc.
   - Firestop Systems

8

Containment in construction

1st layer: The Room
2nd layer: Smoke Compartments
3rd layer: Floors
4th layer: Building Components
5th layer: Exits





Compartmentation is critical for a successful defend-in-place strategy

9

Code Requirements

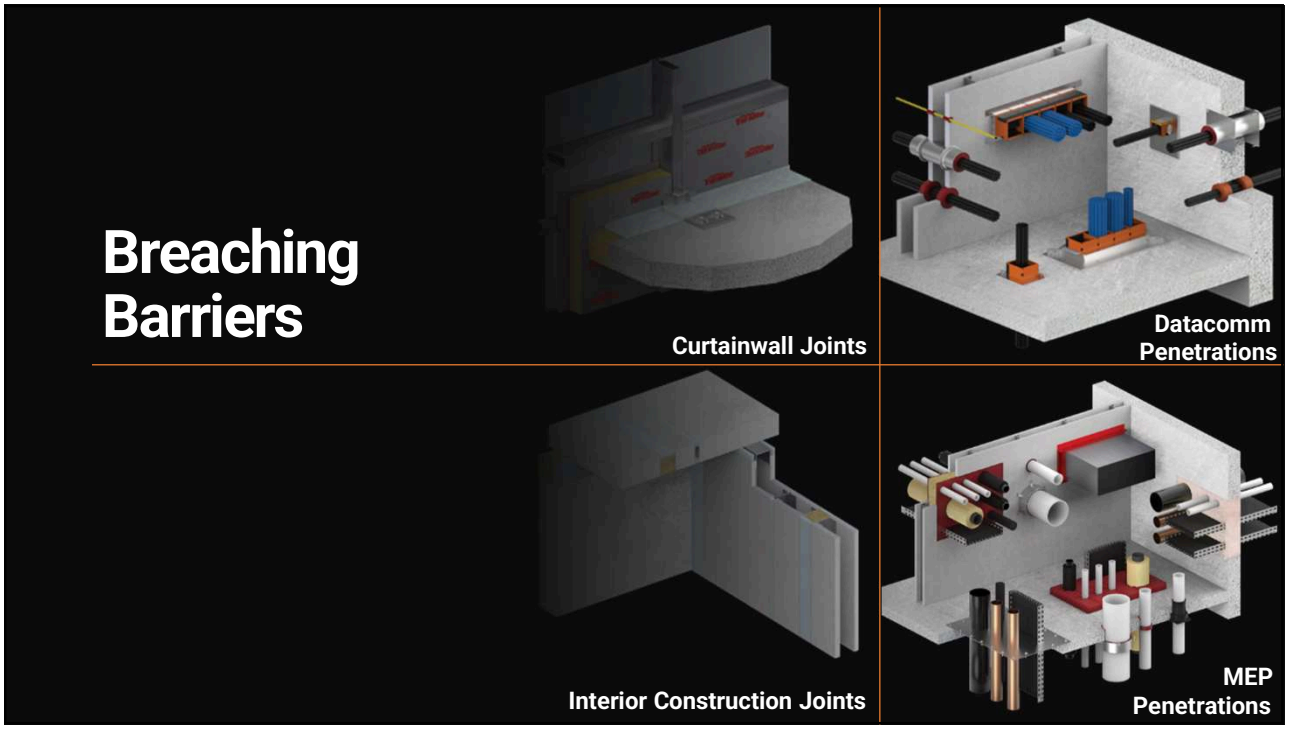
Building Design & Construction
- IBC (International Building Code)
- Local/Regional Code

Ongoing Facility Operations
- NFPA 101 (Life Safety Code)
- NFPA 99 (Healthcare Facilities Code)

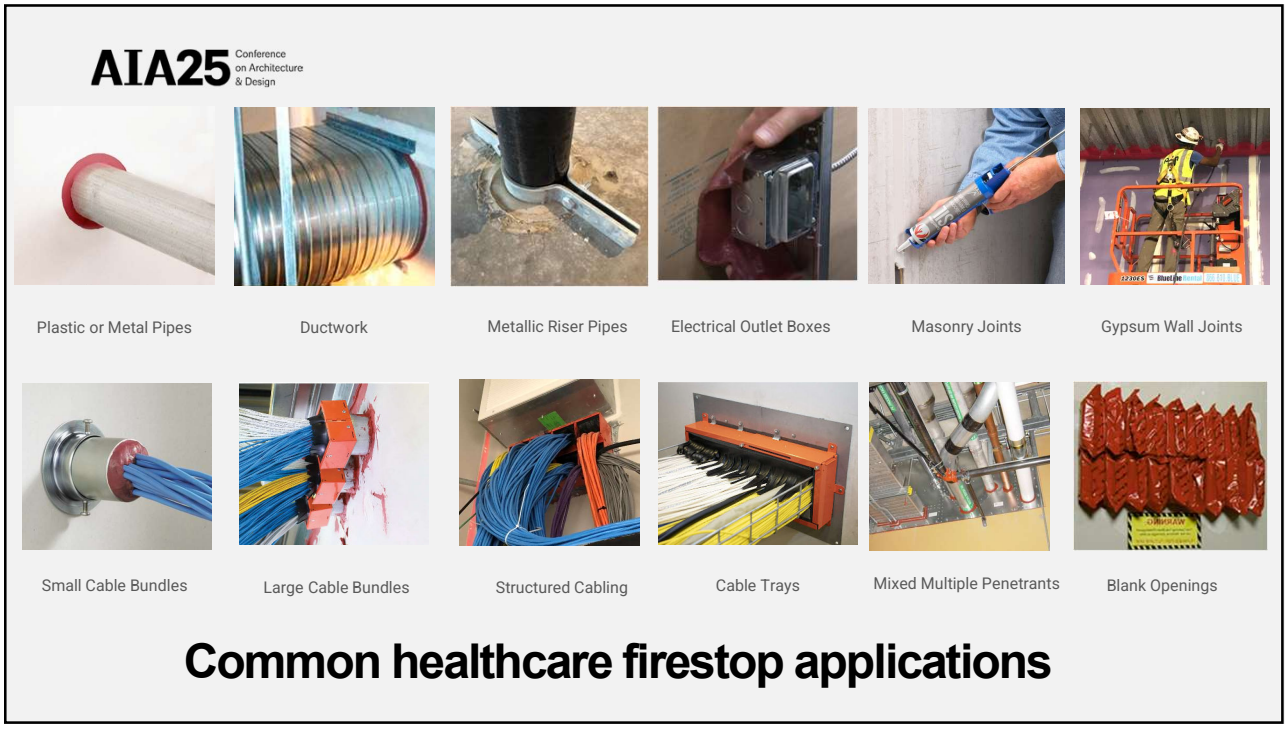
Inspections & Compliance
- CMS (AHJ)
- TJC, HFAP, DNV (Accrediting Orgs.)

CMS
CENTERS FOR MEDICARE & MEDICAID SERVICES
The Joint Commission
HFAP
DNV

10


Breaching Barriers
Curtainwall Joints
Datacomm Penetrations
Interior Construction Joints
MEP Penetrations

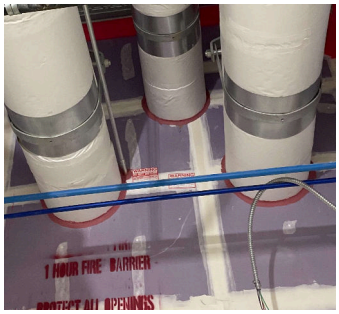
11


AIA25 Conference on Architecture & Design
Plastic or Metal Pipes
Ductwork
Metallic Riser Pipes
Electrical Outlet Boxes
Masonry Joints
Gypsum Wall Joints
Small Cable Bundles
Large Cable Bundles
Structured Cabling
Cable Trays
Mixed Multiple Penetrants
Blank Openings
Common healthcare firestop applications

12

What is firestopping?

The process of sealing openings around penetrating items or in construction joints to restore hourly fire resistance ratings



A barrier with unsealed openings has been compromised

13

Recognized and accredited third-party test facilities (US)

Tests conducted per ASTM & UL code-required standards

UL Solutions

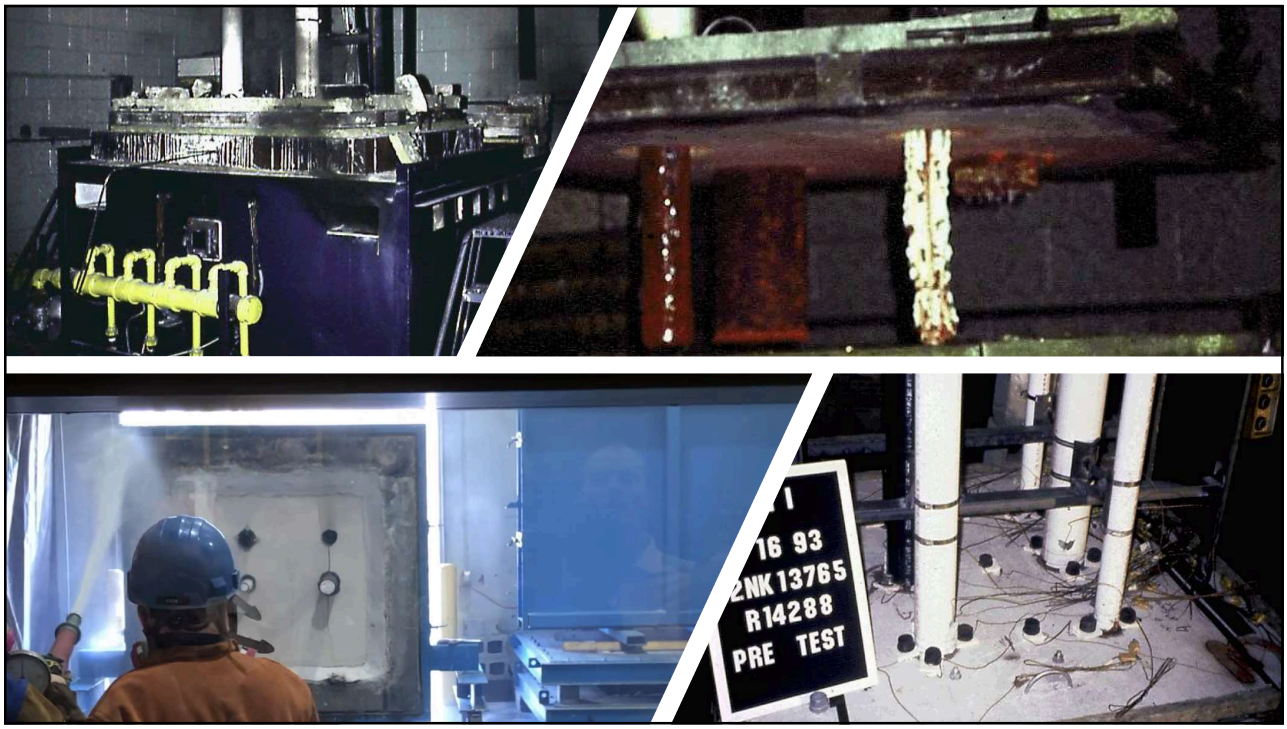
intertek
Total Quality. Assured.

FM Approvals®
Member of the FM Global Group

"Nationally recognized testing laboratories" are of equal status in regulations (code acceptance)

Each test lab publishes its own listing directory

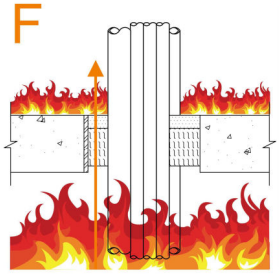
14



15

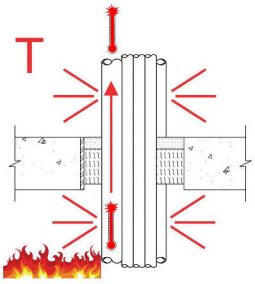
Firestop System Ratings

F



The time-period that the through-penetration firestop system limits the spread of fire through the penetration when tested in accordance with ASTM E 814 or UL1479.

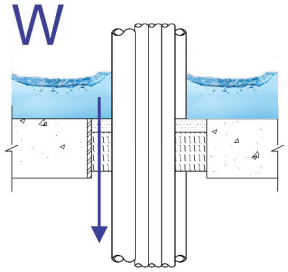
T



The time it takes for a single point on the non-fire side to reach 325ºF over the initial starting temperature

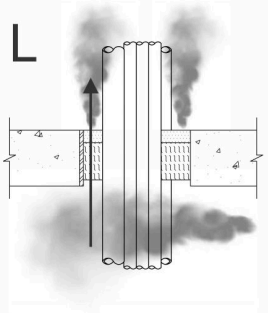
(e.g. 400 ºF where the ambient temperature was 75ºF)

W



- **Quantifiably measures resistance of a firestop product to water in buildings**
- 3 feet of head pressure is applied to the seal for 72 hours to determine if the seal is "water-tight"
- Intended to address "washout" during construction

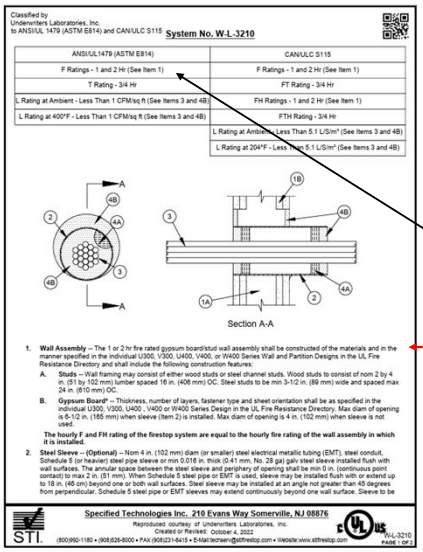
L



- 714.4.4 Penetrations in ***smoke barriers***.
- Systems for penetrations in smoke barriers must be tested for air leakage per UL 1479.
- L Rating shall not exceed:
  - 5 cfm/sf of opening for each firestop system
  - Total of 50 cfm for any 100 sf of wall or floor area

16

Firestop systems are two things for an installer:



Classified by Underwriters Laboratories, Inc. to ANSI/UL 1479 (ASTM E814) and CAN/ULC S115 **System No. W-L-3210**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings - 1 and 2 Hr (See Item 1)	F Ratings - 1 and 2 Hr (See Item 1)
T Rating - 3/4 Hr	FT Rating - 3/4 Hr
L Rating at Ambient - Less Than 1 CFM/sq ft (See Items 3 and 4B)	FH Ratings - 1 and 2 Hr (See Item 1)
L Rating at 400°F - Less Than 1 CFM/sq ft (See Items 3 and 4B)	FTH Rating - 3/4 Hr
	L Rating at Ambient - Less Than 5.1 L/S/m² (See Items 3 and 4B)
	L Rating at 204°F - Less Than 5.1 L/S/m² (See Items 3 and 4B)

Section A-A

1. **Wall Assembly** – The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, V300, U400, V400, or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. **Studs** – Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3-1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) OC.
   B. **Gypsum Board*** – Thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300, V300, U400 , V400 or W400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 6-1/2 in. (165 mm) when sleeve (Item 2) is installed. Max diam of opening is 4 in. (102 mm) when sleeve is not used.

   The hourly F and FH rating of the firestop system are equal to the hourly fire rating of the wall assembly in which it is installed.
2. **Steel Sleeve – (Optional)** – Nom 4 in. (102 mm) diam (or smaller) steel electrical metallic tubing (EMT), steel conduit, Schedule 5 (or heavier) steel pipe sleeve or min 0.018 in. thick (0.41 mm, No. 26 ga) galv steel sleeve installed flush with wall surfaces. The annular space between the steel sleeve and periphery of opening shall be min 0 in. (continuous point contact) to max 2 in. (51 mm). When Schedule 5 steel pipe or EMT is used, sleeve may be installed flush with or extend up to 18 in. (46 cm) beyond one or both wall surfaces. Steel sleeve may be installed at an angle not greater than 45 degrees from perpendicular. Schedule 5 steel pipe or EMT sleeves may extend continuously beyond one wall surface. Sleeve to be

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W-L-3210 PAGE 1 OF 2

1. Set of build instructions

2. Evidence of compliance

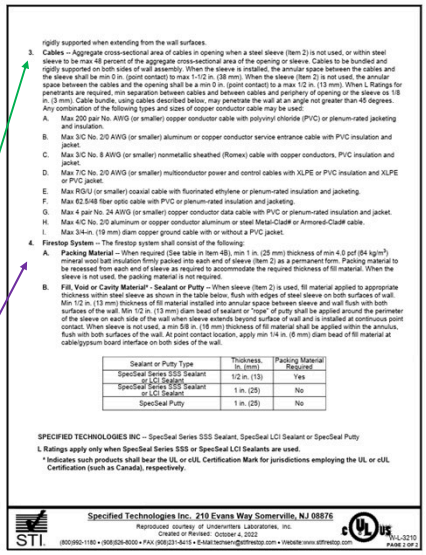
Ratings

Barrier

Penetrating Items

Firestop Material

Much more than just red caulk!



rigidly supported when extending from the wall surfaces.

3. **Cables** – Aggregate cross-sectional area of cables in opening when a steel sleeve (Item 2) is not used, or within steel sleeve to be max 48 percent of the aggregate cross-sectional area of the opening or sleeve. Cables to be bundled and rigidly supported on both sides of wall assembly. When the sleeve is installed, the annular space between the cables and the sleeve shall be min 0 in. (point contact) to max 1-1/2 in. (38 mm). When the sleeve (Item 2) is not used, the annular space between the cables and the opening shall be a min 0 in. (point contact) to a max 1/2 in. (13 mm). When L Ratings for penetrants are required, min separation between cables and between cables and periphery of opening or the sleeve os 1/8 in. (3 mm). Cable bundle, using cables described below, may penetrate the wall at an angle not greater than 45 degrees. Any combination of the following types and sizes of copper conductor cable may be used:
   A. Max 200 pair No. AWG (or smaller) copper conductor cable with polyvinyl chloride (PVC) or plenum-rated jacketing and insulation.
   B. Max 3/C No. 2/0 AWG (or smaller) aluminum or copper conductor service entrance cable with PVC insulation and jacket.
   C. Max 3/C No. 8 AWG (or smaller) nonmetallic sheathed (Romex) cable with copper conductors, PVC insulation and jacket.
   D. Max 7/C No. 2/0 AWG (or smaller) multiconductor power and control cables with XLPE or PVC insulation and XLPE or PVC jacket.
   E. Max RG/U (or smaller) coaxial cable with fluorinated ethylene or plenum-rated insulation and jacketing.
   F. Max 62.5/48 fiber optic cable with PVC or plenum-rated insulation and jacketing.
   G. Max 4 pair No. 24 AWG (or smaller) copper conductor data cable with PVC or plenum-rated insulation and jacket.
   H. Max 4/C No. 2/0 aluminum or copper conductor aluminum or steel Metal-Clad® or Armored-Clad® cable.
   I. Max 3/4-in. (19 mm) diam copper ground cable with or without a PVC jacket.
4. **Firestop System** – The firestop system shall consist of the following:
   A. **Packing Material** – When required (See table in Item 4B), min 1 in. (25 mm) thickness of min 4.0 pcf (64 kg/m³) mineral wool batt insulation firmly packed into each end of sleeve (Item 2) as a permanent form. Packing material to be recessed from each end of sleeve as required to accommodate the required thickness of fill material. When the sleeve is not used, the packing material is not required.
   B. **Fill, Void or Cavity Material* - Sealant or Putty** – When sleeve (Item 2) is used, fill material applied to appropriate thickness within steel sleeve as shown in the table below, flush with edges of steel sleeve on both surfaces of wall. Min 1/2 in. (13 mm) thickness of fill material installed into annular space between sleeve and wall flush with both surfaces of the wall. Min 1/2 in. (13 mm) diam bead of sealant or "rope" of putty shall be applied around the perimeter of the sleeve on each side of the wall when sleeve extends beyond surface of wall and is installed at continuous point contact. When sleeve is not used, a min 5/8 in. (16 mm) thickness of fill material shall be applied within the annulus, flush with both surfaces of the wall. At point contact location, apply min 1/4 in. (6 mm) diam bead of fill material at cable/gypsum board interface on both sides of the wall.

Sealant or Putty Type	Thickness, In. (mm)	Packing Material Required
SpecSeal Series SSS Sealant or LCI Sealant	1/2 in. (13)	Yes
SpecSeal Series SSS Sealant or LCI Sealant	1 in. (25)	No
SpecSeal Putty	1 in. (25)	No

SPECIFIED TECHNOLOGIES INC – SpecSeal Series SSS Sealant, SpecSeal LCI Sealant or SpecSeal Putty

L Ratings apply only when SpecSeal Series SSS or SpecSeal LCI Sealants are used.

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

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W-L-3210 PAGE 2 OF 2

17

There are over <u>10,000</u> listed firestop systems…

How do you make sure you have the right ones for your facility?

18

Barrier Management Program

Identifies:
- All fire-rated and non-rated assemblies
- All penetrant types
- All joint types

Sets expectations for:
- Vendors
- Contractors
- Facility maintenance personnel

Goals:
- Meet regulatory compliance
- Exhibit a proactive approach to inspectors
- Promote proper installations
- Prevent property loss
- Life-Safety
- Reduce annual outlay of capital

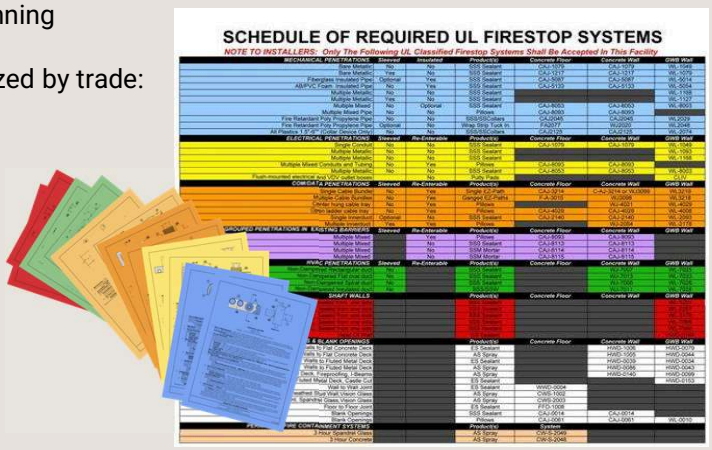
19

Set the Standard…

BMP® BARRIER MANAGEMENT PROGRAM

Standardized set of systems for the project are selected during planning

Systems are organized by trade:
- Mechanical
- Electrical
- Plumbing
- Sprinkler
- Drywall
- Mason
- Data
- Etc.



…by streamlining and clarifying the parameters of the job

20

Firestop considerations in the design phase

Decisions made for the facility <u>today</u>, could create elevated cost <u>tomorrow</u>.

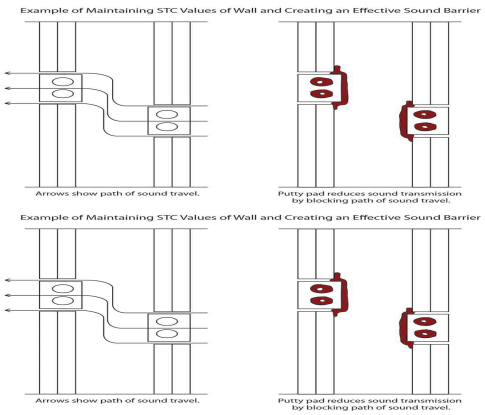
- How often will barriers need to be re-entered?
- How often will cables in sleeves need to be moved, added, or changed?
- Who will monitor these penetrations after re-entry?
- What parameters have been put in place to eliminate costly repairs downstream?

21

Design-phase considerations

<u>Electrical Boxes</u>

- Putty Pads



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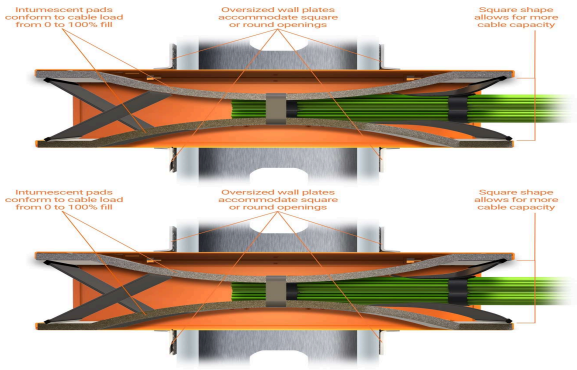
Design-phase considerations

High Traffic Openings (HTO)

- Fire-Rated Cable Pathways

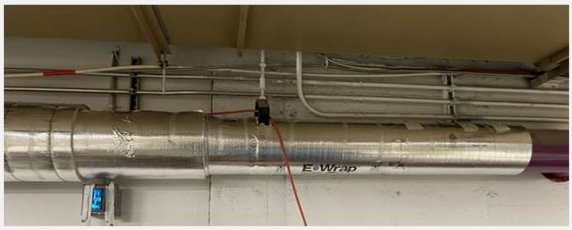


23

Design-phase considerations

Critical Circuits and Infrastructure

- Endothermic Wrap
  - Emergency Responder Communications Enhancement Systems (ERCES, DAS, ARCS)
  - Fuel Oil Lines
  - Fire Alarm Controls
  - Stair Pressurization
  - Smoke Extraction Fans
  - Emergency Generator
  - Fire Pump Controls



24

PCRA

Get it right the first time!

25

Possible PCRA discussion items

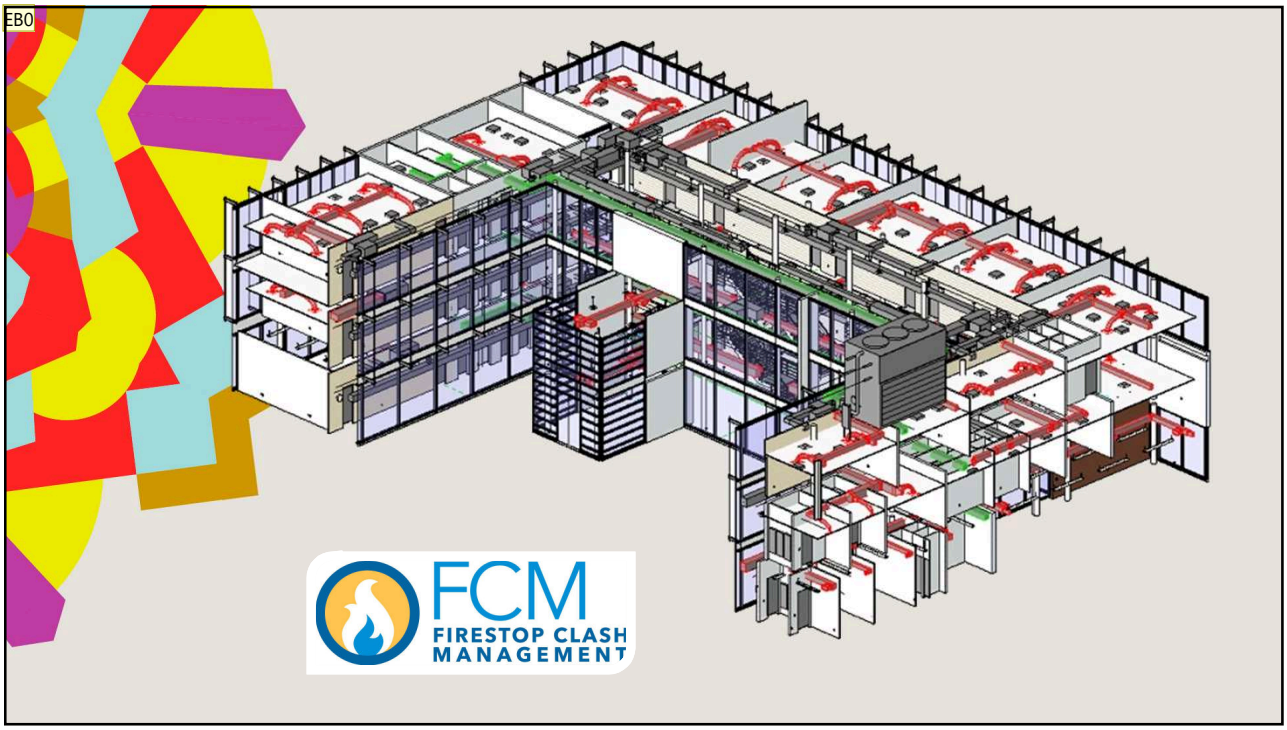
Requirements for:
- Annular space, movement, etc.
- Labeling
- Engineering Judgments
- Acoustics/STC
- “Special” Inspections

Scheduling of trades
- Firestop Clash Management
- Proper systems for each application

Future technology considerations
- High-Traffic Openings (HTO) need for re-entry
- Fire-Rated Cable Pathways

Training
- Manufacturer Trained
- Mock-up walls

26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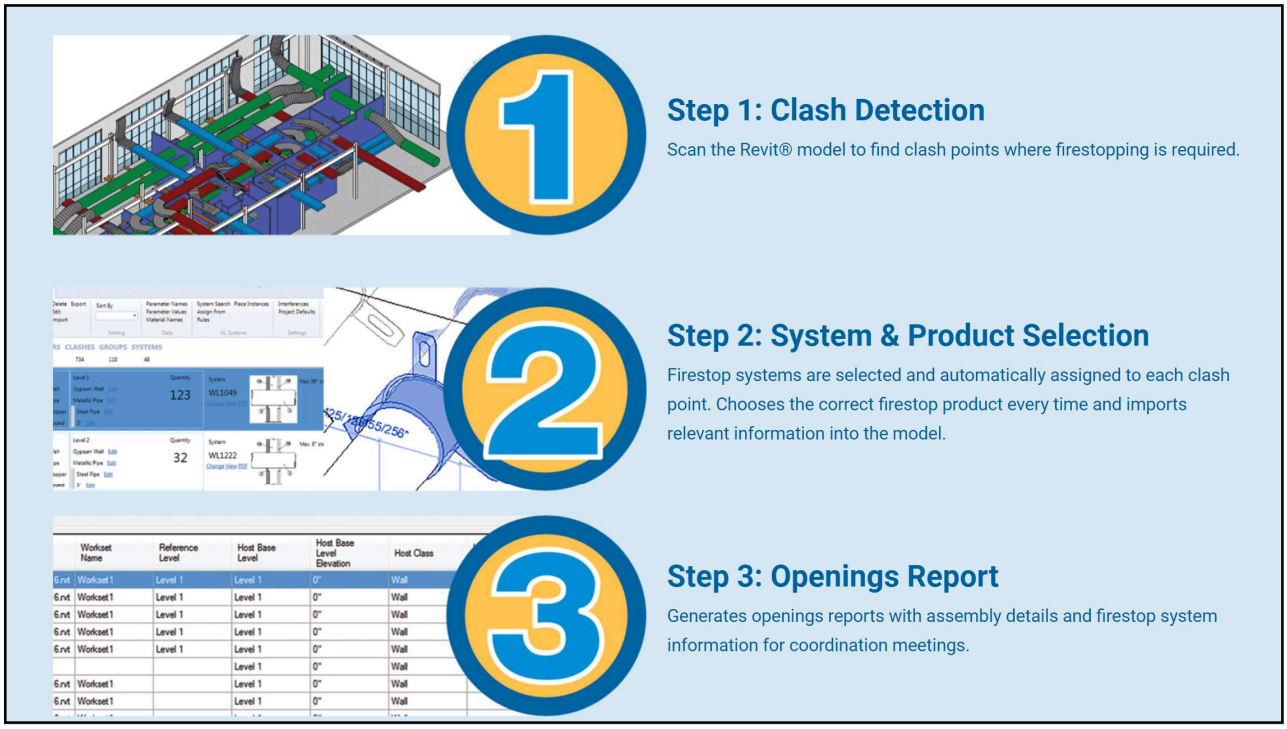
FCM
FIRESTOP CLASH
MANAGEMENT

27


1
Step 1: Clash Detection
Scan the Revit® model to find clash points where firestopping is required.
2
Step 2: System & Product Selection
Firestop systems are selected and automatically assigned to each clash point. Chooses the correct firestop product every time and imports relevant information into the model.
3
Step 3: Openings Report
Generates openings reports with assembly details and firestop system information for coordination meetings.

28

Slide 27

EB0 [@Stacy Moses] [@Rebecca Myers] I added a few blank slides with different options, didn't want to make anything too complex. Does this work?
Erin Baird, 2024-12-18T20:44:51.270

RM0 0 Thank you! Looks good.
Rebecca Myers, 2024-12-18T21:48:29.639

Digital documentation programs can help

- Streamline the Firestop tracking process using mobile tools (app or web)
- Platforms include both iOS and Android
- Interactive with underlying floor drawings
- Track penetrations, construction joints, doors, dampers, etc.
- Turn-key solution with pre-printed QR labels
- Share documents easily
- Corrective action reports

Firestop Locator

29

What is a Standard Operating Practice (SOP)?

- Architectural specifications that match the standard set
- Full overview of fire-barrier expectations
- Part of the bid documents
- Outlines requirements for:
  - Procedural
  - Performance
  - Submittal
  - Installation

30

Typical SOP Requirements

- Most current SOP readily available
- Review life-safety & building plans
- Obtain applications & penetration permits
- Prepare itemized schedule of firestop systems
- Complete submittal
- Documentation / Labeling
- Meet EJs requirements *(if necessary)*
- Complete training

31

Best Practices Recap

- Develop a firestop standard with a Barrier Management Program
- Align trades during pre-construction meetings
- Create a Standard Operating Procedure
- Require Firestop Instructional Training
- Install future-proof products & systems

- Benefits:
  - Reduce Costly Mistakes
  - Minimizes Design Changes
  - Eliminate Inspection Delays
  - Reduce Liability
  - Save Lives

32

33