Key Points in Firestopping Fire Barrier Walls

FCIA, DOHA
Today we will cover…

1. What is Firestopping & Firewalls
2. Major issues and examples
   a. Coordination
   b. Data
   c. Plastic Pipes
   d. “Simple” Through Penetrations
   e. Joints
3. Inspection: Good / Bad Examples
Containment in construction

Three principles of fire protection

1. Prevention
   - Reduce chances fire starts
   - Plan and rehearse for fire

2. Detection & suppression
   - Early warning for egress & fighting fire
   - Extinguish fire (Active protection)

3. Containment
   - Contain fire to place of origin (Passive)
Buildings are usually required to have fire-rated barriers

Compartments are six-sided fire-rated boxes

Compartmentation stops the propagation of fire, smoke and gasses
Essential services often compromise fire and life safety

Openings are needed to run essential services...

...But if they stay unsealed, fire, smoke and gasses will spread
Regulations therefore require “firestopping”

Firestopping = sealing the opening to restore the hourly rating to fire barrier
Firestopping is required for ALL openings…
Firestopping is a technical business requiring tested Systems

- Drawing showing system
- System Number
- System Description
Through-Penetrations
Membrane-Penetrations
Construction Joints
Perimeter Containment
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This is what you want...
This is what you want...

Vertical Construction Joints Installed with Specseal ES105 backfilled with Thermafibre
But is this what you get?
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The physics of fire

Cables are a rich source of FUEL!
One FOOT of Loaded Tray = 150,000 BTUs*

Equivalent to 4.2 liters (1.1 gal) of Gasoline!

*Fully Loaded 45 cm x 10 cm Tray (18” x 4”)*
Challenge: How do we get from this...
...Or this...
...To manageable compliance?
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Plastics melt away fast. Technology becomes important…

Expansion Times

Time-Temperature Curve

- Soften
- Ignite
- Burn

Expansion Times: 30, 24, 21, 15, 9, 6, 4, 2

Temperature °F: 200, 300, 400, 500, 600, 700, 800, 900, 1000, 1300, 1500, 1900

Soften, Ignite, Burn

STI

Other
In closing a plastic pipe well and fast!

A PVC Pipe & Firestop Collar After a Fire

Charred Pipe

Hot-Side View

Knot formed from Collapsing pipe

Cold-Side View
Example of Successful Testing

Construction - 4” PVC Through Drywall

Firestopping - Intumescent Device & Sealant

Before

After
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Many MEP situations require just caulk

Step 1
Packing

Step 2
Caulking

Tooling
Step 3
If the annular space is tight, you could avoid using backing material.
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“Top Of Wall” spacings are common in joints and must be firestopped
Mineral wool blocks are typically stuffed in
...As are strips of mineral wool
And the opening is sprayed
Small TOW joints can be also caulked.
Examples of Joint Systems

1. **Wall Assembly** — Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m²) structural concrete. Wall may also be constructed of any UL Classified Concrete Blocks.*

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

2. **Floor Assembly** — Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100 - 150 pcf or 1600-2400 kg/m²) structural concrete.

3. **Joint System** — Max separation between edge of floor and face of wall (at time of installation of joint system) is 4 in. (102 mm). The joint system is designed to accommodate a max 15 percent compression or extension from its installed width. The joint system shall consist of the following:
   
   A. **Forming Material** — Min 4 pcf (64 kg/m²) mineral wool batt insulation installed in joint opening as a permanent form. Pieces of batt cut to min width of 4 in. (102 mm) and installed edge-first into joint opening, parallel with joint direction, such that batt sections are compressed min 33 percent in thickness and such that the compressed batt sections are recessed from top surface of the floor as required to accommodate the required thickness of fill material. Adjoining lengths of batt to be tightly-butted with butted seams spaced min 16 in. (406 mm) apart along the length of the joint.

   FIBREX INSULATIONS INC — FBX Sating Insulation.
   IIC MINWOOL L L C — Sating Insulation/MW.
   ROCK WOOL MANUFACTURING CO — Delta Board
   ROXUL INC — SAFE
   THERMAFIBER L L C — Type SAF

   B. **Fill, Void or Cavity Material** — **Spray** — Min 1/8 in. (3.2 mm) wet thickness or 1/16 in. (1.6 mm) dry thickness of fill material applied within the joint, flush with top surface of floor and lapping a min 1 in. (25 mm) onto the top surface of the floor and side of wall.

   SPECIFIED TECHNOLOGIES INC — SpecSeal AS200 Elastomeric Spray

*Bearing the UL Classification Mark
Examples of Joint Systems

System No. FW-D-1006
Assembly Rating — 2 Hr
Nominal Joint Width — 4 In.
Class II Movement Capabilities — 15% Compression or Extension
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Firestop Inspection

The RED RING Syndrome

RED is not necessarily right.
Firestop Inspection

Annular Space
Firestop Inspection

Crown Bead at Point Contact

SIDE VIEW

TOP VIEW
Firestop Inspection

Poor Sealant Footprint
Firestop Inspection

Improved Sealant Footprint
Flat Sides Braced With Angles
Sprinkler Pipe Considerations
5) Firestop Inspection - Electrical Boxes
**FICTION:** Firestop caulk must be RED!

**FACT:** There is **NO** Model Building Code Requirement anywhere that mandates product color. However, most manufacturers deliberately use colors that stand out to facilitate inspection and different colors to distinguish between products.
**FICTION:** Polyurethane foam is a firestop.

**FACT:** Polyurethane foams, frequently used as draft stops, burn vigorously and are not generally not acceptable firestopping materials. Some are UL Classified for *surface flammability* only, but typically are not *fire resistant*. 

![Polyurethane Foam]
FICTION: Fire tape and drywall compound is a firestop.

We get asked all the time:

“I understand why intumescent products are needed for plastic pipe and cables, but why on earth can’t we just firetape and mud around metallic pipes?”

Patching Through-Penetrations with Drywall Mud is a common practice
FICTION: Concrete, mortar, and grout are firestops.

FACT: While all of these products are perfectly good for their intended purposes . . . Never use untested materials and designs for firestopping!
FICTION: Safing insulation is an adequate firestop.

FACT: Fire safing, or packing an opening with mineral wool is certainly better than nothing, but is *not* a firestop. Using only mineral wool does not provide a *smoke seal*, does not address combustible penetrants and cannot withstand the shock from the hose stream.
Visual Inspection Quiz
What’s wrong with this install?

Dissimilar products in the same opening is not allowed
Visual Inspection Quiz

What’s wrong with this install?

- Drywall compound is never an acceptable firestop material
- Collar should be flush with ceiling surface
Visual Inspection Quiz
What’s wrong with this install?
Visual Inspection Quiz
What’s wrong with this install?
Visual Inspection Quiz
What’s wrong with this install?

Head of wall joint is firestopped, but penetrations are not

Penetrant opening at top of wall must be firestopped with same product as head of wall

Is there firestopping behind the drywall compound?
Thanks

شكرا

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