Firestopping – What To Consider?

Agenda

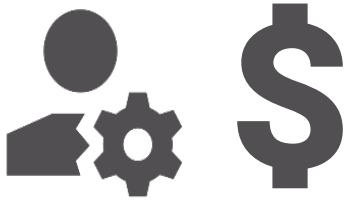
1.0 Introduction to firestopping
2.0 Substrates
3.0 Service Types
4.0 Spacing
5.0 Fire Ratings
6.0 Firestopping with Movement
7.0 Testing/Evidence
8.0 Good/Bad installations
9.0 Q&A

Introduction to Passive Fire

Why are buildings Firestopped?

1 SAVE LIVES

2 PROTECT ASSETS



3 BUILDING PERFORMANCE

4 LEGISLATION REQUIREMENTS

Active and passive Firestopping systems

Fire Alarm Systems

Fire Escape Routes

Fire Suppression

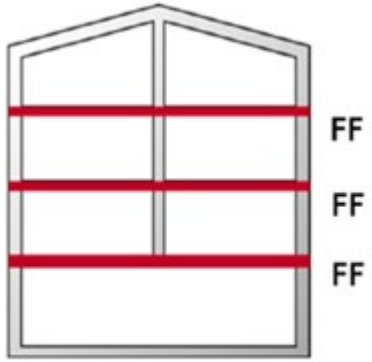
Fire Compartmentation

Compartmentation is important to keep the fire in one defined space

Compartmentation

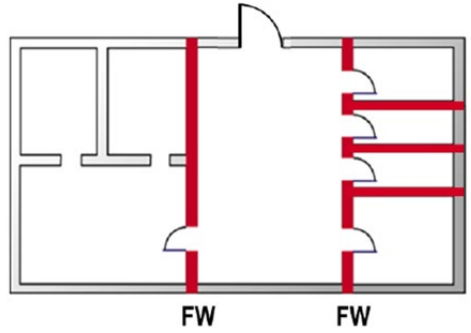
- The spread of fire can be restricted by dividing a building into separate compartments with fire resistive walls and floors
- This will increase the availability of escape routes for occupants

Fire Floors



FF – Fire Rated Floor

Fire Walls

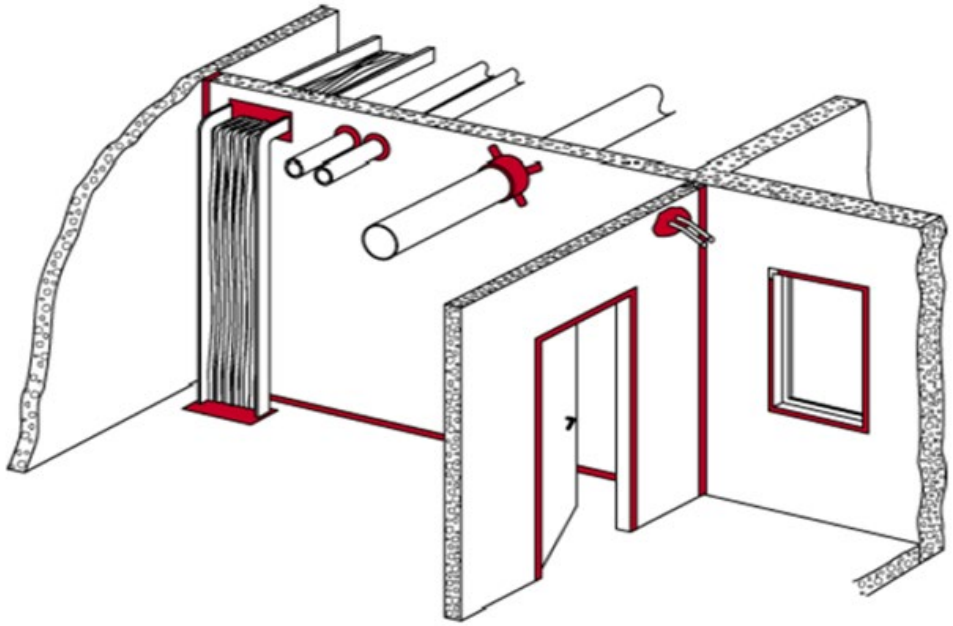


FW – Fire Rated Wall

The degree of sub-division providing compartmentation will depend on…

- The Use of the Building
- Fire Load in the Building
- The Height of the Building
- Availability of a Sprinkler System

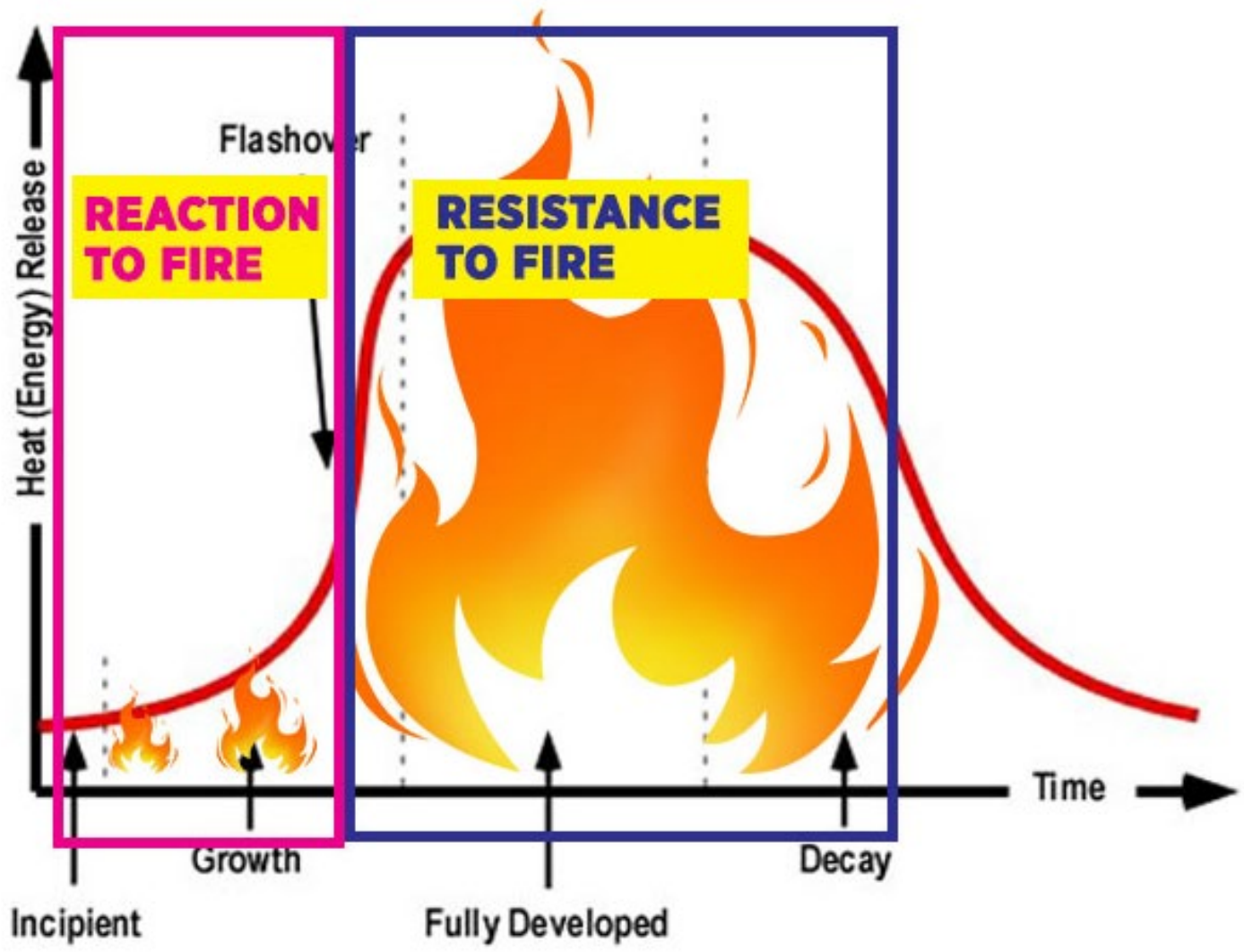
We need to ensure that passive fire protection fulfils its function



- Openings in fire-resisting walls and floors are areas of **weakness**
- Firestop **maintains** the **integrity** of compartments breached by services and other openings
- Reduces the **spread of fire and smoke**
- The goal of Firestop is to ensure a **safe escape** (time)

Fire spread within buildings can be reduced by ensuring that Passive Fire Protection systems have sufficient fire and movement resistance

Reaction Vs Resistance to fire



Regulations & Guidance

Building Regulations as by Approved document B

Smoke and flame

Products tested to do the job

"every joint or imperfection of fit .. should be adequately protected by sealing or Firestopping" ADB 11.2

design which has been shown by test to be capable of meeting that performance or have been assessed from test evidence

"The building shall be designed .. so that the unseen spread of fire and smoke .. is inhibited" ADB B3-4

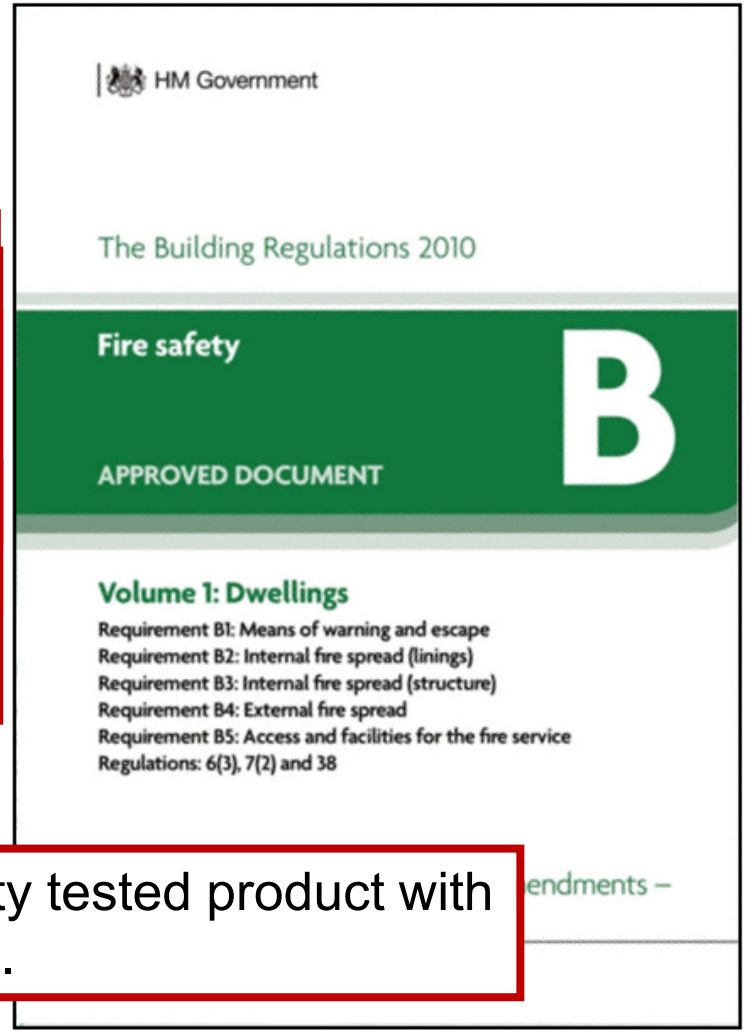
supplied are provided to the same specification or design as that was tested/assessed" 0.20

"Third party accreditation .. of installers of .. materials.. provide a means of ensuring that installations have been conducted by knowledgeabl

increasing reli

ADB 0.20

Minimising risk while maximising life safety: third party tested product with third party accredited installation.



What's included within The Building Safety Act?

Building Safety Act 2022

1. Functions and duties of the **Building Safety Regulator**
2. Defines who is an **accountable person** and their responsibilities
3. Requirement to establish a building **Resident's Panel**
4. Production of a safety case report for an occupied **higher-risk building**
5. Amendments to the **Building Act 1984**
6. Requirement for **higher-risk buildings** to have a building assessment certificate
7. Reporting, sharing and maintaining information known as the **Golden Thread**

Trade Bodies and Associations

FPA Fire Protection Association®

IFE The Institution of Fire Engineers

THE ASFP SERVES AND REPRESENTS THE NEEDS OF ITS MEMBERS AND THE WIDER PASSIVE FIRE PROTECTION INDUSTRY BY RAISING STANDARDS AND COMPETENCE THROUGH TRAINING, TESTING, CERTIFICATION AND QUALITY OF INSTALLATION AND MAINTENANCE.

PFKG
Passive Fire Knowledge Group
LEADING CULTURE CHANGE THROUGH COLLABORATION

Can I have a firestopping detail for a plastic pipe please. It's going through a wall??

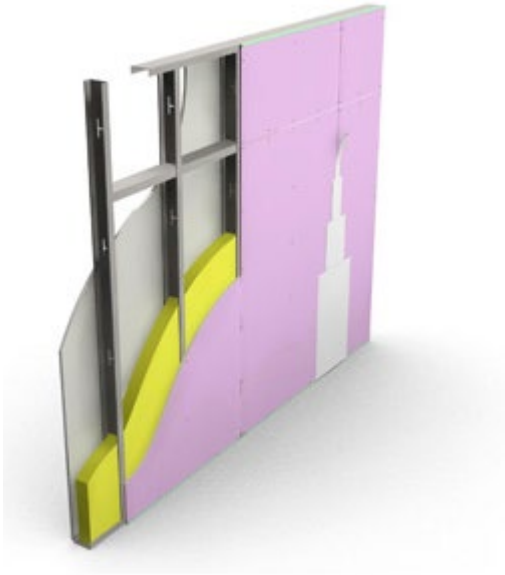
Substrates

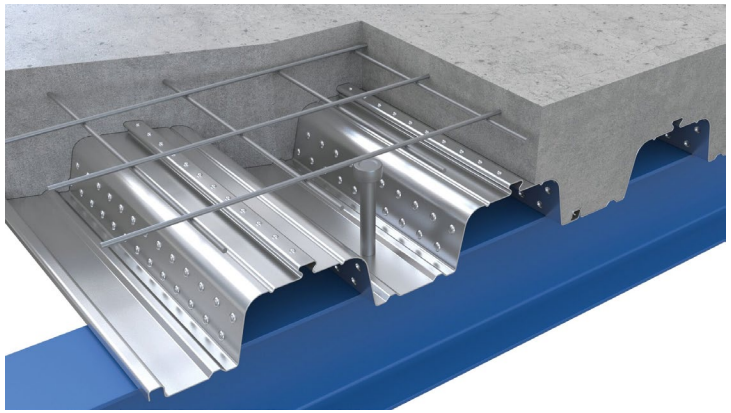
Substrate Types

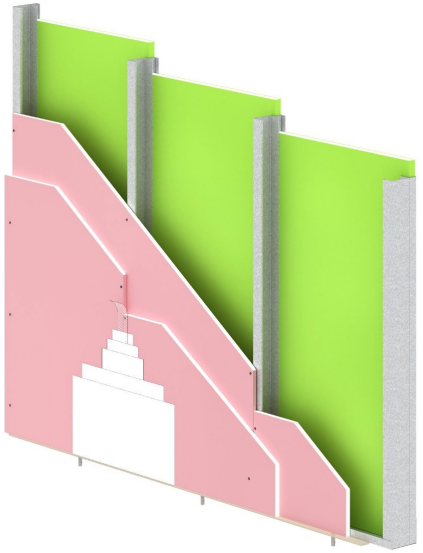
Wall or Floor

- Concrete Floor
- Timber Floor
- Profile Floor
- Waffle/Hollow Core Floor
- Plasterboard Ceiling
- FR Ceiling tiles

- Drylining
- Block-work
- Block Work Cavity Wall
- Composite Panel
- Insulated Panel
- Timber Frame/CLT
- Steel Stud / Metsec

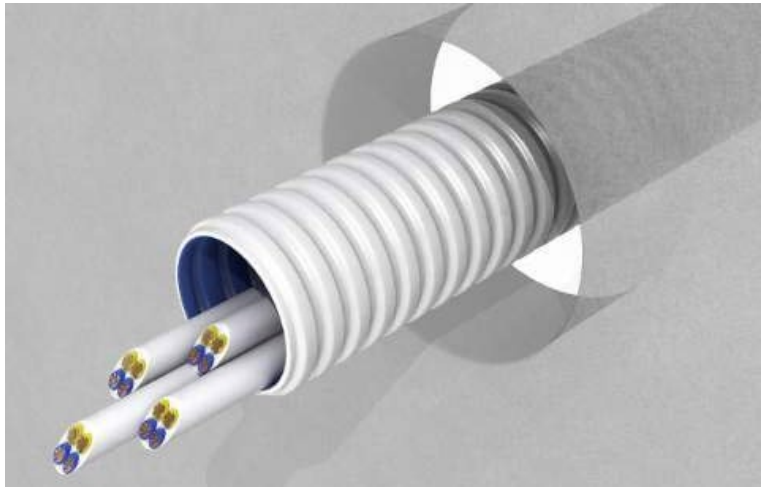






Service Types

Service Types



Combustible plastics

(PVC, PVC-U, C-PVC, HDPE, LDPE, MDPE, PE, PP, PPR, ABS)

Lagged Non-combustible

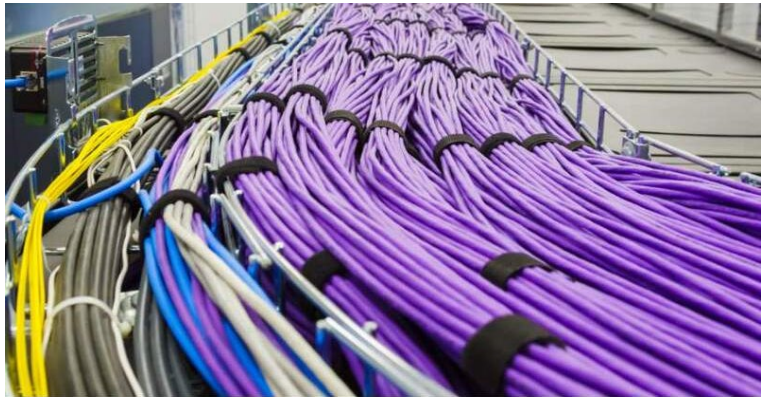
(phenolic, nitrile rubber, stonewool, glass wool)

Non-combustible

(cable trays, steel pipe, copper pipe)

Cables

(A,B,C,D,E,G/123)



Diameter of service?

Wall thickness of pipe/lagging?

Is it chemically compatible?

Fire rating required?

Conduit/Trunking?

Bends, valves or joints?

Dampers or Ducts?

Spacing

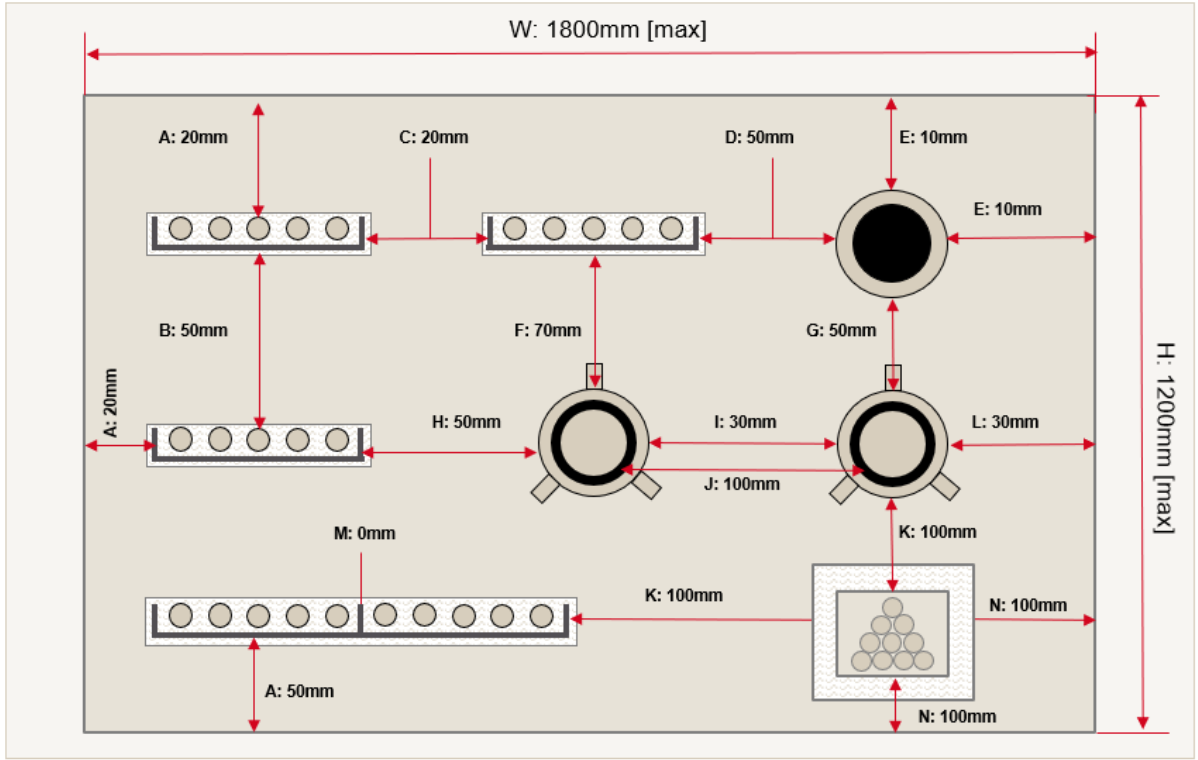
Spacing of services

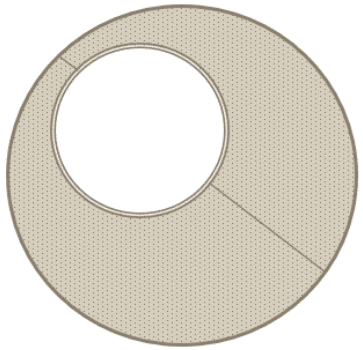
The most important design parameters for service penetrations are:

Opening size must be within tested and approved limits, especially when penetrated by multiple services.

Annular space needs to be closed for smoke tightness.

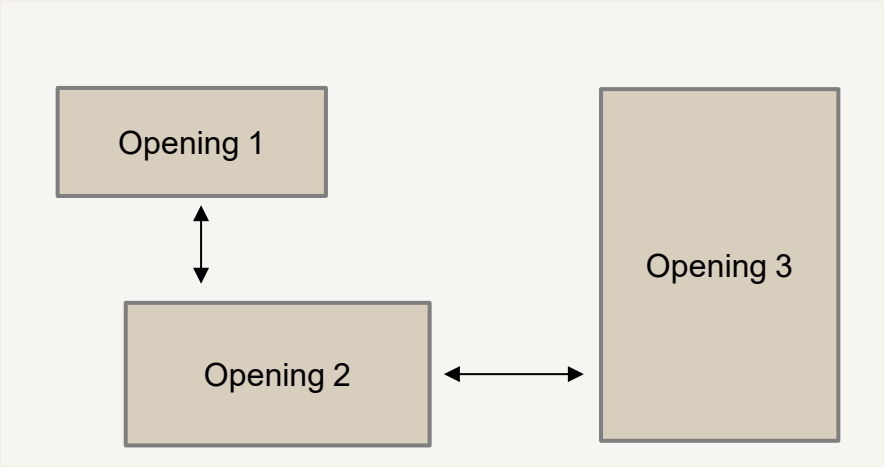
Distances between penetrants and to edge of opening.

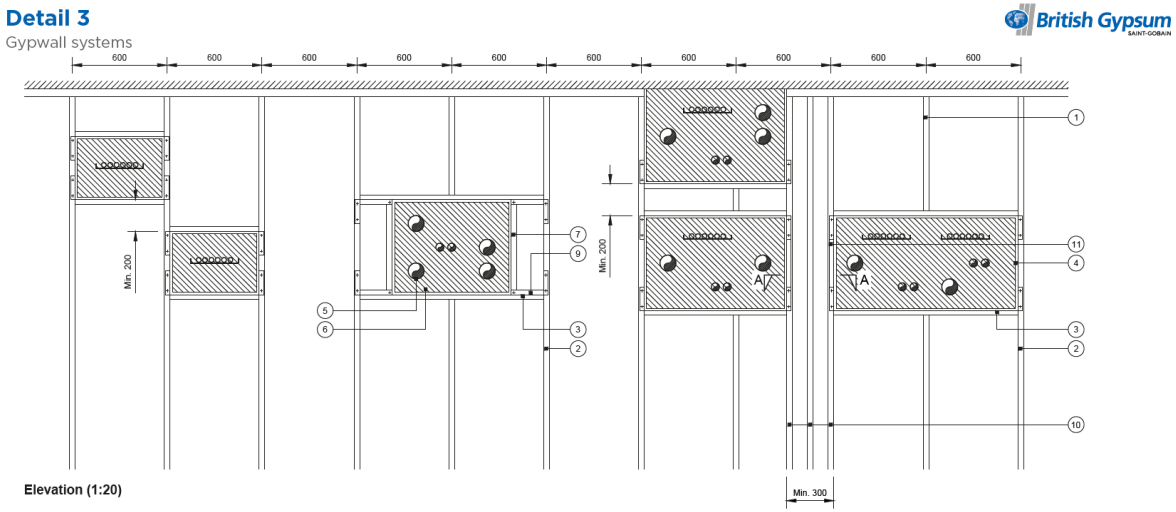




Spatial Coordination

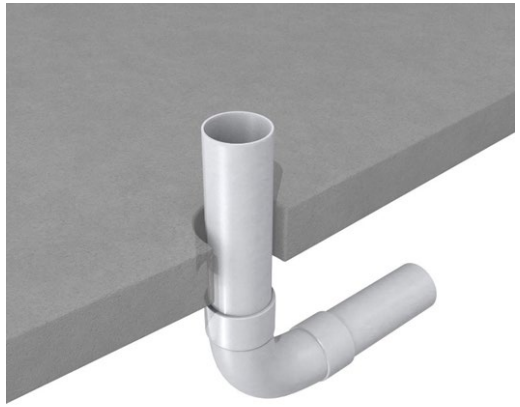
- In many cases this can be a minimum of **100mm**
- **However,** this is typically determined by the drywall manufacturer and the wall type(s) chosen.
- Distance to ‘other openings’ (Doors, Fire Dampers) is typically **200mm**

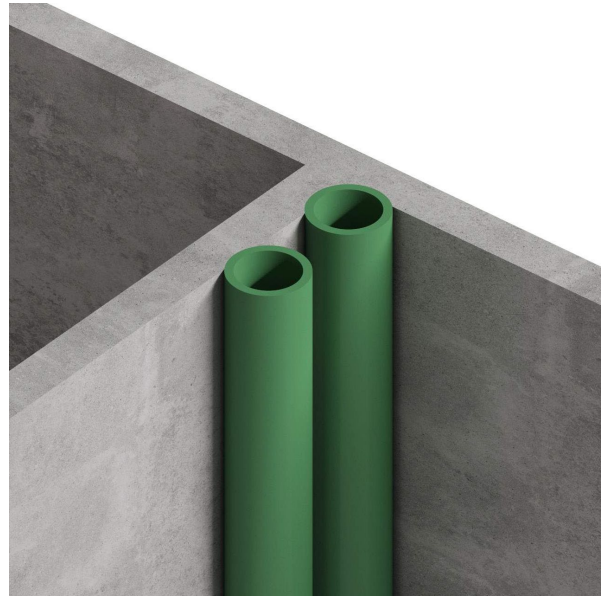




Other important considerations

- **Pipe bends and connections**
- **Proximity to wall/floor edge**
- **Angle of service**
- **Service supports**



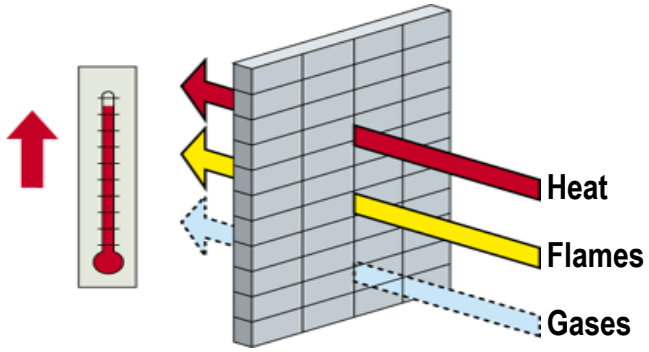


Fire Ratings

Testing to EN1366

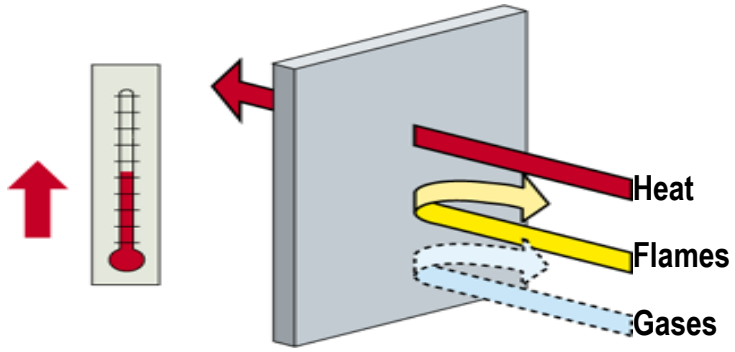
Firestop Systems are tested based on the following Criteria:

*All three criteria are measured in hours and minutes.



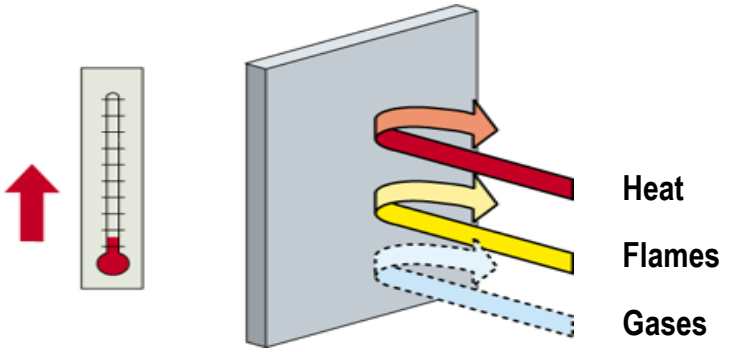
(R) Load bearing Capacity*

Measures the structural stability of the product in fire



(E) Integrity*

Measures the ability of a product to prevent gas & flame to pass through it in a fire



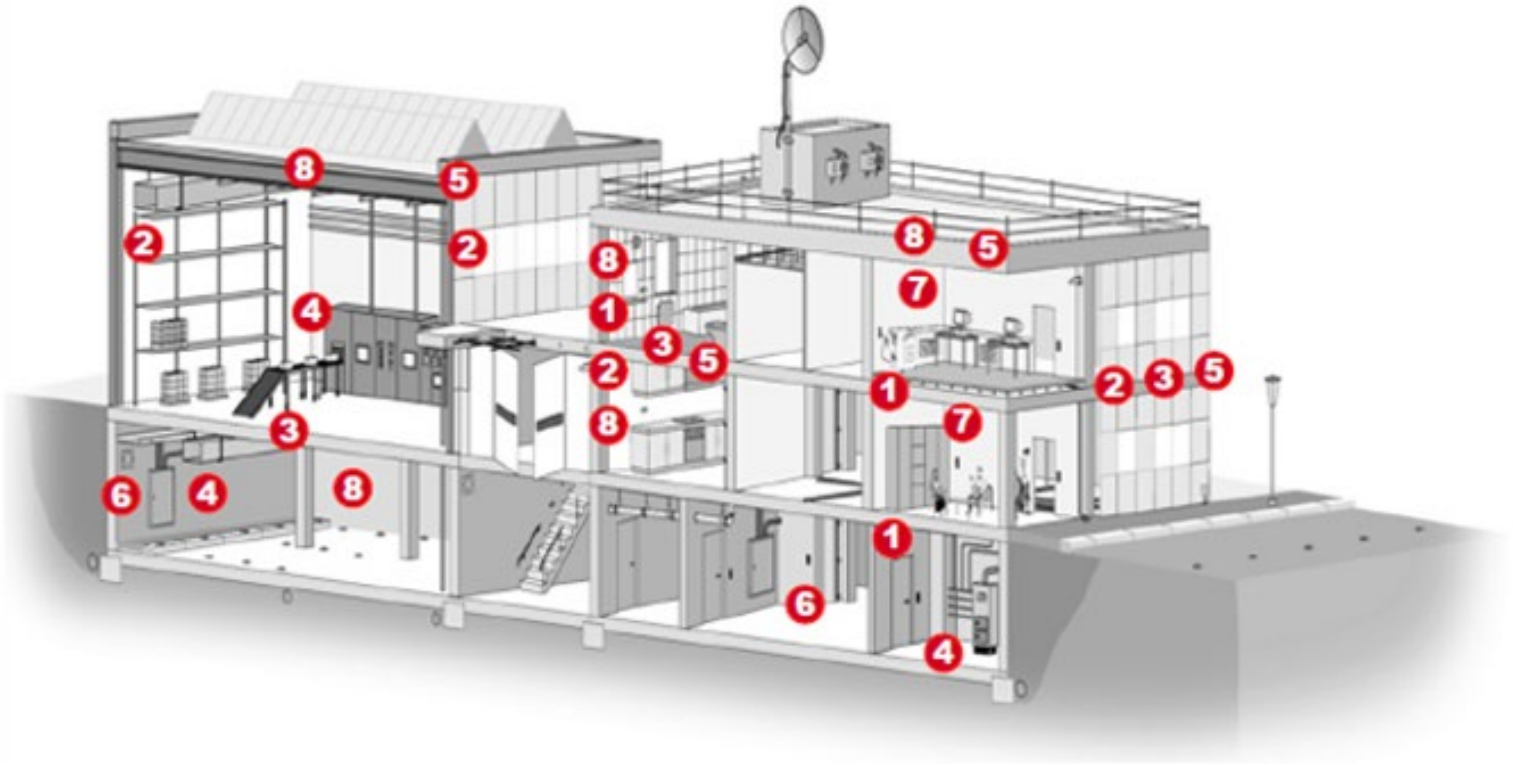
(I) Insulation*

Measures the ability of an element to insulate, i.e. how long it takes for the non-fire side of the element to reach 180°

Example = EI90

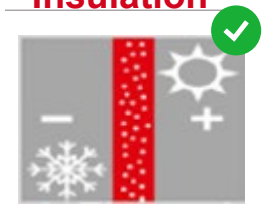
May also be E90 I60

Firestop tested for additional elements

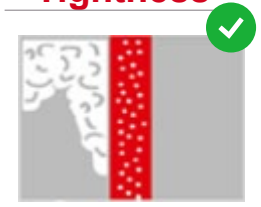


1. Acoustics

2. Thermal Insulation



3. Smoke & Gas Tightness



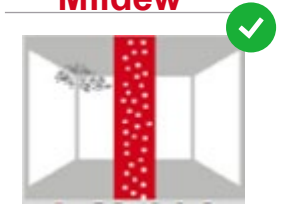
4. Movement / Seismic

5. Water Tightness

6. Explosion Resistance

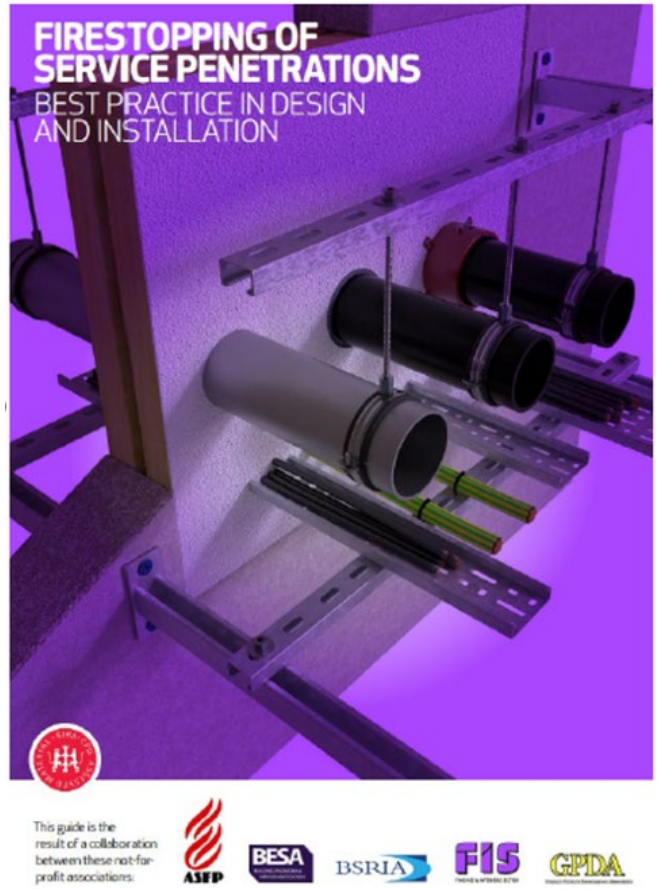
7. Indoor Room Quality /HSE

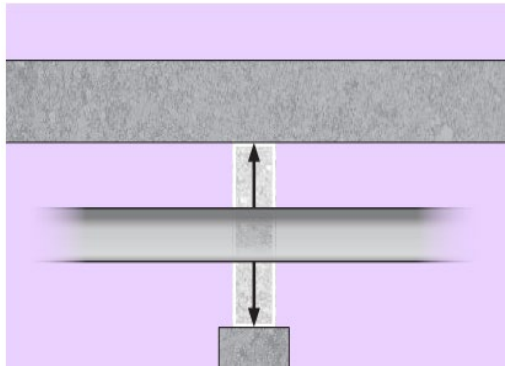
8. Mould & Mildew

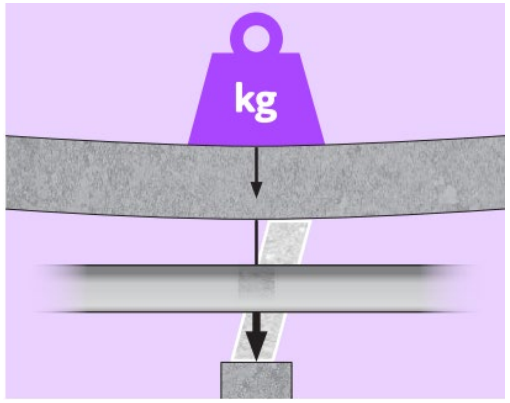


Firestopping with Movement

Structural movement effects FS seals







- **Structural engineers** often instruct that there will be **movement** of the slab of up to **25mm**
- This information is used when **designing** the partition walls **deflection heads** are installed to deal with the impact the **movement** will have on **internal walls**
- As the **services** are attached to the **slab**, the same consideration **should** be taken for the **firestop seals** & at the head of internal **block walls** & **service penetrations**

Designing with structural movement

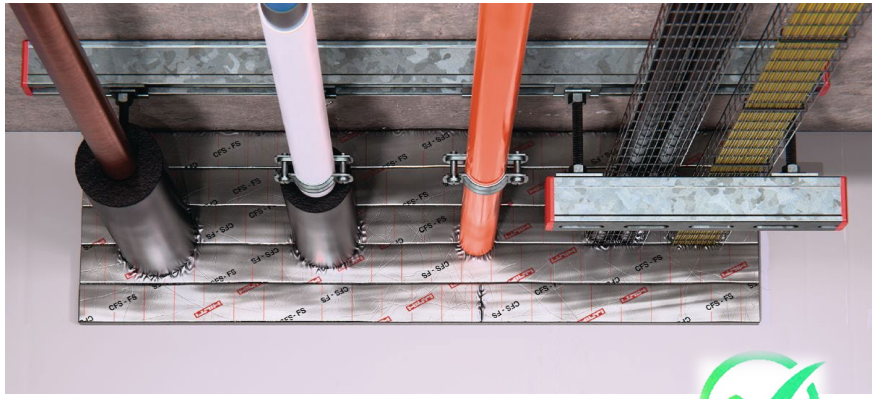
Consider

- In many applications, fire-stopping products **must accommodate movement** of the **services** or **joints** through the build and in everyday usage
- This deflection of the slab is caused by **static** or **dynamic loads** and should be **considered** in the **design process**.

Take Action

- Products such as mastics have a certain movement capability & fire ratings
- They should be selected appropriately on the requirements and their capabilities in these situations

The services are supported off of the slab in a deflection head and the correct products have been selected.



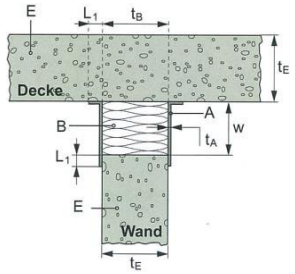
Example: With a deflection of 15mm, the gap at the head of the wall should be a minimum of 37.5mm.

A = CFS-SP WB tA = Thickness of seal 3mm

B= Mineral wool L1 = Overlap on joints 15mm

tE = Wall thickness 100mm minimum

W = Gap size required (37.5mm minimum)



Product movement capability +/- 40%
Information available in ETA 12 / 0078

Incorrect gap and mastic has been selected.

Testing/Evidence

Fire testing to EN1366-3 service penetration seals

Harmonised Standard

ISO 834 heat curve (internationally accepted)

Specific arrangement of services

Specified cables

More demanding test

Benefits

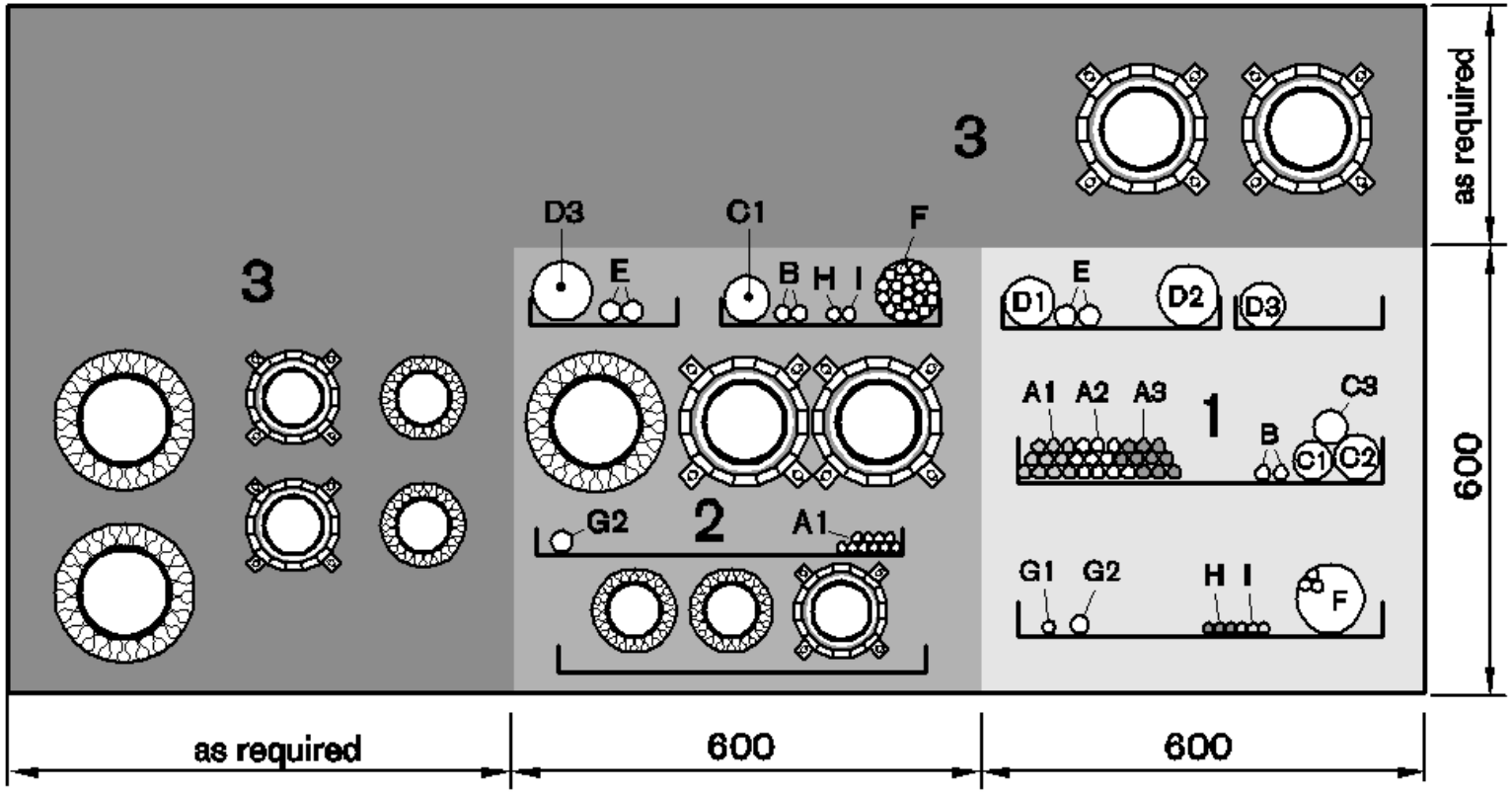
Better for design purposes

Representative of site installation

ETA, UKTA data available

European wide acceptance

FIRE BATT WITH MIXED SERVICES



Fire testing to EN1366-4 linear joint seals

Harmonised Standard

ISO 834 heat curve (internationally accepted)

Specific joints sizes

Specified base materials

Benefits

Better for design purposes

Representative of site installation

ETA, UKTA data available

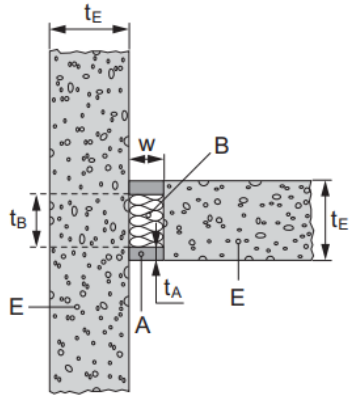
European wide acceptance

Various Applications

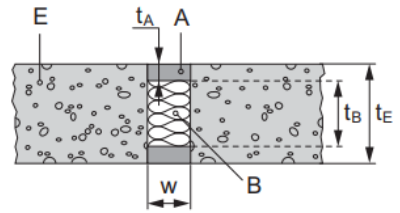
Example of Joint Configuration

Type I

Vertical joints in between rigid wall constructions (according to Annex 3, clause 3.1.1.c of this ETA)



Type IA
(top view)



Type IB
(top view)

- **A** = Hilti Firestop Acrylic Sealant CFS-S ACR
- **B** = mineral wool product (see Annex 2, clause 2.2.1 of this ETA)
- $t_E \geq 150$ mm, $t_B \geq 100$ mm
- maximum movement capability: ± 12,5%
- splice distance of insulation minimum 1250 mm

Benefits of ETA firestop products

Safety

Comparable, realistic, demanding, standardised results

Transparency

Independent testing with standard configurations

Conformity

Common guidelines and compliance with EU requirements

Reliability / Quality

Third party approval, inspection and traceability

Scope of use

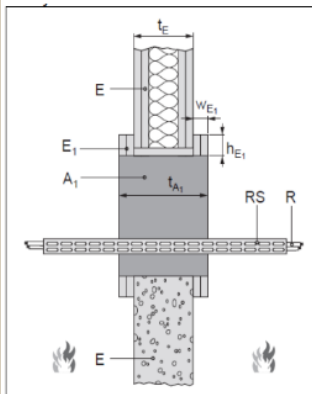
Shows a complete range of product approvals and to extend the scope of applications

Increased safety & proven reliability of Firestop leading to reduced risk for specifiers and installers

Example of a test fit for purpose & one not!

Hilti CFS-F FX

European Technical Assessment **ETA-10/0109 of 11.01.2023**



8.3.4.1.A:

CFS-F FX seal, penetrated with a cable tray RS in flexible or rigid wall

Cable support construction: Perforated metal cable trays with a melting point higher than 1100°C (e.g. galvanised steel, stainless steel). Trays with organic coatings are covered if their overall classification is minimum A2 according to EN 13501-1.

Cables within flexible and rigid wall constructions according to sec.8.3.1:

Penetration seal / Services	Classification (multiple)	(mixed)
Seal thickness	$150 \le t_A \le 200$	$t_A \ge 200$
All sheathed cable types currently and commonly used in building practice in Europe (e.g. power, control, signal, telecommunication, data, optical fibre cables, with a diameter of:		
Ø ≤ 21 mm	EI 60	EI 120
21 ≤ Ø ≤ 50 mm	EI 60	EI 90
50 ≤ Ø ≤ 80 mm	EI 60	EI 90

Test evidence should indicate the product is tested to ETA & where to find them, mentions wall make ups, thickness, pipe sizes and materials that can be used along with other products used as part of test.

V

Fire Foam (Pink Foam)

PRODUCT DESCRIPTION

[redacted] Handheld Fire Foam is a quick-setting one-part polyurethane foam with fire-retardant properties. The foam expands on application to up to 50 times its original volume and meets the test criteria BS476 Part 20; Class B1. Fire rated up to 4 hours in certain joint configurations. Once cured, the foam can be cut, sawn or plastered over after approximately one hour.

USES

Filling:
- Gaps around pipe entries through fire-rated walls
- To provide a fire-rated seal around window and door frames
- Electrical wire chasing prior to plastering, where a fire rating is required
- Deep joints prior to applying sealant or plaster
- Irregular gaps in stone, brick, concrete or plaster

Fixing:
- Door frames
- Timber structures
- Windowsills and thresholds
- Window frames

Insulating:
- Behind cladding to exterior walls
- Behind soffit and barge boards

When used as part of a fire-rated joint, use in conjunction with [redacted]® intumescent sealant for maximum fire rating.

CHARACTERISTICS / ADVANTAGES

- High degree of fire rating: slows down the passage of flames and smoke
- Quick setting - can be cut, sawn or plastered in 1 hour
- Economical in use - expands up to 50 times its original aerosol volume
- Fills irregular and broad gaps where most conventional fillers would fail
- Possesses insulating and sound deadening properties

Expansion	40 litres (750ml can)
Cell structure	Medium fine
Elongation at tension	25% (DIN 53430)

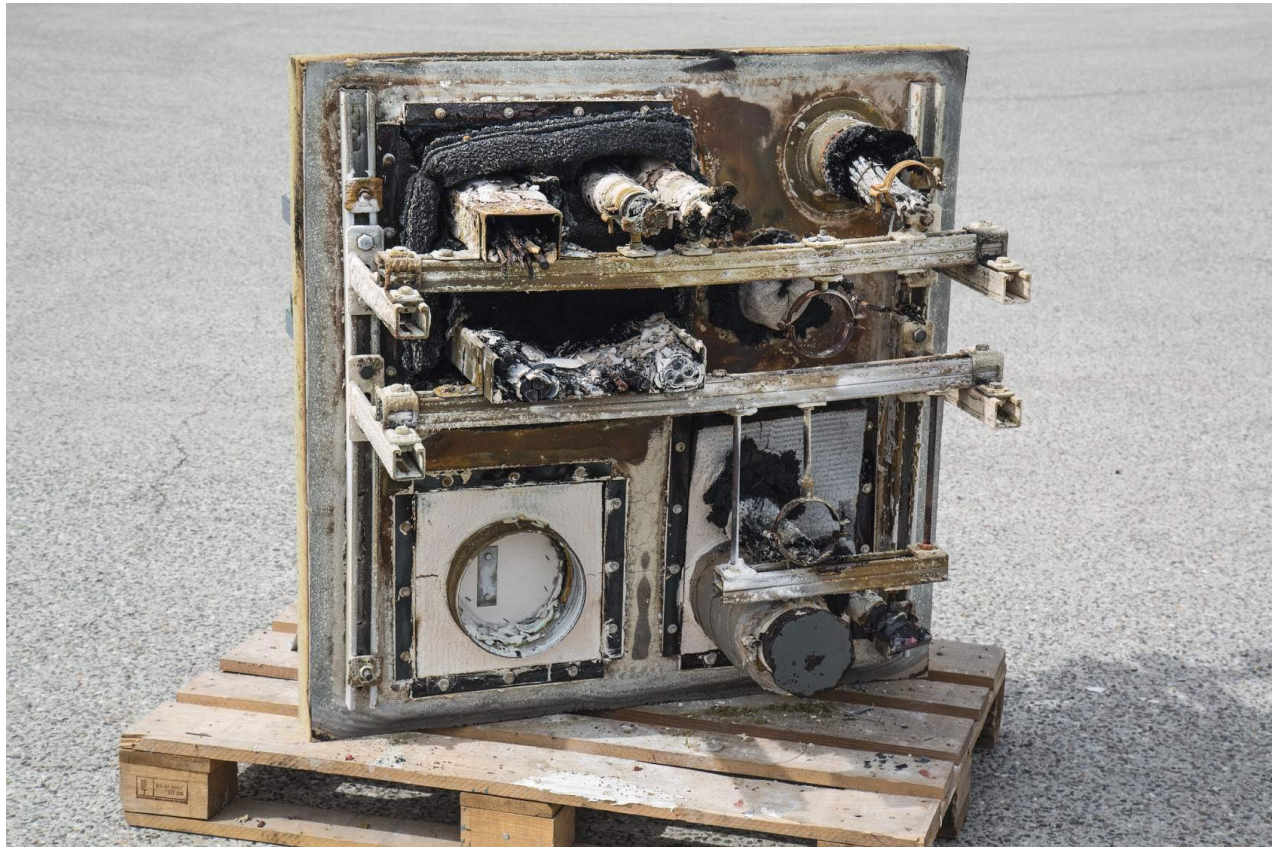
APPROVALS / STANDARDS

Meets the requirements of DIN 4102 Part 1 for Construction Materials; BS476 Part 20 Class B1. Copies of the independent test certificates are available on request. Warrington fire report number 160899 and 151680 (for use with stud partition walls and cables).

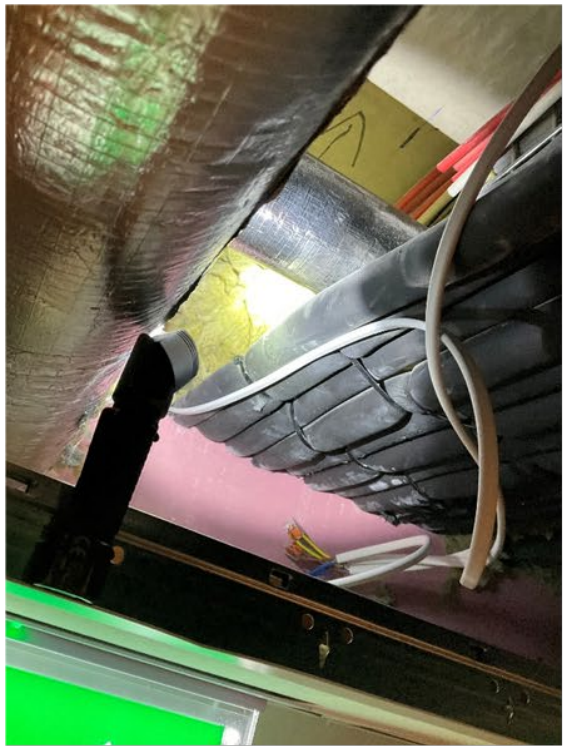
Test reference indicates BS testing of the product and is only tested in certain joint configurations!

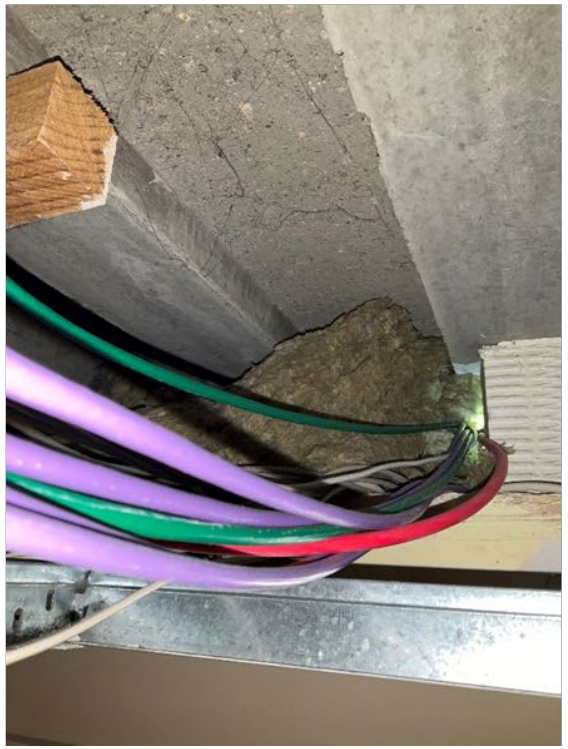
Good vs Bad Installs

Before and After Test

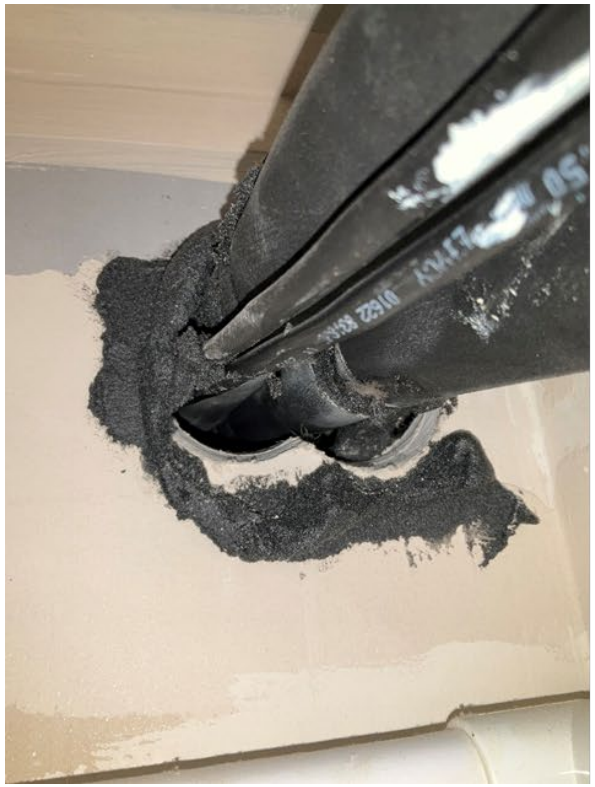


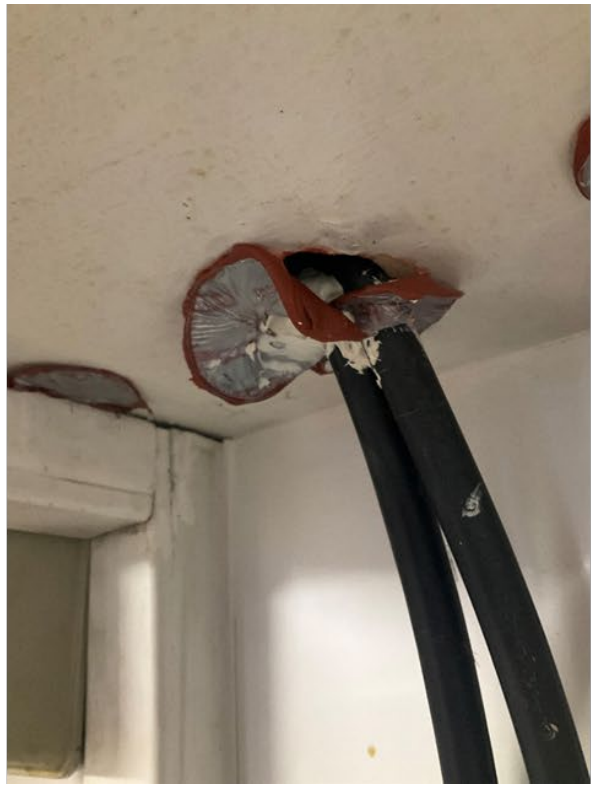
Incorrect or damaged Installs

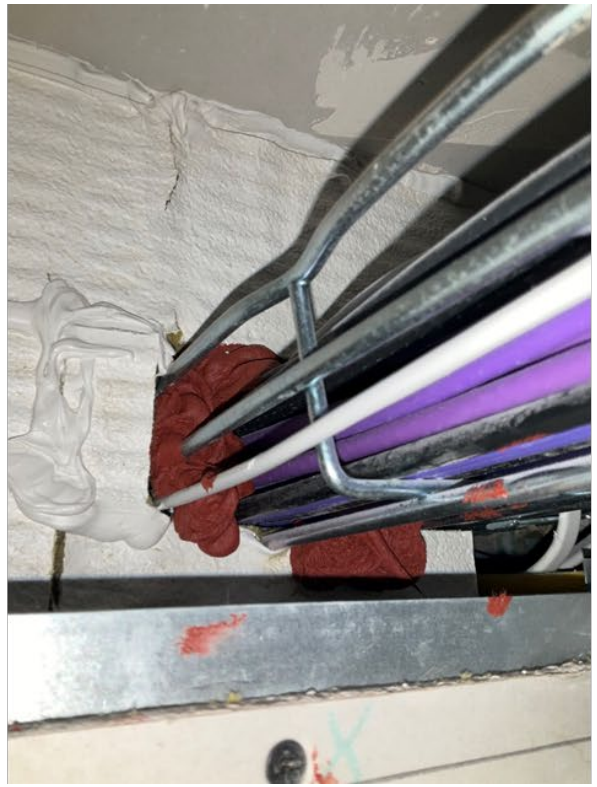


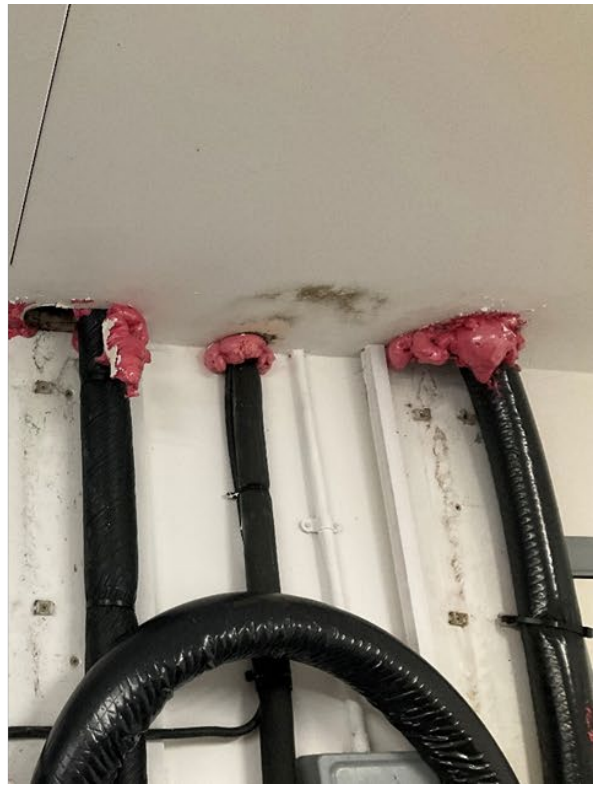


Incorrect or damaged installs



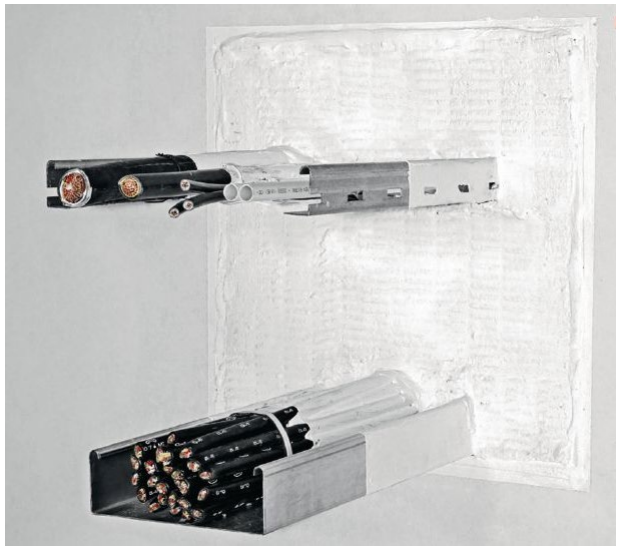


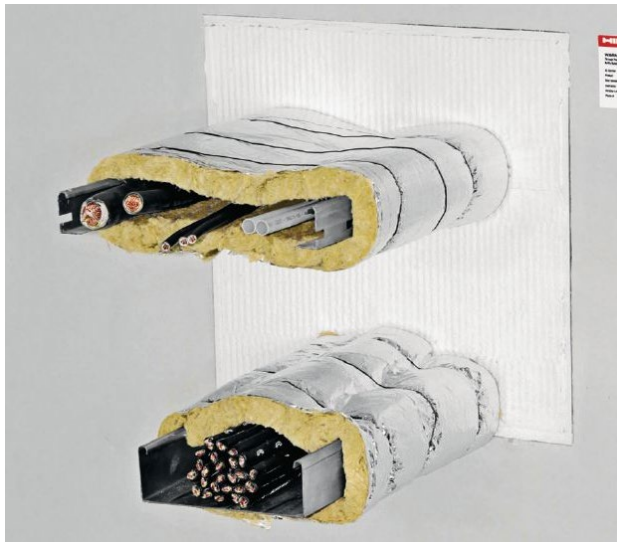


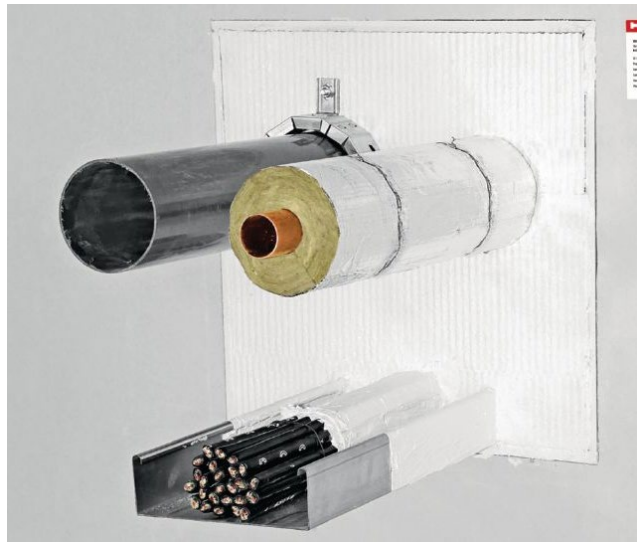


Correctly installed?

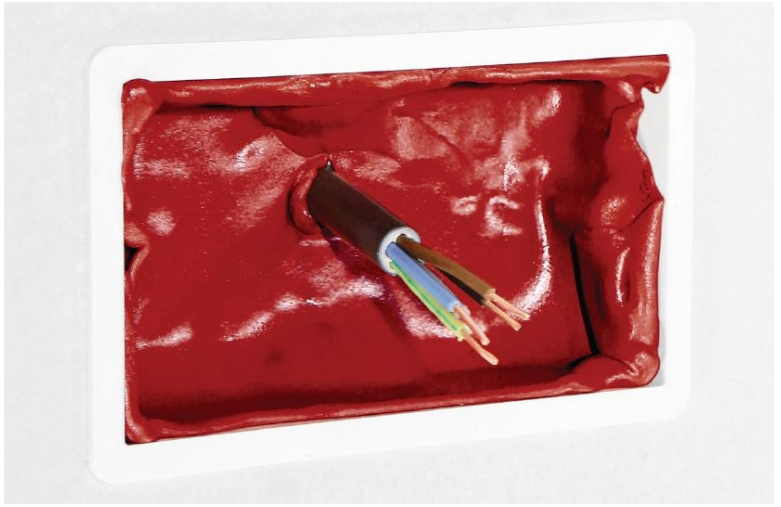
Correct installation

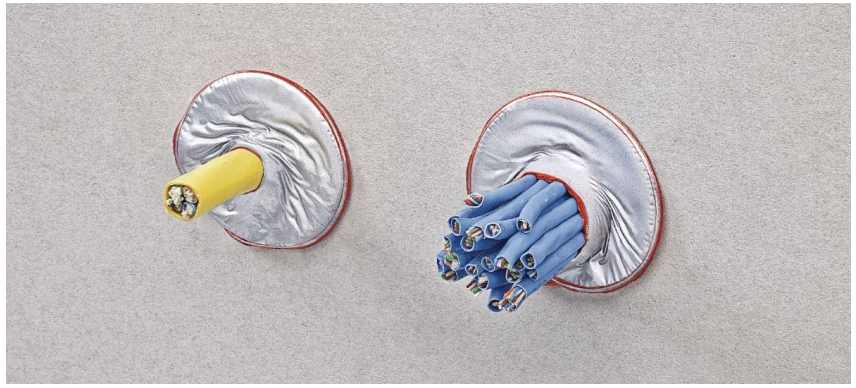




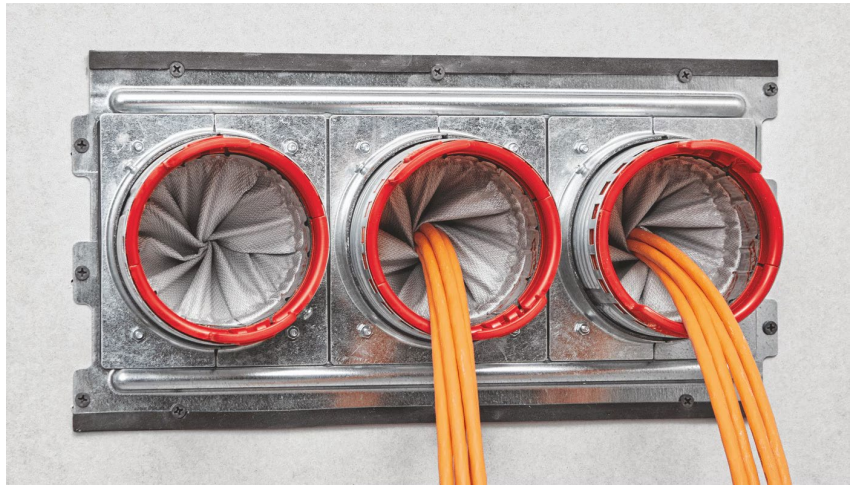


Hilti Solutions





Hilti Solutions



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Thank you

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