June 2025 | Version 1.1

KNOWLEDGE SHARE: 009

PFKG
Passive Fire Knowledge Group

TITLE: USE OF TESTED OR CERTIFIED PENETRATION SEAL DETAILS FOR FIRE STOPPING OF MEP SERVICES

BUILDING TYPE: ALL BUILDINGS

OVERVIEW OF THE PROBLEM

It is a requirement under Building Regulations that: "Where reasonably necessary to inhibit the spread of fire within the building, measures shall be taken, to an extent appropriate to the size and intended use of the building, comprising sub-division of the building with fire-resisting construction."

To respond to these legal requirements, a fire engineer will develop the fire strategy, which will include the compartmentation design for the building, utilising guidance from relevant code of practice documents (e.g., BS 9999:2017 Fire safety in the design, management and use of buildings – Code of practice or BS 7974:2019 Application of fire safety engineering principles to the design of buildings) and where applicable, Approved Document B (England) and Building Standards Technical Handbooks (Scotland).

The fire strategy will define the fire resistance of all compartments and require that services which penetrate them be provided with penetration seals to reinstate the fire resistance of the construction element.

Practical guidance (not to be confused with Building Regulations functional requirements) within Approved Document B/ Building Standards Technical Handbooks references instances where the use of untested fire-stopping systems may be permissible or where fire-stopping may be omitted altogether.

For example, the guidance contained within Section 2.1.14 of the Building Standards Technical Handbook (Scotland) outlines exemptions for certain service types & sizes as follows:

"Fire stopping of the following services passing through a compartment wall or compartment floor need not be provided for:

- *a pipe or cable with a bore, or diameter, of not more than 40 mm, or*
- *not more than four 40 mm diameter pipes or cables that are at least 40 mm apart and at least 100 mm from any other pipe, or*
- *more than four 40 mm diameter pipes or cables that are at least 100 mm apart, or*
- *a pipe which has a bore of not more than 160 mm and is of iron, steel or copper, or of a material capable of withstanding 800 °C without allowing flames or hot material to pass through the wall of the pipe, or*
- *a pipe which has a bore of not more than 110 mm connected to a vertical drainage or water service pipe, constructed from aluminium, aluminium alloy, or uPVC to BS 4514: 2001.*

Where a pipe connects to another pipe which attracts a more demanding fire resistance duration and is within 1m from the compartment wall or compartment floor, the pipe should be fire stopped to the more demanding guidance."

Approved Document B: Volume 2 section 10.4 states:

"Where a proprietary sealing system is not used, fire-stop around the pipe, keeping the opening for the pipe as small as possible..."

Whilst this suggests provision of a penetration seal, it is vague and doesn't provide guidance regarding number of services, or aperture dimensions. This is a problem because without the application of a third party tested or certified penetration seal detail, it is not possible to evidence the overall fire resistance performance in accordance with a project fire strategy.

Approved Document B: Volume 2 section 10.5 states:

"A pipe with a maximum nominal internal diameter of 160mm may be used with a sleeve made out of a high melting point metal..."

This is a problem because sleeved services as suggested in the above clause are not covered in the scope of BS EN1366-3:2021 and as a result are unlikely to be supported by test evidence.

However, it is likely that only way to comply with the requirements of the fire strategy, is through the application of third party tested or certified penetration seals in accordance with relevant test standards (e.g., BS EN 1366-3:2021 Fire resistance tests for service installations).

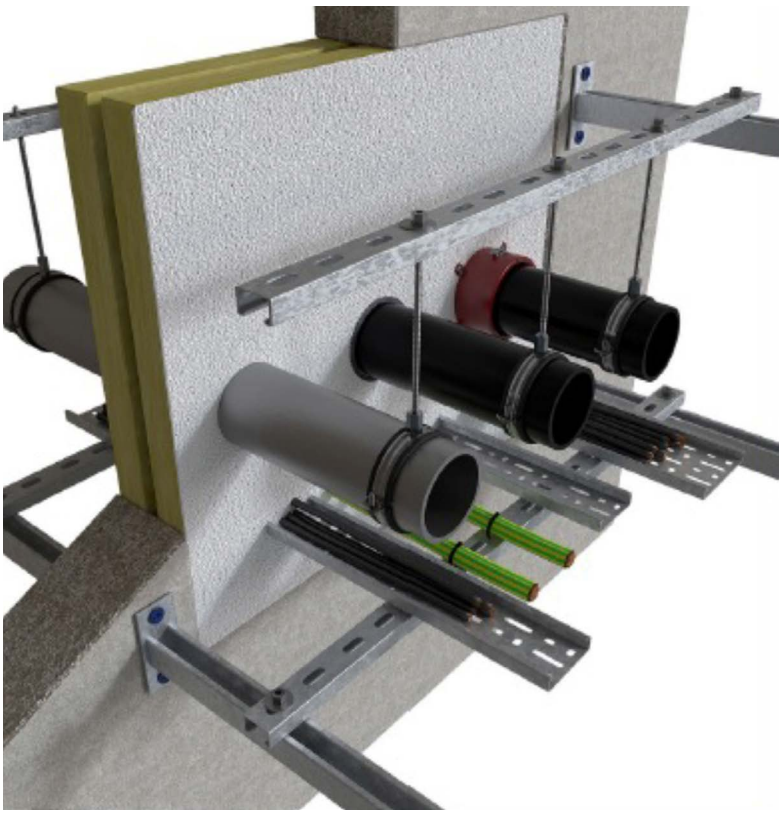

Figure 1: typical example of a mixed services penetration seal

PFKG
Passive Fire Knowledge Group

WHY IS THIS A PROBLEM?

When MEP (Mechanical, Electrical, and Plumbing) services pass through fire compartment walls or floors, it is essential that any penetrations are properly sealed to reinstate the performance of the compartment. If penetrations are left unsealed, it may be possible for the passage of smoke, heat, noxious gasses, and flames to compromise the fire resistance of the compartment and lead to premature failure of the compartment wall or floor.

If services penetrations of any type and dimension are left unsealed or sealed with products where evidence of performance is unavailable, it can present a severe risk to life and damage to built assets. Additionally, it may also contravene the requirements of the project fire strategy.

RECOMMENDATIONS

The most robust way to evidence compliance with the requirements of a fire strategy is the use of tested or certified penetration sealing systems. An un-tested penetration seal detail is not supported by relevant test evidence to prove the performance of the penetration seal as a system (which includes the service and substrate) and therefore cannot evidence adherence to the requirements.

The Association for Specialist Fire Protection (ASFP), supports this through their publication: **"ASPF Advisory Note 2: Firestopping of combustible pipes with an internal diameter of 40 mm or less".** This advisory note advocates the use of proprietary fire-stopping systems in all instances and does not support any alternative provision suggested in guidance documents. Fire resistance testing of unsealed penetration seals conducted by the ASFP resulted in premature failures well in advance of typical minimum compartmentation requirements.

In summary, it is the recommendation of the PFKG that all MEP services penetrations must rely on the provision of a tested or certified penetration seal detail (in accordance with relevant BS EN standards).