

Introduction

When a fire resisting element is used to provide fire compartmentation, every opening that allows services to pass through the element must be adequately protected by sealing, or fire stopping - so that the fire resistance of the element is not compromised.

Openings for services must be kept to a minimum both in number and in size, and must be fire stopped around the services. In many cases the services themselves must be enclosed by a fire resisting construction or contained in a protected shaft.

The use of protected shafts should be restricted to stairs, lifts, escalators, chutes, ducts and pipes and are used to form a fire barrier between the different compartments connected by the shaft.

Any shaft that passes directly from one compartment to another should also be protected to delay or prevent the spread of fire between compartments.

The Building Regulations, Approved Document B (England and Wales) provides guidance on the use of protected shafts, and for services enclosures. Similar requirements are outlined in the Technical Standards to the Building Standards for Scotland, and in the Technical Booklet E, Building Regulations (Northern Ireland).

These requirements are also now embodied within British Standard BS 9999: 2008.

(Note: Additional provisions are also made where the shaft is a stair way or firefighting stair).

Openings for Pipes

Pipes that pass through a fire separating element should meet the appropriate provisions in the following alternatives:

- Be fitted with a *Proprietary Sealing System* which has been shown, by test, to maintain the fire resistance of the penetrated structure.
- Where a proprietary seal is not used, it must be fire stopped, and conform to the restricted diameters shown in Approved Document B table 14 (see page 85 AD-B vol2), keeping the openings as small as possible. The diameters given in Table 14, used in situation (2), assumes that the *pipes are part of an above ground drainage system* - and that the services are enclosed in an *Services Enclosure* as shown in Diagram 38 (see page 87 AD-B vol 2). If they are not, then the smaller diameters given for situation (3) in the table should be used.

The details in Table 14, and Diagram 38 of the Approved Document B are shown overleaf in Table 1 and Diagram 1 respectively.

- Be a pipe of lead, aluminium, aluminium alloy, fibre-cement or uPVC with a maximum nominal internal diameter of 160mm, *Contained in a Tightly Fitting Non-combustible Pipe* that extends at least 1m either side of the penetrated structure.
- Be contained in a *Protected Shaft*, providing insulation and integrity, (If the penetrated structure is a compartment wall or compartment floor)

Note: There are further restrictions that apply to the use of pipes carrying oil and gas, with specific requirements relating to ventilation. Further guidance is also provided in BS 8313:1997.

Where a *Proprietary System*, such as a Promat PROMASEAL® UniCollar® or a *Tightly Fitting Non-combustible Pipe Extension* is not used, the options are to use a **Services Enclosure** or, if that is not appropriate, a **Protected Shaft**.

Services Enclosures

Where *drainage and water pipes comply with the restricted conditions above*, that enables them to be encased in an *integrity only services enclosure* (fire from outside); then the enclosure may be constructed in Promat SUPALUX® as either a, one, two or three sided enclosure against a compartment wall or floor, or external wall, or intermediate floor - as shown in diagram 1 overleaf.

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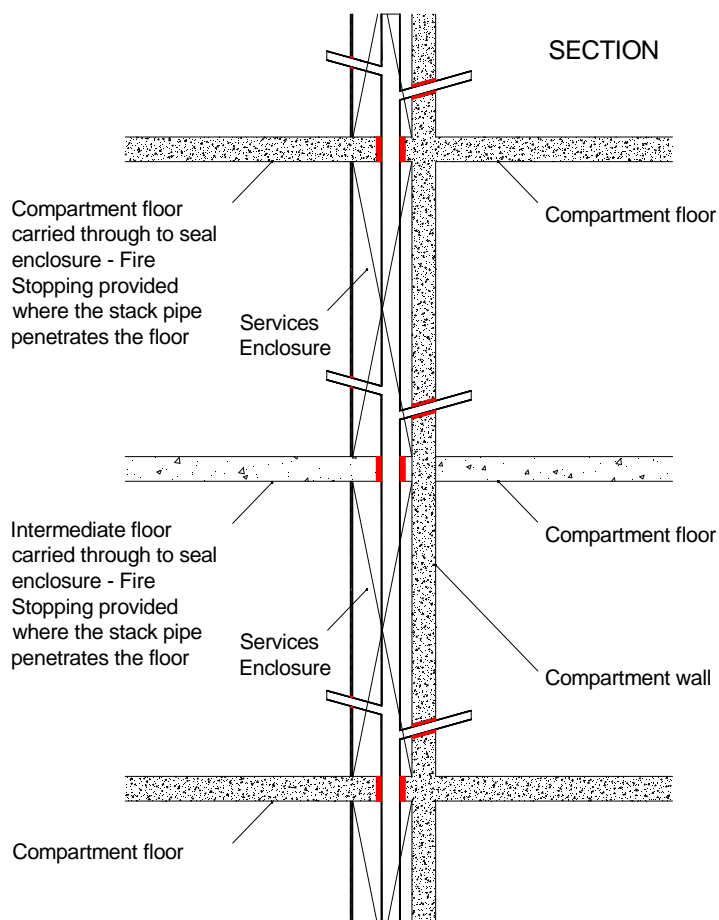
Table 1 - Maximum nominal internal diameter of pipes passing through a compartment wall/floor

Situation	Pipe material and maximum nominal internal diameter (mm)		
	(a) Non-combustible material ⁽ⁱ⁾	(b) Lead, aluminium alloy, uPVC ⁽ⁱⁱ⁾ fibre cement	(c) Any other material
1) Structure (but not a wall separating buildings) enclosing a protected shaft which is not a stairway or a lift shaft	160	110	40
2) Compartment wall or compartment floor between flats	160	160 (stack pipe) ⁽ⁱⁱⁱ⁾ 110 (branch pipe) ⁽ⁱⁱⁱ⁾	40
3) Any other situation	160	40	40

Notes:

- (i) Any non-combustible material (such as cast iron, copper or steel) which, if exposed to a temperature of 800°C, will not soften or fracture to the extent that flame or hot gas will pass through the wall of the pipe.
- (ii) uPVC pipes complying with BS 4514 and uPVC pipes complying with BS 5255.
- (iii) These diameters are only in relation to pipes forming part of an above-ground drainage system and enclosed as shown in diagram 1 below. In other cases the maximum diameters against situation 3) apply.

Diagram 1 - Integrity Enclosure for Drainage or Water Supply Pipes



Notes:

1. The enclosure should:
 - a. be bounded by a compartment wall or floor, an outside wall, an intermediate floor or a casing (see specification at 2 below.)
 - b. have internal surfaces (except framing members) of Class 0 (National class) or Class B-s3, d2 or better (European class).
 - c. not have an access panel which opens into a circulation space or bedroom.
 - d. be used only for drainage, or water supply, or a vent pipes for a drainage system.
2. The enclosure casing should:
 - a. be imperforate except for an opening for a pipe, or an access panel;
 - b. not be of sheet metal;
 - c. have (including any access panel) not less than 30minutes fire resistance.
3. The opening for a pipe, either in the structure or the casing, should be as small as possible and fire-stopped around the pipe.

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Vertical Enclosures

Integrity only service enclosures, may be constructed using light gauge steel angle and channel framing members, together with Promat SUPALUX[®] board of appropriate thickness, to provide the following fire performances (to external and internal fire),

Promat SUPALUX [®] thickness	Integrity - minutes
9mm	120
12mm	240

One, two and three-sided vertical enclosures may be constructed, up to sizes of 1500mm x 1220mm in section.

The building services within the enclosure must be independently supported so that the weight of the services is not taken by the enclosure. These enclosures may also be suitable for other applications, where fire resistance is not *specifically* required but where the use of a non-combustible or Class 0 material is deemed to be prudent or appropriate.

For single-sided enclosures up to 1500mm wide, the Promat SUPALUX[®] boards are fastened to light gauge steel perimeter angles of dimension in the range 30mm x 30mm to 50mm x 50mm and thickness in the range of 0.6mm to 1.2mm, using M4 steel self-tapping screws, at nominal 200mm centres.

The perimeter steel angles are fastened to the concrete floor, soffit and reveals of the masonry wall with M6 all-steel expansion anchors (e.g. Hilti HKD anchors) at 400mm nominal centres. The anchors must penetrate the concrete by at least 50mm.

Additional transverse support channels, 50mm x 50mm x 0.6mm are required at maximum 610mm centres, horizontally behind the enclosure panel face. These channels are fastened to the perimeter angle using 5mm steel pop rivets, and the Promat SUPALUX[®] board fastened to the channels using M4 steel self-tapping screws at 200mm centres.

Two and three-sided enclosures are constructed in a similar manner, with abutting boards at the corners of adjacent faces being backed with a light gauge steel angle as for the perimeter

Four-sided integrity only enclosures are not covered in this application.

Horizontal Enclosures

Horizontal (integrity only) services enclosures, may be formed in a similar manner, although it is more likely to encounter situations where the fire resistance is not essential, and the enclosure is required mainly for aesthetic purposes. For horizontal, and four sided applications, contact Promat Technical Services.

Protected Shafts

Where services are required to be run in a *Protected Shaft* in order that the fire insulation and fire integrity between compartments is maintained, then a fully insulated enclosure may be constructed using steel angle and channel framing members, with PROMATECT[®] L500 board of appropriate thickness to provide the following fire performance (to external and internal fire).

Promat PROMATECT [®] L500 thickness	Insulation & Integrity - minutes
25mm	30
35mm	60
50mm	120

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One, two and three-sided vertical protected shafts may be constructed, up to sizes of 1500mm x 1220mm in section.

The building services within the enclosure must be independently supported so that the weight of the services is not taken by the enclosure.

For single-sided enclosures up to 1500mm wide, the PROMATECT® L500 boards are fastened to light gauge steel perimeter angles of dimension in the range 30mm x 30mm to 50mm x 50mm and thickness in the range of 0.6mm to 1.2mm, using M4 steel self-tapping screws, at nominal 200mm centres.

The perimeter steel angles are fastened to the concrete floor, soffit and reveals of the masonry wall with M6 all-steel expansion anchors (e.g. Hilti HKD anchors) at 400mm nominal centres. The anchors must penetrate the concrete by at least 50mm.

Additional transverse support channels, 50mm x 25mm x 0.8mm are required at maximum 610mm centres, horizontally behind the enclosure panel face. These channels are fastened to the perimeter angle using 5mm steel pop rivets, and the PROMATECT® L500 board fastened to the channels using M4 steel self-tapping screws at 200mm centres.

Two and three-sided enclosures are constructed in a similar manner, with abutting boards at the corners of adjacent faces being backed with a light gauge steel angle as for the perimeter

Four-sided protected shafts are not covered in this application. For horizontal, and four sided applications, contact Promat Technical Services.

Gas Pipe Risers

If the gas pipe riser is external it may be secured to the outside of the building and may be left exposed or hidden behind a cover or enclosure. The enclosure must be sealed where the pipe enters the building and must be open to the outside air (at least at the top and bottom of the riser) to provide free ventilation.

If the gas pipe riser is internal it can only be installed in a shaft, duct or void that has adequate ventilation. If the riser is to be enclosed in a continuous duct or enclosure, the duct or enclosure is required to provide at least 30min fire resistance and to be naturally ventilated at high and low levels to the outside.

Note: *External risers are not permitted on multi-storey timber frame buildings, and internal risers and laterals are required to be designed with particular care, in order to accommodate building movement due to shrinkage.*

Where a riser is installed in a ventilated duct or enclosure that is not continuous, and that is fully fire protected where the pipes penetrate the compartments wall or floor, then top and bottom ventilation must be provided for each isolated enclosure section, together with fully removable panels to allow access to permit maintenance.

If the riser is not installed in a duct or enclosure it must be ventilated indirectly to outside air via an area that is normally occupied, and itself ventilated to the outside, as required by the Building Regulations.

Where the use of an enclosure is largely for aesthetic purposes then it must be appropriately vented.

In new buildings gas service pipes should not be installed within a protected stairway unless the gas installation is in accordance with the requirements set out in the various Gas Safety Regulations.

If the horizontal leg of the gas pipe is situated in a fully ventilated ground/basement area, then it may not be necessary for it to be enclosed. The enclosure type, strategy and requirements will therefore depend to the pipe layout through the building.

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Electrical Risers

Electrical risers should be sized and be large enough, only to accommodate the electrical services and working space necessary to install and maintain the equipment.

Electrical risers within protected stairways should be separated by 30minute fire resisting construction and access doors, which should be kept locked shut.

Electrical risers installed elsewhere than in a stairway should be enclosed with fire resisting construction of a standard equivalent to the elements of structure of the building, and be capable of being locked.

Where however the electrical riser is not a continuous shaft, and the service is fully fire stopped where it penetrates the compartment floor then the riser need not be enclosed with fire resisting construction, although it may be prudent to do so.

Meters installed within any protected stairway should be enclosed within a secure cupboard which should be of 30min fire resisting construction.

Note: *Electrical services for Life Safety and Fire Equipment are subject to separate requirements and are not covered by this document. For further assistance with these applications, contact Promat Technical Services Department.*

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