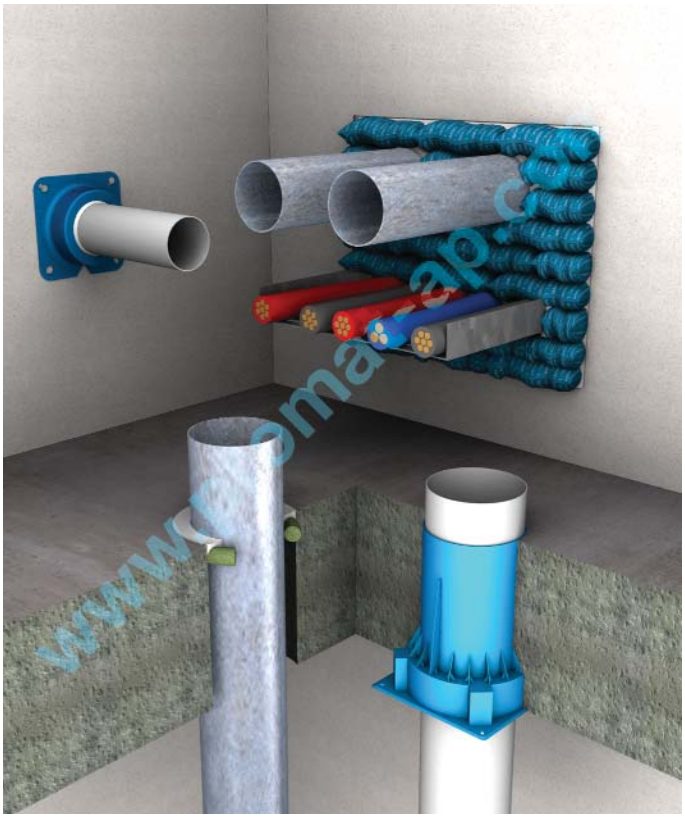
Promat

PROMASEAL® IBS™
Foam Strip For Joints And Gaps



Introduction

While fire resisting compartments are created to contain fire and smoke from spreading within building structures, this also presents a parallel threat as most concealed cavities between fire resisting walls and floors are interlinked. The importance of sealing gaps in this type of construction is therefore vital to ensure the compartmentation systems work to their maximum ability to save life and property. Such gaps are typically at service penetrations through walls and floors, but would also include gaps left for structural movement and gaps left due to poor workmanship.

Recognising this, the development of effective solutions to seal gaps at service penetrations has increased over the past few years and Promat has become a world leader in supplying such solutions. Note should be taken that every service passing through fire resistant building elements react in different ways to fire, so there is no single solution or product that will protect all services.

Services must be tested in accordance with the test method set out in appropriate standards. Tests are generally carried out in accordance with the General Principles of BS476: Part 20: 1987 or EN1366: Part 3 and 4 covering both penetration seals and linear joint seals respectively. In addition, many countries use the Australian Standard AS4072: Part 1: 2005 (Components for the Protection of Openings in Fire-Resistant Separating Elements), which specifies testing in accordance with the test method set out in AS1530: Part 4: 2005. It is important to note that although all of the above test methods can be considered similar, there are some major differences which can affect a particular application (see following pages for comparison of test methods).

Failure Criteria

Failure is measured in terms of integrity and insulation. Stability (or Structural Adequacy) is not recorded for service penetrations, except those which are required to be loadbearing, e.g. PROMASTOP® Cement.

Integrity failure occurs when cracks, holes or openings occur through which flames or hot gases can pass. This is measured in different ways, depending upon the Standard used.

For instance, AS1530: Part 4: 2005 measure integrity failure as flaming on the unexposed face for a time greater than 10 seconds. Other Standards measure integrity failure using the same criteria but with different methods of measurement.

a) Using a cotton pad, held against any gap, to see if the cotton pad ignites within 10 seconds; or

b) If the gap is equal to or greater than 150mm x 6mm; or

c) If a 25mm diameter probe can pass through a gap.

Insulation failure occurs when the temperature rise on the unexposed surface of the service, on the unexposed face of the building element 25mm from the penetration or on the seal itself exceeds 180°C. Insulation failure is inevitable on many metal service penetrations and is often waived as a failure criterion by local building regulations. Under such circumstances it is essential that combustibles be kept at least 100mm clear of these services at the point of penetration.

The PROMASEAL® and PROMASTOP® range of products were introduced to complement Promat's wide range of fire protection board systems.

Due to continuous development of draft fire test standards for this application, and the regular improvements and additions to the product range, only brief details are given in this section of the handbook concerning the products available at the time of writing.

For detailed information and advice on the current range of PROMASEAL® products, please contact Promat.

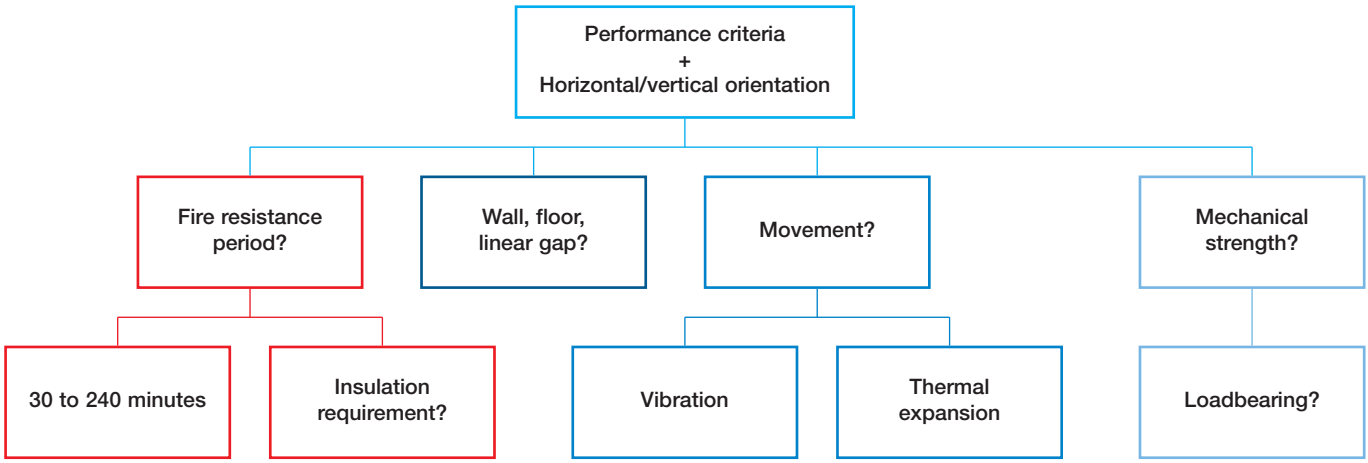
IMPORTANT: Because of the diversity of applications and the on-going test programme, the above and the following notes in this section are of a general nature only and it is essential to confirm that the system specified or being installed is approved for use. Always contact Promat to confirm the specification is correct prior to usage.

	British Standards BS476: Part 20: 1987	European Standards EN1366: Part 3: 2004/ EN1366: Part 4: 2006	Australian Standards AS4072: Part 1: 2005/ AS1530: Part 4: 2005	United States Standards ASTM E814: 1997/ UL1479: 1998
Orientation	Requires representative specimen in both orientations. For asymmetrical specimens, a test should be conducted from each side using separate specimens.	Representative or standard service configurations tested both in horizontal and vertical orientation.	Requires full size or representative specimen and testing in both horizontal and vertical orientation if intended for use in both orientation. Provide standard test configurations.	UL requires both orientations must be tested unless it can be demonstrated that testing in a single orientation does not affect the results. ASTM does not specify but there are differences in temperature and pressure measurements for the two orientations so that, by default, both would be required.
Test sample	Does not specify projection distances of through penetrating elements. The end conditions of pipes should reflect the "as installed" conditions.	The services shall be installed so that they extend 500mm on each side of the supporting construction, of which at least 300mm shall extend beyond the extremities of the sealing system. No part of the service shall be <200mm from the furnace wall or another service. Movement joint seals shall be installed in uniform design cross-sectional area and to maximum length that can be accommodated by separating test element. For non-movement joint seals a shorter length may be used subject to a minimum of 900mm.	The ends of the services shall be sealed on the exposed side of the furnace, to simulate normal extension through compartment. If the end condition of the the unexposed side is unspecified, it shall be left unsealed. The penetrating element shall extend 500mm into the furnace and 2000mm outside the furnace for plastic pipes, all other elements are 500mm inside and outside the furnace.	The penetrating item should extend into the furnace by 300mm and out of it by 910mm. The end of the item on the exposed face is capped, but uncapped on the unexposed side, unless is it to represent a closed system in which case it may be capped. The periphery of the specimen should not to be closer than 1.5 the thickness of the assembly, or 300mm to the furnace edge, whichever is greater.
Conditioning	Materials shall, at time of test, be at a condition approximating the state of strength and moisture content that would be expected in normal service.	The test specimens shall not be tested until both strength and moisture content approximate values the service expects to attain.	The test specimens shall not be tested until both strength and moisture content approximate values the service expects to attain.	Prior to fire testing, each test sample and test assembly is to be conditioned, if necessary, to provide a moisture condition likely to exist in similarly constructed buildings.
Protection of assembly and sample	Ambient temperature should be within 5-35°C prior to heating period, and temperature measurements on the unexposed face must be in draught-free conditions.	Provide reference for test frames and the ambient condition must be 20°C(±10°C) at the commencement of test. During testing, the laboratory temperature shall not decrease >5°C or increase by >20°C for all insulated separating elements while they still satisfy the insulation criterion.	Not specified except that the initial furnace temperature must be not less than 10°C and not more than 40°C.	The testing equipment and test sample are to be protected from any condition of wind or weather that might influence the test results (i.e. ambient temperature at the time of testing must be within 10-32°C while the velocity of air across the sample must not exceed 1.3m per second).
Pressure differential	At mid height of vertical systems, the pressure differential is 15Pa, and the same pressure 100mm below horizontal systems.	For a vertical system with height <1000mm, the pressure differential should be 15±2Pa. If the height >1000mm, pressure differential should be 20±2Pa at the top of the specimen. In this case penetrations should be included in the zone where the pressure is >10Pa. For a horizontal system, the pressure differential should be 20±2Pa at 100±10mm under the supporting construction.	Not less than 20Pa at notional 100mm below the soffit height of horizontal element or at a level with lowest point of the penetration seal of a vertical element it should be 15Pa±3.	Except for the first 10 minutes of the test, the furnace pressure shall be at least 2.5Pa greater than the pressure on the unexposed side of the following locations: a) Wall – at lowest elevation of the test specimen; b) Floors – at the location of the pressure probes. Test sponsor may also specify a unique pressure condition in which case it must be maintained throughout the duration of the test, excluding the first 10 minutes, within 20% of the specification.

	British Standards BS476: Part 20: 1987	European Standards EN1366: Part 3: 2004/ EN1366: Part 4: 2006	Australian Standards AS4072: Part 1: 2005/ AS1530: Part 4: 2005	United States Standards ASTM E814: 1997/ UL1479: 1998
Integrity	a) Cotton pad test; b) Gap gauge; c) Sustained flaming of more than 10 seconds.	a) Cotton pad test is generally performed. For penetration seal tests the use of reduced size cotton pad is permitted if necessary. b) Whilst gap gauge is used for measurement in general test specimens, it shall not be used for evaluation of penetration and linear joint seals tests. c) Sustained flaming.	Failed when: a) Cotton pad test, or b) Flaming takes place at the unexposed face of the specimen for a period exceeding 10 seconds.	Shall not permit the passage of flame throughout the fire test, or water through the hose stream test. Mandatory for all ratings in both standards, i.e. ASTM and UL.
Insulation	The insulation of the specimen is judged to have failed if the temperature on the unexposed side and on penetrations reaches 180°C above the initial temperature.	The insulation of the specimen is judged to have failed if the temperature on the unexposed side and on penetrations reaches 180°C (K) above its initial temperature.	The criteria for failure of insulation is if the temperature of any of the thermocouples on the unexposed side reaches 180°C above the initial temperature.	Shall not permit the passage of flame through the fire test, or water through the hose stream test or allow the temperature to increase by 180°C on the unexposed side. Mandatory for T rating in both standards.
Hose stream test	No specification.	No specification.	No specification.	For both F and T ratings, a duplicate specimen is subjected to a fire exposure test for period half of the desired rating but not more than 60 minutes. Immediately after the fire exposure, the specimen shall be subject to the hose stream test. Same test assembly can be used for both tests but must take place within 10 minutes from the completion of the fire test.
Specification	a) Integrity; b) Insulation; c) Loadbearing capacity where applicable.	a) Integrity; b) Gap gauge (not applicable for penetration and linear joints seal tests); c) Cotton pad; d) Insulation; e) Insulation area 2 (if the test element incorporating two discrete areas of different thermal insulation).	AS1530: Part 4 states results to be expressed in: a) Structural adequacy; b) Integrity; c) Insulation; d) Resistance to incipient spread of flame.	Specified in terms of F rating which require a hose stream test, and T rating which does not require a hose stream test, measures the insulation. UL have an additional L rating for air-leakage.
Reporting	a) Temperature data from all specified critical thermocouple; b) A detailed description of all penetrating services; c) A detailed description of the test construction.	In addition to requirements of EN1363: Part 1, the following are necessary for penetration seal tests: a) For tests on pipes, statement of the pipe end configuration (capped or uncapped); b) For cables, the cable dimensions; c) For metallic pipes, the pipe dimensions; d) For unsupported seals, the maximum area free of services; e) Whether multiple penetrations have been tested in a single test construction. For linear joint seal test, the following shall be included: a) Full description of any procedure used to induce relative movement of the seal faces; b) Orientation of test specimen; c) The limits of the range of nominal widths and the movement capability successfully tested; d) Full description of the splicing method(s) used.	In addition to the requirements of AS1530: Part 3, the report should have: a) Temperature data from all specified critical thermocouple; b) A detailed description of all penetrating services; c) A detailed description of the test construction.	Report must have: a) Description of assembly and materials; b) Relative humidties; c) Temperature recordings; d) The achieved rating; e) Location of pressure probes and differential pressure of the test; f) Record of all observations; g) Correction factor.
Commentary	For positions of thermocouples and other items not specified in this standard, laboratories refer to the EN standard.	These standards are now in effect for use within the industry.	Comprehensive and simple standard configurations, as well as details on permissible variations.	UL also have an addition L rating which is to be reported as the largest leakage rate determined from the air leakage test.

Which System(s) To Use

As penetrations can occur in various building elements, there are a number of important criteria that require consideration in determining the appropriate type of sealing system to be used, simplified in the following chart.

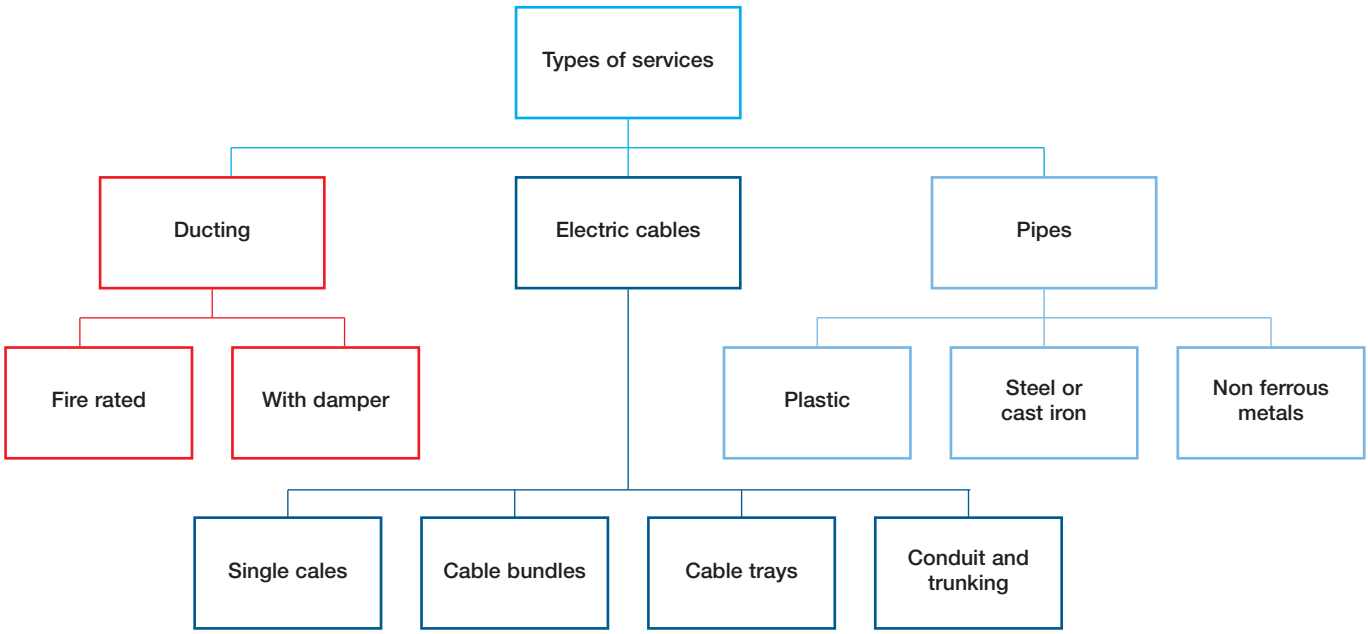


Limitations of Use

- Size of opening
- Penetration services
- Flexibility of seal(s)
- Smoke or gas lightness
- Ambient conditions
- Design life
- Frequecy of change to services
- Parent construction (type of substrate)

Special Considerations

In instances where electrical and mechanical services are involved, the selection of penetration sealing system also require the following additional elements to be carefully considered.



Compatability Considerations

- Intumescent systems in lightweight constructions
- Rigid seals in “dynamic” barriers
- Large spans and thermal expansion
- Smoke or toxicity in populated zones
- Dusty or friable materials in clean-room applications

PROMASEAL® IBS™ is a flexible fire protection foam strip used for sealing joints and gaps within walls or floors. It has excellent versatility, second only to sealant especially dealing with fire stopping for joints, gaps, building and services movement etc. PROMASEAL® IBS™ can be used as a stand alone product or with a cover of PROMASEAL® AN Acrylic Sealant where required.

PROMASEAL® IBS™ is supplied in rolls and is available in the following dimensions:

Shape type	Manufacturing Code	Dimension	Length
Tube	IBS 16	16mm Ø	150 metres
	IBS 22	22mm Ø	100 metres
	IBS 29	29mm Ø	60 metres
	IBS 38	38mm Ø	300 metres
Rectangular	IBS 5020	50mm x 20mm	50 metres
	IBS 5010	50mm x 10mm	500 metres
	IBS 100X10	100mm x 10mm	500 metres

Tested up to 240 minutes fire resistance according to AS1530: Part 4 and AS4072: Part 1. The fire resistance level of PROMASEAL® IBS™ will vary and applications are dependent on the barrier and the type and size of service.

Areas of application to be considered include cable and pipe penetrations, deflection heads of partitions and walls and joints within walls, around fire dampers, floor joints, cable trays, control joints etc. PROMASEAL® IBS™ is also supplied as a component part of lightweight fire and acoustic wall systems which have been developed to satisfy the ever growing demand for noise abatement in residential and commercial applications. These wall systems are primarily used for partitions, corridors and shaft walls in high rise apartments, multi-residential developments, hotels and commercial construction. For more details on this type of wall system, please contact Promat Technical Department.

Installation Guide

Joint sealing in floors and walls

PROMASEAL® IBS™ is easy to install simply by compressing and inserting it into the joint or gap. For joints up to 18mm insert the IBS™ into the centre of the wall or floor or 10mm back from the fire side. The addition of sealant is optional if installed in this manner. For joints over 18mm wide, please follow the directions in the **Performance Table** at right. Where joints or gaps are uneven, the maximum gap width is to be taken and matched to the nominal IBS™ size. If through gaps still occur because of uneven surfaces, these gaps should be sealed with PROMASEAL® AN Acrylic Sealant.

- For gaps up to 30mm wide with the system applied to the non fire side, set the IBS™ 12mm below the surface. The use of a sealant is optional in this application. See the **Performance Table** at right for applicable sealant thicknesses.
- For gaps up to 30mm wide with the system applied to the centre of a masonry or concrete wall (top block must be solid or concrete filled), compress the IBS™ no less than 20%. Sealant is optional in this application.
- FRL up to -/240/240 can be achieved in a 240 minutes fire rated separating element.
- Where butt joints occur in the IBS™ and sealant is not used, the FRL of the system can be maintained by applying an additional 50mm long strip of IBS™ over the joint on either the exposed or unexposed face. Alternatively, apply sealant over the butt joint to a depth of 5mm with a minimum of 5mm coverage on either side of the butt joint.
- Intermediate sizes for IBS™ and sealants may be interpolated.

Lightweight and acoustic partitions

PROMASEAL® IBS™ is supplied as a component of Promat lightweight and acoustic partitions systems. These partitions are primarily used for corridors and shaft walls, in high rise apartments, multi-residential developments, hotels and commercial construction.

In order to maintain the fire resistance level of the systems, PROMASEAL® IBS™ must be installed above any deflection head detail. The IBS™ is positioned at the head of the panel (or blockwork system) and compressed as the panels are fixed in place. See illustrations on page 8. The installation of IBS™ may vary between different manufacturers' systems and should be checked prior to installation.

Metal pipes penetration seal

PROMASEAL® IBS™ is of particular use where the large dimension of an opening around pipes and services would result in the slumping of a stand alone sealant. It can be used to form a slip joint at penetrations so that when pipes/services move, the integrity of the opening is maintained. See illustrations on page 9.

PROMASEAL® AN Acrylic Sealant should be used for joins in IBS™ or where there may be uneven surfaces. Where joints or gaps are uneven, the maximum gap width is to be taken and matched for the nominal IBS™ size. Please contact Promat for more details.

Electrical cables and cable trays penetration seal

Typical opening sizes for electrical cables and cable trays penetration walls within PROMASTOP® Cement are as follows:

Single or bunches of electrical cables:
Maximum 110mm wide x 30mm high

Electrical cables on cable trays:
Maximum 320mm wide x 95mm high

A 1-2mm cover of PROMASEAL® AN Acrylic Sealant must be applied over the PROMASEAL® IBS™ and for approximately 50mm on to the adjoining wall boards. See illustrations on page 10.

Performance Table

Configuration	Maximum joint width	PROMASEAL® IBS™ nominal thickness	Minimum sealant thickness	Maximum FRL
For non fire side only	18mm	22mm	9 (optional)*	-/240/120
	30mm	38mm	12 (optional)*	-/240/120
	35mm	38mm	12	-/240/120
	54mm	60mm	18	-/180/120
	65mm	80mm	20	-/180/120
For fire side only	18mm	22mm	9**	-/240/240
	35mm	38mm	12	-/240/240
	54mm	60mm	18	-/240/240
	65mm	80mm	20	-/240/240
For mid-depth of wall slab	18mm	22mm	Not required	-/240/120

*If sealant is not used in this application, the FRL achieved will be -/180/90.
**If sealant is not used in this application, the FRL achieved will be -/240/180.

Recommended Specification

Where appropriate, the specified joints and gaps within floor/wall openings should be properly fire stopped using PROMASEAL® IBS™ capable of providing a fire resistance of -/180/120, -/240/120 or -/240/240 when tested and assessed in accordance with AS1530: Part 4 and/or BS476: Part 20: 1987. Installation of any fire stopping product should be carried out according to the manufacturer's recommendations.

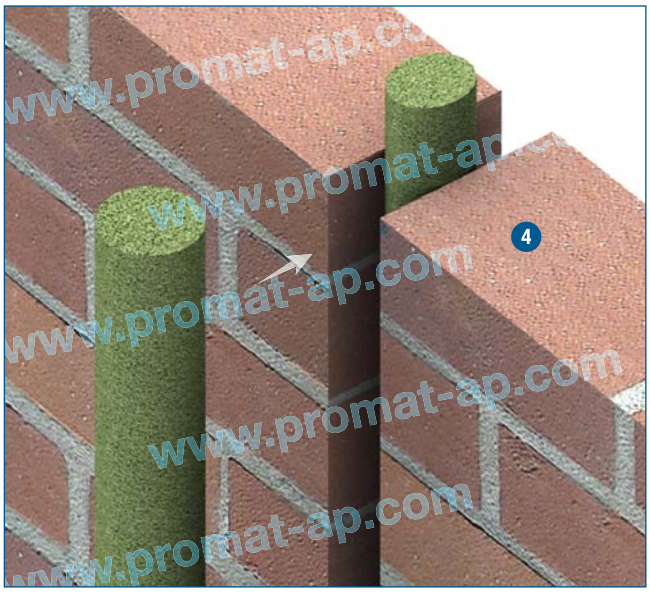
Joint sealing in masonry or concrete floors

TECHNICAL DATA

1. For FRL up to -/240/240, this will vary depending on application and types of the penetrating elements. PROMASEAL® IBS™, thicknesses in accordance with Performance Table on page 6.
2. Gaps filled with PROMASEAL® AN Acrylic Sealant, thicknesses in accordance with Performance Table on opposite page.
3. Concrete floor slab or wall
4. Masonry wall

Joint sealing for wide gap in masonry or concrete walls

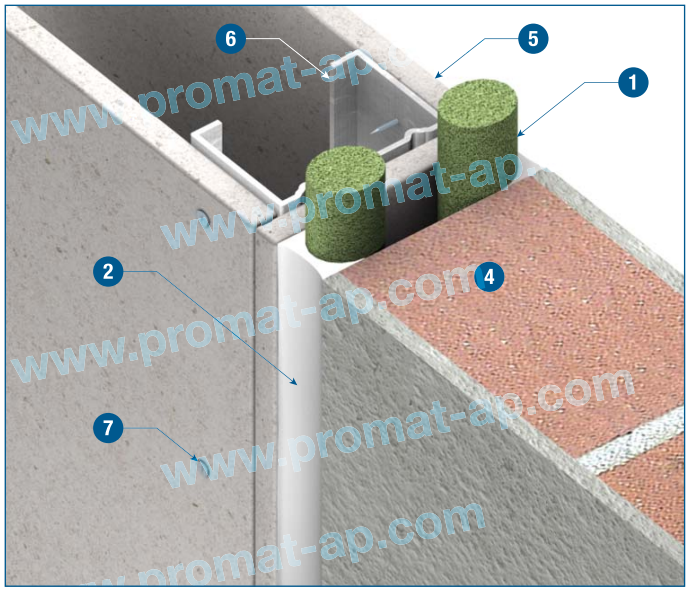
Joint sealing in masonry walls



Joint sealing in head deflection of masonry walls (Multiple strip)

Joint sealing in head deflection of masonry walls (Single strip)

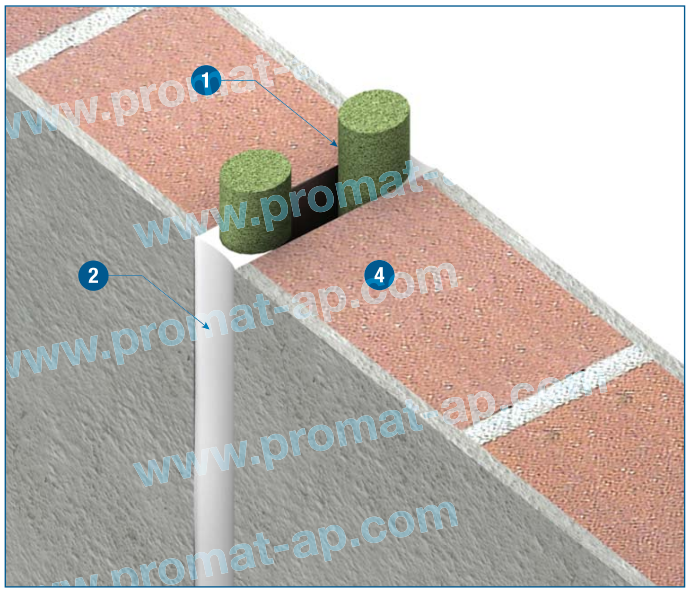
Joint sealing in intersection of masonry walls and partitions



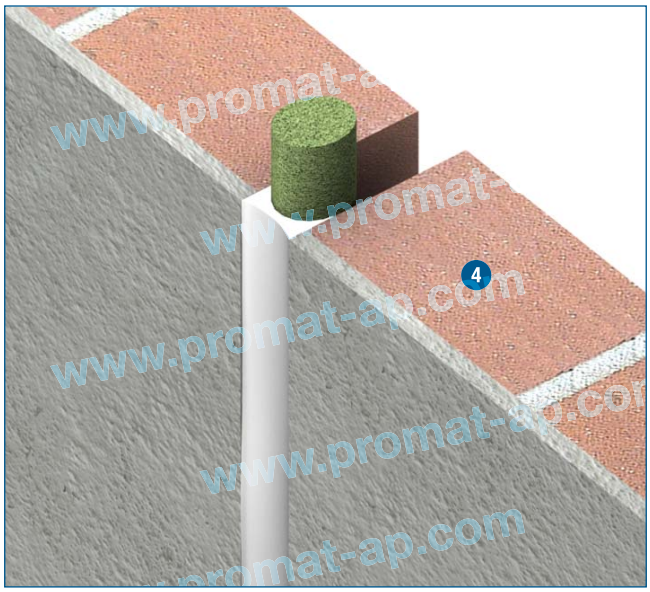
TECHNICAL DATA

1. For FRL up to -/240/240, this will vary depending on application and types of the penetrating elements. PROMASEAL® IBS™, thicknesses in accordance with Performance Table on page 6.
2. Gaps filled with PROMASEAL® AN Acrylic Sealant, thicknesses in accordance with Performance Table on page 6.
3. Concrete floor slab
4. Masonry wall
5. Lightweight partition system
6. Partition framing system
7. Proprietary anchor fixing for partition framing system

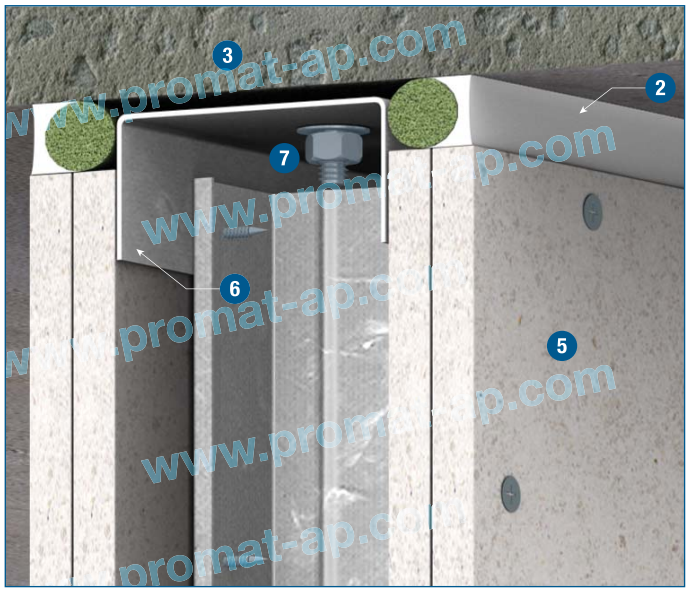
Joint sealing in masonry or concrete walls (Double strip)



Joint sealing in masonry or concrete walls (Single strip)

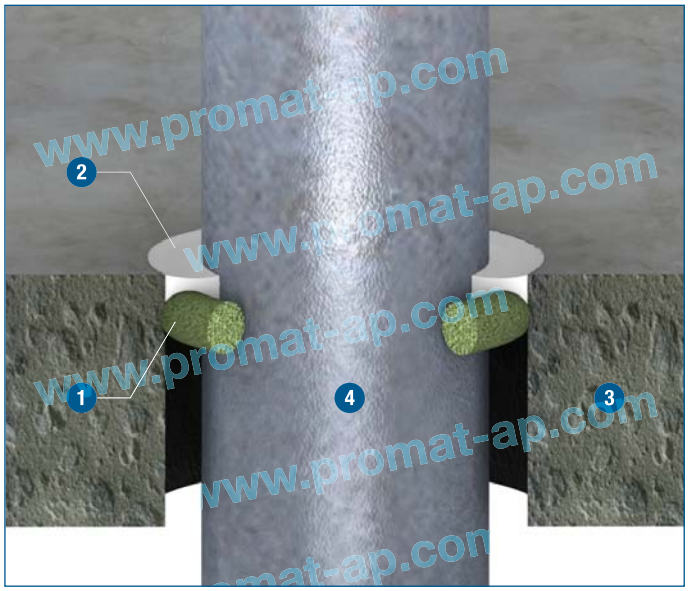


Joint sealing in head deflection of double lining layer partitions



Joint sealing in head deflection of single lining layer partitions

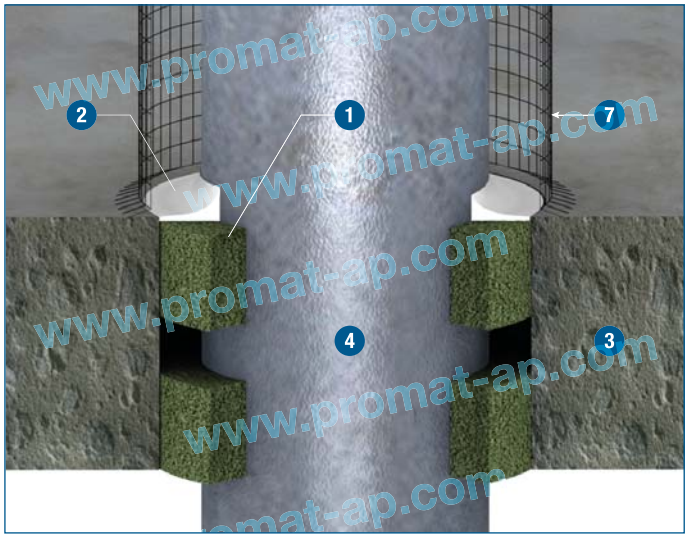
Steel pipe penetration seal in concrete floors



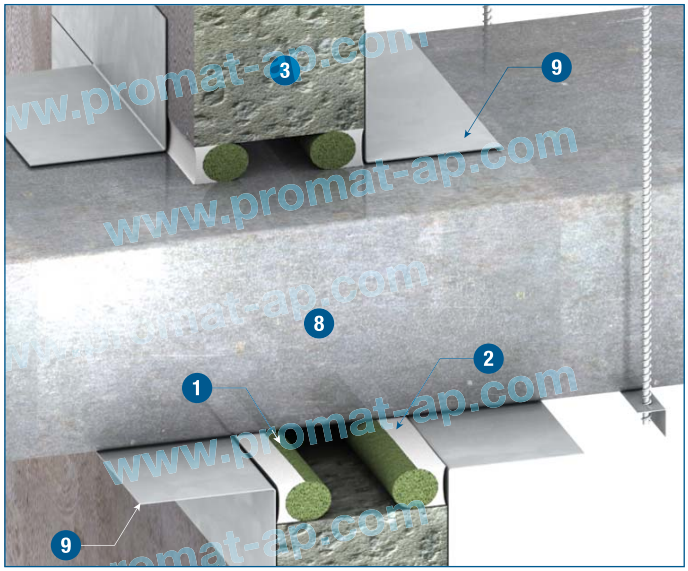
TECHNICAL DATA

1. For FRL up to -/240/- this will vary depending on application and types of the pipes and penetrating elements. PROMASEAL® IBS™, thicknesses in accordance with Performance Table on page 6.
2. Gaps filled with PROMASEAL® AN Acrylic Sealant, thicknesses in accordance with Performance Table on page 6.
3. Concrete floor slab
4. Steel pipes
5. Lightweight partition system
6. Steel sleeve to close off cavity
7. Steel wire mesh to maintain distance from combustible materials, where insulation criteria is required. Please consult Promat for details.
8. Cable trunking or similar passing through masonry or concrete wall
9. Top and bottom steel angle collars on either side of a wall for wide gaps

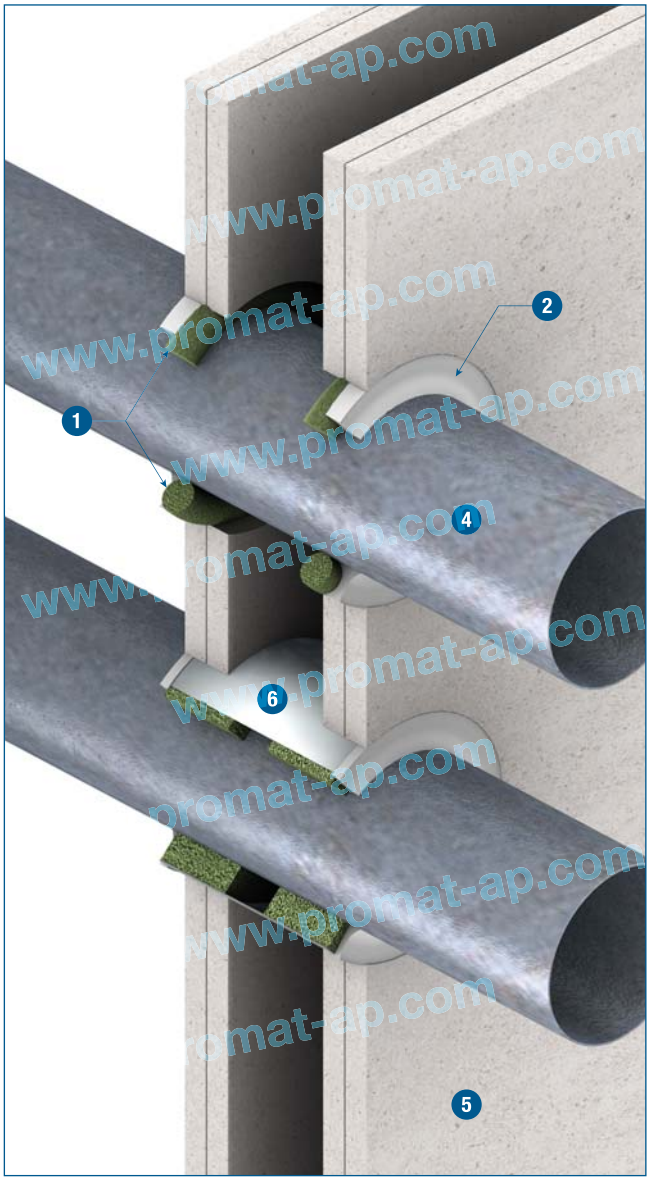
Steel pipe penetration seal in concrete floors with protective steel mesh that prevents combustible material coming into contact with a non insulated penetration



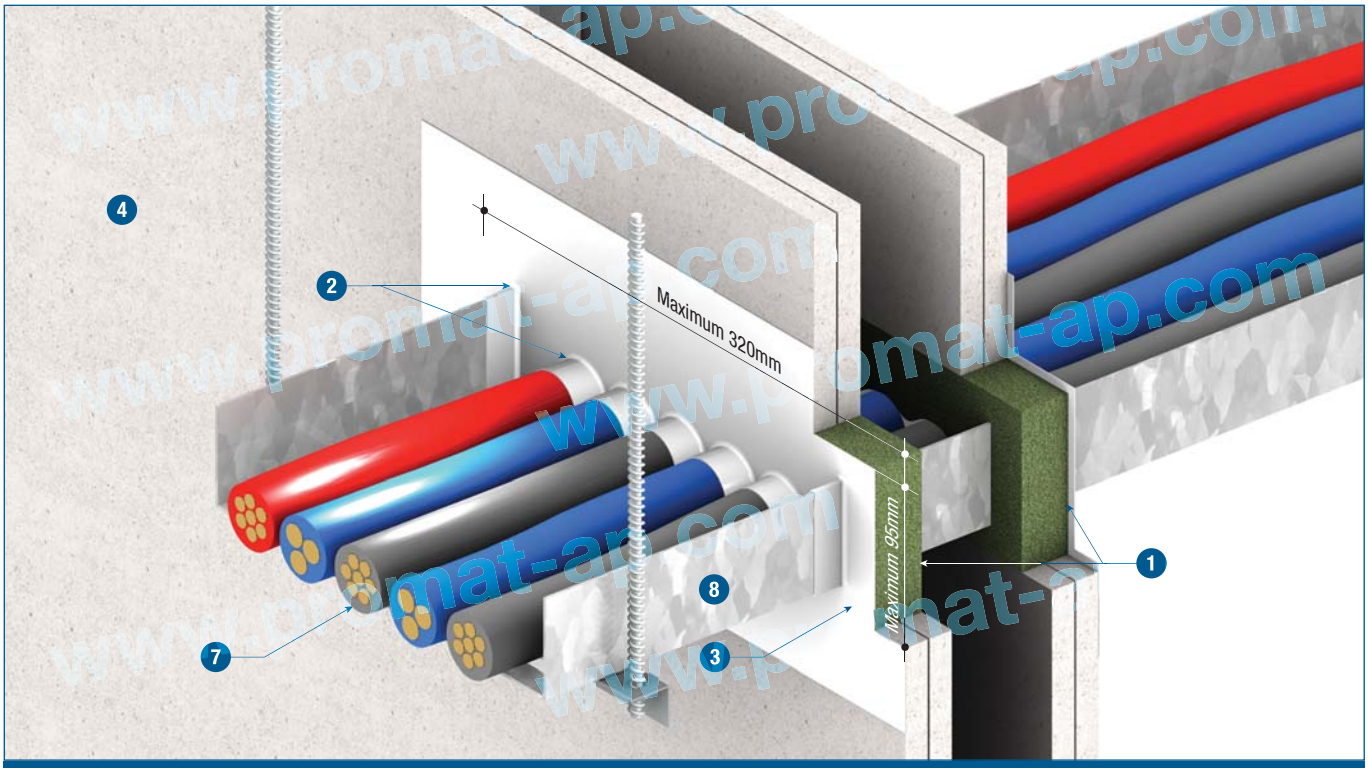
Penetration seal around trunking passing through masonry or concrete walls



Steel pipe penetration seal in lightweight partitions



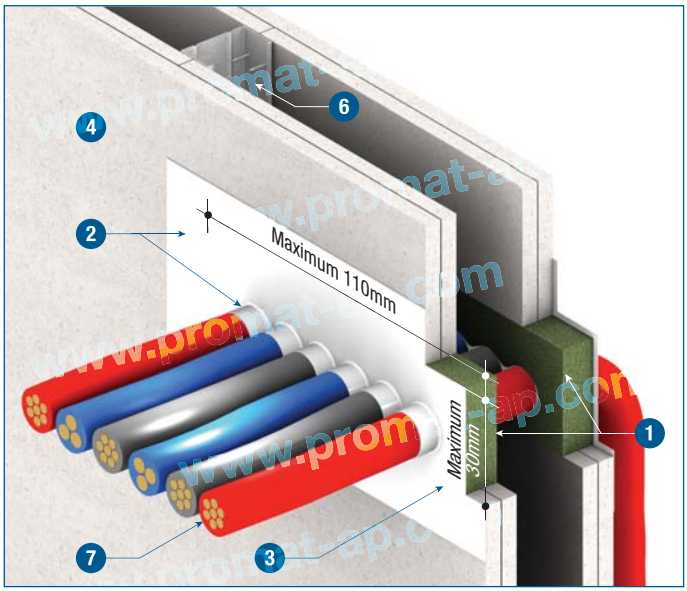
Cable trays penetration seal in lightweight partitions



TECHNICAL DATA

1. For FRL up to -/240/240, this will vary depending on application and types of the pipes and penetrating elements. PROMASEAL® IBS™, thicknesses in accordance with Performance Table on page 6.
2. Opening surroundings and gaps filled with PROMASEAL® AN Acrylic Sealant, thicknesses in accordance with Performance Table on page 6.
3. PROMASEAL® IBS™ coated with thin film of PROMASEAL® AN Acrylic Sealant
4. Lightweight ceiling or partition system
5. Masonry or concrete wall
6. Ceiling or partition framing system
7. Electrical cables supported on both sides of the aperture within 300mm of the partition surface
8. Steel cable tray with hanger support system on either side of the opening, within 300mm of the partition surface and maximum width of 1500mm.
9. Ceiling edge trim
10. Proprietary anchor fixing for ceiling framing system

Electrical cables penetration seal in lightweight partitions



Joint sealing in shadowline of lightweight ceilings

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For latest information of the Promat Asia Pacific organisation,
please refer to www.promat-ap.com

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