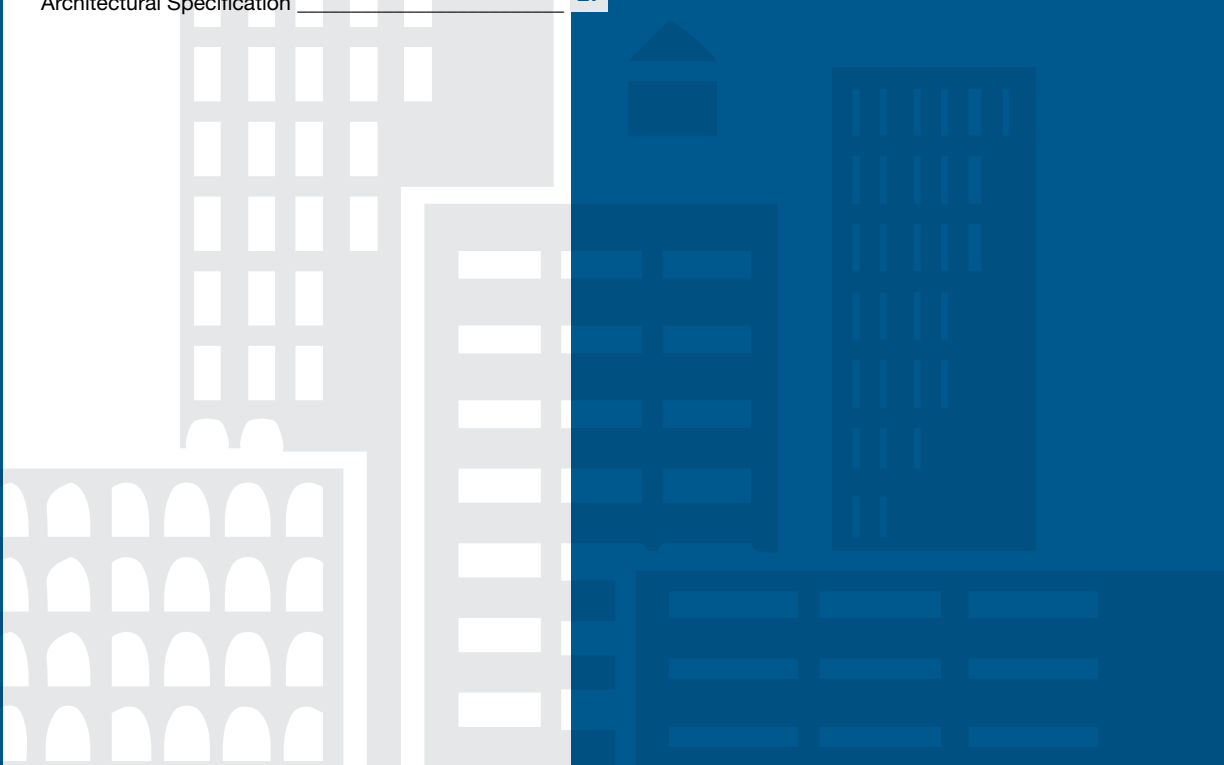


PASSIVE FIRE PROTECTION SYSTEMS **Application & Technical Manual:** **M&E Services Enclosures**



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General M&E services enclosure at the carpark of Tseung Kwan O residential building in Sai Kung District, New Territories, Hong Kong (above) and outside the warehouse of 9 Benoi Sector, Singapore (left). Both use PROMATECT®-H boards.

Electrical cables coated with PROMASTOP® CIS at a warehouse (below) in Ayer Rajah, Singapore.



Mechanical and electrical (M&E) services require fire protection for the following reasons:

- 1) To maintain function of certain essential electrical and/or mechanical systems and services, and
- 2) To prevent fire, smoke and toxic fume propagation from one building compartment to another.

It is necessary to ensure the continued function of essential electrical systems and services is maintained during fire, for a specified period of time, until all the building occupants have escaped. Electrical systems that need protection from fire may include:

- Electrically operated fire alarms
- Emergency escape route lighting
- Electrically operated extinguishing systems
- Smoke extraction venting systems
- Power supply for fire service elevators in high-rise buildings
- Water mains supply and pumps servicing sprinkler systems
- Essential life support and/or computer, communication or information technology networks

It is worth noting that most electrical and to some extent mechanical services contain a high component of plastic materials such as polyvinylchloride, polypropylene, polyethylene, synthetic rubbers etc. The risks associated with these combustible plastics are such that fire can and will spread or propagate through the services. Intensive combustion also means that plastics frequently release toxic and corrosive fumes that can include particulates, unburned fuel, carbon dioxide and carbon monoxide which are not only harmful to the building and its contents but also to its occupants. Such fires can also cause the following problems:

- Production of highly corrosive and extremely toxic gases,
- Long term destruction of buildings and equipment,
- Smoke development and toxic gases in corridors and escape routes,
- Difficult evacuation,
- Impedance of rescue activities by firefighters.

Reliability Of Fire Resistant Cables

Typical uses of cables to, in and from M&E enclosure include fire alarms, emergency lighting, addressable alarm systems, CCTV systems, emergency power supplies and smoke and fire shutters. These cables are normally designed to meet the standards for "Fire Detection and Fire Alarm Systems for buildings" (BS 5839: Part 1: 2002 + A2: 2008) and "Codes of Practice for Emergency Lighting of Premises" (BS 5266: Part 1: 2005).

Many fire resistant cables have been subjected to tests in accordance with BS 6387: 1994 "Specification for performance requirements for cables required to maintain circuit integrity under fire conditions" and/or ISO IEC 60331: Parts 11, 21, 23 and 25 "Test for electric cables under fire conditions – circuit integrity". See also ISO IEC 60331: Parts 1, 2 and 3.

Unfortunately, these standards only test single cables or small bunches of cables, without any support system, exposed to a small gas flame by means of an elongated Bunsen burner. The heat applied during the test is localised to a small area. While such a test may be adequate for small cables carefully secured directly to a fire resisting wall or floor, it is arguably not suitable to assess the fire performance of larger cables or bunches of cables, exposed to a fully developed fire on all sides, especially if they are supported on a suspended cable tray which may pass through compartment walls or floors.

Although the cables may achieve the highest classification of the standard, they may not survive as expected if they are exposed on all sides to a fully developed fire as described, for example, by the ISO 834 time-temperature fire curve.

Fire Resistance Test Standards For Cable Protection Systems

The German standards DIN 4102, "Fire behaviour of building materials and building components", Parts 11 and 12 specify fire resistance test for cable protection systems that simulate a fully developed fire scenario.

DIN 4102: Part 11: 1985 assesses the encasement system when exposed to a fully developed internal fire. The integrity of the encasement, and any penetrations through walls and floors, is measured, as well as the temperature on the outer surface of the encasement (140°C mean temperature rise, 180°C maximum temperature rise). The heating curve for DIN 4102: Part 11: 1985 is the same as that used in BS 476: Part 20: 1987 and AS 1530: Part 4: 2005 and the failure criteria for integrity and insulation are identical. The systems detailed herein have been successfully tested and assessed and are approved for use to provide a performance in accordance with BS 476: Part 20 and AS 1530: Part 4 in terms of compartmentation.

DIN 4102: Part 12: 1991 assesses the encasement system when exposed to a fully developed external fire. In addition to the



requirement to maintain the integrity of the encasement and any penetrations through walls or floors, the standard requires that:

- 1) the cables continue to function for the duration of the exposure period, and
- 2) the temperature on the cable jacket should not exceed 150°C.

The tested encasement system protects a wide range of different cable types. Electrical current is passed through the cables throughout the test. As an added safety factor, the system described on [page 6](#) will ensure that the temperature on the cable jacket does not exceed 120°C.

The Australian/New Zealand standard AS/NZS 3013: 2005 "Electrical installations – Classification of the fire and mechanical performance of wiring system elements" describes the level of protection of a wiring system against fire and/or accidental mechanical damage. The test methods described within this standard call for wiring systems to maintain circuit integrity when subjected to fire tests, mechanical damage and fire and water tests. The resistance to fire test is to determine the ability of a wiring system to maintain circuit integrity under fire conditions for a specified period of time of up to 120 minutes. The wiring system shall be tested in a horizontal furnace complying with AS 1530: Part 4: 2005, which also employs the ISO 834 heating conditions.

Mechanical damage tests are to determine the degree of mechanical impact and cutting load to which the wiring system can be subjected without losing its circuit integrity. These tests are carried out separately from the fire test.

Fire and water tests assess the ability of a wiring system to maintain its circuit integrity when subjected to fire conditions followed by hosing with water.

DIN 4102: Part 12: 1991 and AS/NZS 3013: 2005 are designed to test the functionality of cables under fully exposed fire conditions, unlike the IEC 60331 test regimes. The systems detailed herein relate to maintaining compartmentation as well as the full function of the cables. For more information related to such systems, please consult Promat.

General Design Considerations

In the event of an internal or external fire performance, it has been established that an enclosure fabricated from fire resistant boards is one of the best solutions. Such systems have been tested successfully with encasement constructed from fire protective boards such as PROMATECT[®]-H, PROMATECT[®]-L, PROMATECT[®]-L500, PROMATECT[®] 50 or PROMATECT[®]-S. These well established board systems are representative of the few systems which currently fulfil all performance requirements, especially to the DIN 4102 standards.

Continued on next page

General Design Considerations

A suitably designed duct will:

- prevent the propagation of fire from one building compartment to another,
- assist in maintaining smoke free escape routes,
- ensure the continuing operation of other services within a common service shaft,
- reduce damage to a localised area,
- contain smoke and toxic fumes from burning cables, and
- where required, ensure cable maintain their function when exposed to a fully developed fire.

The following are some of the factors to consider when determining the correct specification to ensure the enclosure system provides the required fire performance. Please consult Promat.

1 Required Fire Exposure

The specification of the enclosure system will depend on whether it is expected to resist external fire, internal fire or both.

2 Required Fire Performance

Generally, the most onerous requirement is to maintain the functional integrity of the circuit(s) when the system is exposed to external fire. If this is not needed, the performance requirements may be reduced by the approval authority to provide only stability, integrity and insulation of the enclosure system and/or wall and floor penetrations. On some occasions, further relaxations may be approved, e.g. a reduced insulation performance can sometimes be acceptable if no combustible materials or personnel are likely to be in contact with the enclosure.

3 Supporting Structure

The supporting hangers and their fixings should be capable of bearing the load of the complete enclosure system including any applied insulation material or other services suspended from it. Chemical anchors are generally not suitable. It is usually not advisable to employ unprotected hangers if the stress exceeds 6N/mm² for up to 240 minutes fire exposure and 10N/mm² for up to 120 minutes fire exposure and/or if hanger lengths exceed 2m. Hanger centres should not exceed the distance limits given for the relevant Promat system.

4 Penetrations Through Walls & Floors

Care should be taken to ensure that movement of the cable system in ambient or in fire conditions does not adversely affect the performance of the wall, partition or floor penetration seals.

5 Ventilation Openings

Heat is generated as current flows through cable core conductors. The greater the electrical current, the hotter the conductor will get. Excessive current flow will cause overheating and may result in overload, short circuit or ground fault. The material of the cable sheath, commonly made from material such as PVC, polyurethane or polyethylene, usually has a self-ignition temperature between 340°C to 490°C.

In general, the heat generated by cables is negligible if appropriately vented. Ventilation openings must have a self-enclosing capability in the event of fire so as to prevent fire spread via such openings. It is recommended that an electrical engineer is consulted to ensure heat build-up does not become an issue. Should ventilation be required, see [page 9](#) for PROMASEAL® Ventilation Grille and Promat Ventbox.

6 Access Hatches

For future inspection and installation of cables, a loose lid construction, described on [pages 6 and 7](#), can be considered. Alternatively, the lid can be fixed and the inspection openings with hatches can be provided in the side walls of the enclosure, as shown on [page 9](#). The hatch is secured completely to the enclosure using threaded inserts such as "Tecserts" (Armstrong Fastening Systems) at maximum 200mm centres.

7 Selection of Board Type

The Promat system constructed from PROMATECT®-H, PROMATECT®-L or PROMATECT®-L500 is lighter than PROMATECT® 50, and would probably be used in most applications.

PROMATECT®-H or PROMATECT® 50 offers a particularly robust system which is also highly resistant to impact and abrasion. Although these products are water tolerant, the latter is generally preferred for more onerous conditions.

For tunnel environments and higher performance requirements, e.g. to resist hydrocarbon fires, please consult Promat.

8 Other Requirements

Acoustic performance, thermal insulation, water tolerance, strength and appearance can also be important considerations (see BS 8313: 1997 Code of practice for accommodation of building services in ducts).

Fibre Optics

Fibre optic cables have a lower failure temperature (typically 50-80°C) due to the fact that the conductor consists bundles of glass fibres which can be as thin as a human hair. Fibre optic cables are widely used for IT networking in many industries, especially in financial and healthcare services. For example, large banks depend on their network cabling systems for most of their routine business transactions. If fire occurs and even one metre of cabling is destroyed, it could cost the company millions of dollars each day their systems remain inoperative. These are problems that businessmen do not want to face and one reason why it is necessary to protect sensitive, strategically important cables against fire risk. Please consult Promat to determine the required board thickness and construction details.

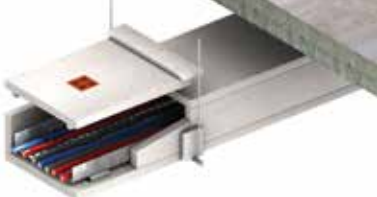





Riser Pipes

The Fire Safety Bureau of Singapore requires that the pipe work for a rising main is adequately protected to prevent collapse and reduction of water pressure at the point of water egress in the event of a fire. In addition, fire will heat the water conveyed through the piping system. It is conceivable that water in the pipe could reach boiling point. This would result in additional pressure being placed upon the pipe system as water expands considerably (1:1700) as it turns to steam. This will result in premature failure of the pipes and joints transporting the water, leading to a loss of pressure and consequential inability to fight or extinguish the fire. Therefore it is required that the rising main pipe work is adequately protected to:

- prevent collapse of the piping system,
- maintain the fire integrity and insulation of the compartment wall or floor where the piping penetrates, and
- prevent water passing through the piping system from reaching boiling point. The temperature at any point on the pipe external surface, measured on the fire-exposed side, must not exceed 75°C above the initial temperature for at least the first 30 minutes of exposure to fire.

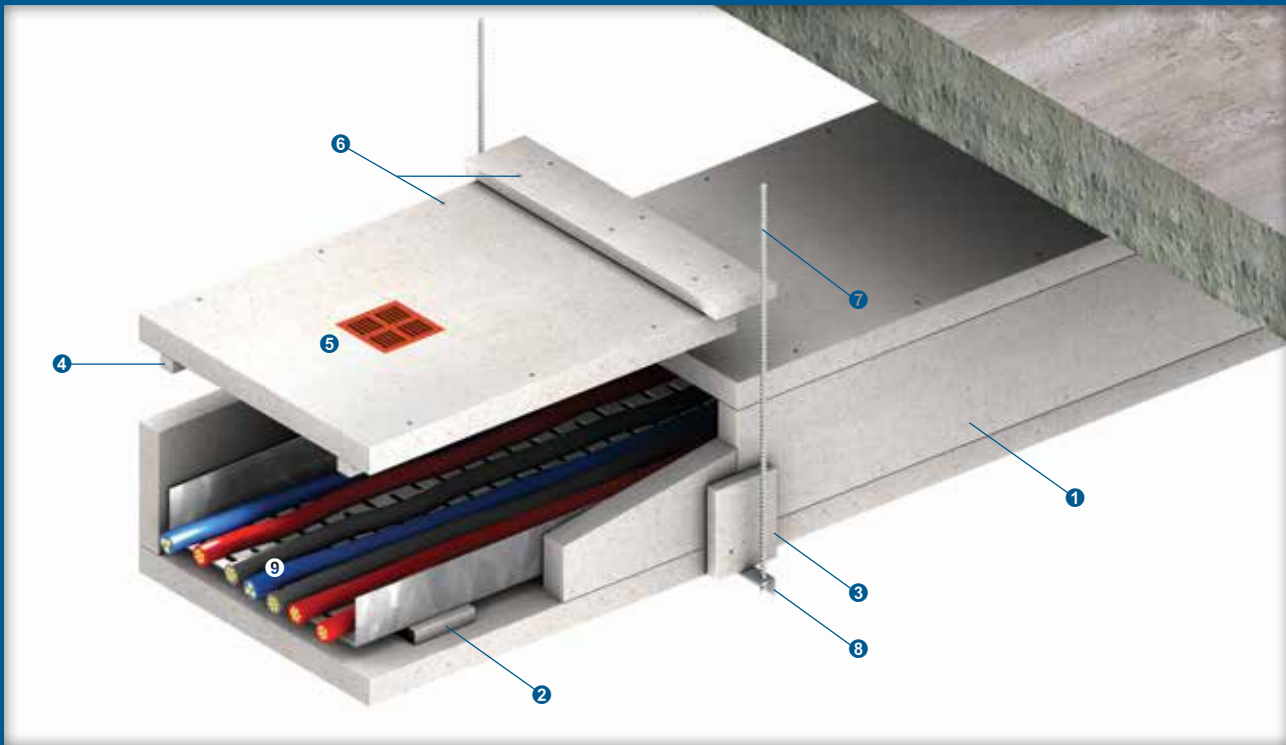
The fire resistance test procedure is described in FSB/PSB/001/00 dated 8 November 2000.



Type	Fire resistance performance	Board thickness	Mineral wool thickness x density	Test/Approval no.	Page no.
 <p>PROMATECT®-H/ PROMATECT®-L/ PROMATECT®-L500 electrical cables enclosure (external fire)</p>	-/30/30	From 20mm	Not required	BRE CC1422.22 and BRE CC90659C to the requirements of BS 476: Part 20: 1987 and/or AS 1530: Part 4: 2005 based on DIN 4102: Parts 11 and 12	6
	-/60/60	From 35mm			
	-/90/90	From 50mm			
	-/120/120	From 70mm			
 <p>PROMATECT®-H/ PROMATECT®-L/ PROMATECT®-L500 electrical cables enclosure (internal fire)</p>	-/30/30	From 15mm	Not required	BRE CC1422.22 and BRE CC90659C to the requirements of BS 476: Part 20: 1987 and/or AS 1530: Part 4: 2005 based on DIN 4102: Parts 11 and 12	7
	-/60/60	From 30mm			
	-/90/90	From 35mm			
	-/120/120	From 40mm			
 <p>PROMATECT®-H M&E services enclosure (integrity and insulation)</p>	-/60/60	9mm	50mm x 60kg/m ³	WF 382587 A, B, C to the requirements of BS 476: Part 20: 1987	11
	-/120/120	12mm	50mm x 100kg/m ³		
	-/240/240	25mm	100mm x 100kg/m ³		
 <p>PROMATECT®-H M&E services enclosure (integrity only)</p>	-/120/-	9mm	Not required	WF 169576 to the requirements of BS 476: Part 20: 1987 and AS 1530: Part 4: 2005	12
	-/240/-	12mm			
 <p>PROMATECT®-L500 M&E services enclosure (integrity and insulation / without cover strip)</p>	-/120/30	25mm	Not required	WFRC C80076 and WF 176908 to the requirements of BS 476: Part 20: 1987	13
	-/240/120	50mm			
 <p>PROMATECT®-L500 M&E services enclosure (integrity and insulation)</p>	-/120/120	20mm	50mm x 100kg/m ³	BRE CC90659B to the requirements of BS 476: Part 20: 1987 and AS 1530: Part 4: 2005	14
	-/240/240	50mm	80mm x 80kg/m ³		



Type	Fire resistance performance	Board thickness	Mineral wool thickness x density	Test/Approval no.	Page no.
 PROMINA® 60 M&E services enclosure (integrity and insulation)	-/60/60	9mm	50mm x 100kg/m ³	WF 171133 to the requirements of BS 476: Part 20: 1987	15
 PROMINA® 60 M&E services enclosure (integrity only)	-/120/-	9mm	Not required	WF 177444 to the requirements of BS 476: Part 20: 1987	16
 PROMATECT®-S M&E services enclosure (integrity and insulation)	-/120/120	6mm	80mm x 140kg/m ³	BRE CC277858 to the requirements of BS 476: Part 20: 1987	21
	-/240/240	9.5mm	120mm x 140kg/m ³		
 PROMATECT®-S M&E services enclosure (integrity only)	-/120/-	6mm	Not required	BRE CC277369 to the requirements of BS 476: Part 20: 1987	22
	-/240/-	9.5mm			
 PROMASTOP® CIS electrical cables coating	External fire for circuit integrity	--	Not required	FM 3046711 to the requirements of FM 3971 Approval Standard	26



Up to -/120/120 fire resistance in accordance with the requirements of BS 476: Part 20: 1987 and AS 1530: Part 4: 2005

- ① PROMATECT®-H, PROMATECT®-L or PROMATECT®-L500 board, thickness in accordance with table below

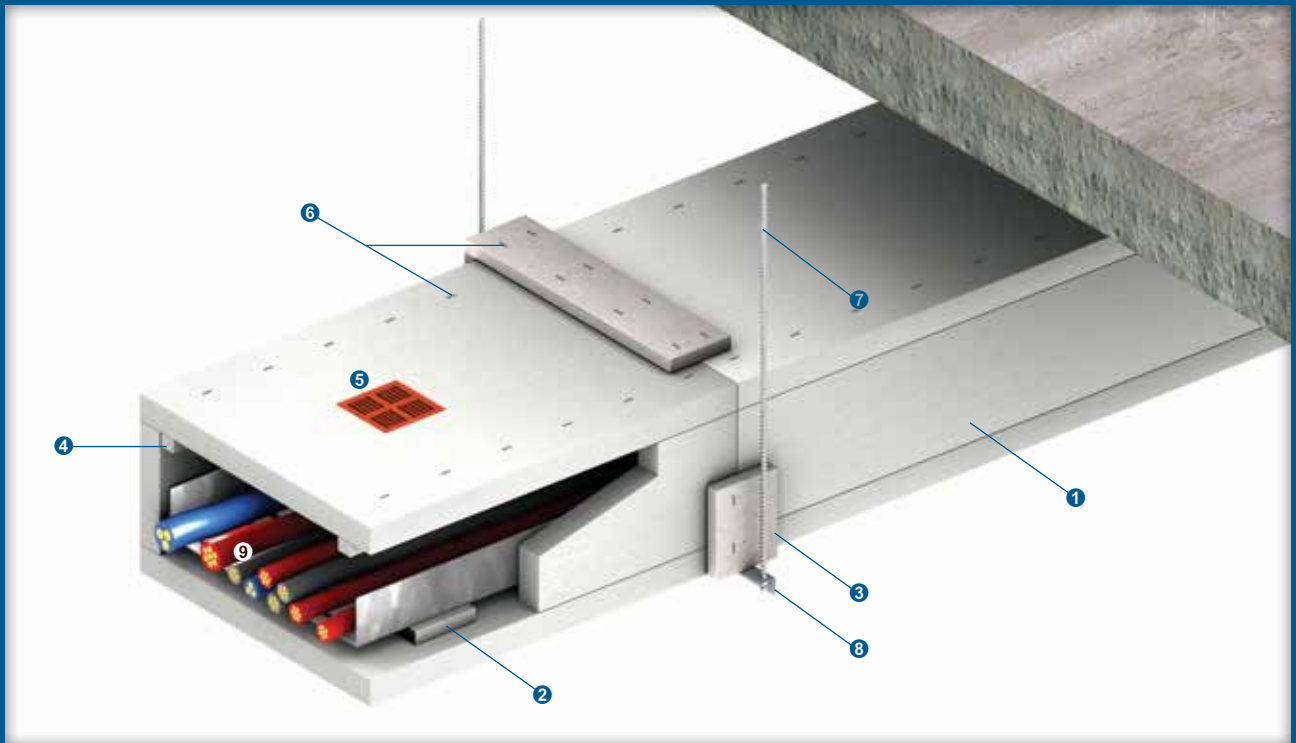
Lid type	Internal Cross Section: Equal or smaller than 110mm x 100mm				Internal Cross Section: Equal or greater than 110mm x 100mm and equal or smaller than 520mm x 250mm				Board type
	Up to -/30/30	Up to -/60/60	Up to -/90/90	Up to -/120/120	Up to -/30/30	Up to -/60/60	Up to -/90/90	Up to -/120/120	
Fixed	24mm	45mm	60mm	75mm	20mm	40mm	50mm	65mm	PROMATECT®-H
Fixed	25mm	40mm	60mm	80mm	20mm	35mm	50mm	70mm	PROMATECT®-L or PROMATECT®-L500
Loose fit	25mm	45mm	60mm	80mm	20mm	40mm	60mm	70mm	

The board thicknesses given in the above table will ensure that when the encasement is exposed to a fully developed cellulosic external fire (BS 476 curve), the cable jacket temperature rise will not exceed 120°C and the cables will remain functional. If the cables are not required to maintain circuit integrity it may be possible to reduce the board thickness after consultation with Promat. Promat can also advise on specifications for larger duct sizes. The board thickness is dependent on the internal dimensions of the duct and whether the duct has a loose fit lid or a fixed lid

- ② PROMATECT®-H, PROMATECT®-L or PROMATECT®-L500 internal cover strip 100mm x 20mm thick, located between tray and base of duct only. Strips positioned at maximum 625mm centres and coinciding with board joints and supports ⑦
- ③ PROMATECT®-H, PROMATECT®-L or PROMATECT®-L500 external cover strip to top and side joints only. Not required for multi layer construction providing the joints between the layers are staggered by at least 80mm and are fixed to each other

Up to -/30/30	100mm x 20mm thick	Up to -/90/90	100mm x 25mm thick
Up to -/60/60	100mm x 20mm thick	Up to -/120/120	100mm x 25mm thick

- ④ PROMATECT®-H, PROMATECT®-L or PROMATECT®-L500 batten, 25mm x 20mm thick fixed to loose fit lid. Not required for fixed lid option
- ⑤ PROMASEAL® Ventilation Grille, if required
- ⑥ Fixings in accordance with the table on page 8. Screws should be deep threaded, self-tapping, drywall type, e.g. Buildex HILO. Alternatively, steel wire staples can be used
- ⑦ Threaded steel hanger rod, minimum diameter 8mm at maximum 1220mm centres, ensure maximum stress does not exceed 10N/mm² for up to -/120/120 fire resistance. Note that when calculating the stress on the support system, the weight of the cables must be considered
- ⑧ Supporting galvanised steel angle or channel, size according to weight and dimensions of the enclosure. Maximum permissible bending stress 10N/mm² for up to -/120/120 fire resistance. Supports should be at maximum 1220mm centres and should coincide with an internal cover strip ②. The cable duct should be supported not more than 500mm from either side of any wall or floor through which it passes
- ⑨ Electrical cables and steel cable tray. Cables containing fibre optics will have a lower failure temperature. Please consult Promat to determine the required board thickness. Note, steel cable trays are required for systems exposed to external fire



Up to -/120/120 fire resistance in accordance with the requirements of BS 476: Part 20: 1987 and AS 1530: Part 4: 2005

❶ PROMATECT®-H, PROMATECT®-L or PROMATECT®-L500 board, thickness in accordance with table below

Lid type	For stability, integrity in fire compartment / Insulation in adjacent compartment				For stability, integrity and insulation in fire compartment				Board type
	Up to -/30/30	Up to -/60/60	Up to -/90/90	Up to -/120/120	Up to -/30/30	Up to -/60/60	Up to -/90/90	Up to -/120/120	
Fixed	15mm	30mm	35mm	40mm	20mm	35mm	40mm	50mm	PROMATECT®-H
Fixed	20mm	30mm	35mm	40mm	25mm	35mm	40mm	52mm	PROMATECT®-L or PROMATECT®-L500
Loose fit	20mm	30mm	35mm	40mm	25mm	35mm	40mm	52mm	

The board thicknesses given in the above table will ensure that the stability, integrity and insulation of the encasement will be maintained when exposed to fully developed cellulosic internal fire (BS 476 curve). For ducts which are not required to satisfy insulation criteria, and for larger ducts, please consult Promat

- ❷ PROMATECT®-H, PROMATECT®-L or PROMATECT®-L500 internal cover strip 100mm x 20mm thick, located between tray and base of duct only. Strips positioned at maximum 625mm centres and coinciding with board joints and supports ❶
- ❸ PROMATECT®-H external cover strip, 100mm x 9mm thick, to top and side joints only. For ducts with an internal height greater than 300mm replace the external strip with an PROMATECT®-H internal strip 100mm x 15mm thick. Fix side boards to ends of internal strip to strengthen casing, external strips not required for multi layer construction providing the joints between layers are staggered by at least 80mm and are fixed to each other
- ❹ PROMATECT®-H, PROMATECT®-L or PROMATECT®-L500 batten, 25mm x 20mm thick fixed to loose fit lid. Not required for fixed lid option
- ❺ PROMASEAL® Ventilation Grille, if required
- ❻ Fixings in accordance with the table on opposite page. Screws should be deep threaded, self-tapping, drywall type, e.g. Buildex HILO. Alternatively, steel wire staples can be used
- ❼ Threaded steel hanger rod, minimum diameter 8mm at maximum 1220mm centres, ensure maximum stress does not exceed 10N/mm². Note that when calculating the stress on the support system, the weight of the cables must be considered
- ❽ Supporting galvanised steel angle or channel, size according to weight and dimensions of the enclosure. Maximum permissible bending stress 10N/mm². Supports should be at maximum 1220mm centres and should coincide with an internal cover strip ❷. The cable duct should be supported not more than 500mm from either side of the wall
- ❾ Electrical cables and steel cable tray. Steel cable tray not required for systems exposed to internal fire only unless the cable weight exceeds 25kg/m when a cable tray should be used or the hanger centres reduced

Fixing of Boards

The Promat cable protection system is fabricated from PROMATECT®-H, PROMATECT®-L or PROMATECT®-L500 boards with thickness according to the tables on pages 6 and 7. The boards can be fixed together with steel staples at maximum centres of 100mm or screws at maximum centres of 200mm in accordance with the table below. Up to three layers of boards can be used to fabricate the required thickness.

This is a self-supporting system and does not require any internal steel framework (subject to width and height of the enclosure not exceeding set limits).

Board thickness	Screws at 200mm centres	Staples at 100mm centres
9mm	25mm x No.6	28/10/1.2
15mm	30mm x No.6	32/10/1.2
20mm	38mm x No.6	50/11/1.5
25mm	50mm x No.6	63/11/1.5
30mm	63mm x No.8	63/11/1.5
35mm	63mm x No.8	70/12/2
40mm	75mm x No.8	80/12/2
50mm	100mm x No.10	80/12/2
60mm	100mm x No.10	90/12/2
75mm	Multi layer	Fix first layer with screws
100mm	Multi layer	Fix first layer with screws

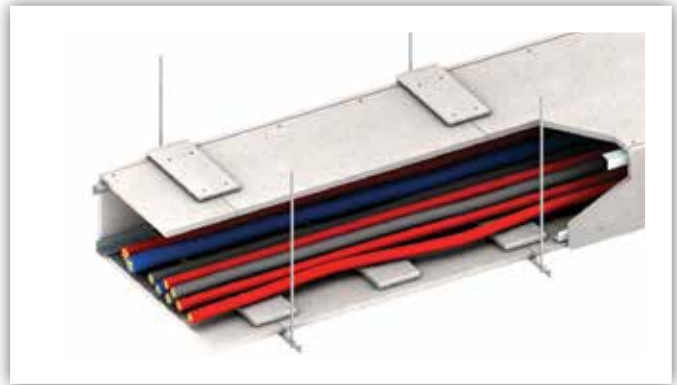
Joints between the sections of enclosure are reinforced with external cover strips of PROMATECT®-H, PROMATECT®-L or PROMATECT®-L500 board, each 100mm wide and a minimum of 9mm thick. The cover strips are fixed with steel staples or screws.

Internal Cross Section Dimensions

The internal cross section of the enclosure system shall not be more than 1000mm wide x 500mm high. Please consult Promat for cross sections not within this range.

Cables And Enclosure Support

Cables are normally supported on steel cable trays within the enclosure but these are not always required when the enclosures are subject to internal fire exposure only.

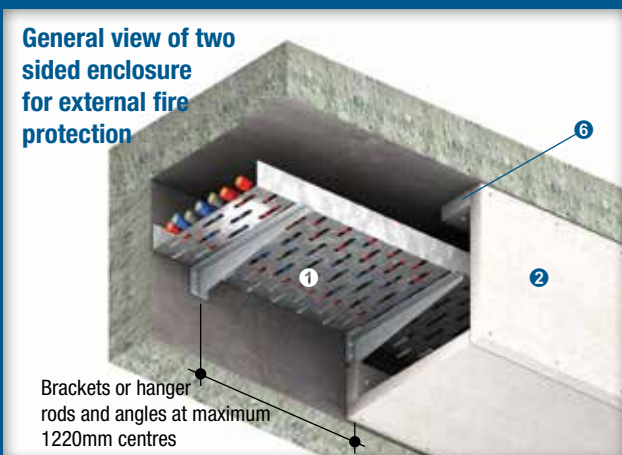


The enclosure system must be supported, either by direct fixing to other structural elements with suitable proprietary steel fixings or by hangers at maximum centres of 1220mm. The hanger supports should coincide with enclosure joints. The hangers consist of steel threaded rods and a steel angle bearer section under the protection system. The tensile and bending stresses of the unprotected hangers and bearers must not exceed 10N/mm² for up to 120 minutes fire resistance.

One, Two or Three Sided Protection

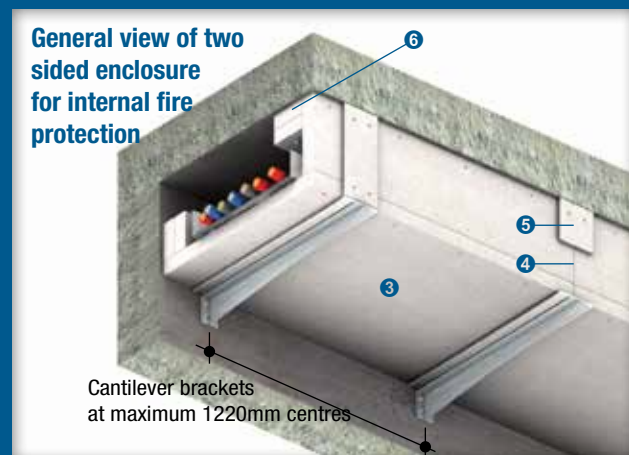
A one, two or three sided enclosure is acceptable where the other sides of the rectangle are formed from an adjoining wall and floor/ceiling of a fire resistance at least equal to that of the enclosure system, and where under fire conditions the substrates will suffer no deflection or excessive movement.

General view of two sided enclosure for external fire protection



Brackets or hanger rods and angles at maximum 1220mm centres

General view of two sided enclosure for internal fire protection



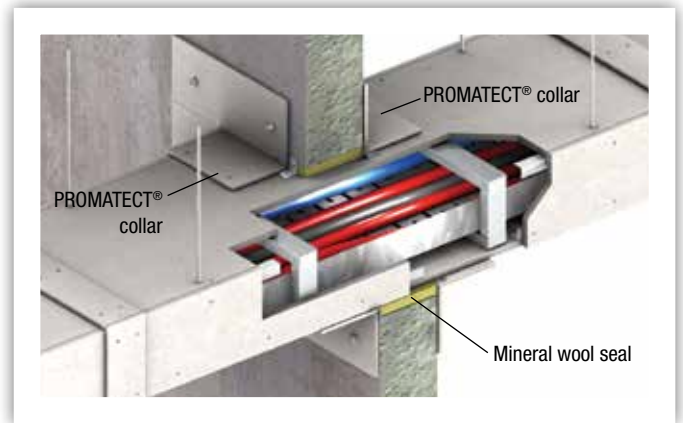
Cantilever brackets at maximum 1220mm centres

- ① Cable tray supported independently within the enclosure on brackets or hangers
- ② PROMATECT®-H, PROMATECT®-L or PROMATECT®-L500 board, thickness in accordance with the table on page 6
- ③ PROMATECT®-H, PROMATECT®-L or PROMATECT®-L500 board, thickness in accordance with the table on page 7
- ④ Board joints to coincide with bracket positions
- ⑤ Board joints covered with PROMATECT®-H cover strip 100mm x 9mm thick
- ⑥ PROMATECT®-L or PROMATECT®-L500 cover strip or light steel angle

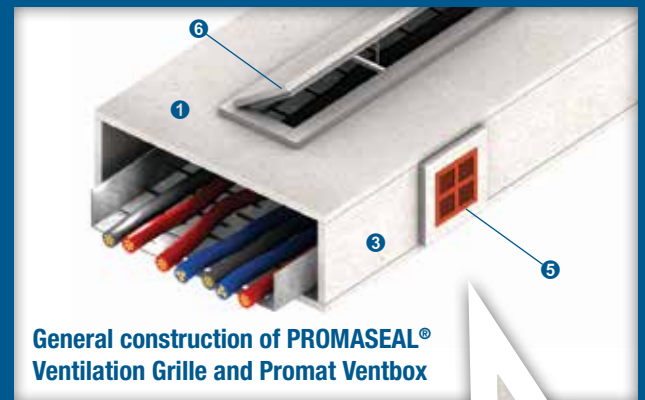
Wall Penetrations

The enclosure system, where it passes through a fire compartment wall, has to be fire stopped. At this penetration, gaps up to 20mm wide may be sealed with mineral wool and PROMASEAL®-A Acrylic Sealant. For wider gaps, a PROMATECT®-H, PROMATECT®-L or PROMATECT®-L500 collar is required on both sides of the wall. The minimum collar dimensions should be 150mm x 20mm thick. Please refer to illustration at right.

Access hatches have to be properly constructed to maintain the fire resistance level of the enclosure system. Hatches generally are comprised of an inner board stapled or secured to the outer board. The inner board should be a close fit to the opening and should be the same thickness as the wall of the enclosure. The outer board should be at least 20mm thick and overlap the opening by at least 50mm on all sides.



General view of construction of inspection opening for external or internal fire protection

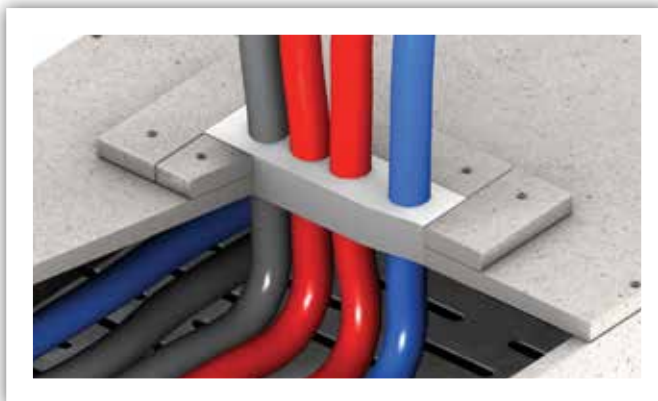


General construction of PROMASEAL® Ventilation Grille and Promat Ventbox

- 1 PROMATECT®-H, PROMATECT®-L or PROMATECT®-L500 electrical cable enclosure
- 2 Outer board sized 50mm larger all around than inner dimensions of opening and 20mm thick
- 3 Inner board stapled to outer board, sized to fit opening and same thickness as side wall of duct
- 4 "Tecserts" or similar at maximum 200mm centres
- 5 PROMASEAL® Ventilation Grille if required and as detailed in illustration at right
- 6 Promat Ventbox



When the cables exit the enclosure, the opening made must be stiffened with PROMATECT®-H, PROMATECT®-L or PROMATECT®-L500 board of at least 50mm width x 20mm thickness. The gaps in the opening must be fully sealed with PROMASEAL®-A Acrylic Sealant for the full depth of the board and the thickness of the stiffener board. See illustration below.



Ventilation openings if required must also be fitted with PROMASEAL® Ventilation Grille or Promat Ventbox. These fittings will ensure that the fire resistance level of the enclosure system is maintained in case of a fire.

PROMASEAL® Ventilation Grille

- Standard grille size is 93mm x 93mm overall. Can be combined in multiples to create a larger free area.
- Free area of one grille is 0.0035m².
- Friction fit grille in aperture. Use VICUBOND® WR adhesive if a loose fit.
- Grilles supplied in various thicknesses as follows: 35mm (for 30 minutes), 60mm or 2 x 35mm (for 60 minutes), 75mm (for 90 minutes) and 75 + 35mm (for 120 minutes).
- Secure 50mm wide cover strips if necessary to ensure grille fully surrounded by board.
- The grille is supported on the inside of the duct by a perforated steel plate (supplied) secured to the duct wall.

Promat Ventbox

- The ventbox consists of an integral outer frame with collar and an automatically operated closing lid which is activated by a thermal link in the event of a fire.
- Free area 0.021m².
- Outer dimensions of frame and collar are 515mm x 130mm.
- Insert ventbox frame into aperture, 465mm x 80mm, and screw down to the board through the collars.

Following is the standard Architectural Specification for electrical cable enclosure system using PROMATECT®-H/PROMATECT®-L/PROMATECT®-L500.⁽¹⁾ The designer must determine the suitability of the design to the application and performance requirements before undertaking or constructing any works relating to the specifications and where in doubt should obtain the advice of a suitably qualified engineer.

External Fire For Circuit Integrity / Internal Fire ⁽¹⁾

Up to 120 minute fire resistance, integrity and insulation in accordance with the criteria of AS 1530: Part 4: 2005 or BS 476: Part 20: 1987⁽¹⁾.

Supporting Structure

Care should be taken that any structural element by which the enclosure system is supported, e.g. a beam, floor or wall, has at least equivalent fire resistance.

Lining Boards

Single-layer or multi-layer⁽¹⁾ _____mm⁽²⁾ thick PROMATECT®-H/PROMATECT®-L/PROMATECT®-L500⁽¹⁾ matrix engineered mineral boards as manufactured by Promat International (Asia Pacific) Ltd. Internal and external cover strips made of 100mm wide and a minimum of 9mm thick boards, where applicable, are secured to the enclosure over the board joints.

Type of Fixing

The boards can be fixed together with steel staples at maximum 100mm or screws at maximum centres of 200mm according to the manufacturer's recommendations.

The complete enclosure system will be suspended with hangers at maximum centres of 1220mm with threaded rods, the whole support system is to have less than 10N/mm² of stress.

Tests & Standards

The complete system along with material and framing is approved to meet the requirements of AS 1530: Part 4: 2005 and/or BS 476: Part 20: 1987.

Jointing

Plain butt joints between machined edges of boards.⁽¹⁾

Joints filled in preparation for painting.⁽¹⁾

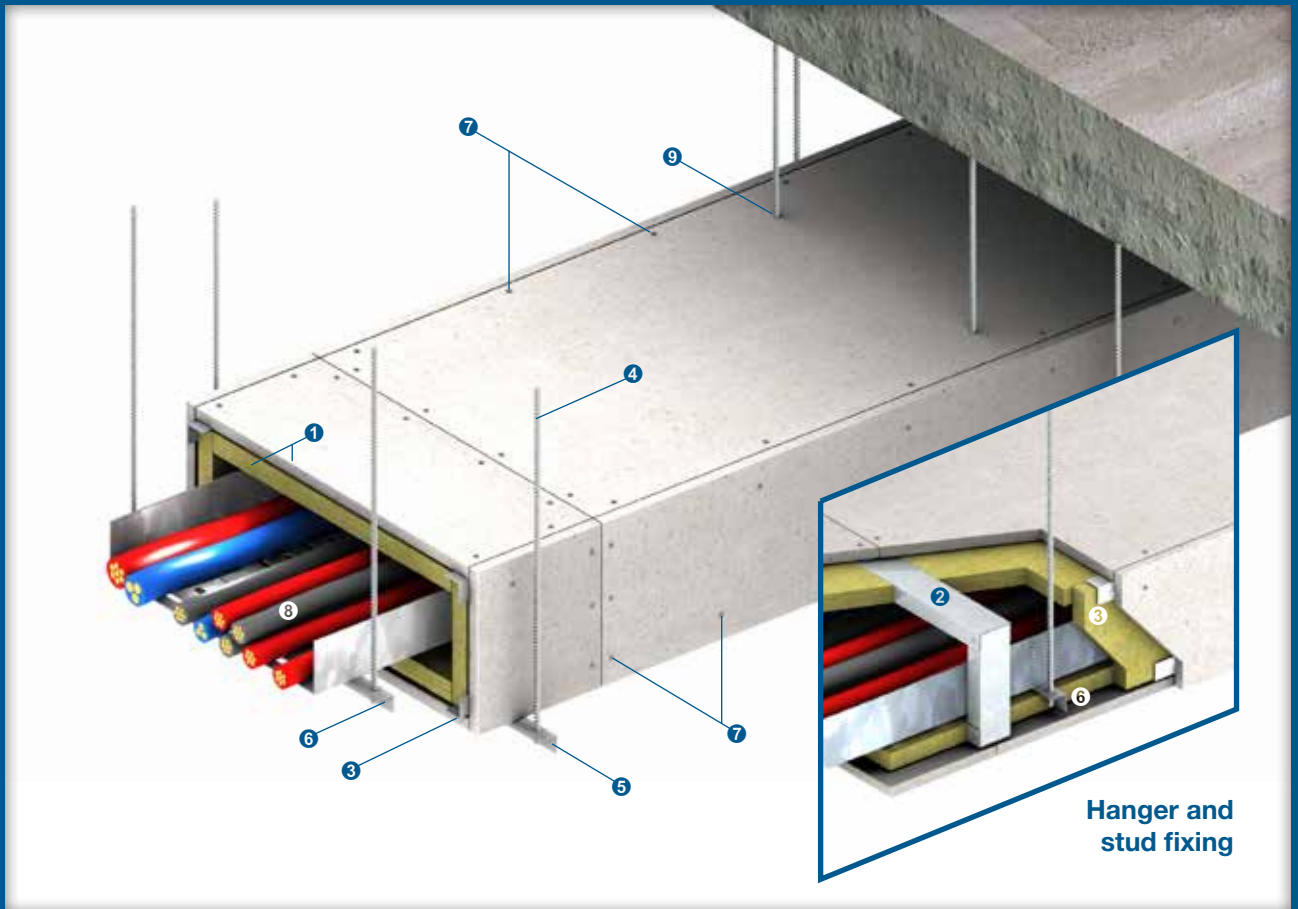
Joints filled and taped in preparation for decoration.⁽¹⁾

Follow-on Trades

Surface of boards to be prepared for painting/plastering/tiling⁽¹⁾ in accordance with manufacturer's recommendations.

NOTE:

- ⁽¹⁾ delete as appropriate.
- ⁽²⁾ insert thickness as appropriate taken from tables on [pages 6 and 7](#).
- Perimeter gaps will be filled with fire resistant PROMASEAL®-A Acrylic Sealant.

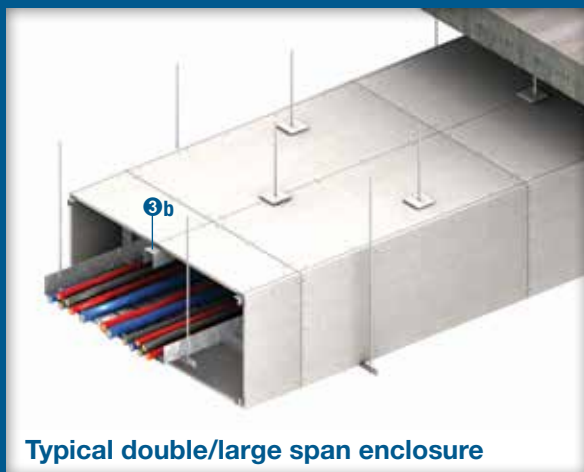
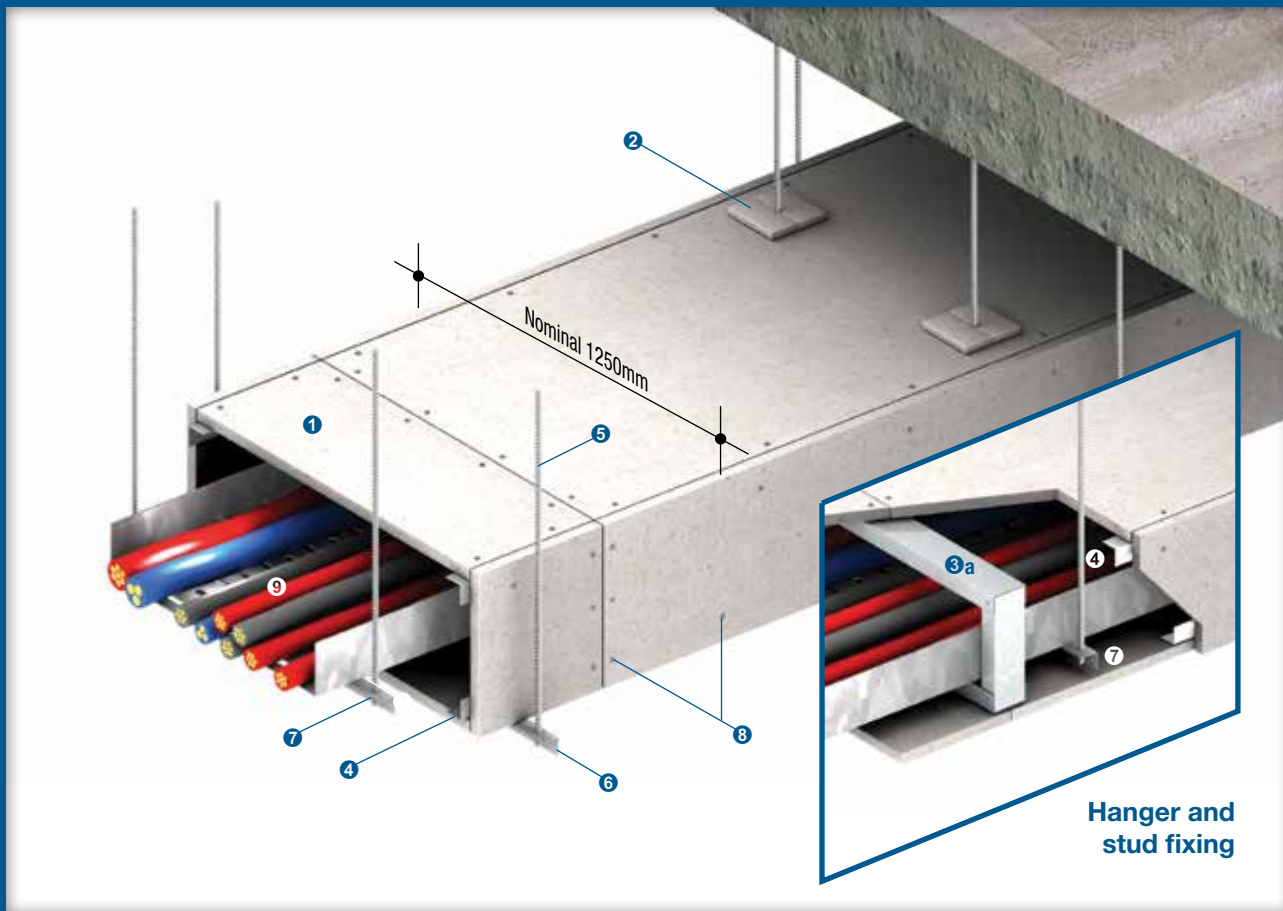


Up to -/60/60, -/120/120 or -/240/240 fire resistance in accordance with the requirements of BS 476: Part 20: 1987

❶ PROMATECT®-H board and mineral wool, requirements in accordance with table below

Fire resistance	Board/collar thickness	Mineral wool thickness x density	Screw length to frame	Screw length to cover strips	Maximum stress allowance of hangers
-/60/60	9mm	50mm x 60kg/m ³	25mm	20mm	15N/mm ²
-/120/120	12mm	50mm x 100kg/m ³	32mm	25mm	10N/mm ²
-/240/240	25mm	100mm x 100kg/m ³	35mm	25mm	6N/mm ²

- ❷ Galvanised steel collars minimum 50mm x 50mm x 0.8mm thick coinciding with board joints at nominal 1220mm centres
- ❸ Galvanised steel angles minimum 50mm x 50mm x 0.8mm thick (-/60/60 to -/120/120 fire resistance) or minimum 50mm x 50mm x 1mm thick
- ❹ Threaded steel hanger rod, maximum stress allowance in accordance with the above table
- ❺ Galvanised steel angles, minimum 30mm x 30mm x 3mm thick and vary in accordance with weight and dimensions of the enclosure and maximum stress allowance of the hanger
- ❻ Service steel hanger and support, size according to weight and dimensions of the services
- ❼ No. 8 self-tapping screws at maximum 200mm centres, length in accordance with the above table
- ❽ General M&E services, e.g. electrical cable, cable tray, steel pipes etc
- ❾ Fill all penetration gaps with PROMASEAL®-A Acrylic Sealant



Fire resistance	Board/cover board/collar thickness	Maximum stress allowance of hangers	Galvanised steel collars
-/120/-	9mm	10N/mm ²	50mm x 25mm x 0.5mm thick
-/240/-	12mm	6N/mm ²	50mm x 25mm x 0.7mm thick

③a Galvanised steel collars coinciding with board joints at nominal 1220mm centres, size and thickness in accordance with the above table

③b Additional support galvanised steel collars at middle span of the enclosure, size and thickness in accordance with the above table

④ Minimum 30mm x 30mm x 0.5mm thick galvanised steel angles at corner joints, consult Promat for appropriate dimensions specification

⑤ Threaded steel hanger rod, maximum stress allowance in accordance with the above table as per the required fire resistance performance

⑥ Galvanised steel angles, minimum 30mm x 30mm x 3mm thick and vary in accordance with weight and dimensions of the enclosure and maximum stress allowance of the hanger

⑦ Service steel hanger and support, size according to weight and dimensions of the services

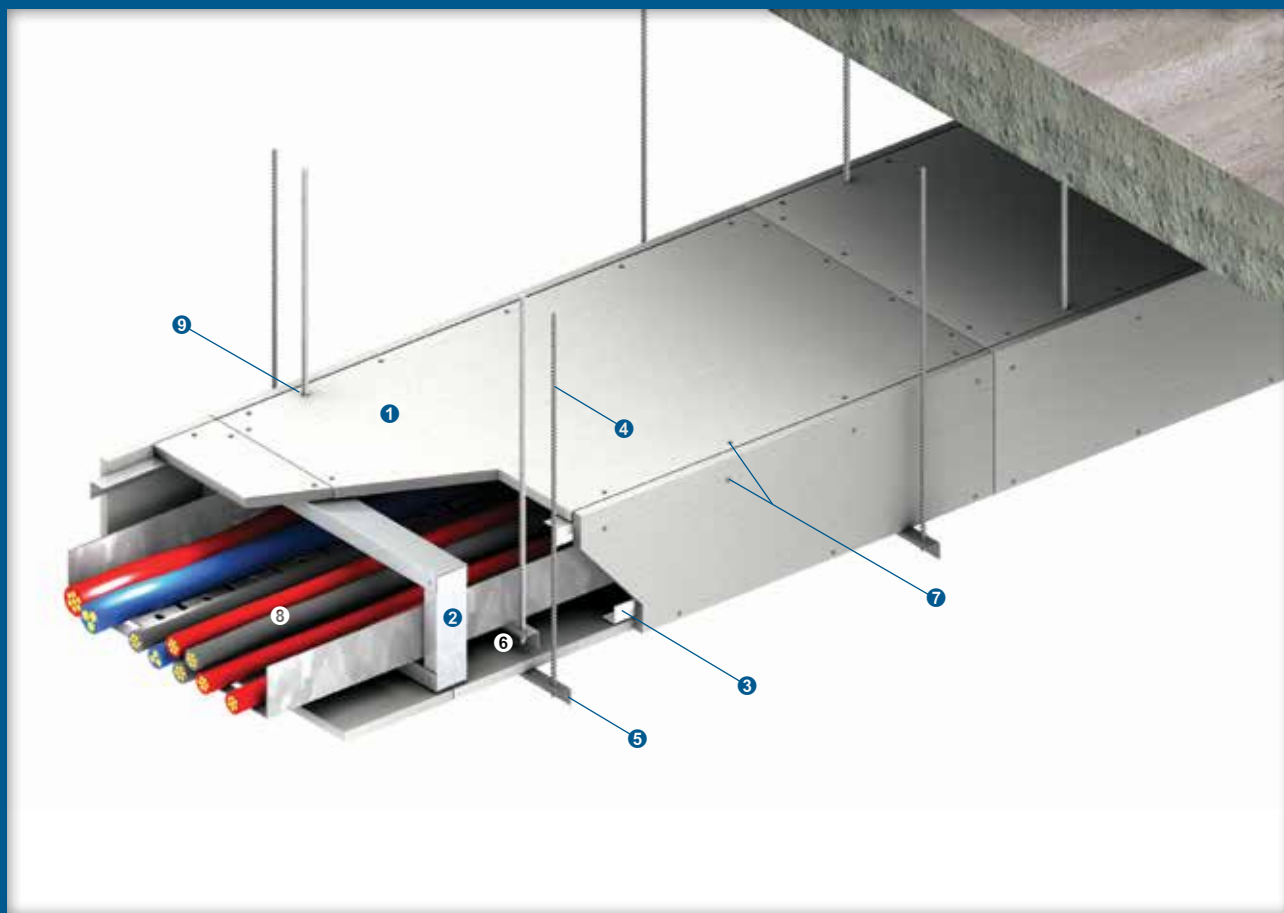
⑧ Minimum 25mm long self-tapping screws at nominal 200mm centres

⑨ General M&E services, e.g. electrical cable, cable tray, steel pipes etc

Up to -/120/- or -/240/- fire resistance in accordance with the requirements of BS 476: Part 20: 1987

- ① PROMATECT®-H board, thickness in accordance with the table at top right
- ② PROMATECT®-H cover plates 75mm x 75mm and filled with PROMASEAL®-A Acrylic Sealant in all gaps where rod hanger penetrates the enclosure, thickness in accordance with the table at top right

Where the enclosure penetrates a fire compartment wall, use 100mm wide PROMATECT®-H collars, thickness in accordance with the above table, fitted around the duct on both sides of the wall forming an L shape using M6 anchor bolts at nominal 600mm centres. See details on page 18



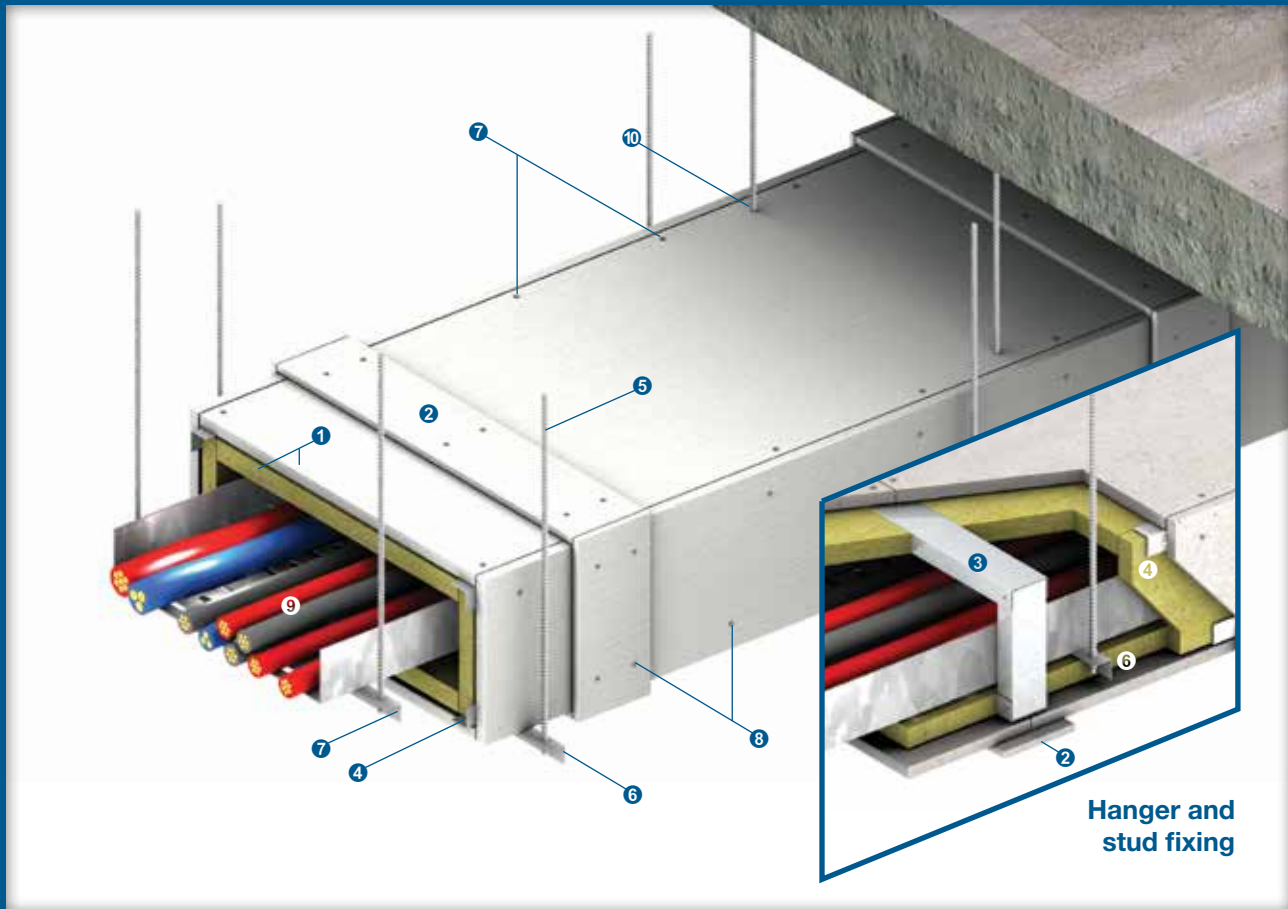
Up to -/120/120 or -/240/240 fire resistance in accordance with the requirements of BS 476: Part 20: 1987

- ❶ PROMATECT®-L500 board, thickness in accordance with table below

Fire resistance	Board thickness	Screw length	Maximum stress allowance of hangers
-/120/30	25mm	50mm	10N/mm ²
-/240/120	50mm	75mm	6N/mm ²

Where the enclosure penetrates a fire compartment wall, use 100mm wide x 9mm thick PROMATECT®-H collars, fitted around the duct on both sides of the wall forming an L shape using M6 anchor bolts at nominal 600mm centres. See details on page 18

- ❷ Galvanised steel collars minimum 50mm x 25mm x 0.5mm thick at nominal 1220mm centres. All board joints to coincide with a framing member
- ❸ Galvanised steel angle minimum 30mm x 30mm x 0.5mm thick at corners
- ❹ Threaded steel hanger rod, maximum stress allowance in accordance with the above table
- ❺ Galvanised steel angles, minimum 30mm x 30mm x 3mm thick and vary in accordance with weight and dimensions of the enclosure and maximum stress allowance of the hanger
- ❻ Service steel hanger and support, size according to weight and dimensions of the services
- ❼ No. 8 self-tapping screws at maximum 200mm centres, length in accordance with the above table
- ❽ General M&E services, e.g. electrical cable, cable tray, steel pipes etc
- ❾ Fill all penetration gaps with PROMASEAL®-A Acrylic Sealant



Up to -/120/120 or -/240/240 fire resistance in accordance with the requirements of BS 476: Part 20: 1987 and AS 1530: Part 4: 2005

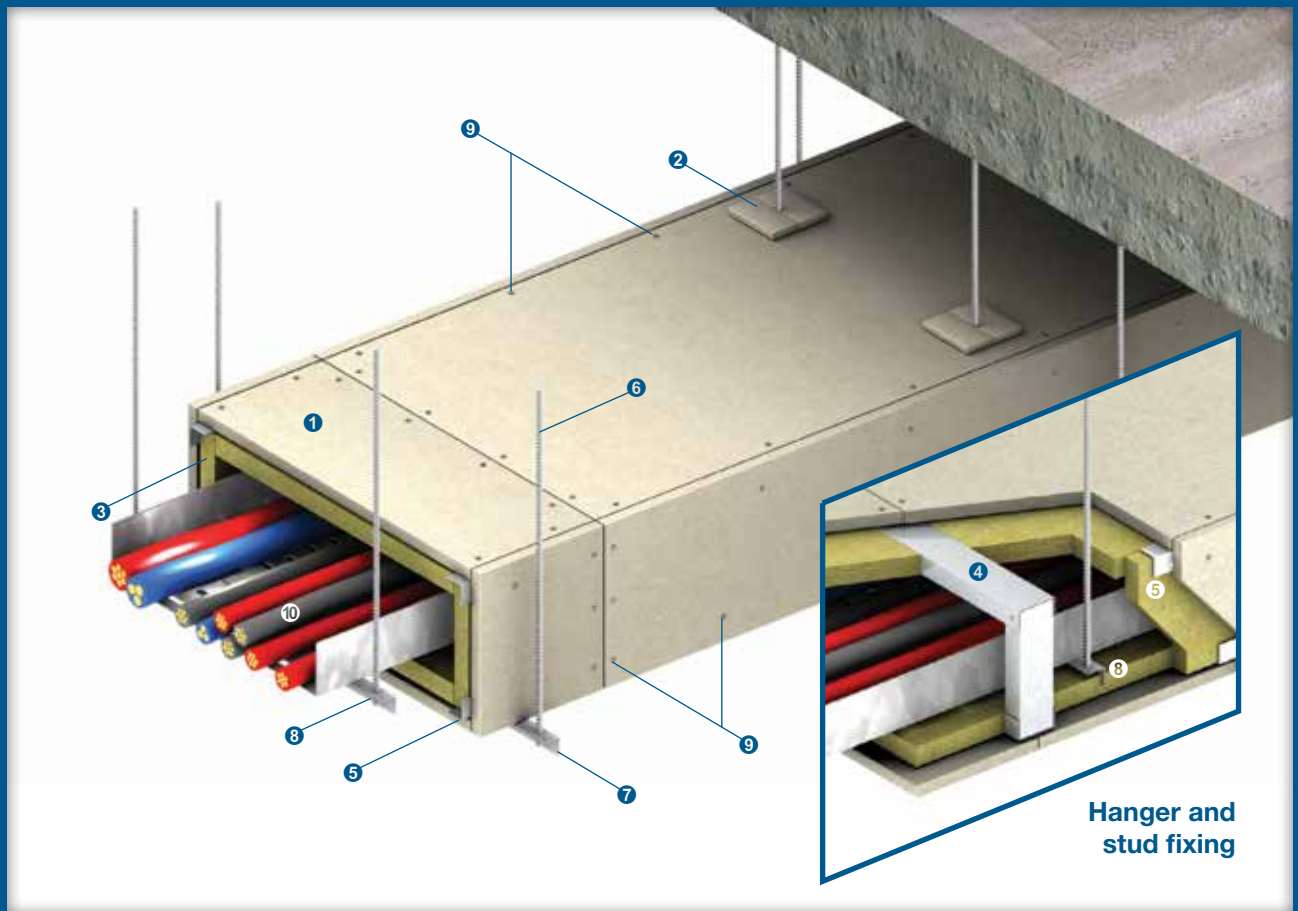
- ❶ PROMATECT®-L500 board and mineral wool, requirements in accordance with table below
- ❷ 100mm wide PROMATECT®-H cover strips, thickness in accordance with table below

Fire resistance	Board/cover strip/collar thickness	Mineral wool thickness x density	Screw length	Maximum stress allowance of hangers
-/120/120 ⁽¹⁾	20mm	50mm x 100kg/m ³	45mm	10N/mm ²
-/240/240	50mm	80mm x 80kg/m ³	75mm	6N/mm ²

⁽¹⁾ Tested to BS 476: Part 20: 1987 only

Where the enclosure penetrates a fire compartment wall, use 100mm wide PROMATECT®-H collars, thickness in accordance with the above table, fitted around the duct on both sides of the wall forming an L shape using M6 anchor bolts at nominal 600mm centres. See details on page 18

- ❸ Galvanised steel collars 50mm x 50mm x 0.9mm thick coinciding with board joints at nominal 1220mm centres. See more details on page 17
- ❹ Galvanised steel angles minimum 50mm x 50mm x 0.9mm thick for one, two, three sided construction at corner joints, or galvanised steel angles minimum 30mm x 30mm x 0.5mm thick for four sided construction at corner joints
- ❺ Threaded steel hanger rod, maximum stress allowance in accordance with the above table
- ❻ Galvanised steel angles, minimum 30mm x 30mm x 3mm thick and vary in accordance with weight and dimensions of the enclosure and maximum stress allowance of the hanger
- ❼ Service steel hanger and support, size according to weight and dimensions of the services
- ❽ No. 8 self-tapping screws at maximum 200mm centres, length in accordance with the above table
- ❾ General M&E services, e.g. electrical cable, cable tray, steel pipes etc
- ❿ Fill all penetration gaps with PROMASEAL®-A Acrylic Sealant



Up to -/60/60 fire resistance in accordance with the requirements of BS 476: Part 20: 1987

❶ PROMINA® 60 board 9mm thick

Where the enclosure penetrates a fire compartment wall, use 100mm wide x 9mm thick PROMINA® 60 collars fitted around the duct on both sides of the wall forming an L shape using M6 anchor bolts at nominal 600mm centres. See details on page 18

❷ PROMINA® 60 cover plates 75mm x 75mm x 9mm thick and filled with PROMASEAL®-A Acrylic Sealant in all gaps where rod hanger penetrates the enclosure

❸ Mineral wool 50mm x 100kg/m³

❹ Galvanised steel collars 50mm x 30mm x 0.6mm thick coinciding with board joints at nominal 1220mm centres

❺ Galvanised steel angles minimum 50mm x 50mm x 0.5mm thick for one, two, three or four sided construction at corner joints

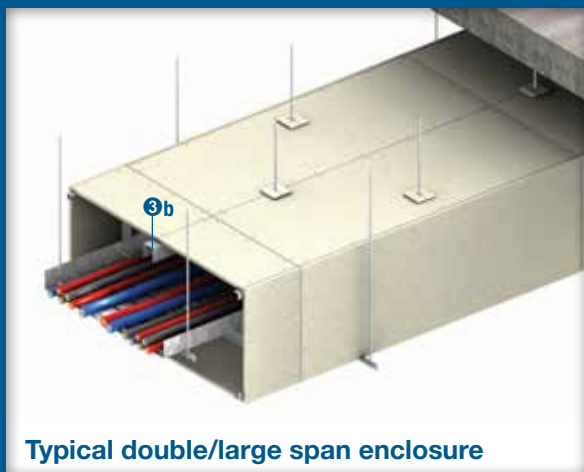
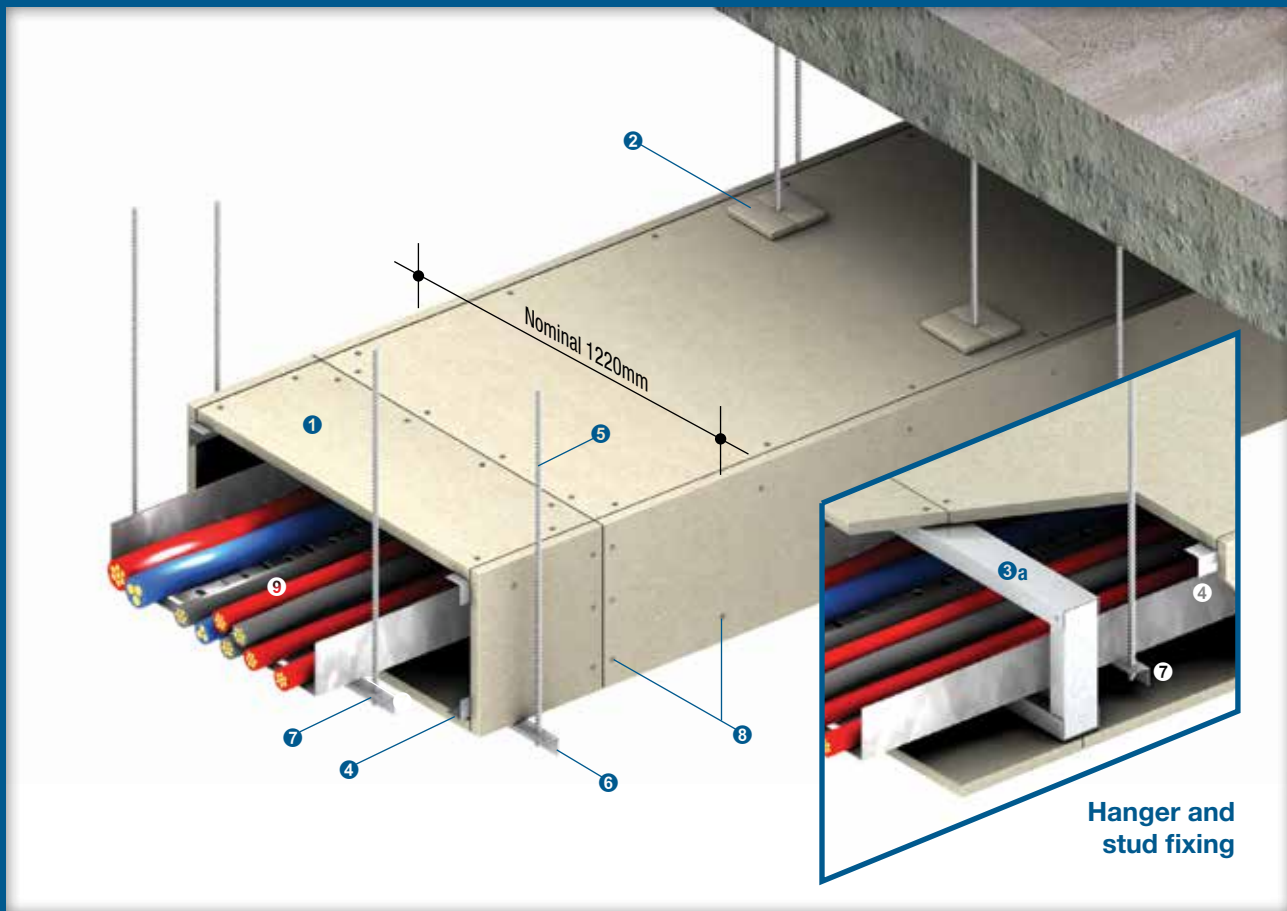
❻ Threaded steel hanger rod, maximum stress allowance 15N/mm²

❼ Galvanised steel angles, minimum 30mm x 30mm x 3mm thick and vary in accordance with weight and dimensions of the enclosure

❽ Service steel hanger and support, size according to weight and dimensions of the services

❾ No. 8 x 25mm self-tapping screws at maximum 200mm centres

❿ General M&E services, e.g. electrical cable, cable tray, steel pipes etc



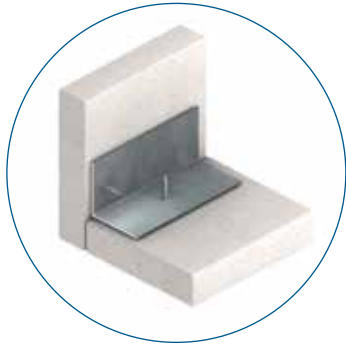
- ③a Galvanised Galvanised steel collars 50mm x 30mm x 0.6mm coinciding with board joints at nominal 1220mm centres
- ③b Additional support galvanised steel collars 50mm x 30mm x 0.6mm at middle span of the enclosure
- ④ Minimum 30mm x 30mm x 0.5mm thick galvanised steel angles at corner joints, consult Promat for appropriate dimensions specification
- ⑤ Threaded steel hanger rod, maximum stress allowance 10N/mm²
- ⑥ Galvanised steel angles, minimum 30mm x 30mm x 3mm thick and vary in accordance with weight and dimensions of the enclosure
- ⑦ Service steel hanger and support, size according to weight and dimensions of the services
- ⑧ No. 8 x 25mm self-tapping screws at nominal 200mm centres
- ⑨ General M&E services, e.g. electrical cable, cable tray, steel pipes etc

Up to -/120/- fire resistance in accordance with the requirements of BS 476: Part 20: 1987

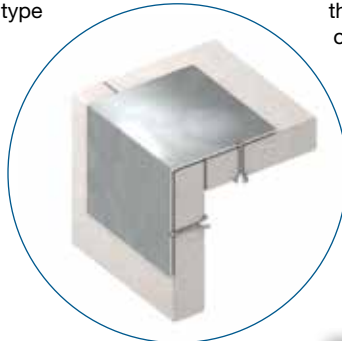
- ① PROMINA® 60 board 9mm thick
Where the enclosure penetrates a fire compartment wall, use 100mm wide x 9mm thick PROMINA® 60 collars fitted around the duct on both sides of the wall forming an L shape using M6 anchor bolts at nominal 600mm centres. See details on page 18
- ② PROMINA® 60 cover plates 75mm x 75mm x 9mm thick and filled with PROMASEAL®-A Acrylic Sealant in all gaps where rod hanger penetrates the enclosure

Internal Steel Framework

The corner junctions of the enclosure are reinforced with internal steel angles, minimum size according to system specification. These corner angles are not necessary if boards of thickness 20mm and above are used, as the boards can be fixed to each other using deep thread drywall type screws or steel wire staples.

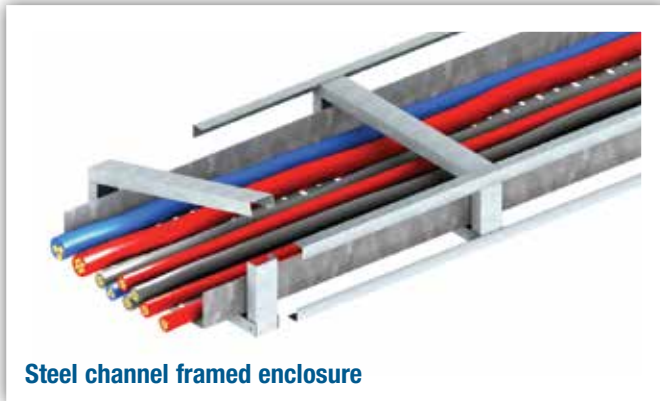


Internal steel angle



External steel angle

Four-sided steel channel collars are positioned at approximately 1220mm centres to support the boards. The steel channels are of minimum size 50mm x 25mm x 0.5mm, up to 50mm x 50mm x 1.2mm thick depending on the system specification.



Steel channel framed enclosure

Fixing of Boards & Mineral Wool

The type of board and thickness shall be selected according to system specification and the required fire resistance level. The boards are fastened to the channel frames and corner angles with self-tapping screws of appropriate length at 200mm nominal centres.

For systems where corner angles are not used, i.e. for 20mm or thicker boards, the boards are to be fastened at the corners with steel self-tapping screws at 200mm nominal centres or steel staples at 100mm nominal centres as per the below table.

Board thickness	Screws at 200mm centres	Staples at 100mm centres
9mm	25mm x No.6	-
15mm	30mm x No.6	-
20mm	38mm x No.6	63/10/1.0
50mm	100mm x No.10	80/12/2.0

Longitudinal joints in the boards (other than the corner joints) must be backed by a steel channel. All butt joints, as required by system specification, are covered with 100mm x 9mm thick PROMATECT®-H cover strips that may be placed either externally or internally.

The cavity between the boards and the building services is filled with mineral wool with thickness and density corresponding to the system's requirement. The steel channels are also filled with the same mineral wool. See the illustrations of **Collar section with external or internal cover strips**.

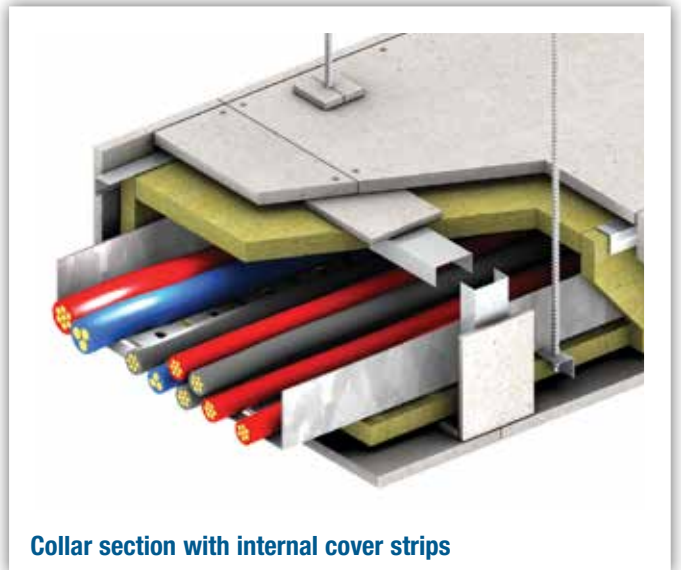
Building Services And Enclosure Support

The hangers used to support the building services enclosure must have tensile and bending stresses not exceeding 15N/mm², 10N/mm² and 6N/mm² for fire resistance up to 60, 120 and 240 minutes respectively. If these stress levels are exceeded, the size of the hanger members must be increased or, alternatively, the spacing of the hangers reduced.

The fixings used to fasten the threaded hanger rods to concrete soffits must be all steel expanding anchors with at least 80mm length penetrating into the concrete of at least 40mm for 120 minute fire resistance and 60mm for 240 minute fire resistance. The anchors must match the size of the threaded rods, be of sufficient strength to support the weight of the enclosure and be fitted in accordance with the manufacturer's specification. When the hanger rods are suspended from protected structural steel beams, the rods must be protected for at least 300mm from the beams with the same levels of protection as the structural beams.



Collar section with external cover strips



Collar section with internal cover strips

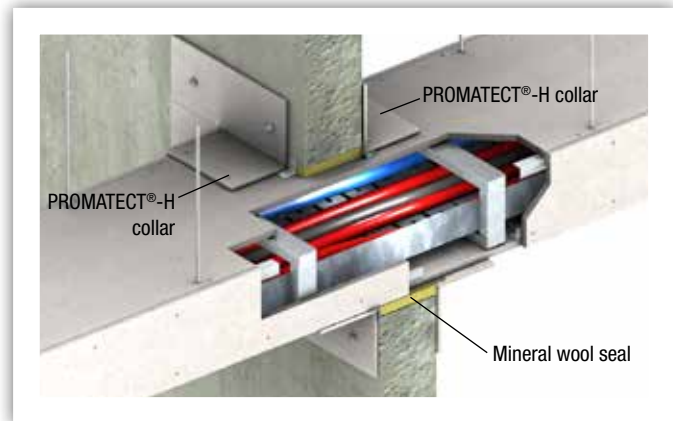
Where the hangers exceed 2000mm in length, the hangers should be clad with a material of similar thickness to the enclosure to prevent excessive thermal expansion.

Where the hanger rods emerge from the enclosure, the hole/slot must be sealed with PROMASEAL®-A Acrylic Sealant and with or without a cover plate depending on the gap at penetration. Please consult Promat when in doubt.

If the building service being encased is a plastic pipe, external hangers and angles will be required to independently support the enclosure.

Wall Penetrations

Where the enclosure passes through a fire compartment wall, the penetration must be properly fire stopped. At this penetration, gaps up to 20mm wide may be sealed with mineral wool and PROMASEAL®-A Acrylic Sealant. For wider gaps, a PROMATECT®-H, PROMATECT®-L, PROMATECT®-L500 or PROMINA® 60 collar is required on both sides of the wall. The minimum collar dimensions should be 150mm x 20mm thick. The space between the enclosure and the reveal of the opening in the wall is filled with mineral wool of minimum 110kg/m³ density. One layer of L-shaped PROMATECT®-H collar is required to be fitted around the enclosure on both sides of the wall. See tables on [pages 11 to 14](#) for thicknesses suitable for different types of enclosure and fire resistance requirements. Please refer to illustration at right.



Internal Cross Section Dimensions (more than 1500mm x 1500mm)

The maximum approved internal dimensions of the enclosure is 6000mm wide x 2500mm high. For enclosures with internal dimensions greater than 1500mm x 1500mm, additional threaded rods are fitted at each hanger position, at 1220mm maximum centres across the width of the enclosure. These threaded rods pass through the enclosure and support the horizontal hanger support element beneath the enclosure. The rods also support the top of the enclosure using a nut and large steel washer, this prevents bowing under fire conditions of wide enclosure systems.

As the width of the enclosure system increases, the spacing of the channel collars must be reduced so that the maximum area of unsupported board does not exceed 1.5m².

The penetrations of the rods through the enclosure are sealed with PROMASEAL®-A Acrylic Sealant.



Typical enclosure up to 6000mm wide x 2500mm high

Please note, the requirements for additional hanger support within the duct for greater width, e.g. 6000mm duct, will require two central supports at maximum 1220mm centres.

One, Two or Three Sided Protection

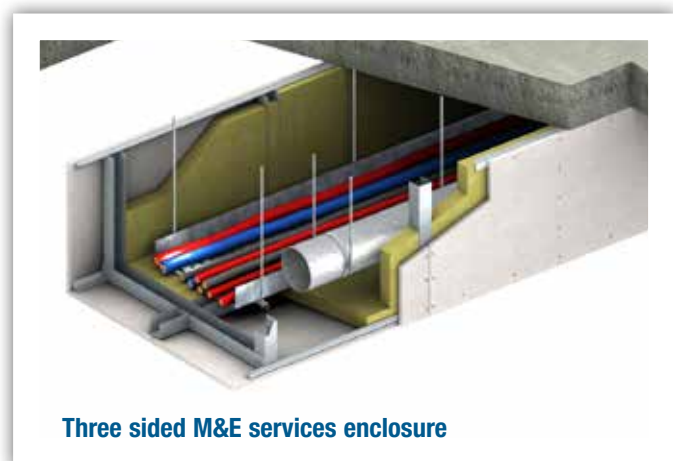
One, two or three sided enclosures are constructed in the same way as a four sided enclosure. Steel angles of 50mm x 50mm x 0.9mm thick and 3mm thick for up to 120 and 240 minutes fire protection respectively, are fastened to the floor soffit or wall with M8 all steel expanding anchors at 500mm nominal centres. The PROMATECT®-H, PROMATECT®-L500 or PROMINA® 60 boards forming the walls of the protection to the building services are then fastened to the angles with steel self-tapping drywall type screws in appropriate length at 200mm nominal centres. The services are independently supported.



Two sided M&E services enclosure



One sided M&E services enclosure

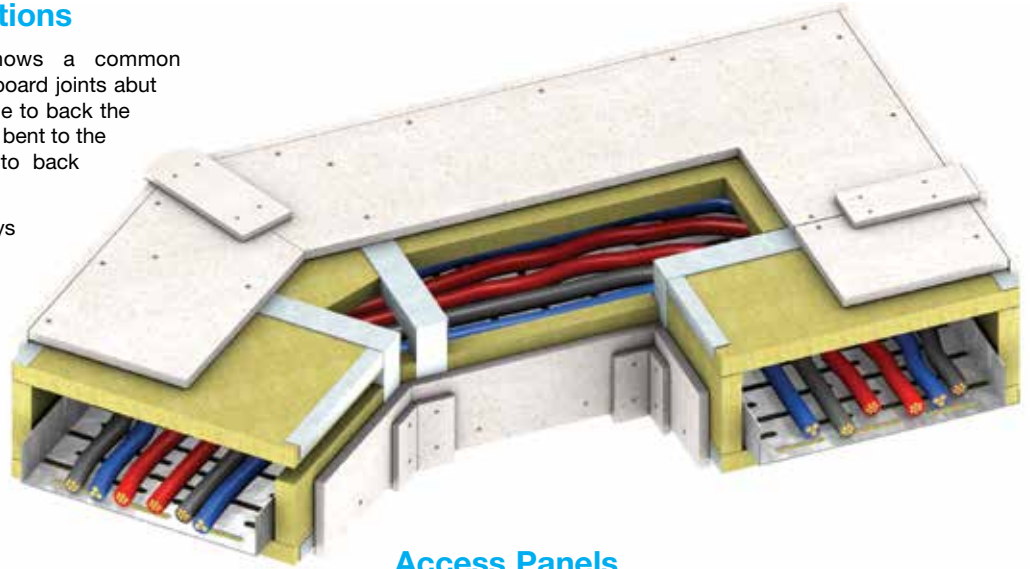


Three sided M&E services enclosure

Transformation Sections

The figure to the right shows a common transformation section. Where board joints abut at an angle and it is not possible to back the joint with steel channels, angles bent to the appropriate degree are used to back these joints.

The steel channels should always be placed to limit the total unsupported area of board to a maximum of 1.5m². Bends or curved shapes must be supported with hangers at mid-span.



Vertical Enclosures

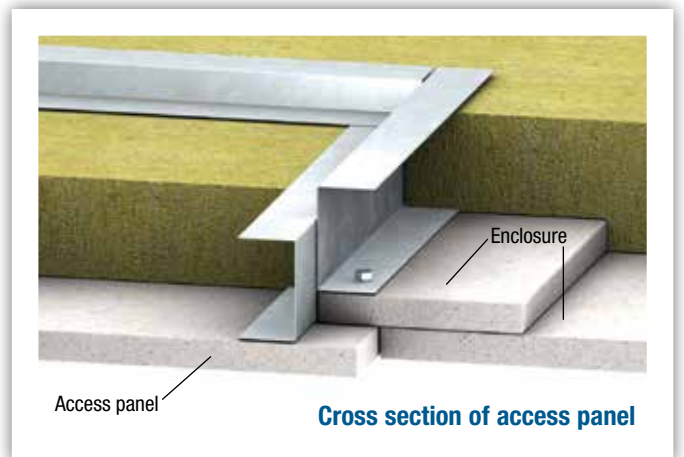
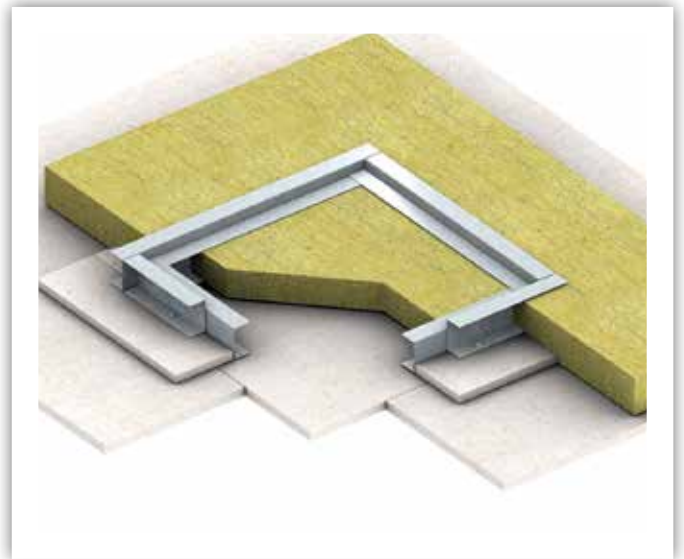
The construction of vertical enclosures is the same as for the horizontal enclosures. Where a vertical enclosure is located adjacent to a wall, the enclosure should be restrained back to the wall with threaded rods and support sections.



The weight of the enclosure assembly must be fully supported at each floor level. Steel angles may be fitted to the enclosure at floor penetration level and sit upon the floor slab, supporting the weight of the enclosure.

Access Panels

Maximum allowable dimensions of access panels are 600mm x 600mm. The panels are fixed to the enclosure through steel channels using steel bolts and nuts at nominal 200mm centres. The thickness of the boards and the mineral wool specifications should be according to system requirements. The mineral wool can be encapsulated within the C-channel sections which in turn are fixed to the access panel by means of steel self-tapping screws.



Following is the standard Architectural Specification for general building services enclosure system constructed using PROMATECT®-H/PROMATECT®-L500/PROMINA® 60.⁽¹⁾ The designer must determine the suitability of the design to the application and requirements before undertaking or constructing any works relating to the specifications and where in doubt should obtain the advice of a suitably qualified engineer.

External & Internal Fire

_____ minute integrity and _____ minute insulation in accordance with the criteria of AS 1530: Part 4: 2005 and/or BS 476: Part 20: 1987.⁽¹⁾

Supporting Structure

Care should be taken that any structural element by which the enclosure system is supported, e.g. a beam, floor or wall, has at least equivalent fire resistance.

Lining Boards

Single-layer _____mm⁽²⁾ thick PROMATECT®-H/PROMATECT®-L500/PROMINA® 60⁽¹⁾ matrix engineered mineral boards as manufactured by Promat International (Asia Pacific) Ltd. Internal or external cover strips made of 100mm wide and a minimum of _____mm⁽²⁾ thick boards, where applicable, are secured to the enclosure over the board joints.

Type of Fixing

Galvanised steel frame made of channel sections minimum 50mm x 25mm x 0.5mm thick, up to 50mm x 50mm x 1.2mm thick depending on the system specification, at 1220mm centres or at every butt joint of boards, with corner angles 30mm x 30mm with thickness of 0.5mm or 0.7mm, depending on the system specification, are fixed to the channel collars at the corners. The services will be suspended with hanger rods with hanger diameter sized to limit stress, _____N/mm² ⁽³⁾.

PROMATECT®-H/PROMATECT®-L500/PROMINA® 60⁽¹⁾ boards will be screw fixed to the frame with _____mm⁽⁴⁾ self-tapping screws at 200mm centres. Where applicable, butt joints should be covered with 100mm wide x _____mm⁽²⁾ thick cover strips. Mineral wool in accordance with the system specification will be tightly filled around the existing services, i.e. between the gap of boards and the services.

Tests & Standards

The complete system along with material and framing is approved to meet the requirements of AS 1530: Part 4: 2005 and/or BS 476: Part 20: 1987.

Jointing

Plain butt joints between machined edges of boards.⁽¹⁾

Joints filled in preparation for painting.⁽¹⁾

Joints filled and taped in preparation for decoration.⁽¹⁾

Follow-on Trades

Surface of boards to be prepared for painting/plastering/tiling⁽¹⁾ in accordance with manufacturer's recommendations.

NOTE:

- ⁽¹⁾ delete as appropriate.
- ⁽²⁾ insert appropriate board thickness taken from which system detailed on [pages 11 to 14](#).
- ⁽³⁾ insert hanger stress limits by not exceeding 15N/mm² for 60 minutes, 10N/mm² for 120 minutes or 6N/mm² for 240 minutes.
- ⁽⁴⁾ insert screw length as appropriate taken from which system detailed on [pages 11 to 14](#).
- Perimeter gaps will be filled with fire resistant PROMASEAL®-A Acrylic Sealant.



Up to -/120/120 or -/240/240 fire resistance in accordance with the requirements of BS 476: Part 20: 1987

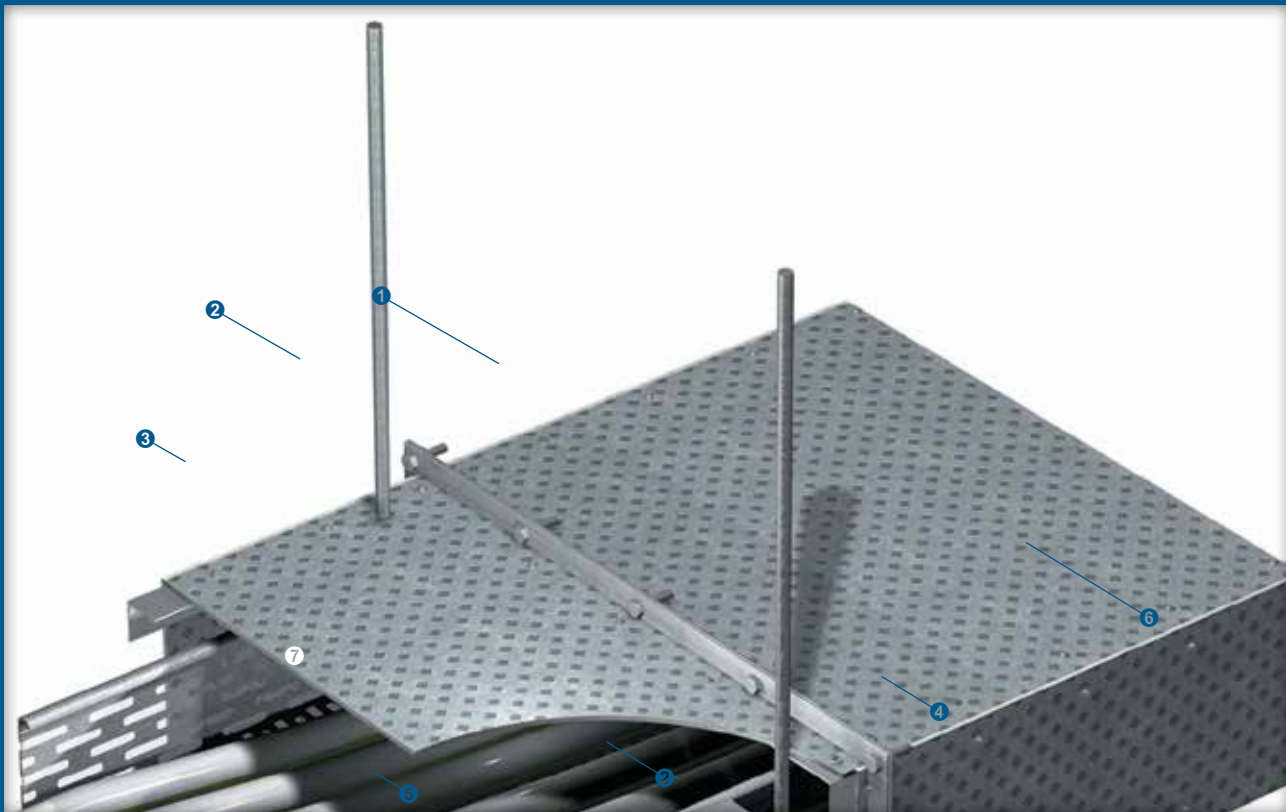
- ❶ PROMATECT®-S board and mineral wool, requirements in accordance with table below

Fire resistance	Board thickness	Mineral wool thickness x density
-/120/120	6mm	100mm x 140kg/m ³
-/240/240	9.5mm	140mm x 140kg/m ³

- ❷ Galvanised steel flanges, fabricated by cutting and welding 50mm x 50mm x 3mm thick angles, are bolted together with M10 nuts and bolts at nominal 200mm centres to form continuous sections
- ❸ Corner galvanised steel angle reinforcement, 50mm x 50mm x 3mm thick, these corner angles do not require any mechanical fixing to the flanges ❷
- ❹ Enclosure steel hanger and supporting angle, size according to weight and dimensions of the enclosure and the required fire resistance. Maximum spacing of hanger is 1800mm centres. Stress limits less than 10N/mm² for -/120/120 fire resistance and 6N/mm² for -/240/240 fire resistance
- ❺ Service steel hanger and support, size according to weight and dimensions of the services
- ❻ 35mm x 5.5mm Teks screws at nominal 200mm centres
- ❼ General M&E services, e.g. cable trunking, steel pipes etc

The above M&E services enclosure is suitable for providing protection to services even under extremely aggressive environments

The maximum permissible dimensions for this enclosure are 2000mm x 500mm for up to -/240/240 fire resistance. The width may be increased to 3000mm if an additional threaded rod is fitted at each hanger position at about mid width which passes through the enclosure and supports the angle of the hanger under the enclosure



Up to -/120/- or -/240/- fire resistance in accordance with the requirements of BS 476: Part 20: 1987

1 PROMATECT®-S board, thickness in accordance with table below

Fire resistance	Board thickness
-/120/-	6mm
-/240/-	9.5mm

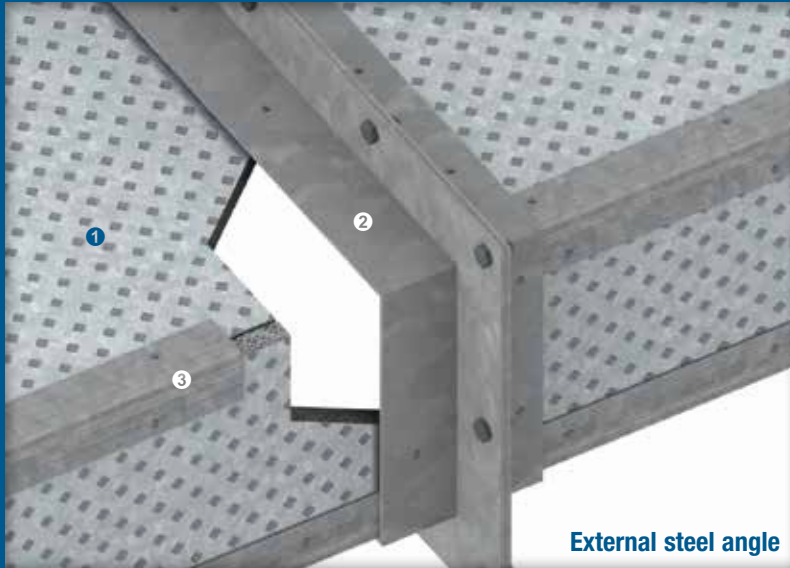
- 2** Galvanised steel flanges, fabricated by cutting and welding 50mm x 50mm x 3mm thick angles, are bolted together with M10 nuts and bolts at nominal 500mm centres to form continuous sections
- 3** Corner galvanised steel angle reinforcement, 50mm x 50mm x 3mm thick for enclosure up to 1500mm x 1500mm; 50mm x 50mm x 5mm thick for enclosure up to 2000mm x 2000mm
- 4** Enclosure steel hanger and supporting angle, size according to weight and dimensions of the enclosure and the required fire resistance. Maximum spacing of hanger is 1800mm centres
- 5** Service steel hanger and support, size according to weight and dimensions of the services
- 6** 35mm x 5.5mm Teks screws at nominal 200mm centres
- 7** General M&E services, e.g. cable trunking, steel pipes etc

The above M&E services enclosure is suitable for providing protection to services even under extremely aggressive environments

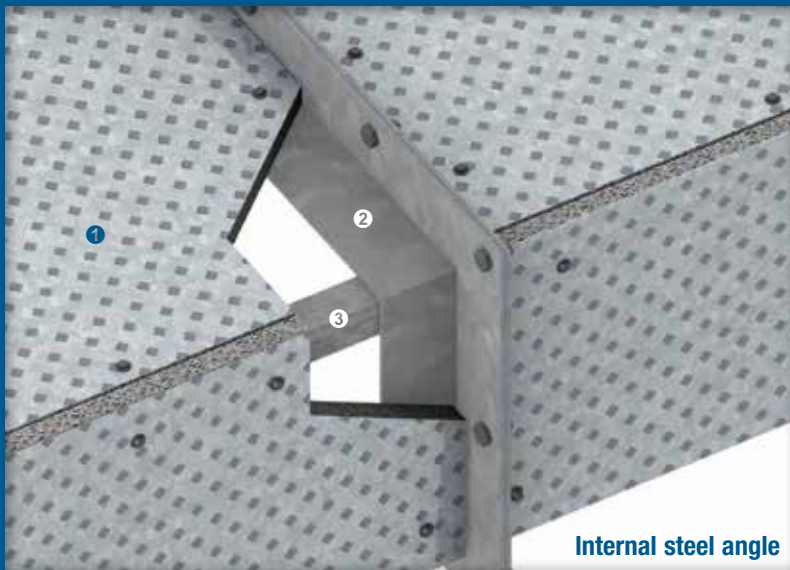
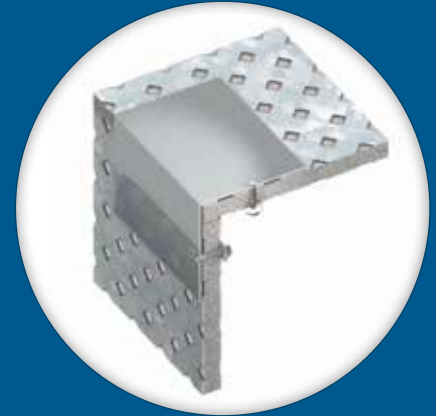
The maximum permissible dimensions for this enclosure are 6000mm x 2000mm for up to -/240/- fire resistance. Where the enclosure is more than 2400mm wide, all intermediate longitudinal board joints will require additional steel framing at the joints of 50mm x 50mm x 3mm thick double angles (back to back) or 50mm x 50mm x 6mm thick T-section

Steel Framework

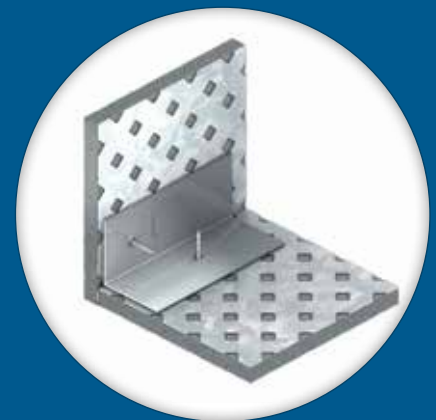
The corner junctions of the PROMATECT®-S M&E services enclosure are reinforced with internal steel angles, minimum size 50mm x 50mm x 3mm. The PROMATECT®-S board is connected with M5.5mm steel self-tapping Tek screws at 200mm centres. Transverse board joints are connected in the same manner but with 100mm x 3mm thick steel flat.



External steel angle



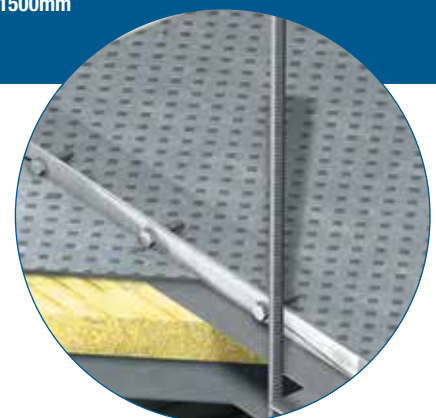
Internal steel angle



- ❶ PROMATECT®-S board, 6 or 9.5mm thick depending on required fire resistance performance
- ❷ Galvanised steel flanges, fabricated by cutting and welding 50mm x 50mm x 3mm thick angles, are bolted together with M10 nuts and bolts at nominal 500mm centres to form continuous sections
- ❸ Corner galvanised steel angle reinforcement, 50mm x 50mm x 3mm thick for enclosure up to 1500mm x 1500mm or 50mm x 50mm x 5mm thick for enclosure up to 2000mm x 2000mm

Fitting of Mineral Wool

Mineral wool insulation is laid in the soffit boards of the PROMATECT®-S enclosure. For the top and sides, however, the insulation is fixed in place using nominal M4 self-tapping screws with 25mm diameter steel washers at nominal 300mm centres in a grid formation. If the insulation is fitted in two or more layers, the joints between the slabs are staggered by at least 300mm between layers. If the insulation is fitted in a single layer, the joints between slabs are sealed and bonded together using VICUBOND® WR adhesive.



Internal Cross Section Dimensions

The maximum approved internal dimension of the enclosure is 2500mm wide x 500mm high. The width may be increased to 3000mm if an additional rod is fitted at each hanger position at mid width. The rod passes through the enclosure and supports the horizontal bearer of the support system beneath the enclosure. The rod also supports the top of the enclosure with a nut and large steel washer on each side of the board. The penetration of the rod through the enclosure must be sealed with PROMASEAL®-A Acrylic Sealant.

Building Services & Enclosure Support

The hangers used to support the building services enclosure must have tensile and bending stresses not exceeding 10N/mm² and 6N/mm² for fire resistance up to 120 and 240 minutes respectively. If these stress levels are exceeded, the size of the hanger members must be increased. Alternatively, the spacing of the hangers can be reduced. The maximum spacing of the hangers is 1800mm centres but this depends on the length of the individual sections.

The fixings used to fasten the threaded hanger rods to concrete soffits must be all steel expanding anchors with a penetration into the concrete of at least 40mm for 120 minute fire resistance and 60mm for 240 minute fire resistance. The anchors must match the size of the threaded rods and be of sufficient strength to support the weight of the enclosure. Anchors must be fitted in accordance with the manufacturer's specification. When the hanger rods are suspended from protected structural steel beams, the rods must be protected for at least 300mm from the beams with the same levels of protection as the structural beams.

If the building service being encased is a plastic pipe, external hangers and angles will be required to independently support the enclosure.

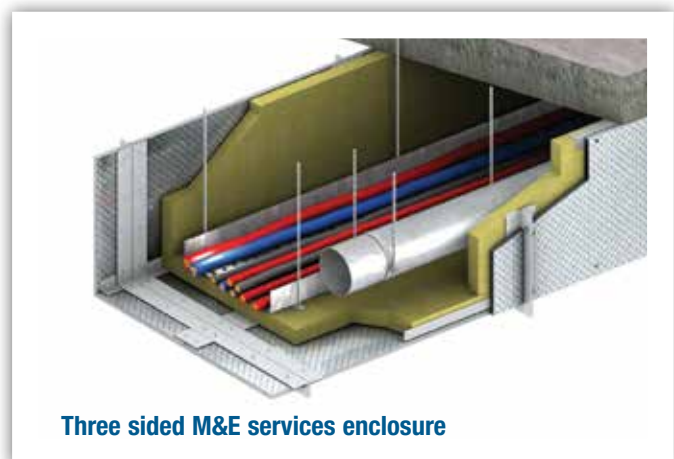
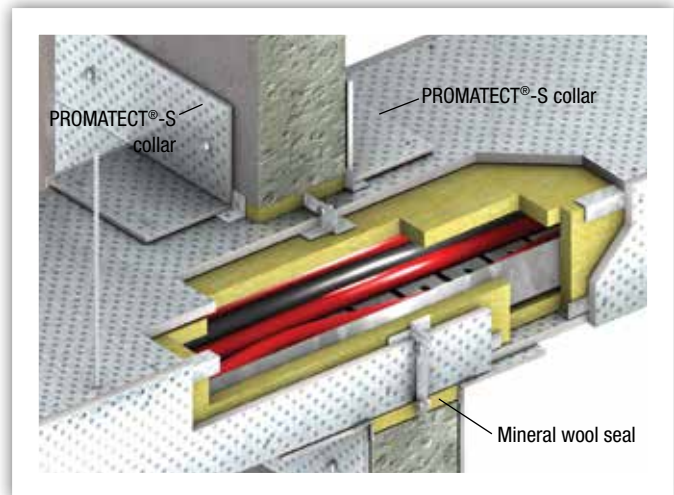
One, Two or Three Sided Protection

One, two or three sided enclosures are constructed in the same manner as a four sided enclosure. The PROMATECT®-S board is connected to the masonry/concrete wall or concrete floor soffit using the same steel angle and screws to the board and M12 all steel expansion bolts, at 500mm maximum centres into the substrate. The bolts must have a minimum penetration into the wall or floor of 60mm. The services are independently supported.



Wall Penetrations

Where the enclosure passes through a fire compartment wall, the penetration must be properly constructed and sealed. Angles 50mm x 50mm x 3mm are fixed to the top and sides of the enclosure and should be set in a position central to the thickness of the compartment wall. The gap between the exterior surface of the enclosure and the perimeter of the wall aperture should be filled either side and over the angles using 140kg/m³ mineral wool slabs friction fitted. The aperture is then covered by an L-shape PROMATECT®-S collar which should extend from the surface of the enclosure and overlap the wall aperture by a minimum of 100mm. The PROMATECT®-S collar should be fixed to the wall using all-steel anchors at nominal 500mm centres.



Following is the standard Architectural Specification for general building services enclosure system using PROMATECT®-S. The designer must determine the suitability of the design to the application and requirements before undertaking or constructing any works relating to the specifications and where in doubt should obtain the advice of a suitably qualified engineer.

External & Internal Fire

Up to 240 minutes fire resistance, integrity and where pertinent insulation in accordance with the criteria of BS 476: Part 20: 1987.

Supporting Structure

Care should be taken that any structural element by which the enclosure system is supported, e.g. a beam, floor or wall, has at least equivalent fire resistance.

Lining Boards

Single-layer 6mm/9.5mm⁽¹⁾ PROMATECT®-S cement/steel composite boards as manufactured by Promat International (Asia Pacific) Ltd.

Type of Fixing

The services will be suspended with hanger rods of diameter sized to limit stress, = 10N/mm² and = 6N/mm² for 120 minute and 240 minute fire exposure respectively. Mild steel frame made of steel angles, minimum size 50mm x 50mm of thickness 3mm or 5mm, depending on the system specification, are used at the corners of the enclosure. 100mm x 3mm thick steel flat plates are positioned such that they coincide with the transverse joints of the boards. The steel framework may be mechanically connected or welded together at all junctions.

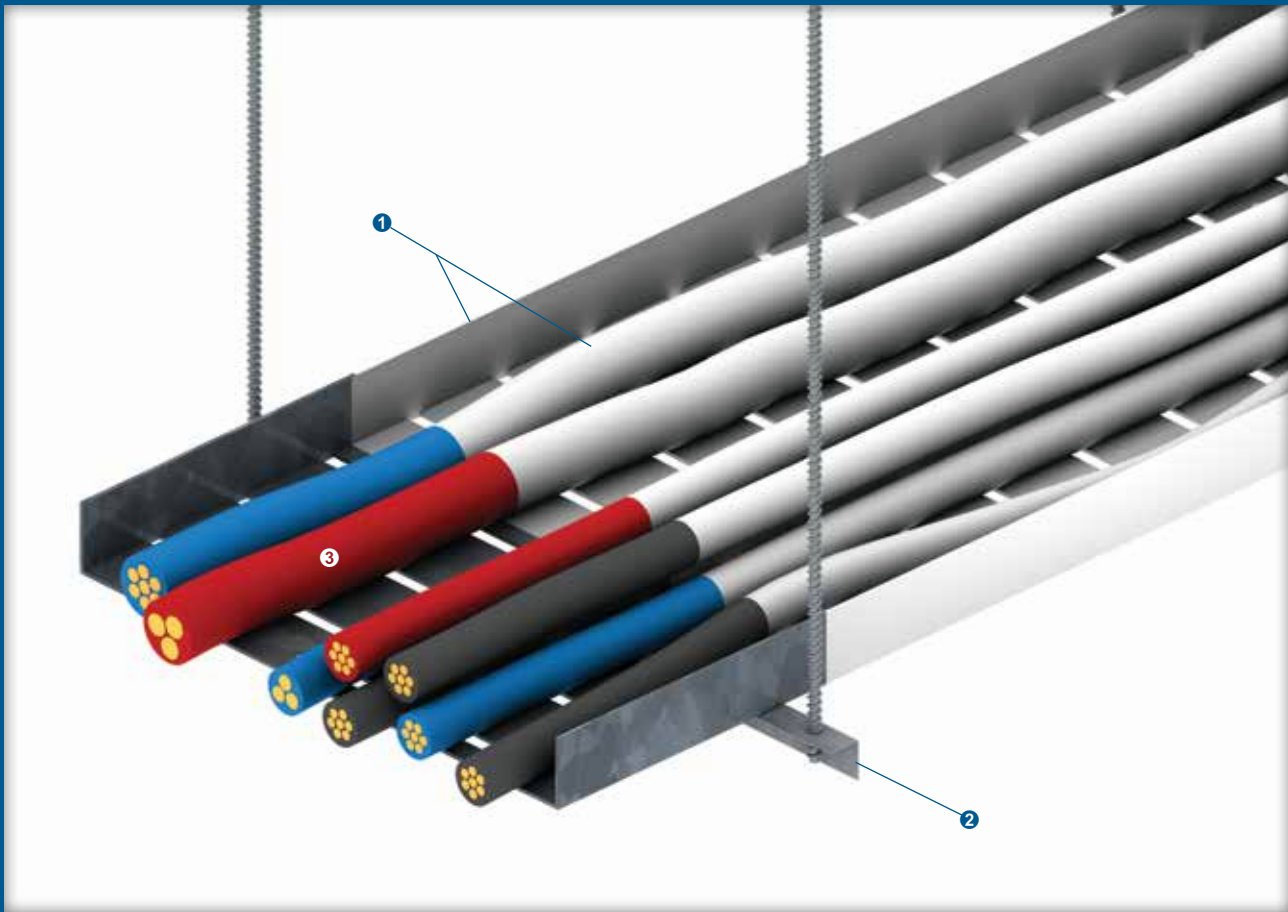
PROMATECT®-S boards will be screw fixed to the frame with 35mm x 5.5mm Teks screws at 200mm centres. Mineral wool in accordance with the system specification will be tightly filled around the existing services, i.e. between the gap of boards and the services. External hangers to support the enclosure with hanger diameter sized to limit stress, = 10N/mm² and = 6N/mm² for 120 minute and 240 minute fire exposure respectively are located at not more than 1800mm centres.

Tests & Standards

The complete system along with the material and framing is approved to meet the requirements of BS 476: Part 20: 1987.

NOTE:

- ⁽¹⁾ delete as appropriate.
- Perimeter gaps will be filled with fire resistant PROMASEAL®-A Acrylic Sealant.



Circuit integrity in accordance with the requirements of FM 3971 Approval Standard

- ❶ PROMASTOP® CIS coated electrical cable and cable tray to provide DFT (dry film thickness) of minimum 1.6mm
- ❷ Service steel hanger and support, size according to weight and dimensions of the services
- ❸ General M&E services, e.g. electrical cable and cable tray

NOTE: In general coatings to cables are designed to restrict the spread of flame along the cables and thus reduce propagation of fire. Thin film coatings will maintain circuit integrity to small diametrical cables in restricted applications. The specifier must use with caution when recommending cable coatings to ensure the performance criteria clearly matches their expectations and requirements. If there is any doubt regarding performance and the maintenance of the circuit integrity is imperative, the specifier should consider the use of a board cladding system. For further clarification and assistance, please consult Promat

Following is the standard Architectural Specification for cable coating system using PROMASTOP® CIS. The designer must determine the suitability of the design to the application and requirements before undertaking or constructing any works relating to the specifications and where in doubt should obtain the advice of a suitably qualified engineer.

External & Internal Fire

Maintain circuit integrity of cables in accordance with the criteria of FM 3971 Approval Standard.

Supporting Structure

Care should be taken that any structural element by which the enclosure system is supported, e.g. a beam, floor or wall, has at least equivalent fire resistance.

Coating

DFT of minimum 1.6mm of PROMASTOP® CIS cable coating as supplied by Promat International (Asia Pacific) Ltd.

Application

The services will be suspended with hanger rods of diameter sized to limit stress = 15N/mm^2 to withstand at least 60 minutes fire. PROMASTOP® CIS is applied to the cables for a DFT of minimum 1.6mm. Cable trays, if supporting cables, should be coated in a similar manner.

Tests & Standards

The complete system along with the material and framing is approved to meet the requirements of FM 3971 Approval Standard.

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