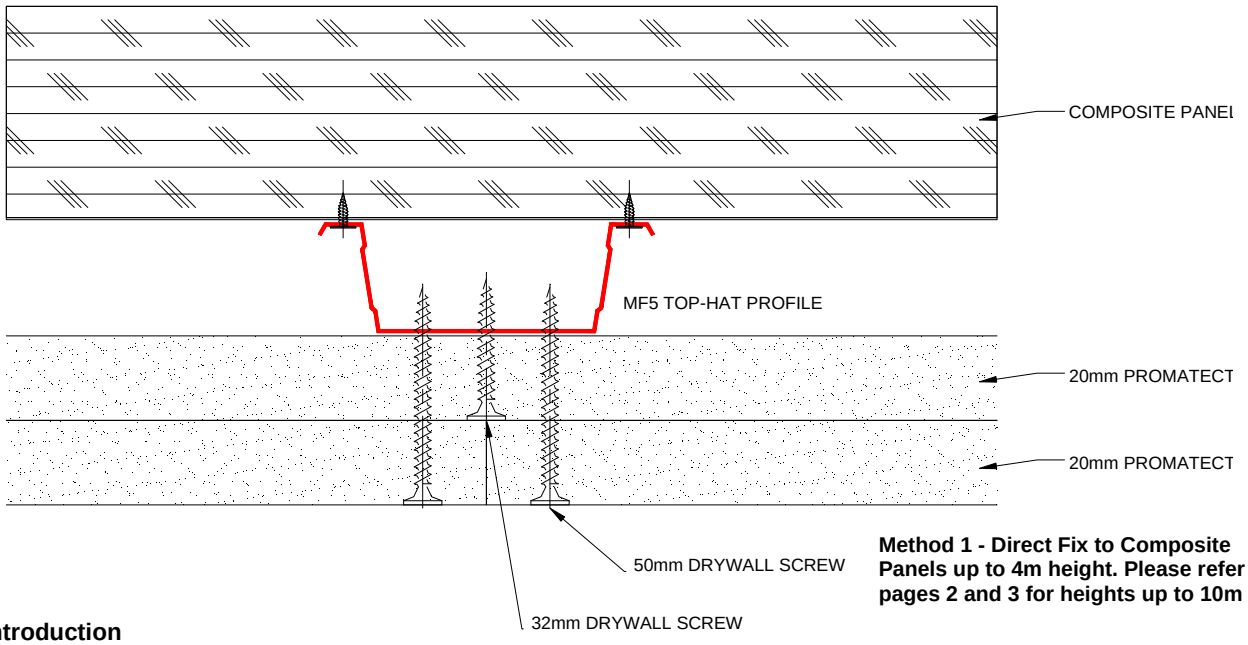

Method 1 - Direct Fix to Composite Panels up to 4m height. Please refer to pages 2 and 3 for heights up to 10m

Introduction

Modern building techniques have resulted in a plethora of new construction methods, materials and systems.

Whilst these have often been developed to meet the particular demand for high thermal insulation, or to provide a low carbon footprint, they may not necessarily retain the intrinsic fire resistance that is characteristic of traditional materials such as bricks and concrete.

In addition, unless they have been subjected to specific fire resistance testing by the manufacturer *to the end use in which they are being used,* then they may also be difficult to incorporate into fire resisting constructions to provide the fire separation required.

This is particularly true where a fire rated version of a product may have been available, but where a *non* fire rated version has actually been installed, as can happen with insulated composite cladding panels. Consequently where fire resistance is required to be *added* to an existing construction, the ability to do so may be particularly challenging.

In addition, whilst these products may be Class 1 to surface spread of flame, or even Class 0 to the building regulations, they may still be *combustible* materials and may not necessarily contribute to the fire resistance in separating elements.

Under these circumstances, where the fire resistance contribution of an insulated composite panel cannot be ascribed, the only prudent method of incorporating the required fire resistance element is to ensure that the face of the actual *composite panel* is kept well below the decomposition and auto ignition temperature of the panel components.

The composite panels, considered in this application, are steel faced panels containing one of the following insulation materials:

- **Phenolic foam**
- **Polyisocyanurate foam (PIR)**
- **Polyurethane foam (PUR)**
- **Extruded Polystyrene foam (XPS)**
- **Expanded Polystyrene foam (EPS)**

The typical ignition temperature of these insulation products is above 400°C; and the temperature at which some of these foams start to decompose or melt (and therefore begin to contribute to fire) is typically 180°C to 200°C.

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The PROMATECT® 250 fire resisting membrane, comprising two layers of 20mm-thick board, used in this application has been tested against a highly insulative composite panel and the protection system has been assessed to achieve 60minutes fire insulation and integrity, against the performance criteria of BS 476: Part 22: 1987.

Construction Method.

It is assumed that the composite panel partition is constructed and installed in accordance with the manufacturer's recommendations.

Note: In addition, all panel joints must be sealed with Promat PROMASEAL® Intumescent Sealant.

There are *two alternative* constructions for the PROMATECT® 250 composite panel protection system:

Method 1 Top hat framing, direct fix to composite panels – may be used up to a maximum height of 4m:

Supporting Steel Framing

- Ceiling and floor channels, 27mm web x 20mm flanges x 0.5mm thick.
- Perimeter channels are bedded on stone wool or Promat PROMASEAL® Intumescent Sealant and fastened to the surrounding construction with M6 all-steel anchor bolts (or equivalent to suit the type of surrounding construction) at 600mm nominal centres.
- Vertical top hat sections, 12mm x 26mm x 50mm x 26mm x 12mm x 0.5mm thick, at maximum 600mm centres.
- Both lips of the top hat sections are fastened to the steel face of the composite panels with M4 steel wafer head self-tapping screws at 300mm nominal centres.

PROMATECT® 250 Boards

- Two layers of PROMATECT® 250 board of nominal thickness 20mm are fitted to the steel framework.
- The boards are screwed to the top hat sections and perimeter channels with M4 steel self-tapping screws at 400mm nominal centres for the inner layer and at 200mm nominal centres for the outer layer. All screws are positioned nominal 12mm from board edges and 40mm from board corners. Vertical board joints coincide with the studs and are staggered by minimum 600mm between layers.
- At horizontal board joints the layers of board are fastened together using M4 x 38mm-long self-tapping screws at nominal 300mm centres on both sides of the joint.
- Boards are butt jointed.

Method 2 a) Independent Metal Stud framing - partitions up to a maximum height of 4m:

Supporting Steel Framing

- Ceiling and floor channels, minimum 50mm web x 25mm flanges x 0.5mm thick.
- C-studs, minimum 48mm web x 32/34mm flanges x 0.5mm thick, at maximum 600mm centres.
- Perimeter channels are bedded on stone wool or Promat PROMASEAL® Intumescent Sealant and fastened to the surrounding construction with M6 all-steel anchor bolts (or equivalent to suit the type of surrounding construction) at 600mm nominal centres.
- Provide a minimum expansion allowance of 10mm for the studs up to 3m, a minimum expansion allowance of 12mm for the studs up to 4m.

PROMATECT® 250 Boards

- Two layers of PROMATECT® 250 board of nominal thickness 20mm are fitted to the steel framework.
- Boards are screwed to the studs and perimeter channels with M4 steel self-tapping screws at 400mm nominal centres for the inner layer and at 200mm nominal centres for the outer layer. All screws are positioned nominal 12mm from board edges and 40mm from board corners. Vertical board joints coincide with the studs and are staggered by minimum 600mm between faces.
- At horizontal board joints the layers of board are fastened together using M4 x 38mm-long self-tapping screws at nominal 300mm centres on both sides of the joint.
- Boards are butt jointed.

b) Independent Metal Stud framing - partitions above 4m and up to a maximum height of 10m:

Use the modified expansion allowance, and stud sizes indicated in tables 1 and 2 overleaf.

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Extending partition heights above 4m

As the height of the partition increases, the minimum requirements for the steel framework also must increase. Table 2 shows the maximum partition height for various sizes of the steel studs.

The steel top and bottom channel sections must have approximately the same web dimensions as the studs so that the studs are a sliding fit in the channels.

The minimum size of the top and bottom channel sections is 50mm web x 25mm flanges x 0.5mm thick. The channels must have the same thickness as the studs. For heights above 5m the bottom channel must have a minimum flange dimension of 30mm. For heights above 7.5m the bottom channel must have a minimum flange dimension of 40mm.

Table 1 – Top Channel and Expansion Allowance

The minimum depth of the top steel channel and the minimum expansion allowance for the studs at different partition heights are as follows:

Height - m	Minimum depth of top channel - mm	Minimum expansion allowance - mm
3	25	10
4	25	12
5	30	15
6	40	18
8	50	24
10	60	30

The allowance for expansion may be provided at stud joints and/or by the studs sliding up into the top channel. Any joint in the stud that incorporates an expansion allowance must not decrease the strength of the stud.

Table 2 - Partition height

Size of C-studs - mm				Maximum height (m)
Web	Flange	Lip	Gauge	
48	32/34	6.5	0.5	4.15
50	32/34	6.5	0.5	4.25
60	32/34	6.5	0.5	4.90
70	32/34	6.5	0.5	5.50
70	32/34	6.5	0.7	6.15
73	32/34	6.5	0.5	5.70
92	32/34	6.5	0.5	6.85
146	32/34	6.5	0.5	10.00
146	32/34	6.5	0.7	10.00
48.8	47/49	6.0	0.6	4.75
48.8	47/49	6.0	0.7	5.00
48.8	47/49	6.0	1.0	5.55
58.8	47/49	6.0	0.6	5.45
73.8	47/49	6.0	0.6	6.50
73.8	47/49	6.0	0.7	6.80
73.8	47/49	6.0	1.0	7.60
98.8	47/49	6.0	0.6	8.15
98.8	47/49	6.0	0.7	8.55
98.8	47/49	6.0	1.0	9.50
123.8	47/49	6.0	0.6	9.75
148.8	47/49	6.0	0.6	10.00

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Maintaining Fire Compartmentation

At Supporting Structures

If the perimeter abuts a structural steel column, as in the case of a portal frame building; it is *essential* that the PROMATECT® 250 protective membrane is continued *around* the column supporting structure *in the same double layer construction,* to maintain the protection to the composite panel at the column position.

Note: The normal thickness of PROMATECT® 250 boards, as required just to provide fire protection to the structural steel work, is not sufficiently adequate to maintain the lower critical temperatures required for compartmentation against the composite panels. For further information please consult Promat Technical Services Department.

At Penetrating Services

When building services, (excluding ventilation ductwork) penetrate through the partition assembly, additional protection must be provided on each face that the PROMATECT® 250 board is fitted.

Services must be protected on all four sides with two layers of PROMATECT® 250 board for a minimum distance of 500mm from the face of the partition assembly.

The PROMATECT® 250 boards are connected with steel angles or channels, minimum 0.5mm thick, at the corners and fastened with M4 steel self-tapping screws at 200mm nominal centres.

The PROMATECT® 250 board collars are also fastened to the PROMATECT® 250 partition in the same manner.

Penetrating services must not interrupt the stud supports to the PROMATECT® 250 protection system.

The open ends of the PROMATECT® 250 collars are sealed with a proprietary fire rated penetration seal system that has a proven fire resistance of at least 60minutes for the type of installation and services.

Services must be independently supported with steel supports, such that the services do not bear their load on to the PROMATECT® 250 partition assembly.

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