



Note: - The Direct Fixing of the PROMATECT® 250 Protection System to the Composite Panel, is not appropriate. Please refer to pages 2 & 3 for fixing details

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 of two layers of 20mm-thick board, together with an additional layer of 20mm of PROMALIGHT® 320 (a high performance nanoporous high temperature insulation material) used in this application, has been tested against a highly insulative composite panel, and the protection system has been assessed to achieve 120 minutes 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: It is essential that all the composite panel joints are sealed with Promat PROMASEAL® Intumescent Sealant.

Barriers up to a maximum height of 3m:

Supporting Steel Framing

- Ceiling and floor channels, minimum 75mm web x 40mm flanges x 0.6mm thick.
- C-studs, minimum 73.8mm web x 47/49mm flanges x 0.6mm 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.
- A minimum expansion allowance of 15mm must be provided at the head of the studs.

PROMATECT® 250 Boards / PROMALIGHT® 320 panels

- The first of two layers of 20mm PROMATECT® 250 board is fastened to the steel framework using 32mm drywall screws at 300mm nominal centres. All screws are positioned nominal 12mm from board edges and 40mm from board corners. All vertical board joints coincide with the studs.
- A central (core) layer of 20mm PROMALIGHT® 320 is then applied to the PROMATECT® 250 boards using a smear of VICUBOND® WR at the four corners, to hold the PROMALIGHT® 320 panels in place whilst the second layer of PROMATECT® 250 is being installed.
- **Note:** Particular care is required in handling the PROMALIGHT® 320 as it is a readily friable material, and is easily damaged. PROMALIGHT® 320 is supplied in a variety of finishes (plain, aluminium foil faced and PE shrink wrapped). Any of these can be used, but if the PE shrink wrapped material is used, please contact Promat Technical Services Department on Tel: 01344 381 400 for further specific advice on the installation.
- All joints in the PROMALIGHT® 320 panels must be tightly butted, and the joints staggered, both vertically and horizontally by a minimum of 100mm away from any of the joints in *both* of the PROMATECT® 250 board layers. This will usually require (at least) the first vertical run of panel from a starting edge to be cut, to ensure that the joint falls appropriately *between* the steel stud framing positions.
- A second (facing) layer of PROMATECT® 250 is then fastened *through* the PROMALIGHT® 320 and first PROMATECT® 250 layers into the supporting steel studs, with 600mm staggered joints (both vertically and horizontally) to the first PROMATECT® 250 layer, using 70mm drywall screws at 300mm centres.

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Extending barriers above 3m – up to 10m

As the height of the partition increases, the minimum requirements for the steel framework must also increase. Table 2 shows the maximum partition height for various sizes of the steel studs for barriers, up to a height of 10m.

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 75mm web x 40mm flanges x 0.6mm thick. The channels must have at least the same thickness as the studs.

For heights above 6m the bottom channel has a minimum flange dimension of 50mm.

The minimum depth of the top steel channel and the minimum expansion allowance for the studs at different partition heights shown in table 1 below:

Table 1 – Top Channel and Expansion Allowance

Height - m	Minimum depth of top channel - mm	Minimum expansion allowance - mm
3	40	15
4	40	20
5	50	24
6	50	28
8	60	35
10	70	42

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

Web	Size of C-studs - mm			Gauge	Maximum height (m)
	Flange	Lip			
73.8	47/49	6.0	0.6	0.6	3.80
73.8	47/49	6.0	0.7	0.7	4.00
73.8	47/49	6.0	1.0	1.0	4.50
98.8	47/49	6.0	0.6	0.6	4.90
98.8	47/49	6.0	0.7	0.7	5.20
98.8	47/49	6.0	1.0	1.0	5.80
123.8	47/49	6.0	0.6	0.6	6.00
148.8	47/49	6.0	0.6	0.6	7.05
97	49/52	0	1.5	1.5	6.40
97	49/52	0	2.0	2.0	7.00
147	49/52	0	1.5	1.5	9.15
147	49/52	0	2.0	2.0	10.00

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 as described above is continued *around* the column supporting structure *in the same triple 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* sufficient to maintain the lower critical temperatures required for compartmentation against the composite panels. For further information please consult Promat Technical Services Department, Tel: 01344 381 400

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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.

The services must be protected around all four sides with two layers of PROMATECT® 250 board and PROMALIGHT® 320 core layer, 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 120 minutes 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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