Promat

PROMATECT® 50
Protection For Structural Steelwork

Promat

PROMATECT® 50
Contents

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PROMATECT® 50
Cement Bound Matrix Board

P50

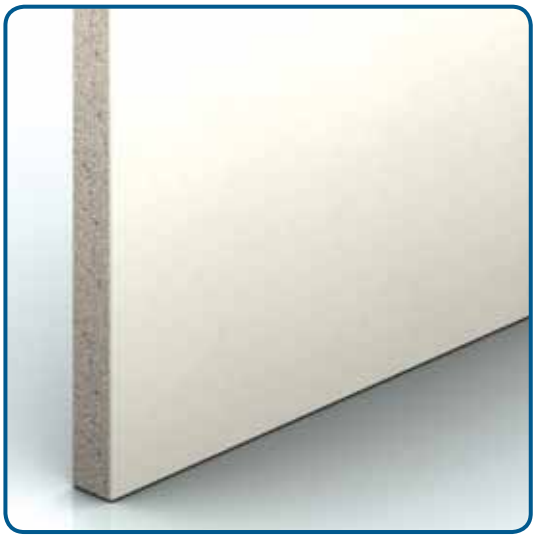
General Description

PROMATECT® 50 is Promat's matrix technology of binding organic materials and inorganic minerals within a calculated mineral matrix to form a monolithic core. Known as **Promax®** technology Cement Bound Matrix board, this low energy environmentally friendly manufacturing process makes an excellent board that offers not only superior fire resistance but also exemplary physical strength, robustness and performance.

PROMATECT® 50 is off-white in colour. One face is extremely smooth and ready to form a finished surface able to receive almost any form of architectural/finish treatment. The reverse face has a (visible) fibre mesh reinforcement.

PROMATECT® 50 is resistant to the effects of moisture and will not physically deteriorate when used in damp or humid conditions. Performance characteristics are not degraded by moisture. A fully saturated PROMATECT® 50 retains up to 95% of its physical strength.

A health and safety data sheet is available from the Promat Technical Department and, as with any other materials, should be read before working with the board. The board is not classified as a dangerous substance so no special provisions are required regarding the transportation and the disposal of the product to landfill. They can be placed in on-site rubbish skips with other general building waste which should then be disposed by a registered contractor in the appropriate and approved manner.



Typical Mechanical Properties

Flexural strength, $F_{rupture}$ (EN 12467: 2000)	Longitudinal N/mm² Transverse N/mm²	13.76 10.80
Tensile strength, $T_{rupture}$ (EN 12467: 2000)	N/mm²	4.2
Compressive strength (average, perpendicular on board face) (BS 5669: Part 1: 1989)	N/mm²	13.10

Applications

- Steel stud partitions, solid/frameless partitions
- Self-supporting ceilings, suspended ceilings
- Timber floor protection, upgrading of timber floor
- Steel duct cladding
- M&E services enclosure, riser pipes enclosure

General Technical Properties

Product generic description		**Promax®** technology Cement Bound Matrix board
Material class (BS 476: Part 4: 1970)		Non combustible
Surface spread of flame (BS 476: Part 7: 1997)		Class 1
Surface spread of flame for bare floors (AS ISO 9239: Part 1: 2003)		No ignition
Building regulations classification		Class 0
Heat and smoke release rates (AS/NZS 3837)		Group 1
Fire propagation of product (BS 476: Part 6: 1989)		I = 0; i_1 = 0; i_2 = 0; i_3 = 0
Simultaneous determination of ignitability, flame propagation, heat and smoke release (AS 1530: Part 3: 1999)		Indices 0/0/0/0-1
Density (EN 12467: 2000)	kg/m³	1200 (± 10% tolerance)
Thermal conductivity (approximate) at 20°C (ASTM C518: 1991)	W/m°K	0.193
Typical moisture content, ambient to dry condition (BS 5669: Part 1: 1989, Clause 9)		2.4%
Emission test (ASTM D5116-90 for Green Label Singapore)		Within limits set out by the Singapore Environment Council
Thickness tolerance of standard boards	mm	± 0.5
Length x Width tolerance of standard boards	mm	± 5
Surface condition		Front face: Smooth, fair Back face: Smooth with fibre mesh reinforcement

Thickness (mm)	Standard dimensions (mm x mm)	Number of boards per pallet	Surface per pallet (m²/pallet)	Weight per m² of sheet (approximate kg/m²)	Weight per pallet (approximate kg)
7	2440 x 1220	78	232	8.4	1849
9	2440 x 1220	60	178	10.8	1922
12	2440 x 1220	45	134	14.4	1929
15	2440 x 1220	36	107	18.0	1926
18	2440 x 1220	30	89	21.6	1922
20	2440 x 1220	27	80	24.0	1820
25	2440 x 1220	21	63	30.0	1890

*Other dimensions are available upon request. The properties in above tables are mean values given for information and guidance only. If certain properties are critical for a particular application, it is advisable to consult Promat Technical Department.

PROMATECT® 50 is manufactured under a quality management system certified in accordance with ISO 9001: 2008.

AS FOR ALL NATURAL MATERIALS SUCH AS CONCRETE AND CLAY QUARTZ CAN BE PRESENT, THIS PRODUCT MAY ALSO RELEASE DUST CONTAINING QUARTZ PARTICLES WHEN IT IS MECHANICALLY MACHINED (CUTTING, SANDING, DRILLING). INHALATION OF HIGH CONCENTRATIONS OF DUST CAN IRRITATE THE RESPIRATORY SYSTEM. DUST CAN ALSO IRRITATE THE EYES AND/OR THE SKIN. THE INHALATION OF QUARTZ CONTAINING DUST, IN PARTICULAR HIGH CONCENTRATION OF FINE (RESPIRABLE) DUST OR OVER A PROLONGED PERIOD OF TIME CAN LEAD TO LUNG DISEASE (SILICOSIS) AND AN INCREASED RISK OF LUNG CANCER. AVOID THE INHALATION OF DUST BY USING MACHINERY WITH DUST EXTRACTION. GUARANTEE ADEQUATE VENTILATION ON THE WORK FLOOR. AVOID CONTACT WITH THE EYES AND SKIN AND AVOID INHALATION OF THE DUST BY WEARING APPROPRIATE PERSONAL PROTECTION GEAR (SAFETY GOGGLES, PROTECTIVE CLOTHING AND DUST MASK). FOR MORE INFORMATION PLEASE CHECK THE MATERIAL SAFETY DATA SHEET, AVAILABLE UPON REQUEST.

Introduction

Numerous research programmes show that some types of fully stressed steel sections can achieve a fire resistance of 30 minutes without any additional protection materials being applied. However, these apply to a limited number of steel sections only, based on the allowable Section Factor Hp/A. Section Factor is a common term used in fire protection for steelwork and is discussed in detail below.

Typical building regulations usually require certain elements of structure to be fire resistant for more than 30 minutes and up to a specified minimum period of time. The thickness of any fire protection material depends on a number of factors, such as:

- Duration of fire resistance specified;
- Type of protection used (e.g. board, paint, spray etc);
- Perimeter of the part of steel section exposed to fire;
- Shape and dimensions of the steel section.

To determine how these various factors affect the fire resistance, all Promat products and systems have been tested at nationally accredited laboratories around the world to a variety of standards, e.g. BS 476: Part 21, AS 1530: Part 4, DIN 4102 and ASTM E119.

Tests carried out in accordance with BS476: Part 21 are performed on both loaded and unloaded beams and columns which are clad with fire protection material. Steel surface temperatures are monitored with thermocouples to assess the performance of the cladding. Steel that is fully stressed in accordance with the design guides BS 449 or BS 5950: Part 1 (Australian equivalent AS 4100), begin to lose their design margin of safety at temperatures around 550°C. The table at top right shows how the strength of steel reduces as temperatures rise.

Variation of effective yield strength factor of normal structural steels with temperature

Temperature (°C)	20	100	200	300	400	500	600	700	800
Effective yield strength factor	1.00	1.00	1.00	1.00	1.00	0.78	0.47	0.23	0.11

Example: At 700°C, the effective yield strength of Grade 4 (S275) steel is 0.23 x 275 = 63.25N/mm^2.

The above is extracted from the ASFP publication “Fire Protection for Structural Steel in Buildings”, commonly known as “The Yellow Book”.

A range of unloaded sections are also tested to obtain data for analytical calculation, to measure exactly how much protection is needed for the most common steel sections and for providing fire resistance for different time periods.

IMPORTANT NOTE: When using Promat protection systems for structural steelwork, conservative limiting temperatures of 550°C and 620°C are referred to for columns and beams respectively and are in general use throughout this brochure. Apart from temperature data, the fire tests also need to demonstrate the ability of cladding to remain in place, usually described as the “stickability” of the material, for the maximum duration for which the protection may be required. The availability of thin boards and the low weight of Promat systems, plus the possibility of prefabrication, ensure maximum cost efficiency.

Section Factor (Hp/A)

The degree of fire protection provided depends on the Hp/A Section Factor for the steel section. The Hp/A factor is a function of the area of the steel exposed to the fire and the mass of the steel section. The higher the Hp/A, the faster the steel section heats up and so the greater the thickness of fire protection material required.

It should be noted that in European design standards, the section factor is presented as A/V which has the same numerical value as Hp/A. A/V measures the rate of temperature increase of a steel cross-section by the ratio of the heated surface area to the volume. It is likely to gradually replace the use of Hp/A.

Depending on type of material used for protection, the calculation method for Hp/A value may differ. Generally there are two methods of construction for the protection materials. Box protection and profile protection.

Box Protection

For box protection, Hp is the sum of the inside dimensions of the smallest possible rectangular or square encasement of the steel section (except for circular hollow sections) as shown on pages 4.

Where a steel section abuts or is built into a fire resisting wall or floor, the surface in contact with or the surface within the wall or floor is ignored when calculating Hp.

However, the value A is always the total cross-sectional area of the whole steel section.

The serial size and mass per metre of most steel sections are available in tables from steel manufacturers. Sometimes such tables also provide Hp/A values calculated for 3 or 4-sided box protection.

Upon request, Promat Technical Department will provide assistance in calculating Hp/A section factors and required material thicknesses. As a general guide, please refer to pages 4. Following is an example of a calculation section for a beam box protection.

Example: Steel beam, serial size 406mm x 178mm x 54kg/m to be encased on 3 sides

Serial size	= 406mm x 178mm
Actual size	= 402.6mm x 177.6mm
Hp	= B + 2 D = 177.6 + 402.6 + 402.6 = 982.8mm (0.9828m)
A	= 68.4cm^2 (0.00684m^2)
Hp/A	= 0.9828 ÷ 0.00684 = 144.7m^{-1} ≈ 144m^{-1}

The value of A, the cross-sectional area, can be obtained either from steelwork tables or by accurate measurement. However, if the mass per metre is known then the Hp/A value can be calculated as follows:

$$\frac{Hp}{A} = \frac{7850 \times Hp}{W}$$

Where W = Mass of per metre (kg/m)

Where 7850 = Nominal density of steel

Sample calculation using the previous example:

$$\frac{Hp}{A} = \frac{7850 \times 0.9828}{54}$$

$$= 142.87m^{-1}$$

$$\approx 143m^{-1}$$

NOTE: The shape of the steel section can also play an important role when determining the required thickness of a protection material. Following are some notes for reference. For details on steel profiles not outlined here, please consult Promat Technical Department.

Castellated Sections / Cellform Beams

These steel members heat up more quickly than the original section from which they were produced. Protection thickness should therefore be 20% greater than those calculated from the Hp/A value of the original section from which the castellated section is formed.

However, it should be noted that the above information is now considered somewhat out dated and a new, more scientific approach is applied for the protection of castellated sections. The following is taken from Fire protection for structural steel in buildings, 4th Edition published by the ASFP (see www.asfp.org.uk).

The recommended method of obtaining the section factor (Hp/A) for castellated sections is now amended as follows. The recommendation from the Steel Construction Institute, as published in RT 1085, that for castellated sections and cellular beams manufactured from all rolled steel sections and from welded plate, the Section Factor for passive fire protection systems should be calculated as:

Section factor [m^{-1}]	=	1400/t
Where t	=	the thickness [mm] of the lower steel web and applies for beams made from all steel rolled sections and from welded steel plate.

It should be noted that there are a number of conditions attached to the use of this calculation methods, which are detailed in the ASFP "Yellow Book" publication detailed above.

Individual protection products, normally quite similar in performance when compared on the basis of rolled steel sections, may require radically different thicknesses for the same cellular beam.

Structural Hollow Section

The same thickness of Promat board materials can be used on square, rectangular and circular hollow sections as on 'I' sections of the same Hp/A value.

Bracing

Bracing is included in a structure to give resistance to wind forces and provide overall stiffness. Masonry walls and steel cladding contribute to a structure's rigidity but these are rarely taken into account in design. Also, the probability of a major fire occurrence concurrent with maximum wind load is remote (see BS 5950: Part 8). It seems unreasonable therefore to apply the 550°C steel temperature criteria to bracing. While each case must be judged on individual merits, protection to bracing is generally not necessary, but where it is required the Hp/A value of the bracing section or 200m^{-1} should be used, whichever is the lesser.

Lattice Members

As the determination of the protection necessary to protect lattice members requires broad consideration of the lattice design, please consult a local Promat Technical Department for advice concerning such steel sections.

Partially Exposed Members

Where columns or beams are partly built into or are in close contact with walls or floors, the protection afforded to the steelwork by the wall or floor should be taken into account. In those instances where the steel section sits within or against masonry or concrete constructions, this will give protection to the adjacent surface of the steelwork. Thus, for the purpose of determining the heated perimeter (Hp), this should be taken as only that part of the steel section which is exposed. It should be noted that where the steelwork penetrates both sides of a fire resisting construction, i.e. a wall protruding into a space which has an open end, simultaneous attack from fire on both sides may occur on columns partially exposed within the wall. In such an instance, the section factor should be calculated based upon the sum of the areas exposed to fire on either side of the wall and the total volume of the steel section.

Note that separating elements are generally required to offer a performance including the insulation criteria of 140°C/180°C. Therefore, where a steel section passes through a separating element and is exposed on both sides, consideration must also be given to providing sufficient protection not only to maintain the temperature of the steel section below 550°C but also to ensure the surface temperature on the unexposed face does not exceed the 140°C/180°C insulation criteria of the separating element. Due allowance for any expected building movement should also be considered.

External Lightweight Walls

Where the structural elements form portal legs supporting a lightweight external wall, the insulation performance required of the wall may contribute to the protection of any column flange falling within the thickness of the wall. In such cases, please consult the local Promat Technical Department to confirm the board thickness and which areas of such columns should be protected.

Internal Lightweight Walls/Partitions

Where a column or beam is built into a fire resistant lightweight wall or partition, the protection to the steelwork can generally be designed on the assumption that only one side of the wall or partition will be exposed to fire at any one time. The wall or partition should be adequately secured to the column in such a way as to ensure the wall or partition will not apply stress on the protection encasement. Due allowance for any expected building movement should be considered.

Floors

Where beams are wholly within the cavity of a timber floor protected by a PROMATECT®-H ceiling, test evidence shows that the cavity air temperature of the floor is such that the beam will be adequately protected to the same fire resistance by the ceiling that protects the floor. Where the beam is wholly or partly below the line of the PROMATECT®-H ceiling then Hp should be based upon the portion of the steel beam that is below ceiling level.

Beams Supporting Composite Floors With Profiled Metal Decking

A series of fire resistance tests has demonstrated that it is not always necessary to fill the void formed between the top flange of a beam and the underside of a profiled steel deck. Recommendations based on the research have been published by the Steel Construction Institute (UK) and for decks running perpendicular to the beams, are as follows:

Dovetail decks
Voids may be left unfilled for all fire resistance periods; unless a fire resisting wall or partition is located beneath the beam.

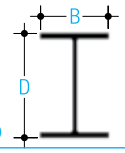
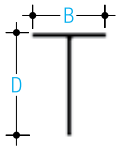
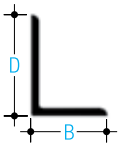
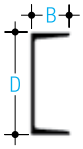
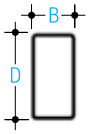
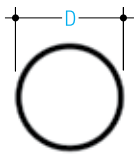
Trapezoidal decks
Generally, voids may be left unfilled for up to 60 minutes fire resistance. Also, for 90 minutes if the board thickness used is appropriate for the Hp/A + 15%. Care should be taken to ensure that if the voids are unfilled, the main encasement will need to be adequately secured. Please refer to the Promat Technical Department for advice.

For periods over 90 minutes the voids should be filled.

In all instances, voids should also be filled if a fire wall is located beneath the beam, for all fire resistance periods. These recommendations apply to board encasements. The trapezoidal steel deck slab should be designed to act structurally with the beam. If this is not the case, the voids should be filled for all fire resistance periods.

Hp/A Section Factor Box

Protection configurations with values of perimeter Hp for use in the calculation of section factor Hp/A (A/V)

Steel section	Box protection				
Universal beams, universal columns and joists (plain and castellated)  Hp	4 sides  2B + 2D	3 sides  B + 2D	3 sides (partially exposed)  B + 2d	2 sides  B + D	1 side (partially exposed)  B
Structural and rolled tees  Hp	4 sides  2B + 2D	3 sides (flange to soffit)  B + 2D	3 sides (toe of web to soffit)  B + 2D		
Angles  Hp	4 sides  2B + 2D	3 sides (flange to soffit)  B + 2D	3 sides (toe of flange to soffit)  B + 2D		
Channels  Hp	4 sides  2B + 2D	3 sides (web to soffit)  2B + D	3 sides (flange to soffit)  B + 2D		
Hollow sections (square or rectangular)  Hp	4 sides  2B + 2D	3 sides  B + 2D			
Hollow sections (circular)  Hp	 pD	NOTE: The air space created in boxing a section improves the insulation and a value of Hp/A. Therefore, Hp higher than profile protection would be anomalous. Hence, Hp is taken as the circumference of the tube and not 4D.			

Example:
Using 305mm x 305mm x 240kg/m universal beam

B = 317.9mm D = 352.6mm
t = 23mm A = 305.6cm^2

c) Box protection – 4-sided exposure
Hp = 2B + 2D

Hence Hp = 2 x 317.9 + 2 x 352.6
= 1341mm = 1.341m

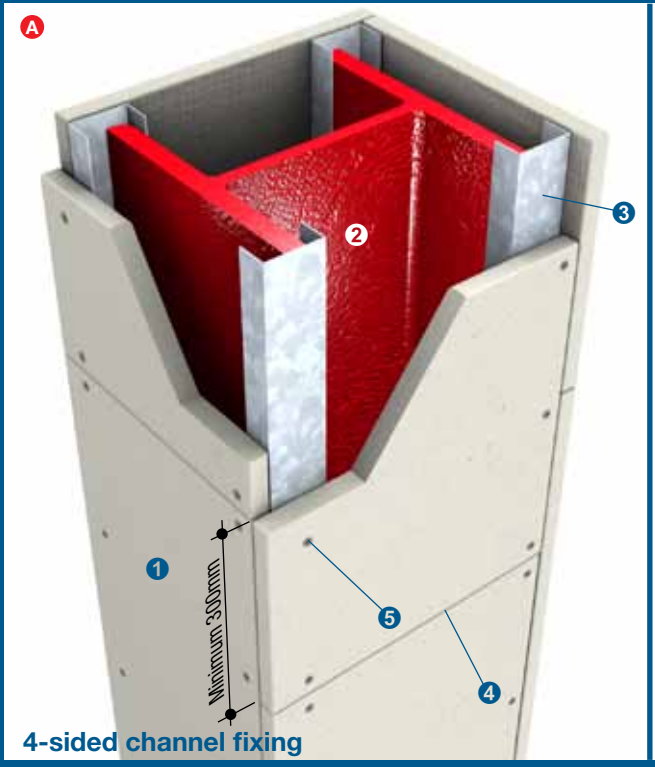
Hp/A = 1.341/0.03056 = 43.9m^{-1}

d) Box protection – 3-sided exposure
Hp = B + 2D

Hence Hp = 317.9 + 2 x 352.6
= 1612.9mm = 1.613m

Hp/A = 1.613/0.03056 = 52.8m^{-1}

NOTE: The values are approximate in that radii at corners and roots of all sections are ignored. In these figures Hp/A = A/V.



4-sided channel fixing

4-sided edge fixing

1. 1 layer of PROMATECT® 50 board, thickness in accordance with Table C1 to C4 on page 7 & 8.
2. Structural steel column
3. Continuous galvanised steel channel 19mm x 38mm x 19mm x 1.6mm thick or similar, leg of each channel is located against inner surface of flange.
4. Horizontal joints are simply butt jointed without cover strips. No filler or sealant is required at joints. Joints in adjacent sides to be staggered minimum 300mm.

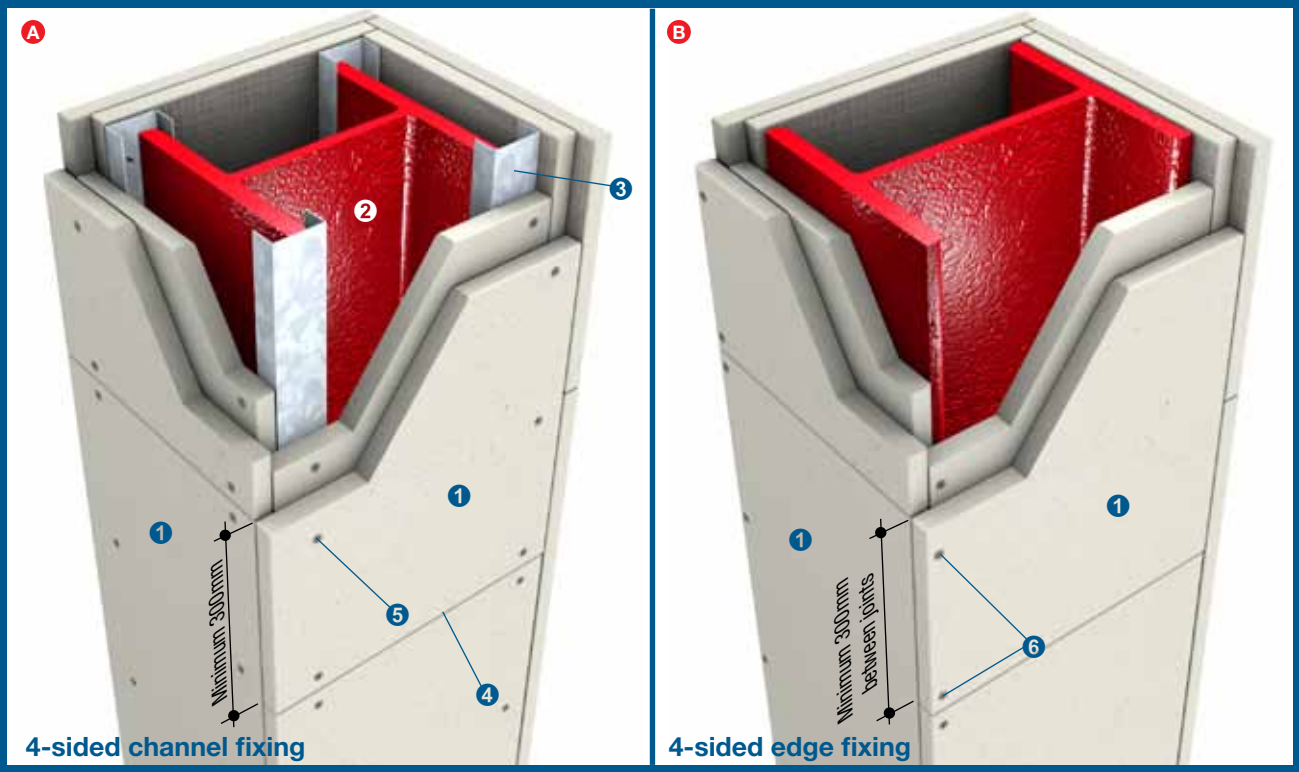
   For wide columns, it may be desirable to include a cover strip behind the horizontal joints within the web of the steel section to provide additional impact resistance.
5. Self-drilling or self-tapping drywall screws at nominal 200mm centres.
6. Fixings in accordance with the following table, care should be taken not to overtighten screws. When edge fixing it is advisable to drill pilot holes, particularly with thinner boards.

PROMATECT® 50 board thickness	Deep threaded drywall type screws preferably with ribbed heads at 200mm centres
15mm	40mm
20mm	55mm
25mm	60mm

   For further guidance on steel wire staple fixing, please contact Promat Technical Department.
7. Continuous galvanised steel angles fixed to the wall using non combustible anchors at nominal 500mm centres.

A. Applicable where required PROMATECT® 50 boards ≤ 15mm.

B. Applicable where required PROMATECT® 50 boards > 15mm.



1. 2 layer of PROMATECT® 50 board, thickness in accordance with Table C1 to C4 on page 7 & 8.
2. Structural steel column
3. Continuous galvanised steel channel 19mm x 38mm x 19mm x 1.6mm thick or similar, leg of each channel is located against inner surface of flange.
4. Horizontal joints are simply butt jointed without cover strips. No filler or sealant is required at joints. Joints in adjacent sides to be staggered minimum 300mm.
5. Self-drilling or self-tapping drywall screws at nominal 200mm centres
6. Fixings in accordance with the following table, care should be taken not to overtighten screws. When edge fixing it is advisable to drill pilot holes, particular with thinner boards.

PROMATECT® 50 board thickness	Deep threaded drywall type screws preferably with ribbed heads at 200mm centres
15mm	40mm
20mm	55mm
25mm	60mm

For guidance on steel wire staple fixing, please contact Promat Technical Department.

7. Continuous galvanised steel angles fixed to the wall using non combustible anchors at nominal 500mm centres

A. Applicable where required PROMATECT® 50 boards ≤ 15mm.

B. Applicable where required PROMATECT® 50 boards > 15mm.

Hp/A Ratio Table C1: PROMATECT® 50 for up to 120 minutes fire resistance in accordance with the requirements of AS 1530: Part 4: 2005

Section Factor (V/A)	Fire Resistance Duration at 550°C (minutes)			
	30	60	90	120
70	10	10	12	18
75	10	10	12	18
80	10	10	12	18
85	10	10	15	18
90	10	10	15	18
95	10	10	15	18
100	10	10	15	20
105	10	10	15	20
110	10	10	15	20
115	10	10	15	20
120	10	10	15	20
125	10	10	15	20
130	10	10	15	20
135	10	10	15	20
140	10	10	15	20
145	10	10	15	20
150	10	12	15	20
155	10	12	18	22
160	10	12	18	22
165	10	12	18	22
170	10	12	18	22
175	10	12	18	22
180	10	12	18	22
185	10	12	18	22
190	10	12	18	22
195	10	12	18	22
200	10	12	18	22
205	10	12	18	22
210	10	12	18	22
215	10	12	18	22
220	10	12	18	22
225	10	12	18	22
230	10	12	18	22
235	10	12	18	22
240	10	12	18	22
245	10	12	18	22
250	10	12	18	22
255	10	12	18	22

Hp/A Ratio Table C2: PROMATECT® 50 for up to 120 minutes fire resistance in accordance with the requirements of BS 476: Part 21

Section Factor (V/A)	Fire Resistance Duration at 550°C (minutes)			
	30	60	90	120
10	10	10	10	10
15	10	10	10	10
20	10	10	10	10
25	10	10	10	12
30	10	10	10	12
35	10	10	10	15
40	10	10	12	15
45	10	10	12	15
50	10	10	12	15
55	10	10	12	18
60	10	10	15	18
65	10	10	15	18
70	10	10	15	18
75	10	10	15	18
80	10	10	15	18
85	10	10	15	18
90	10	10	15	20
95	10	10	15	20
100	10	10	15	20
105	10	12	15	20
110	10	12	15	20
115	10	12	15	20
120	10	12	15	20
125	10	12	15	20
130	10	12	18	20
135	10	12	18	20
140	10	12	18	20
145	10	12	18	22
150	10	12	18	22

Section Factor (V/A)	Fire Resistance Duration at 550°C (minutes)			
	30	60	90	120
155	10	12	18	22
160	10	12	18	22
165	10	12	18	22
170	10	12	18	22
175	10	12	18	22
180	10	12	18	22
185	10	12	18	22
190	10	12	18	22
195	10	12	18	22
200	10	12	18	22
205	10	12	18	22
210	10	12	18	22
215	10	12	18	22
220	10	12	18	22
225	10	12	18	22
230	10	12	18	22
235	10	12	18	22
240	10	12	18	22
245	10	12	18	22
250	10	12	18	22
255	10	12	18	22
260	10	12	18	22
265	10	12	18	22
270	10	12	18	22
275	10	12	18	25

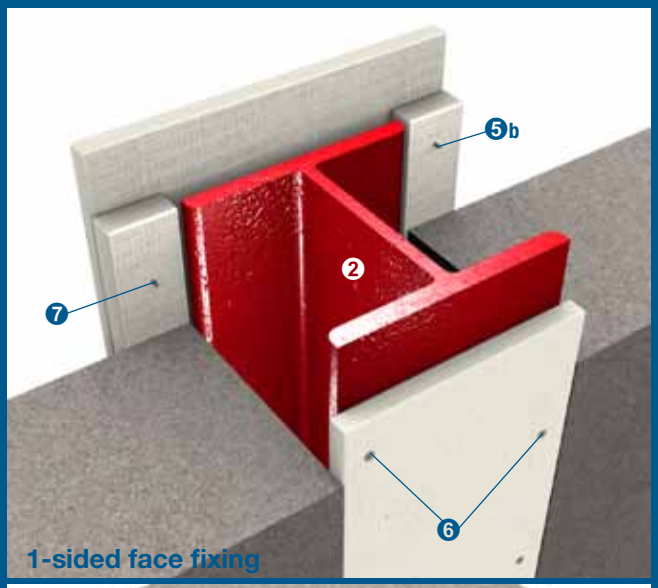
Hp/A Ratio Table C3: PROMATECT® 50 for up to 120 minutes fire resistance in accordance with the requirements of AS 1530: Part 4: 2005

Section Factor (V/A)	Fire Resistance Duration at 620°C (minutes)			
	30	60	90	120
70	10	10	10	15
75	10	10	10	15
80	10	10	12	15
85	10	10	12	15
90	10	10	12	18
95	10	10	12	18
100	10	10	12	18
105	10	10	12	18
110	10	10	12	18
115	10	10	15	18
120	10	10	15	18
125	10	10	15	18
130	10	10	15	18
135	10	10	15	18
140	10	10	15	18
145	10	10	15	18
150	10	10	15	18
155	10	10	15	20
160	10	10	15	20
165	10	10	15	20
170	10	10	15	20
175	10	10	15	20
180	10	10	15	20
185	10	10	15	20
190	10	10	15	20
195	10	10	15	20
200	10	10	15	20
205	10	10	15	20
210	10	10	15	20
215	10	10	15	20
220	10	10	15	20
225	10	10	15	20
230	10	10	15	20
235	10	10	15	20
240	10	10	15	20
245	10	12	15	20
250	10	12	15	20
255	10	12	15	20

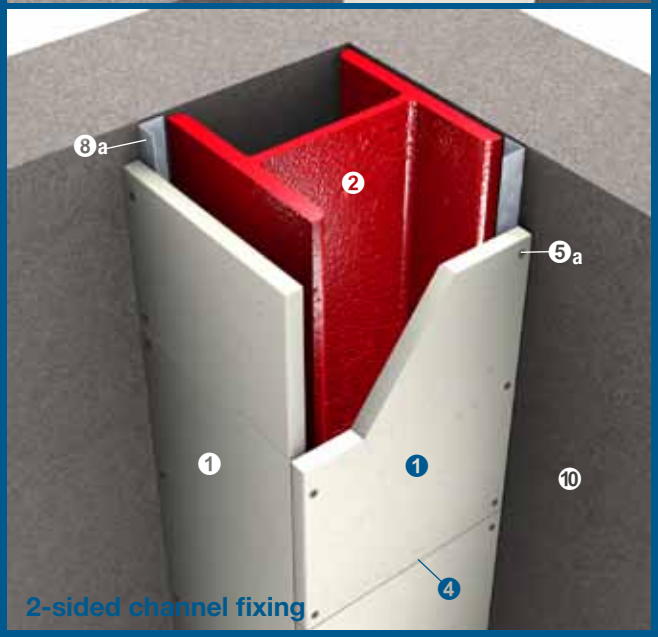
Hp/A Ratio Table C4: PROMATECT® 50 for up to 120 minutes fire resistance in accordance with the requirements of BS 476: Part 21

Section Factor (V/A)	Fire Resistance Duration at 620°C (minutes)			
	30	60	90	120
10	10	10	10	10
15	10	10	10	10
20	10	10	10	10
25	10	10	10	10
30	10	10	10	10
35	10	10	10	12
40	10	10	10	12
45	10	10	10	15
50	10	10	10	15
55	10	10	12	15
60	10	10	12	15
65	10	10	12	15
70	10	10	12	15
75	10	10	12	18
80	10	10	12	18
85	10	10	12	18
90	10	10	15	18
95	10	10	15	18
100	10	10	15	18
105	10	10	15	18
110	10	10	15	18
115	10	10	15	18
120	10	10	15	18
125	10	10	15	18
130	10	10	15	18
135	10	10	15	18
140	10	10	15	20
145	10	10	15	20
150	10	10	15	20

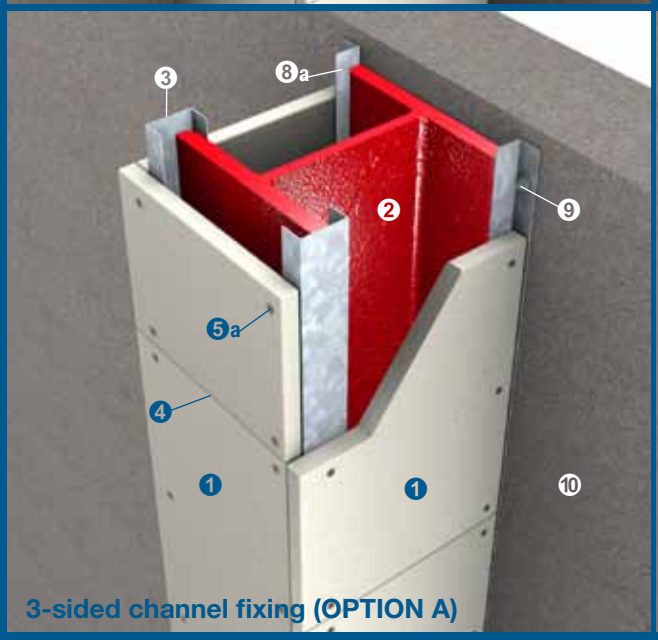
Section Factor (V/A)	Fire Resistance Duration at 620°C (minutes)			
	30	60	90	120
155	10	10	15	20
160	10	10	15	20
165	10	10	15	20
170	10	10	15	20
175	10	10	15	20
180	10	10	15	20
185	10	10	15	20
190	10	10	15	20
195	10	12	15	20
200	10	12	15	20
205	10	12	15	20
210	10	12	15	20
215	10	12	15	20
220	10	12	18	20
225	10	12	18	20
230	10	12	18	20
235	10	12	18	20
240	10	12	18	22
245	10	12	18	22
250	10	12	18	22
255	10	12	18	22
260	10	12	18	22
265	10	12	18	22
270	10	12	18	22
275	10	12	18	22



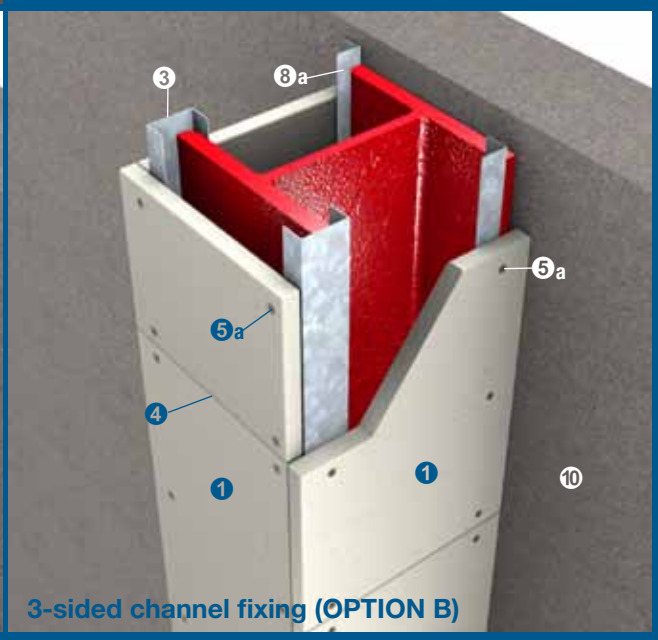
1-sided face fixing



2-sided channel fixing



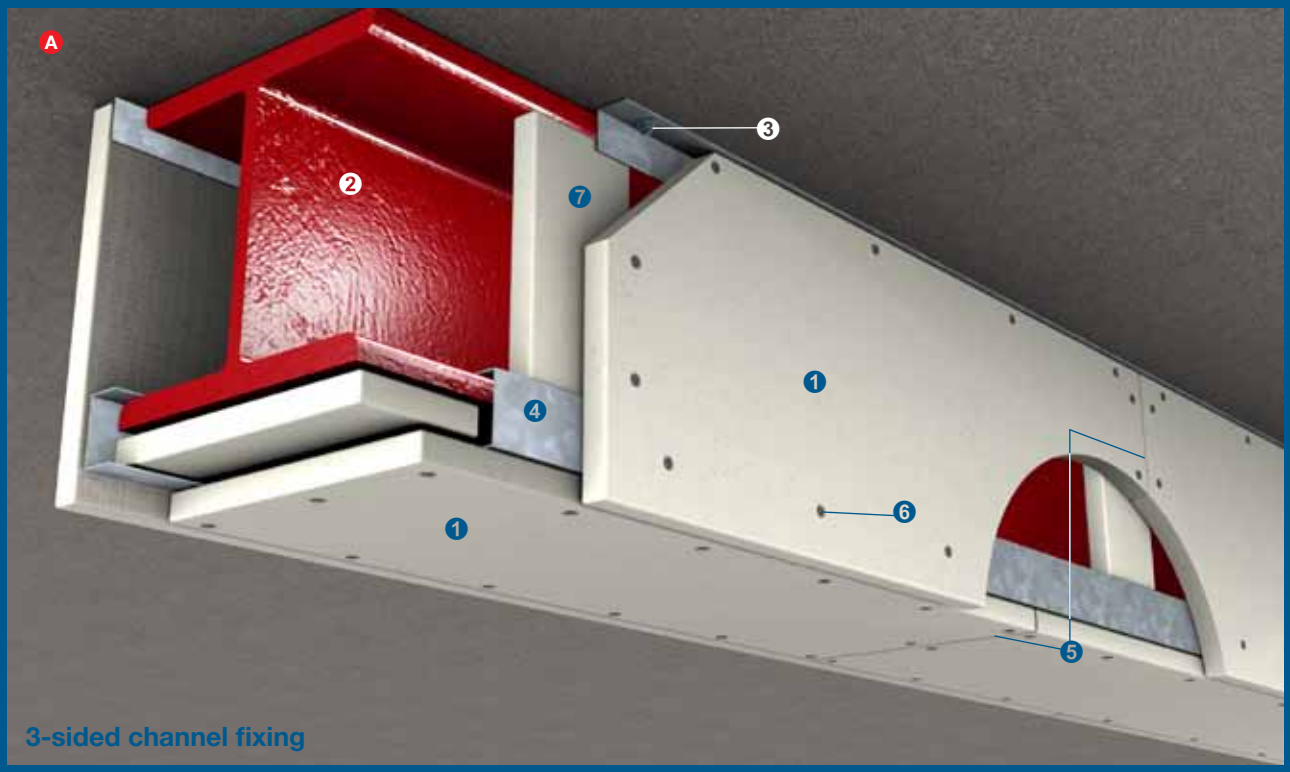
3-sided channel fixing (OPTION A)



3-sided channel fixing (OPTION B)

1. PROMATECT® 50 board, thickness in accordance with Table C1 to C4 on page 7 & 8.
2. Structural steel column
3. Continuous galvanised steel channel 19mm x 38mm x 19mm x 1.6mm thick or similar, leg of each channel is located against inner surface of flange.
4. Horizontal joints are simply butt jointed without cover strips. No filler or sealant is required at joints. Joints in adjacent sides to be staggered minimum 300mm.

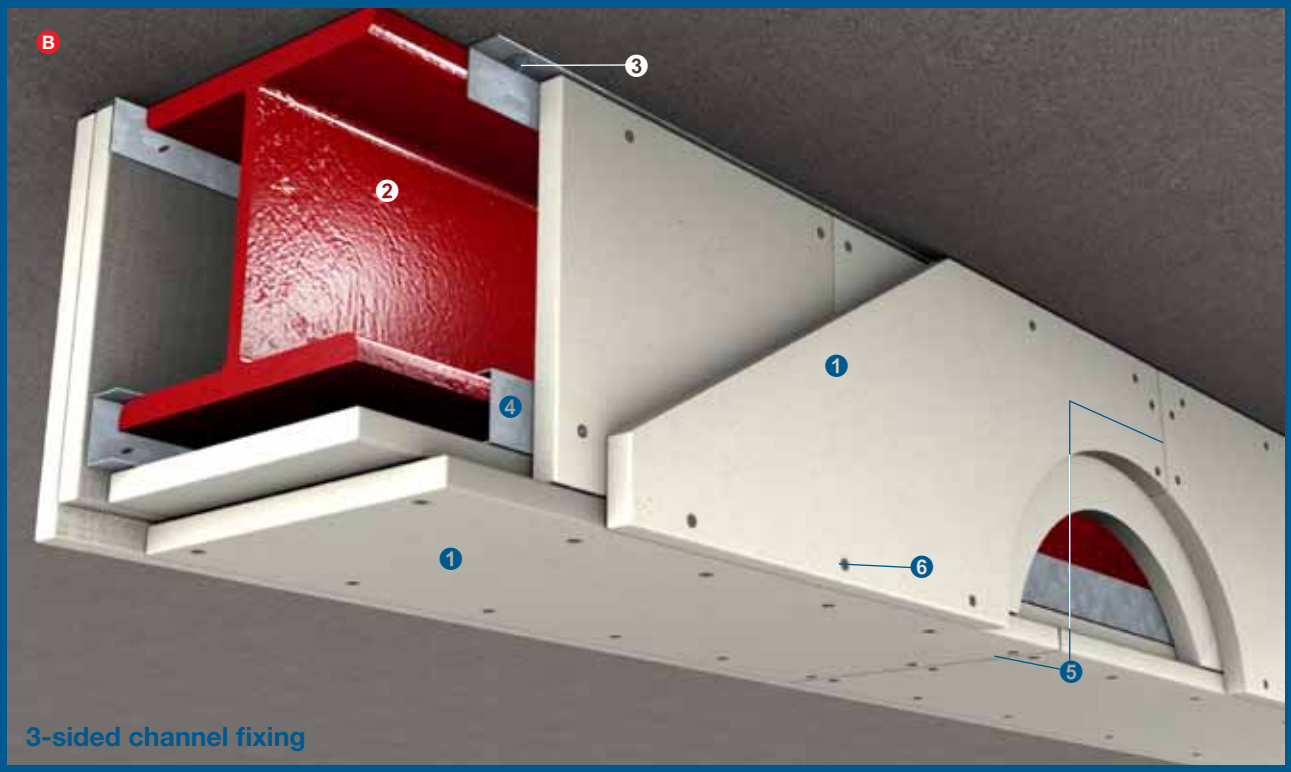
   For wide columns, it may be desirable to include a cover strip behind the horizontal joints within the web of the steel section to provide additional impact resistance.
5. a Self-drilling or self-tapping drywall screws at nominal 200mm centres
5. b Self-drilling or self-tapping screws at 200mm centres or steel wire staples at 100mm centres fixing main PROMATECT® 50 boards to 7
6. 2 rows of self-drilling, self-tapping Teks screws at nominal 300mm staggered centres
7. PROMATECT® 50 spacer strips, fixed to substrate using non combustible fixings at 500mm centres with minimum 50mm overlap to either side of steel section. Minimum strip 50mm x 25mm.
8. a Continuous galvanised steel angles fixed to the wall using non combustible anchors at nominal 500mm centres
9. Proprietary anchor fixing
10. Concrete wall



3-sided channel fixing

1. 1 layer of PROMATECT® 50 board, thickness in accordance with Table B1 to B4 on page 13 & 14.
2. Structural steel beam
3. Continuous galvanised steel angle, minimum 32mm x 19mm x 0.9mm thick or similar, fixed to flange or floor slab at nominal 500mm centres using proprietary anchor fixing.
4. Continuous galvanised steel channel, 19mm x 38mm x 19mm x 1.6mm thick or similar, resting on lower flange, mechanical fixing to flange not required.
5. Staggered joints in adjacent boards by at least 300mm
6. Screw PROMATECT® 50 to angles and channels with self-tapping screws at 200mm centres and to cover strips at 100mm centres. Screw length should be board thickness + 20mm.
7. PROMATECT® 50 cover strips, 100mm wide x casing thickness, located behind joints. Screw casing to cover strips at 100mm centres.

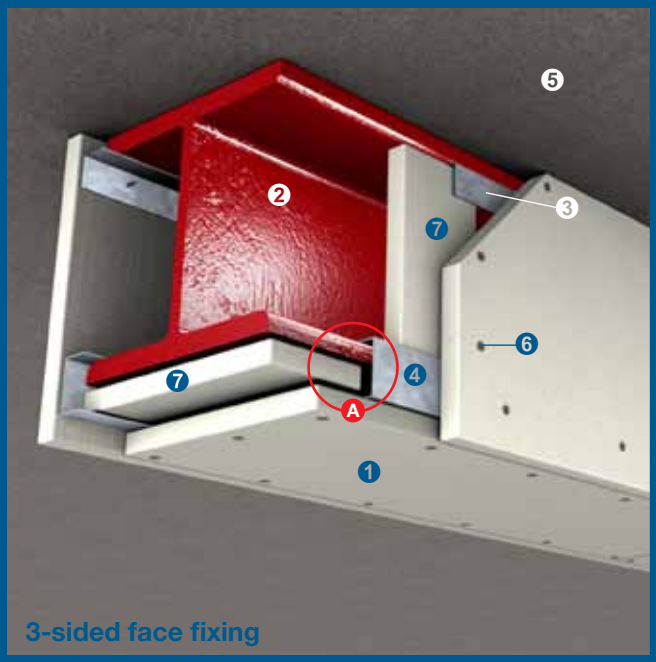
A. Applicable where required PROMATECT® 50 boards ≤ 15mm.



3-sided channel fixing

1. 2 layer of PROMATECT® 50 board, thickness in accordance with Table B1 to B4 on page 13 & 14.
2. Structural steel beam
3. Continuous galvanised steel angle, minimum 32mm x 19mm x 0.9mm thick or similar, fixed to flange or floor slab at nominal 500mm centres using proprietary anchor fixing.
4. Continuous galvanised steel channel, 19mm x 38mm x 19mm x 1.6mm thick or similar, resting on lower flange, mechanical fixing to flange not required.
5. Staggered joints in adjacent boards by at least 300mm
6. Screw PROMATECT® 50 to angles and channels with self-tapping screws at 200mm centres and to cover strips at 100mm centres. Screw length should be board thickness + 20mm. No cover fillers at joints required.

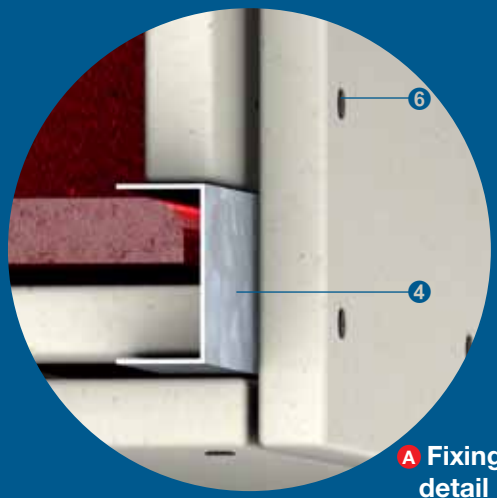
B Applicable where required PROMATECT® 50 boards > 15mm.



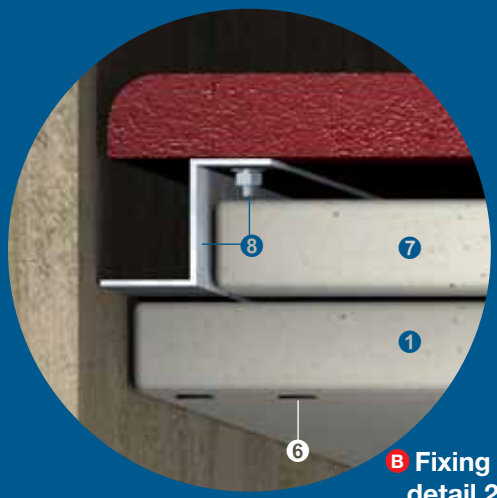
3-sided face fixing

2-sided channel fixing

1. PROMATECT® 50 board, thickness in accordance with Table B1 to B4 on page 13 & 14.
2. Structural steel beam
3. Continuous galvanised steel angle, minimum 32mm x 19mm x 0.9mm thick or similar, fixed to flange or floor slab at 500mm centres.
4. Continuous galvanised steel channel, 19mm x 38mm x 19mm x 1.6mm thick or similar, resting on lower flange, mechanical fixing to flange not required.
5. Substrate soffit
6. Screw PROMATECT® 50 to angles and channels with self-tapping screws at 200mm centres and to cover strips at 100mm centres. Screw length should be board thickness + 20mm.
7. PROMATECT® 50 cover strips, 100mm wide x casing thickness, located behind board joints. Screw casing to cover strips at 100mm centres or staple fix at 50mm centres.
8. Continuous galvanised steel top hat or Z-section, fixed to bottom flange of section using proprietary anchor fixing (see below Fixing detail 2) and to PROMATECT® 50 soffit board at nominal 200mm centres to allow differential movement. Seal between edge of PROMATECT® 50 board and substrate using PROMASEAL® AN Acrylic Sealant.



A Fixing detail 1



B Fixing detail 2

Hp/A Ratio Table B1: PROMATECT® 50 for up to 120 minutes fire resistance in accordance with the requirements of AS 1530: Part 4: 2005

Section Factor (V/A)	Fire Resistance Duration at 550°C (minutes)			
	30	60	90	120
90	10	10	15	18
95	10	10	15	18
100	10	10	15	18
105	10	10	15	18
110	10	10	15	18
115	10	10	15	18
120	10	10	15	18
125	10	10	15	18
130	10	10	15	18
135	10	10	15	18
140	10	10	15	18
145	10	10	15	18
150	10	10	15	20
155	10	10	15	20
160	10	10	15	20
165	10	10	15	20
170	10	10	15	20
175	10	10	15	20
180	10	10	15	20
185	10	10	15	20
190	10	10	15	20
195	10	10	15	20
200	10	12	15	20
205	10	12	15	20
210	10	12	18	20
215	10	12	18	22
220	10	12	18	22
225	10	12	18	22
230	10	12	18	22
235	10	12	18	22
240	10	12	18	22
245	10	12	18	22
250	10	12	18	22
255	10	12	18	22
260	10	12	18	22
265	10	12	18	22
270	10	12	18	22

Hp/A Ratio Table B2: PROMATECT® 50 for up to 120 minutes fire resistance in accordance with the requirements of BS 476: Part 21

Section Factor (V/A)	Fire Resistance Duration at 550°C (minutes)			
	30	60	90	120
10	10	10	10	10
15	10	10	10	10
20	10	10	10	10
25	10	10	10	10
30	10	10	10	10
35	10	10	10	10
40	10	10	10	12
45	10	10	10	12
50	10	10	10	12
55	10	10	10	15
60	10	10	10	15
65	10	10	12	15
70	10	10	12	15
75	10	10	12	15
80	10	10	12	15
85	10	10	12	15
90	10	10	12	18
95	10	10	12	18
100	10	10	15	18
105	10	10	15	18
110	10	10	15	18
115	10	10	15	18
120	10	10	15	18
125	10	10	15	18
130	10	10	15	18
135	10	10	15	18
140	10	10	15	20
145	10	10	15	20
150	10	10	15	20

Section Factor (V/A)	Fire Resistance Duration at 550°C (minutes)			
	30	60	90	120
155	10	10	15	20
160	10	10	15	20
165	10	10	15	20
170	10	12	15	20
175	10	12	15	20
180	10	12	15	20
185	10	12	15	20
190	10	12	18	20
195	10	12	18	20
200	10	12	18	20
205	10	12	18	22
210	10	12	18	22
215	10	12	18	22
220	10	12	18	22
225	10	12	18	22
230	10	12	18	22
235	10	12	18	22
240	10	12	18	22
245	10	12	18	22
250	10	12	18	22
255	10	12	18	22
260	10	12	18	22
265	10	12	18	22
270	10	12	18	22
275	10	12	18	22
280	10	12	18	22
285	10	12	18	22
290	10	12	18	22

Hp/A Ratio Table B3: PROMATECT® 50 for up to 120 minutes fire resistance in accordance with the requirements of AS 1530: Part 4: 2005

Section Factor (V/A)	Fire Resistance Duration at 620°C (minutes)			
	30	60	90	120
90	10	10	12	15
95	10	10	12	15
100	10	10	12	15
105	10	10	12	15
110	10	10	12	15
115	10	10	12	15
120	10	10	12	15
125	10	10	12	18
130	10	10	12	18
135	10	10	12	18
140	10	10	12	18
145	10	10	12	18
150	10	10	15	18
155	10	10	15	18
160	10	10	15	18
165	10	10	15	18
170	10	10	15	18
175	10	10	15	18
180	10	10	15	18
185	10	10	15	18
190	10	10	15	18
195	10	10	15	18
200	10	10	15	18
205	10	10	15	18
210	10	10	15	18
215	10	10	15	20
220	10	10	15	20
225	10	10	15	20
230	10	10	15	20
235	10	10	15	20
240	10	10	15	20
245	10	10	15	20
250	10	10	15	20
255	10	10	15	20
260	10	10	15	20
265	10	10	15	20
270	10	10	15	20

Hp/A Ratio Table B4: PROMATECT® 50 for up to 120 minutes fire resistance in accordance with the requirements of BS 476: Part 21

Section Factor (V/A)	Fire Resistance Duration at 620°C (minutes)			
	30	60	90	120
10	10	10	10	10
15	10	10	10	10
20	10	10	10	10
25	10	10	10	10
30	10	10	10	10
35	10	10	10	10
40	10	10	10	10
45	10	10	10	10
50	10	10	10	10
55	10	10	10	12
60	10	10	10	12
65	10	10	10	12
70	10	10	10	12
75	10	10	10	15
80	10	10	10	15
85	10	10	10	15
90	10	10	12	15
95	10	10	12	15
100	10	10	12	15
105	10	10	12	15
110	10	10	12	15
115	10	10	12	18
120	10	10	12	18
125	10	10	12	18
130	10	10	12	18
135	10	10	15	18
140	10	10	15	18
145	10	10	15	18
150	10	10	15	18

Section Factor (V/A)	Fire Resistance Duration at 620°C (minutes)			
	30	60	90	120
155	10	10	15	18
160	10	10	15	18
165	10	10	15	18
170	10	10	15	18
175	10	10	15	18
180	10	10	15	18
185	10	10	15	18
190	10	10	15	18
195	10	10	15	20
200	10	10	15	20
205	10	10	15	20
210	10	10	15	20
215	10	10	15	20
220	10	10	15	20
225	10	10	15	20
230	10	10	15	20
235	10	10	15	20
240	10	10	15	20
245	10	10	15	20
250	10	10	15	20
255	10	10	15	20
260	10	10	15	20
265	10	10	15	20
270	10	12	15	20
275	10	12	15	20
280	10	12	15	20
285	10	12	18	20
290	10	12	18	20

Architectural Specification

Only general information can be provided in this document. It is recommended that the local Promat Technical Department be contacted to confirm details that are pertinent to any particular situation.

The installation methods described herein are suitable for steel sections up to 686mm deep and 325mm wide. For larger section; or when protecting multiple sections within a single encasement, please consult the local Promat Technical Department.

Where a column box encasement abuts a beam protected with a profiled fire protection system, e.g. intumescent paint, the column webs should be sealed at their tops using PROMATECT® 50.

The following are standard Architectural Specifications for structural steelwork protection using PROMATECT® 50. Please note that fixing PROMATECT® 50 can be carried out by using either pressed steel sections or soldiers and screw fixings. The end user must determine the suitability of any particular design to meet the performance requirements of any application before undertaking any work. If in doubt, the advice of a suitably qualified engineer should first be obtained.

(Channel)	(Board to board fixing)
Area of Application	
Exposed faces of steelwork internal to building, for up to 120 minutes fire protection in accordance with the requirements of BS476: Part 21: 1987 or AS 1530: Part4: 2005.[1]	
Location	
_____[2]	
Type of Fixing	**Type of Fixing**
Using pressed steel sections and screw fixing.	Soldiers and screw fixing.
Type of Construction	
_____[3] minutes PROMATECT® 50 in a 1, 2, 3 or 4 sided encasement fire protection to structural beams and columns.	
Lining Boards	
PROMATECT® 50 fire protection board _____mm[4] thick as manufactured by Promat International (Asia Pacific) Ltd., in board size _____mm x _____mm[5], cut to size on site/pre-cut in accordance with schedule of sizes[6] and fixed in accordance with manufacturer's recommended details and fixing instructions.	
Fixing **COLUMNS** Boards to be fixed to 38mm x 19mm x 1.6mm pressed steel channels or similar, by means of _____mm[7a] self-tapping screws at nominal 200mm centres. **BEAMS** Boards to be fixed by means of _____mm[7a] self-tapping screws 200mm centres to nominal 38mm x 19mm x 1.6mm continuous pressed steel channels or similar at bottom steel flange and to 19mm x 32mm x 0.9mm continuous pressed steel angles secured to soffit of floor/roof slab or top steel flange. The angles should be fixed to the substrate at nominal 500mm centres.	**Fixing** **COLUMNS** Boards to be fixed by board-to-board edge screwing, using _____mm[7b] deep threaded screws at nominal 200mm centres. Allow minimum 25mm penetration. **BEAMS** Side boards to be fixed to 100mm x __mm thick PROMATECT® 50 soldiers wedged between flanges at nominal 1220mm centres, using _____mm[7b] deep threaded screws at nominal 100mm centres. Side boards to be fixed to soffit boards using screws at 200mm centres.
Jointing	**Jointing**
For beam casings only, board joints to be backed with 100mm wide internal cover strips of PROMATECT® 50 secured with _____mm[8a] self-tapping screws at nominal 100mm centres. Cover strips to be same thickness as casing.	For beam casings only, board joints in the soffit to be backed with 100mm wide internal cover strips of _____mm[8b] thick PROMATECT® 50 secured with deep threaded screws to both sides of board joint.
Follow-on Trades	
Surface of boards to be prepared for painting/plastering/tiling[9] in accordance with manufacturer's recommendations.	

NOTES:

- [1], [6], [9] delete as appropriate.
- [2] insert location, e.g. "beams and columns to offices interior", or give steelwork drawing reference.
- [3] insert required fire resistance level (not exceeding 120 minutes for BS or AS.
- [4] insert required thickness by reference to Section Factor (Hp/A) on page 2 and fire resistance period.
- [5] select board size on basis of economy in cutting. Standard board size is 2440mm x 1220mm.
- [7a] insert screw length which is at least 20mm longer than the casing thickness.
- [7b] insert screw length which gives minimum 25mm penetration having regard to casing thickness.
- [8a] insert screw length which is at least 5mm longer than twice the casing thickness.
- [8b] cover strips to be not less than casing thickness.

This specification relates to 3 or 4-sided casings. For 1 or 2-sided casings, please consult the local Promat Technical Department.

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ASIA PACIFIC HEADQUARTERS

Promat International (Asia Pacific) Ltd.
Unit 19-02-01, Level 2 PNB Damansara
No.19 Lorong Dungun, Damansara Heights
50490 Kuala Lumpur
MALAYSIA
Tel: +60 (3) 2095 5111
Fax: +60 (3) 2095 6111
Email: info@promat-ap.com

AUSTRALIA

Promat Australia Pty. Ltd.
1 Scotland Road
Mile End South, SA 5031
Tel: 1800 PROMAT (776 628)
Fax: +61 (8) 8352 1014
Email: mail@promat.com.au

New South Wales Office
Promat Australia Pty. Ltd.
Unit 1, 175 Briens Road
Northmead, NSW 2152
Tel: 1800 PROMAT (776 628)
Fax: +61 (2) 9630 0258
Email: mail@promat.com.au

Victoria Office
Promat Australia Pty. Ltd.
Suite 205, 198 Harbour Esplanade
Docklands, VIC 3008
Tel: 1800 PROMAT (776 628)
Fax: 1800 334 598
Email: mail@promat.com.au

Queensland Office
Promat Australia Pty. Ltd.
1/68 Lisgar Street
Virginia, QLD 4014
Tel: 1800 011 376
Fax: 1800 334 598
Email: mail@promat.com.au

CHINA

Promat China Ltd.
Room 506, Block A, Qi Lin Plaza
13-35 Pan Fu Road
510180 Guangzhou
Tel: +86 (20) 8136 1167
Fax: +86 (20) 8136 1372
Email: info@promat.com.cn

Beijing Office
Promat North China
(Division of Promat China Ltd.)
Room 1507 Building 5, SOHO Xiandaicheng
No.88 Jianguo Road, Chaoyang District
100022 Beijing
Tel: +86 (10) 8589 1254
Fax: +86 (10) 8589 2904
Email: info@promat.com.cn

For Promat International groups worldwide:
www.promat-international.com

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HONG KONG

Promat International (Asia Pacific) Ltd.
Room 1010, C.C. Wu Building
302-308 Hennessy Road
Wanchai
Tel: +852 2836 3692
Fax: +852 2834 4313
Email: apromath@promat.com.hk

INDIA

Promat International (Asia Pacific) Ltd.
(India Representative Office)
610-611, Ansal Imperial Tower
C-Block, Community Centre
Naraina Vihar, Naraina
110028 New Delhi
Tel: +91 (11) 2577 8413
Fax: +91 (11) 2577 8414
Email: info-india@promat-asia.com

Bangalore Office
Promat International (Asia Pacific) Ltd.
(India Representative Office)
Cabin No.BC-9 & BC-10
Oculus Workspaces, No.66/1, 2nd Floor
Coles Road, Frazer Town
560005 Bangalore
Tel: +91 (80) 4031 4151
Fax: +91 (80) 4125 2135
Email: info-india@promat-asia.com

Mumbai Office
Promat International (Asia Pacific) Ltd.
(India Representative Office)
Stylus Serviced Offices
Ground Floor, Velocity
Phase 1, Logitech Park
Andheri Kurla Road, Andheri East
400072 Mumbai
Tel: +91 (22) 4376 4567
Fax: +91 (22) 4376 4568
Email: info-india@promat-asia.com

MALAYSIA

Promat (Malaysia) Sdn. Bhd.
Unit 19-02-01, Level 2 PNB Damansara
No.19 Lorong Dungun, Damansara Heights
50490 Kuala Lumpur
Tel: +60 (3) 2095 8555
Fax: +60 (3) 2095 2111
Email: info@promat.com.my

SINGAPORE

Promat Building System Pte. Ltd.
10 Science Park Road, #03-14 The Alpha,
Singapore Science Park II
Singapore 117684
Tel: +65 6776 7635
Fax: +65 6776 7624
Email: info@promat.com.sg

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