



Promat

PROMATECT[®]-XS

For fire protection of steel structures



Structural Protection

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of living

PROMATECT®-XS

For structural fire protection of steel structures

Promat is the leading manufacturer of fire resistant materials that offers solutions for passive fire protection of steel structures. The complete solution range of fire protection of steel structures can be delivered by a single supplier. With our support during the design and application you can choose the optimal solution for your project. Safe, economical and ensuring peace of mind.

Our products have proven durability and reduce maintenance costs throughout the design life of a building. Promat is a company with strong traditions and long history. We can offer worldwide long-term fire safety in your buildings, giving you peace of mind.

Thanks to the synergy between different technologies used in the Etex Group, Promat has developed a new fire protective product called PROMATECT®-XS. It is the outcome of an intense R&D work involving our best internal experts in material science, passive fire protection and manufacturing processes, reinforced by our 50 years of proven track records in delivering durable fire compartmentation solutions to ensure fire safety in buildings.

Description of PROMATECT®-XS

PROMATECT®-XS is an innovative high performing fire protective board, specifically designed for the fire protection of structural steel elements such as columns, beams in either opened or hollow sections, when high fire protection performance is required.

PROMATECT®-XS can be applied directly on the steel structures, without the need of any secondary substructures like steel angles, clips or other ancillary products.

PROMATECT®-XS is a non-combustible product, based on a unique proven technology, which contributes to the fire rating of steel structures, tested according to the most severe international standards. The degree of fire protection depends on section factor (Hp/A or Esa/M) and the required critical design temperature of the metal element. This in turn dictates the thickness of PROMATECT®-XS.

PROMATECT®-XS is strong, highly moisture resistant, non-combustible and has improved workability compared to traditional steel encasement products.

PROMATECT®-XS has a durability of at least 25 years, and is extremely easy to maintain and repair (reparation doesn't affect the fire resistance).

Mechanical stability, long durability, easy to cut/apply, good quality of finish and excellent fire behaviour are the main characteristics of PROMATECT®-XS.

PROMATECT®-XS is characterised by very good mechanical properties such as impact resistance, stiffness as well as bending strength and compressive strength.

Applications

Fire protective board for steel structures (beams and column) with either open or hollow sections, from FRL 30/-/- to 240/-/-.

Advantages of PROMATECT®-XS

- Promat's new fire protective board, based on the 50 years of Promat experience in steel protection.
- By offering the best technical support, Promat ensures your peace of mind.
- Extremely good fire performance/system price ratio.
- Outstanding performances for steel protection up to 240/-/- one of the thinnest board's solution on the market for fire protection.
- Less material to order, less material to stock, less material to install, less material to handle, cut and fix, less waste.
- Mass factor up to 355m^{-1} and critical temperatures from 350°C up to 750°C .
- Non-combustible according to NCC C1.9/C2D10.
- High durability (>25 years) for internal and external semi exposed applications.
- Approved in accordance with AS1530.4:2014 and AS4100.
- Tests carried out by official laboratories with random product selection, manufacturing plant under third party factory production control.
- The steel columns and beams encasement does not require any additional substructure, which significantly increases the efficiency of the solution and reduces the assembly costs.
- Quick and simple installation using staples and wedge soldiers, no steel angles nor metallic clips required.
- Lightweight - the low weight of the system (panels) improves the speed and safety of the installation.
- Maintenance and repairs system tested and approved in fire condition.

Dimensions and tolerances		
Thickness	Standard dimensions	Board weights (approximate)
15mm	1200 x 2000mm	33kg
20mm	1200 x 2000mm	44kg
25mm	1200 x 2000mm	54kg
Board tolerances*	thickness	+/- 0.7mm
	length and width	+0 / -5mm
	length and width	2.5mm/m

* Not all thicknesses available as stock item.
Contact Promat for locally available thicknesses.

Physical properties	
Property	Value
Minimum apparent density (EN 12467 - § 7.3.1)	910 (+/- 5%) Kg/m ³
Bending strength (EN 12467-§7.3.2)	
Longitudinal	> 12 MPa (12.7mm) > 6 MPa (25mm)
Transversal	> 8 MPa (12.7mm) > 5 MPa (25mm)
Tensile resistance (EN 789 - §9)	
Longitudinal	> 3 MPa (12.7mm) > 1.5 MPa (25mm)
Transversal	> 2 MPa (12.7mm) > 1 MPa (25mm)
Compressive strength (EN 789 - §8)	
Longitudinal	> 8 MPa (12.7mm) > 7 MPa (25mm)
Transversal	> 7 MPa (12.7mm) > 6 MPa (25mm)
Modulus of elasticity (EN 12467-§7.3.2)	
Longitudinal	> 2000MPa
Transversal	> 2000MPa
Fire reaction classification (EN 13501-1)	A1
Durability, freeze-thaw (EN12467)	Passed (25 cycles), RL = 0.95
Dimensional stability (EN 318), length:	
65%RH 20°C to 85%RH 20°C	0.2mm/m
65%RH 20°C to 30%RH 20°C	-0.4mm/m
Dimensional stability (EN 318), thickness:	
65%RH 20°C to 85%RH 20°C	0.1mm/m
65%RH 20°C to 30%RH 20°C	-0.3mm/m
Thermal conductivity coefficient, λ	0.21W/mK

Description

PROMATECT®-XS is an innovative high performing fire protective board, specifically designed for the fire protection of steel elements such as columns, beams and hollow sections, when high fire protection performance is required.

PROMATECT®-XS is a non-combustible product, based on a unique proven technology, which contributes to the fire rating of steel structures, tested according to the most severe international standards. The degree of fire protection depends on mass factor (Hp/A or Esa/M) and the critical design temperature. This in turn dictates the thickness of PROMATECT®-XS.

PROMATECT®-XS is strong, highly moisture resistant, non-combustible and has improved workability compared to traditional steel encasement products.

Application

Fire protection of structural steel beams and columns up to FRL 240/-/-, for critical temperature from 350°C to 750°C, for section factors up to 355m-1.

Appearance

PROMATECT®-XS has a smooth surface finish on the front and back sides. The core of the board is light blue coloured whereas the front and back surfaces are off-white coloured.

The boards is printed on its back side. The board has square edges on its longitudinal and transversal sides.

Composition

PROMATECT®-XS is made of aerated calcium sulfate di-hydrate, reinforcing glass fibres, functional additives and water. The core is reinforced by glass-mat facers on the front and back sides of the boards. The board contains a water resistant additive and a biocide to inhibit mould growth.

Compliance authority

The board is approved in accordance with the requirements of AS1530.4:2014 and AS4100.

General processing instructions, handling, cutting and fixing

Storage: Store on flat surface, in a dry area.

Handling:

- The boards are delivered on pallets.
- The boards shall be horizontally stacked on a flat surface in a dry and ventilated space.
- The boards shall always be manipulated from the stack by two persons and then be transported vertically.

Installation: The board can be installed as fire encasement by direct stapling with soldiers, without the need of metallic clips and substructures.

Health & safety

Refer to PROMATECT®-XS material and safety data sheet.

General principles for structural steel protection

General

Building Regulations require certain elements of structures to have fire resistance for a specified minimum period of time.

Steel is an increasingly essential building material. It is classified non-combustible without special certification, but structural steel loses a significant portion of its loadbearing capacity when it reaches a temperature of approximately 500-600°C.

Steel structures are designed according to AS4100. One of the most important pieces of data is the critical temperature of each element of the steel structure. Critical temperature can vary between 350 and 750°C, depending how much of the members total load capacity is being utilized in a particular application.

During many actual fire scenarios, temperatures higher than 350°C or even 500°C can be attained within minutes, so a protective material is needed.

The amount of fire protection required to achieve this depends on a number of factors.

Fire resistance of load-bearing steel constructions

The required fire resistance of the structure is indicated by the first number in the FRL. Eg. 120/-/- and is known as structural adequacy. This is often achieved by protecting with fire protective systems. The fire protective system shall be tested according to AS1530.4 or equivalent test standard by an accredited laboratory. The results of standardized tests are then used to create an assessment according to AS4100. Dimensioning tables are part of the assessment, which list the necessary thickness of the fire protective material. Contractors must apply the appropriate thickness of the correct fire protective material according to the dimensioning tables. To determine the proper thickness of the material the following input data is required:

Determine the material and configuration of the fire protection measures (boxed or profiled configuration)

Boxed configuration is typical for fire protective cladding. It provides reliable fire protection of load-bearing structures such as PROMATECT®-XS and simple installation. The thickness of the applied material is easy to check and the surface can be aesthetically finished.

Fire resistance level (e.g. FRL 90/-/-)

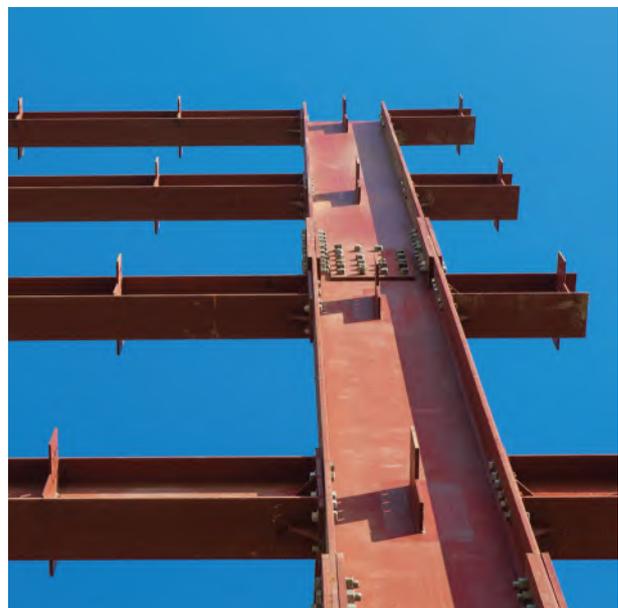
The fire protection level of structure must be specified in the project. **WARNING:** Applicator who installs the fire protective material must have the basic information of the required characteristics for each case: fire resistance level and design temperature.

Information about requested thermal stresses on the time / temperature curve (e.g. ISO 834)

In fire resistance tests, structures can be exposed to different time/temperature relations, known as fire curves. The most common one is the standard fire curve (also called ISO 834 or cellulosic fire curve) which is valid for most buildings. All information in this design guideline is valid for the standard fire curve. However other fire curves exist, such as the hydrocarbon (HC) fire curve for petrochemical applications and the Rijkswaterstaat (RWS) and modified hydrocarbon (HCM) curves for tunnels. For such requirements, contact the local Promat office.

Design temperature (e.g. 500°C)

The strength of steel reduces with increasing temperature. When heated under fire, the strength is reduced to a level where the loads can no longer be carried, and the structure will then fail. The higher the load on the steel element, the lower the failure temperature will be. This failure temperature is called the critical steel temperature. The critical steel temperature for each element is derived from the calculations set out in AS4100. This critical steel temperature serves as the design temperature for the determination of the fire protection thickness. A lower design temperature is more demanding and requires a higher thickness of protective material. The assessment provides thickness for design temperatures ranging from 350°C to 750°C. Where no critical temperature is provided default values of 550°C for columns and 620°C for beams could be considered as relatively conservative, however best practice would be to ensure the critical temperature is known.



Details of all members of steel structures - section type, size, cross-sectional area, open / closed, exposure to fire.

The input data is the source for calculating section factor H_p/A or ESA/M for each member and determines the thickness of the fire protection.

The geometric shape of the steel section has a great influence on its behaviour under fire conditions. Sections are divided into two groups:

- Open sections - no cavities, such as sections I, H, L, T, U, C
- Hollow sections - RHS - Rectangular Hollow Sections, SHS - Square Hollow Sections and CHS - Circular Hollow Sections.

Exposure to fire

Elements of steel structures are often exposed to fire from three or four sides. For example, if a steel beam is protected from the top by a concrete slab, it is exposed to the fire from three sides.

Some features are only partially exposed to fire, from 1 or 2 sides (assuming that the fire resistance of the element meets at least the required rating). The greater the surface exposed to fire, the faster the member heats. This physical dependence is taken into account when calculating the section factor H_p/A or ESA/M .

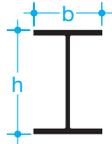
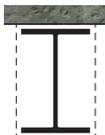
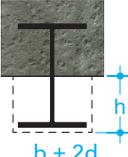
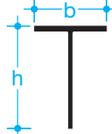
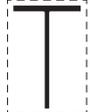
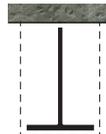
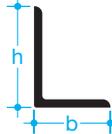
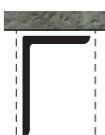
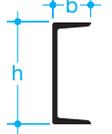
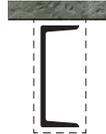
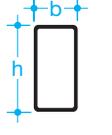
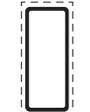
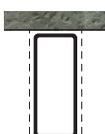
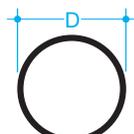
Calculation of section factor H_p/A

The degree of fire protection depends on the H_p/A section factor for the steel section. The H_p/A factor is a function of the length of the exposed perimeter of the steel exposed to the fire and the cross sectional area of the steel section. The higher the H_p/A , the faster the steel section heats up, and so the greater the thickness of fire protection material required. The section factor and critical temperature are the most important factors used to determine the thickness of protection required.



Various box protection

Various boxed protection configurations with values of perimeter U for use in the calculation of section factor H_p/A .

Steel section	Box protection				
	Four sides	Three sides	Three sides (partially exposed)	Two sides	One side (partially exposed)
I & H sections 	 $2b + 2h$	 $b + 2h$	 $b + 2d$	 $b + h$	 b
T sections 	 $2b + 2h$	 $b + 2h$	 $b + 2h$		
L sections 	 $2b + 2h$	 $b + 2h$	 $b + 2h$		
U sections 	 $2b + 2h$	 $2b + h$	 $b + 2h$		
Square or rectangular hollow sections 	 $2b + 2h$	 $2b + h$			
Circular hollow sections 	 nD	NOTE: The air space created in boxing a circular section improves the insulation. Therefore, A_p higher than profile protection would be anomalous. Hence, the calculated A_p per section length is taken as the circumference of the circular section (nD) and not $4D$.			

Performance of PROMATECT®-XS for structural steel protection

Protective thickness

- The thickness tables shown in the following pages are derived from the documents cited below.
 - FAS210283 - A - Warringtonfire "Fire Performance of Steel Columns protected with PROMATECT®-XS boards without noggins".
 - FAS21083-B - Warringtonfire "Fire Performance of Steel Columns and Beams protected with PROMATECT®-XS boards with noggins".
- On the following pages are thickness requirement vs section factor for 3 sided protection of beams at a critical temperature of 620°C. For 4 sided columns at a critical temperature of 550°C with or without noggins. Along with thickness for common steel sizes.

Choice of thicknesses and number of layers

- Increasing the thickness of the cladding is allowed from the fire safety point of view.
- The thinner board should always be mounted on the thicker board.





Design tables

Table 1: Column Cladding at 550°C AS4100 (FAS210283-A) No Noggins

Fire Resistance	Limiting Section Factor per thickness						
	15mm	20mm	25mm	30mm (15 + 15)	35mm (15 + 20)	40mm (2 x 20mm)	45mm (20 + 25)
30 mins	355	-	-	-	-	-	-
60 mins	220	355	-	-	-	-	-
90 mins	90	160	290	355	-	-	-
120 mins	60	90	140	210	355	-	-
180 mins	-	-	-	70	90	140	240

Table 2: Column Cladding at 550°C AS4100 (FAS210283-B) Noggins

Fire Resistance	Limiting Section Factor per thickness						
	15mm	20mm	25mm	30mm (15 + 15)	35mm (15 + 20)	40mm (2 x 20mm)	45mm (20 + 25)
30 mins	355	-	-	-	-	-	-
60 mins	260	355	-	-	-	-	-
90 mins	100	170	280	355	-	-	-
120 mins	60	100	140	240	355	-	-
180 mins	-	-	-	70	110	190	355
240 mins	-	-	-	-	50	80	100

Table 3: Beam Cladding at 620°C AS4100 (FAS210283-B) Noggins

Fire Resistance	Limiting Section Factor per thickness						
	15mm	20mm	25mm	30mm (15 + 15)	35mm (15 + 20)	40mm (2 x 20mm)	45mm (20 + 25)
30 mins	355	-	-	-	-	-	-
60 mins	355	-	-	-	-	-	-
90 mins	130	230	355	-	-	-	-
120 mins	80	120	180	355	-	-	-
180 mins	-	-	-	90	140	320	355
240 mins	-	-	-	60	90	140	290

Table 4: PROMATECT®-XS Thicknesses For Onesteel Structural Steel Members Universal Columns. Noggin Installation Method - Critical Temperature 550°C

Member	ESA/M RATIO	PROMATECT®-XS THICKNESS (mm) to provide fire resistance level of					
Universal Columns	(M ² /T)	30 min	60 min	90 min	120 min	180 min	240 min
310UC158	8.1	15	15	15	20	15 + 15	15 + 20
310UC137	9.2	15	15	15	20	15 + 15	15 + 20
310UC118	10.5	15	15	15	20	15 + 20	20 + 20
310UC97	12.7	15	15	15	25	15 + 20	20 + 20
250UC89	11.5	15	15	15	25	15 + 20	20 + 20
250UC73	13.9	15	15	20	25	15 + 20	-
200UC60	13.9	15	15	20	25	15 + 20	-
200UC52	15.7	15	15	20	25	15 + 20	-
200UC46	17.6	15	15	20	25	15 + 20	-
152UC37	17.0	15	15	20	25	15 + 20	-
152UC30	20.7	15	15	20	15 + 15	15 + 20	-
152UC23	26.1	15	15	25	15 + 15	15 + 20	-
100UC15	26.5	15	15	25	15 + 15	15 + 20	-

Table 5: PROMATECT®-XS Thicknesses For Onesteel Structural Steel Members Universal Columns. No Noggin Installation Method - Critical Temperature 550°C

Member	ESA/M RATIO	PROMATECT®-XS THICKNESS (mm) to provide fire resistance level of				
Universal Columns	(M ² /T)	30 min	60 min	90 min	120 min	180 min
310UC158	8.1	15	15	15	20	15 + 20
310UC137	9.2	15	15	15	20	15 + 20
310UC118	10.5	15	15	15	20	15 + 20
310UC97	12.7	15	15	20	25	15 + 20
250UC89	11.5	15	15	20	25	15 + 20
250UC73	13.9	15	15	20	25	15 + 20
200UC60	13.9	15	15	20	25	15 + 20
200UC52	15.7	15	15	20	25	20 + 20
200UC46	17.6	15	15	20	25	20 + 20
152UC37	17.0	15	15	20	25	20 + 20
152UC30	20.7	15	15	25	15 + 15	20 + 20
152UC23	26.1	15	15	25	15 + 15	20 + 20
100UC15	26.5	15	15	25	15 + 15	20 + 20

Table 6: PROMATECT®-XS Thicknesses For Onesteel Structural Steel Members Universal Beams. Noggin Installation Method - Critical Temperature 620°C

Member	ESA/M RATIO	PROMATECT®-XS THICKNESS (mm) to provide fire resistance level of					
Universal Beams	(M ² /T)	30 min	60 min	90 min	120 min	180 min	240 min
61O UB 125	11.6	15	15	15	20	20 + 20	20 + 20
61O UB 113	12.8	15	15	15	20	20 + 20	20 + 20
61O UB 101	14.2	15	15	15	20	20 + 20	20 + 20
53O UB 92	13.8	15	15	15	20	20 + 20	20 + 20
53O UB 82	15.4	15	15	15	25	20 + 20	20 + 25
46O UB 82	13.5	15	15	15	20	20 + 20	20 + 20
46O UB 74	14.8	15	15	15	20	20 + 20	20 + 20
46O UB 67	16.4	15	15	15	25	20 + 20	20 + 25
41O UB 60	16.6	15	15	20	25	20 + 20	20 + 20
41O UB 54	18.3	15	15	20	25	20 + 20	-
36O UB 57	15.6	15	15	15	25	20 + 20	20 + 25
36O UB 51	17.4	15	15	20	25	20 + 20	20 + 20
36O UB 45	19.6	15	15	20	25	20 + 20	-
31O UB 46	16.9	15	15	20	25	20 + 20	20 + 20
31O UB 40	19.1	15	15	20	25	20 + 20	-
25O UB 37	17.7	15	15	20	25	20 + 20	20 + 20
25O UB 31	20.7	15	15	20	25	20 + 20	-
20O UB 30	18.4	15	15	20	25	20 + 20	-
20O UB 25	21.3	15	15	20	25	20 + 20	-
18O UB 22	20.2	15	15	20	25	20 + 20	-
18O UB 18	24.3	15	15	20	15 + 15	20 + 20	-
15O UB 18	21.4	15	15	20	25	20 + 20	-
15O UB 14	26.8	15	15	20	15 + 15	20 + 20	-

Table 7: PROMATECT® - XS Thicknesses For Onesteel Structural Steel Members Square Hollow Sections. No Noggin Installation Method - Critical Temperature 550°C

Member	ESA/M RATIO	PROMATECT® -XS THICKNESS (mm) to provide fire resistance level of				
Square Hollow Sections	(M ² /T)	30 min	60 min	90 min	120 min	180 min
400 x 400 x 16 SHS	8.6	15	15	15	20	15 + 20
400 x 400 x 12.5 SHS	10.8	15	15	15	20	15 + 20
400 x 400 x 10 SHS	13.4	15	15	20	25	15 + 20
350 x 350 x 16 SHS	8.7	15	15	15	20	15 + 20
350 x 350 x 12 SHS	10.9	15	15	15	20	15 + 20
350 x 350 x 10.0 SHS	13.5	15	15	20	25	15 + 20
350 x 350 x 8.0SHS	16.6	15	15	20	25	20 + 20
300 x 300 x 16 SHS	8.8	15	15	15	20	15 + 20
300 x 300 x 12.5 SHS	11.0	15	15	15	20	15 + 20
300 x 300 x 9.5 SHS	13.6	15	15	20	25	15 + 20
300 x 300 x 8.0 SHS	16.8	15	15	20	25	20 + 20
250x 250 x 16 SHS	9.0	15	15	15	20	15 + 20
250 x 250 x 12.5 SHS	11.2	15	15	15	20	15 + 20
250 x 250 x 10.0 SHS	13.8	15	15	20	25	15 + 20
250 x 250 x 9.0 SHS	15.2	15	15	20	25	20 + 20
250 x 250 x 8.0 SHS	16.9	15	15	20	25	20 + 20
250 x 250 x 6.0 SHS	22.2	15	15	25	15 + 15	20 + 20
200 x 200 x 16 SHS	9.4	15	15	15	20	15 + 20
200 x 200 x 12.5 SHS	11.5	15	15	20	25	15 + 20
200 x 200 x 10.0 SHS	14.0	15	15	20	25	15 + 20
200 x 200 x 9.0 SHS	15.4	15	15	20	25	20 + 20
200 x 200 x 8.0 SHS	17.2	15	15	20	25	20 + 20
200 x 200 x 6.0 SHS	22.5	15	15	25	15 + 15	20 + 20
200 x 200 x 5.0 SHS	26.7	15	15	25	15 + 15	20 + 20
150 x 150 x 10.0 SHS	14.5	15	15	20	25	20 + 20
150 x 150 x 9.0 SHS	15.9	15	15	20	25	20 + 20
150 x 150 x 8.0 SHS	17.7	15	15	20	25	20 + 20
150 x 150 x 6.0 SHS	22.9	15	15	25	15 + 15	20 + 20
150 x 150 x 5.0 SHS	27.2	15	15	25	15 + 20	20 + 20

Table 7: PROMATECT® - XS Thicknesses For Onesteel Structural Steel Members Square Hollow Sections. No Noggin Installation Method - Critical Temperature 550°C

Member	ESA/M RATIO	PROMATECT® -XS THICKNESS (mm) to provide fire resistance level of				
Square Hollow Sections	(M ² /T)	30 min	60 min	90 min	120 min	180 min
125 x 125 x 10 SHS	15.0	15	15	20	25	20 + 20
125 x 125 x 9 SHS	16.3	15	15	20	25	20 + 20
125 x 125 x 8 SHS	18.1	15	15	20	15 + 15	20 + 20
125 x 125 x 6 SHS	23.3	15	15	25	15 + 15	20 + 20
125 x 125 x 5 SHS	27.5	15	15	25	15 + 20	20 + 20
125 x 125 x 4 SHS	33.9	15	20	25	15 + 20	20 + 20
100 x 100 x 10.0 SHS	15.6	15	15	20	25	20 + 20
100 x 100 x 9.0 SHS	17.0	15	15	20	25	20 + 20
100 x 100 x 8.0 SHS	18.7	15	15	20	15 + 15	20 + 20
100 x 100 x 6.0 SHS	23.9	15	15	25	15 + 15	20 + 20
100 x 100 x 5.0 SHS	28.1	15	20	25	15 + 20	20 + 20
100 x 100 x 3.0 SHS	44.7	15	20	15 + 15	15 + 20	20 + 20
89 x 89 x 6.0 SHS	24.3	15	15	25	15 + 15	20 + 20
89 x 89 x 5.0 SHS	28.4	15	20	25	15 + 20	20 + 20
89 x 89 x 3.5 SHS	39.3	15	20	15 + 15	15 + 20	20 + 20
75 x 75 x 6.0 SHS	24.9	15	15	25	15 + 15	20 + 20
75 x 75 x 5.0 SHS	29.1	15	20	25	15 + 20	20 + 20
75 x 75 x 3.5 SHS	37.9	15	20	15 + 15	15 + 20	20 + 20
75 x 75 x 3 SHS	43.9	15	20	15 + 15	15 + 20	20 + 20
65 x 65 x 6.0 SHS	25.6	15	15	25	15 + 15	20 + 20
65 x 65 x 5.0 SHS	29.7	15	20	25	15 + 20	20 + 20
65 x 65 x 4.0 SHS	36.0	15	20	15 + 15	15 + 20	20 + 20
65 x 65 x 3.0 SHS	45.2	15	20	15 + 15	15 + 20	20 + 20
50 x 50 x 6.0 SHS	27.3	15	15	25	15 + 20	20 + 20
50 x 50 x 5.0 SHS	31.3	15	20	25	15 + 20	20 + 20
50 x 50 x 4.0 SHS	37.4	15	20	15 + 15	15 + 20	20 + 20
50 x 50 x 3.0 SHS	45.2	15	20	15 + 15	15 + 20	20 + 20
40 x 40 x 4.0 SHS	39.1	15	20	15 + 15	15 + 20	20 + 20

**Table 8: PROMATECT®-XS Thicknesses For Onesteel Structural Steel Members
Rectangular Hollow Section. No Noggin Installation Method - Critical Temperature 550°C**

Member	ESA/M RATIO	PROMATECT®-XS THICKNESS (mm) to provide fire resistance level of				
Rectangular Hollow Sections	(M ² /T)	30 min	60 min	90 min	120 min	180 min
400 x 300 x 16 RHS	8.2	15	15	15	20	15 + 20
400 x 300 x 12.5 RHS	10.5	15	15	15	20	15 + 20
400 x 300 x 10 RHS	13.0	15	15	20	25	15 + 20
400 x 300 x 8 RHS	16.2	15	15	20	25	20 + 20
400 x 200 x 16 RHS	8.3	15	15	15	20	15 + 20
400 x 200 x 12.5 RHS	10.6	15	15	15	20	15 + 20
400 x 200 x 10 RHS	13.1	15	15	20	25	15 + 20
400 x 200 x 8 RHS	16.3	15	15	20	25	20 + 20
350 x 250 x 16 RHS	8.3	15	15	15	20	15 + 20
350 x 250 x 12.5 RHS	10.6	15	15	15	20	15 + 20
350 x 250 x 10 RHS	13.1	15	15	20	25	15 + 20
350 x 250 x 8 RHS	16.3	15	15	20	25	20 + 20
300 x 200 x 16 RHS	8.4	15	15	15	20	15 + 20
300 x 200 x 12.5 RHS	10.6	15	15	15	20	15 + 20
300 x 200 x 10 RHS	13.2	15	15	20	25	15 + 20
300 x 200 x 8 RHS	16.3	15	15	20	25	20 + 20
300 x 200 x 6 RHS	21.7	15	15	25	15 + 15	20 + 20
250 x 150 x 16 RHS	8.6	15	15	15	20	15 + 20
250 x 150 x 12.5 RHS	10.8	15	15	15	20	15 + 20
250 x 150 x 10 RHS	13.3	15	15	20	25	15 + 20
250 x 150 x 9 RHS	14.7	15	15	20	25	20 + 20
250 x 150 x 8 RHS	16.5	15	15	20	25	20 + 20
250 x 150 x 6 RHS	21.8	15	15	25	15 + 15	20 + 20
250 x 150 x 5 RHS	26.0	15	15	25	15 + 15	20 + 20
200 x 100 x 10 RHS	13.5	15	15	20	25	15 + 20
200 x 100 x 9 RHS	14.9	15	15	20	25	20 + 20
200 x 100 x 8 RHS	16.7	15	15	20	25	20 + 20

**Table 8: PROMATECT®-XS Thicknesses For Onesteel Structural Steel Members
Rectangular Hollow Section. No Noggin Installation Method - Critical Temperature 550°C**

Member	ESA/M RATIO	PROMATECT®-XS THICKNESS (mm) to provide fire resistance level of				
Rectangular Hollow Sections	(M ² /T)	30 min	60 min	90 min	120 min	180 min
200 x 100 x 6 RHS	22.0	15	15	25	15 + 15	20 + 20
200 x 100 x 5 RHS	26.2	15	15	25	15 + 15	20 + 20
152 x 76 x 6 RHS	22.2	15	15	25	15 + 15	20 + 20
152 x 76 x 5 RHS	26.4	15	15	25	15 + 15	20 + 20
150 x 100 x 10 RHS	13.7	15	15	20	25	15 + 20
150 x 100 x 9 RHS	15.1	15	15	20	25	20 + 20
150 x 100 x 8 RHS	16.8	15	15	20	25	20 + 20
150 x 100 x 6 RHS	22.1	15	15	25	15 + 15	20 + 20
150 x 100 x 5 RHS	26.3	15	15	25	15 + 15	20 + 20
150 x 50 x 6 RHS	22.4	15	15	25	15 + 15	20 + 20
150 x 50 x 5 RHS	26.6	15	15	25	15 + 15	20 + 20
150 x 50 x 3 RHS	43.5	15	20	15 + 15	15 + 20	20 + 20
127 x 51 x 6 RHS	22.5	15	15	25	15 + 15	20 + 20
127 x 51 x 5 RHS	26.7	15	15	25	15 + 15	20 + 20
125 x 75 x 6 RHS	22.4	15	15	25	15 + 15	20 + 20
125 x 75 x 5 RHS	26.6	15	15	25	15 + 15	20 + 20
125 x 75 x 3 RHS	43.5	15	20	15 + 15	15 + 20	20 + 20
102 x 76 x 6 RHS	22.5	15	15	25	15 + 15	20 + 20
102 x 76 x 5 RHS	26.7	15	15	25	15 + 15	20 + 20
100 x 50 x 6 RHS	22.8	15	15	25	15 + 15	20 + 20
100 x 50 x 5 RHS	27.0	15	15	25	15 + 20	20 + 20
100 x 50 x 3 RHS	43.9	15	20	15 + 15	15 + 20	20 + 20
76 x 38 x 3 RHS	44.4	15	20	15 + 15	15 + 20	20 + 20
75 x 50 x 6 RHS	23.2	15	15	25	15 + 15	20 + 20
75 x 50 x 5 RHS	27.4	15	15	25	15 + 20	20 + 20
75 x 50 x 3 RHS	44.2	15	20	15 + 15	15 + 20	20 + 20

General processing instructions, handling, cutting and fixing

- The boards are delivered on pallets.
- The boards shall be horizontally stacked on a flat surface in a dry and ventilated space.
- The boards shall always be manipulated from the stack by two persons and then be transported vertically.

Choice of thickness

- The required thickness of the fire protective cladding depends on the required fire resistance, the design temperature of the steel structure (the maximum allowed critical temperature of the steel member) and the Hp/A or Esa/M ratio. Please refer to the tables earlier in this manual to determine the required thickness of PROMATECT®-XS.
- Increasing the thickness of the cladding is allowed from the fire safety point of view.
- The thinner board should always be mounted on the thicker board.

Protection of columns

General

- Cladding of steel column is generally done from four sides.
- Board joints on different faces should be offset by minimum 500mm.
- Board joints and fixing heads do not require sealing or covering.
- Where the joint between the bottom of the board and the floor exceeds 3mm then it should be filled with PROMASEAL® A Acrylic Sealant.

Installation of single layer of PROMATECT®-XS for columns

- Cut noggins 120mm wide x minimum 20mm thick from the PROMATECT XS board. The noggin should be sized such that it can be wedged between the flanges of the column. Once the noggin is cut, cut it at an angle of approximately 15° starting at a point one third of the way from the top. This will create two wedges. These are installed so that the 120mm width is parallel to the column web and are flush with the flange tips.

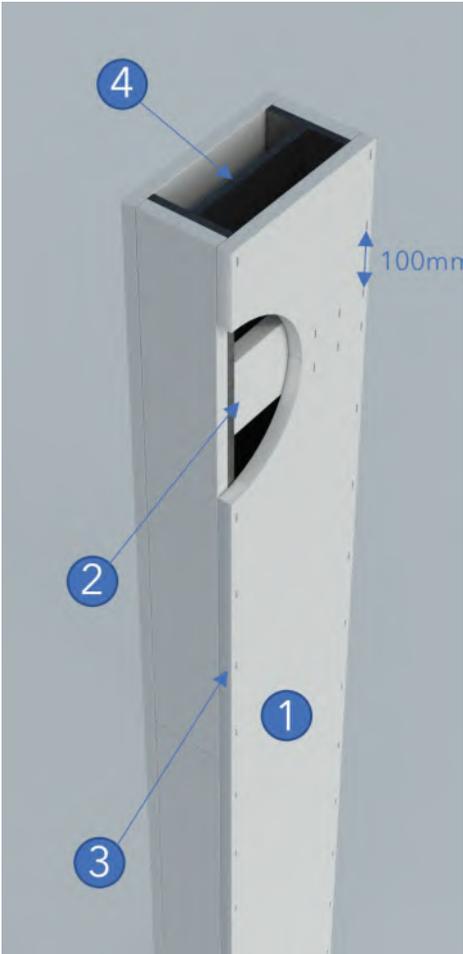
Place the two parts together and hammer to wedge them in place. Noggins are required at maximum 1200mm centres.

- Columns can also be installed without noggins, however different thickness of board may apply. Consult thickness tables for further details.
- The board that is hard against the flanges of the column shall be cut at the same width as the flange. Where the board is hard against the steel, no joint cover or noggin is required. The boards on the noggin/web faces shall be cut to overlap the board fixed to the flange peices.
- Fix the boards through the face of the web board into the edge of the flange board at maximum 100mm centres with staples. (Refer table for size & length). Web Boards are also stapled to the noggins at 100mm centres.
- No joint filler is needed.

Installation of double layer of PROMATECT®-XS for columns

- Board joints on different layers should be offset by minimum 600mm.
- Cut and install noggins as per the single layer system with the noggins installed in line with the joints of the first layer of board at maximum 1200mm centres.
- Columns can also be installed without noggins, however different thickness of board may apply. Consult thickness tables for further details.
- First layer of board installed in the same manner as the single layer construction. The second layer is installed in a similar manner with the board on the flange side installed between the boards on the web side.
- Fix the boards through the face of the web board into the edge of the flange board at maximum 100mm centres with staples. (Refer table for size & length). Where board joints occur in the second layer, they should be stapled on each side of the joint to the first layer at 100mm centres.
- No joint filler is needed.

Single layer protection



Double layer protection

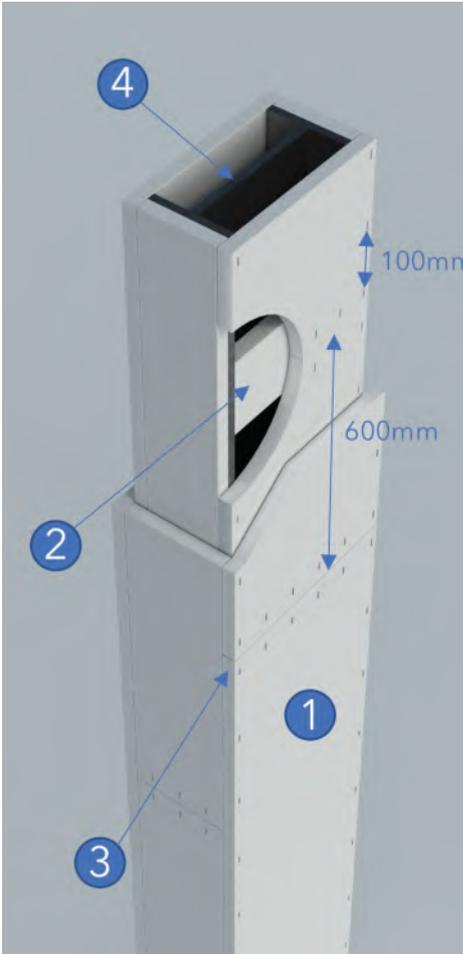


Image Legend:

- 1. PROMATECT XS
- 2. Wedge Noggins
- 3. Staples
- 4. Steel Member



Example of Noggins Construction



Protection of Hollow Sections

Protection of beams

General

- Cladding of steel beams is generally done from three sides.
- PROMATECT®-XS noggin shall be adjusted in such a way that their outer noggin surfaces protrude about 5mm over the support flange. The cladding shall be fastened to the noggin. The drawings show the standard detail for three-sided cladding of steel beams. The required data for H_p/A value calculation and determination of the required thickness of cladding are given in the tables earlier in this manual.

Installation of single layer of PROMATECT®-XS for beams:

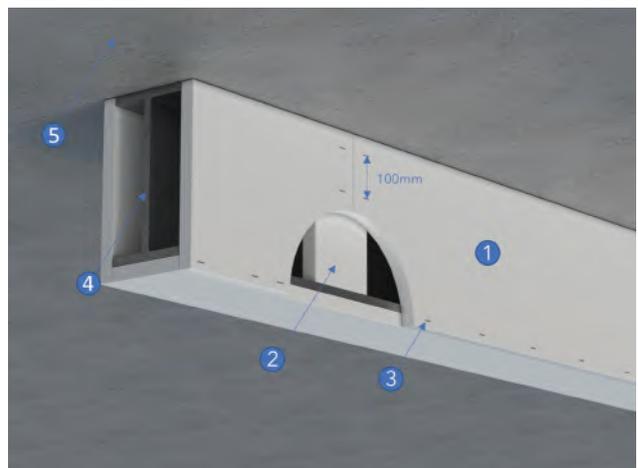
- Cut noggins 120mm wide x minimum 20mm thick from the PROMATECT XS board. The noggin should be sized such that it can be wedged between the flanges of the column. Once the noggin is cut, cut it at an angle of approximately 15° starting at a point one third of the way from the top. This will create two wedges. These are installed so that the 120mm width is parallel to the column web and are protruding approximately 5mm from the flange tips. Place the two parts together and hammer to wedge them in place. Noggins are required at maximum 1200mm centres.
- The underside board is installed in between the 2 side boards, and does not require a noggin or coverstrip where board joints occur. Joints between the underside and side boards should be offset by 500mm.
- Install the side boards first by fixing to the noggins with staples at 100mm centres. The underside board is then fitted between the side ones and fixed with staples at 100mm centres also. For staple specification refer to the table on the right.
- No joint filler is needed.

Installation of double layer of PROMATECT®-XS for beams:

- The first layer is installed in the same manner as the single layer construction except that the board joints on the flange and web side are not required to be staggered.
- Board joints for the second layer should be staggered by 600mm from joints in the first layer.

- The second layer is installed in the same manner as the first with the underside board fitted between the two side boards and stapled board to board at 100mm centres. There is no requirement to stagger the joints between the underside and side of the second layer.
- Where board joints occur in the underside or side boards they should be fixed to the first layer with staples at 100mm centres on each side of the joint.
- No joint filler is needed.

Single layer protection



Double layer protection

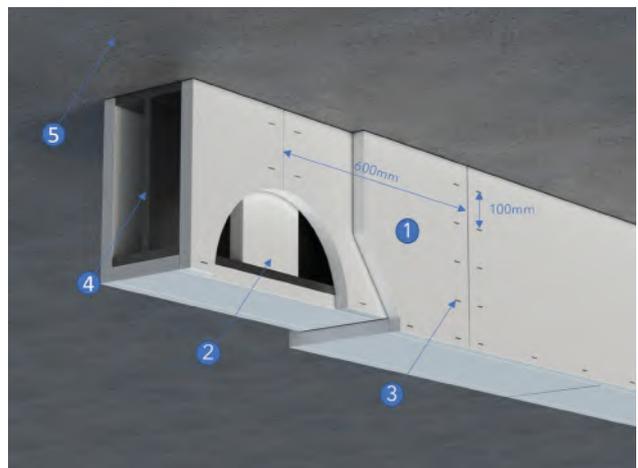


Image Legend:

1. PROMATECT XS
2. Wedge Noggin
3. Staple
4. Steel Member
5. Concrete slab

Staple length for board thickness:

Single and double layer cladding:

Type	Staples
Material	Steel
Dimensions	
for 15mm thick boards	Length 35mm, bridge 10.5mm, wire 1.45 x 1.30mm
for 20mm thick boards	Length 40mm, bridge 10.5mm, wire 1.45 x 1.30mm
for 25mm thick boards	Length 50mm, bridge 10.5mm, wire 1.45 x 1.30mm

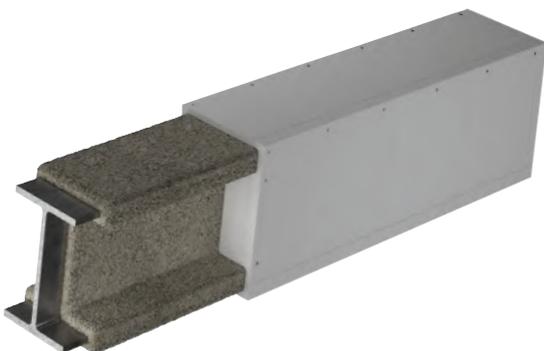
Providing fire protection of steel structures at the construction site

- The required fire resistance is achieved only after proper and professional installation of the product.
- The Installer must follow all requirements of the installation process to ensure that an approved system is installed.
- The installer should ensure that the system is suitable for the specific conditions in which it is to be installed.

Connection to other systems and unprotected members

- Refer to NCC Clause 1.8/ C2D9 Lightweight Construction to determine if voids behind the protection will require filling to meet indentation and damage requirements.
- Where the PROMATECT®-XS interfaces with an unprotected member a coatback of 300mm length will be required. The thickness will be as per the protected member.
- Where the PROMATECT®-XS Interfaces with a Cafco Spray system the spray shall overlap onto the board by a minimum 100mm.

Interface drawing



Coatback drawing



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