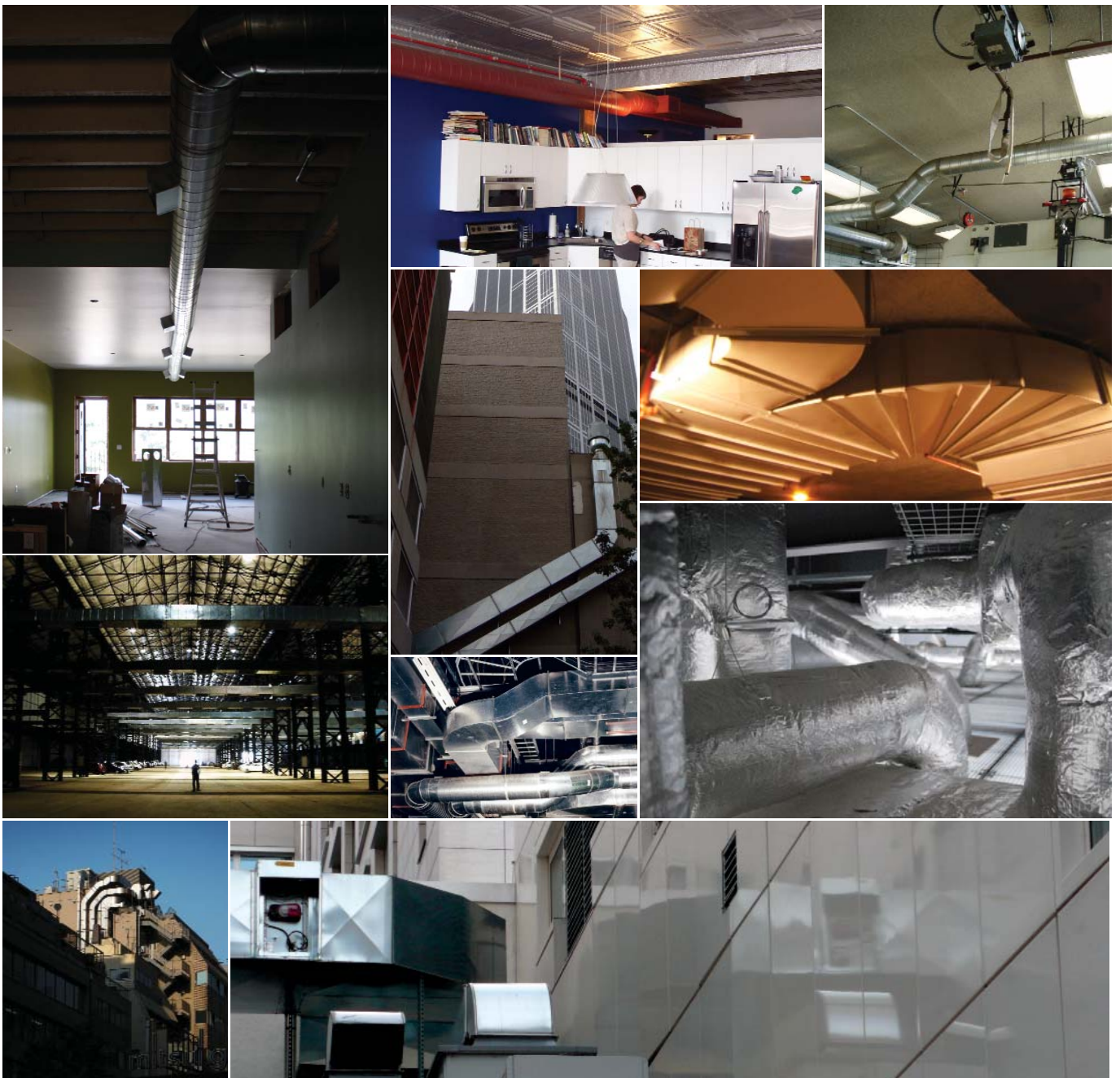


Promat



PROMATECT® 50 Fire Resistant Steel Ducts



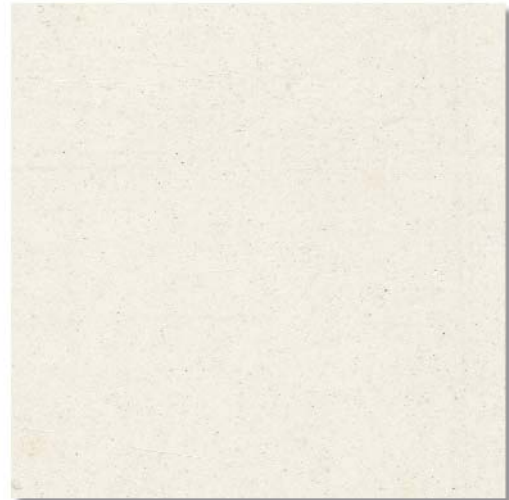
General Description

PROMATECT® 50 is Promat's newest 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 boards 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 Transverse	N/mm ² N/mm ²	13.76 10.80
Tensile strength, $T_{rupture}$ (EN 12467: 2000)		N/mm ²	4.2
Compressive strength (average, perpendicular on board face) (BS 5669: Part 1: 1989)		N/mm ²	13.1

Applications

- Ceilings
- Partitions
- E&M services enclosures
- Wet and dry riser pipes enclosures

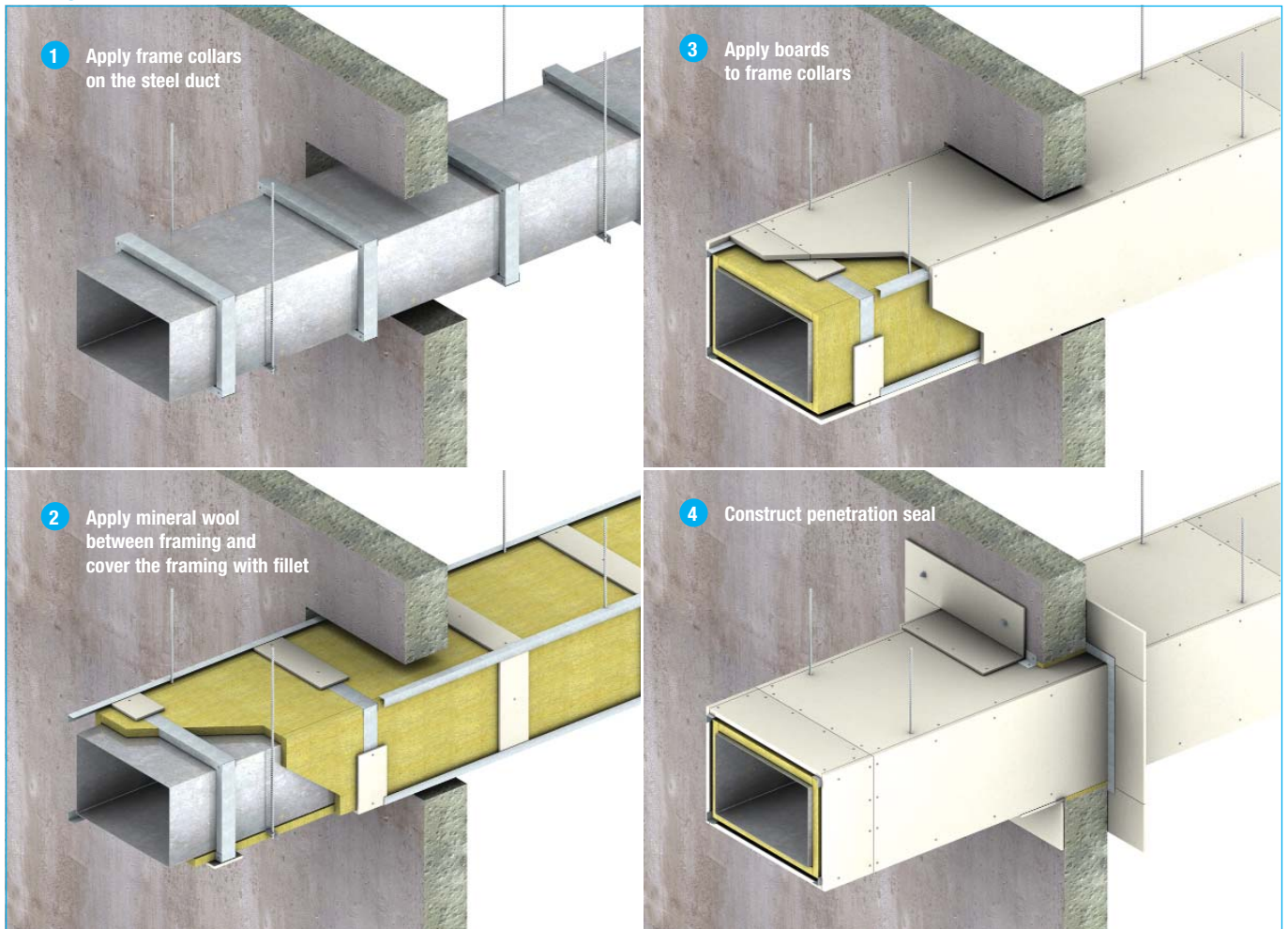
General Technical Data

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 (AS1530: Part 3: 1999)	Indices 0/0/0/0-1	
Density (EN 12467: 2000)	kg/m ³	1200 (± 10% tolerance)
Thermal conductivity (approximate) at 20°C (ASTM C518: 1991)	W/m ² K	0.193
Typical moisture content, ambient to dry condition (BS 5669: Part 1: 1989, Clause 9)	2.4%	
Emission test (to 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 face Back face: smooth with fibre mesh reinforcement	
Thickness (mm)	Standard dimensions* (mm x mm)	Weight per m ² of sheet (approximate kg/m ²)
7	2440 x 1220	8.4
9	2440 x 1220	10.8
12	2440 x 1220	14.4
15	2440 x 1220	18.0
18	2440 x 1220	21.6
20	2440 x 1220	24.0
25	2440 x 1220	30.0

*Other sizes 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 your nearest Promat Technical Department. PROMATECT® 50 PromaX® technology Cement Bound Matrix board is manufactured under a quality management system certified in accordance with ISO9001: 2000 Certification. For further technical information, please consult Promat.

Integrity & Insulation



A part of a standard fire test, duct systems are exposed to external fire (also known as Duct type A) and one sample to both external AND internal fire (also known as Duct type B). Fans create a standard pressure difference and air flow and the ducts fire performance is assessed in both the fan-on and the fan-off situations. When testing horizontal ducts, a run of at least 3000mm is located within the fire compartment (note, the EN and revised ISO standards required a 4000mm length exposed) and a further 2500mm outside the fire compartment. BS476: Part 24 expresses the fire resistance of ducts without the aid of dampers, in terms of stability, integrity and insulation.

Stability failure occurs when the suspension or fixing devices can no longer retain a duct in its intended position or when sections of the duct collapse. This requirement does not apply to the length of the duct exposed to internal fire (Duct type B) within the fire compartment. It should be noted that if a duct suffers extensive deformation, such that it can no longer fulfil its intended purpose, this would be classed as a stability failure. For Duct type A, loss of pressure within the duct during testing is also construed as a stability failure.

Integrity failure occurs when cracks, holes or openings occur in the duct or at any penetrations within walls or floors, through which flames or hot gases can pass. The effects on integrity of the movement and distortion of both restrained and unrestrained ducts are also included in the standard.

Insulation failure occurs when the temperature rise on the outer surface of the duct outside the fire compartment exceeds 140°C (mean) or 180°C (maximum). The guidance in the standard also states that ducts lined with combustible materials or coated internally with fats or greases, e.g. kitchen extract, should also have this criterion for the inner surface of the duct within the fire compartment when the duct is exposed to external fire (Duct A).

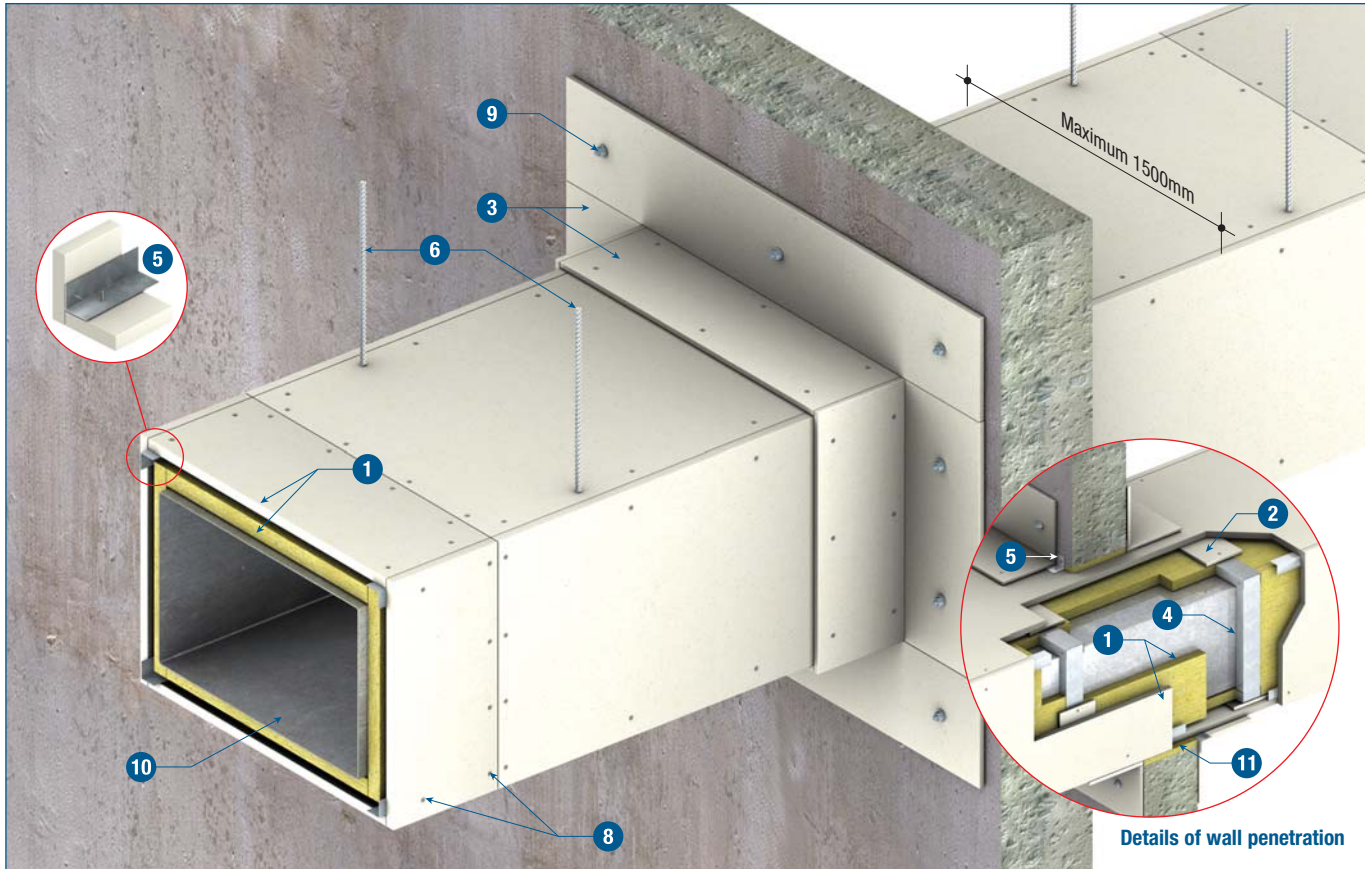
For Smoke extraction, the guidance in the standard states that the cross sectional area of a duct required to extract smoke in the event of a fire should not be reduced by more than 25% for the duration of the fire exposure. PROMATECT® 50 ducts meet this requirement for in excess of 120 minutes.

Ductwork systems which are located in more than one compartment should always be tested or assessed for their performance when exposed to the heating conditions described within BS476: Part 24. Reduced heating curves are generally only acceptable for certain of the systems components e.g. the fan.

The performance of a ductwork system will vary depending on whether or not a fire could have direct access to inside the duct through an unprotected opening. If in doubt, one should assume has direct access i.e. the Duct B scenario described above. The PROMATECT® 50 fire resistant duct constructions detailed in this brochure fulfil both the Type A and Type B requirements.

The steel duct is supported from steel hanger rods and appropriate supporting channels. For a duct resistant to fire for 120 minutes, the stress of the hanger rods should not exceed 10N/mm², the stress of the supporting angles or channels should not have a bending moment in excess of 19.5N/mm². The centres of the hangers for a 120 minute duct should not exceed 2500mm centres. These support centres must be reduced to 1250mm if the ducts are wider than 2500mm.

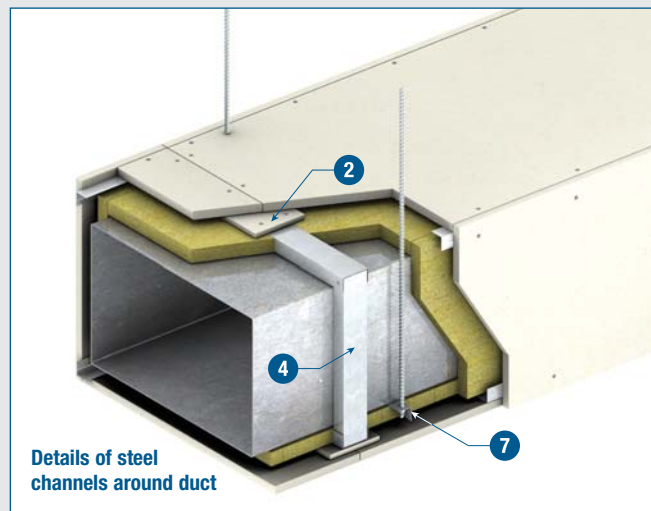
The length of the hanger support system should not exceed 2500mm unless appropriate insulation is provided to reduce the effect of thermal expansion. If the hanger supports are longer than 2500mm and unprotected there is a likelihood that excessive expansion of the support system could place undue strain on the duct and lead to premature failure of the smoke extraction system.



Details of wall penetration

TECHNICAL DATA

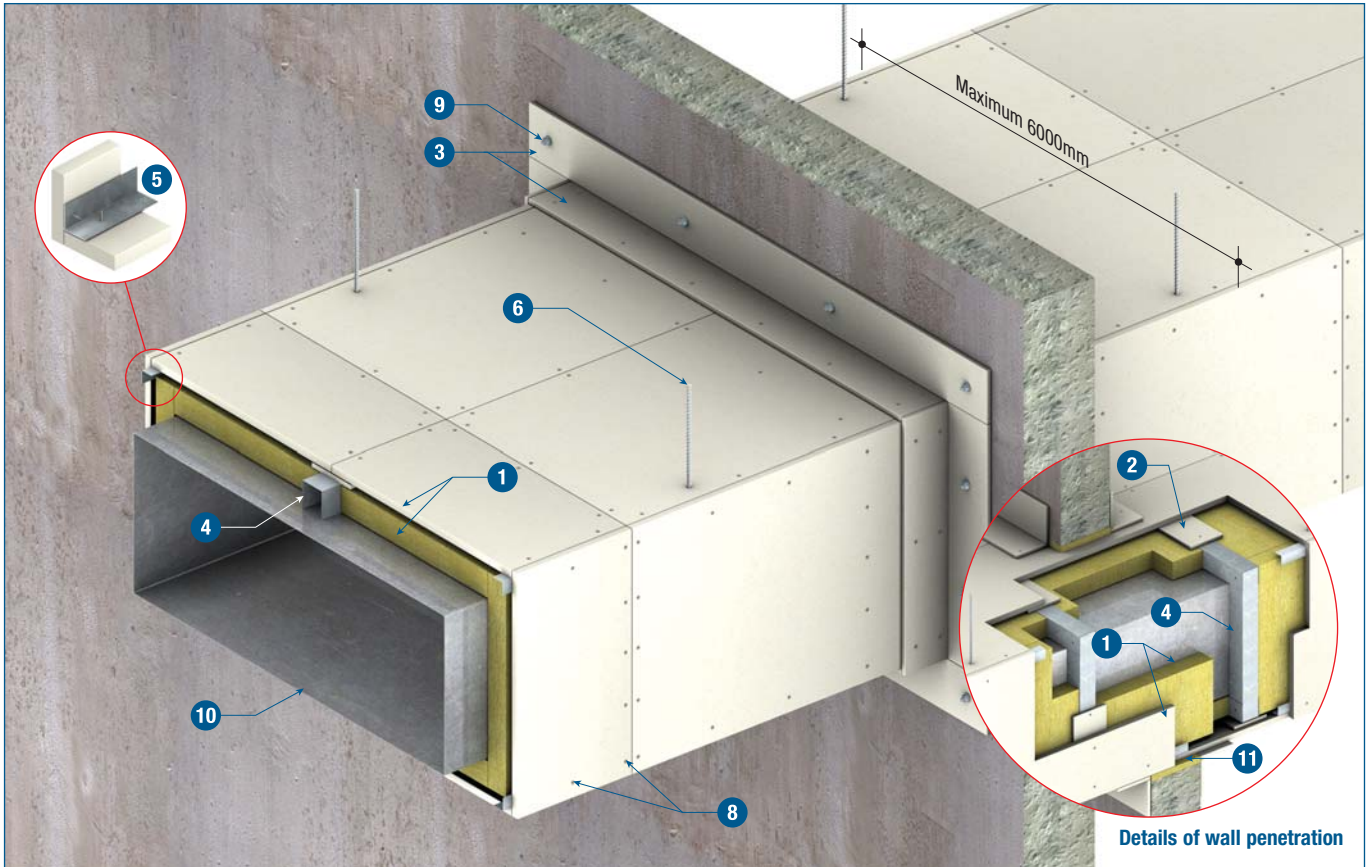
- 1** For FRL of -/120/120
1 layer of PROMATECT® 50 board 15mm thick with 1 layer of mineral wool 50mm x 100kg/m³ for maximum duct size up to 6000mm wide x 2500mm high
- 2** PROMATECT® 50 cover strips, 100mm wide x 15mm thick over internal collars.
- 3** PROMATECT® 50 collars, 200mm wide x 15mm thick, fitted around the duct on both sides on the wall forming an L-shape. See [page 6](#) for details.
- 4** Steel channels minimum 50mm x 35mm x 0.9mm thick at 610mm or 1220mm centres, depending on duct width.
- 5** Steel angles 50mm x 50mm x 0.6mm thick
- 6** Duct hanger system, please contact Promat for details of stress calculation.
- 7** Steel angles minimum 30mm x 30mm x 4mm thick according to duct weight and size and maximum permitted stress levels
- 8** No.8 self-tapping screws at nominal 200mm centres, 35mm long at corners and 50mm long to steel collars.
- 9** M6 anchor bolts at nominal 300mm centres
- 10** Mild steel ventilation duct in accordance with DW144 or SMACNA construction requirements
- 11** Mineral wool tightly packed into aperture of the wall or floor penetration between substrate and the surface of the steel duct



Details of steel channels around duct

Fire resistant ducts can be formed where the substrate from which the steel duct is supported provides protection to some areas, thus 1, 2 and 3-sided solutions in combination with walls and ceilings are available. See [page 7](#).

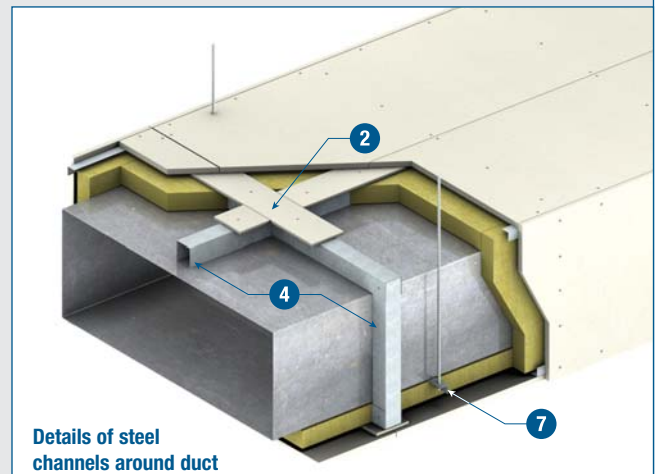
The above construction of fire resistant encasements around steel ducts is up to 1500mm wide in accordance with the criteria of BS476: Part 24, exposed to external and internal fire. However, PROMATECT® 50 duct systems are approved for up to 6m wide.



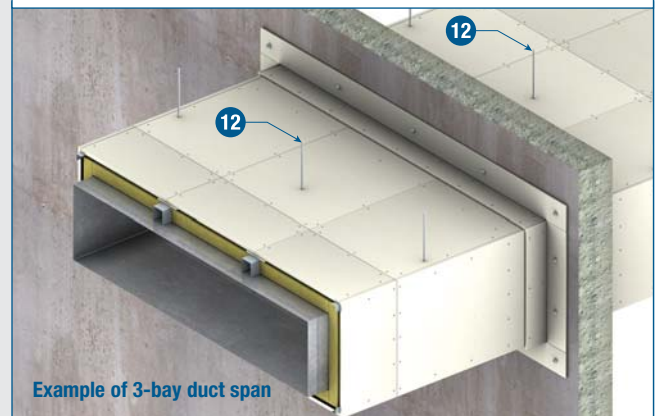
Details of wall penetration

TECHNICAL DATA

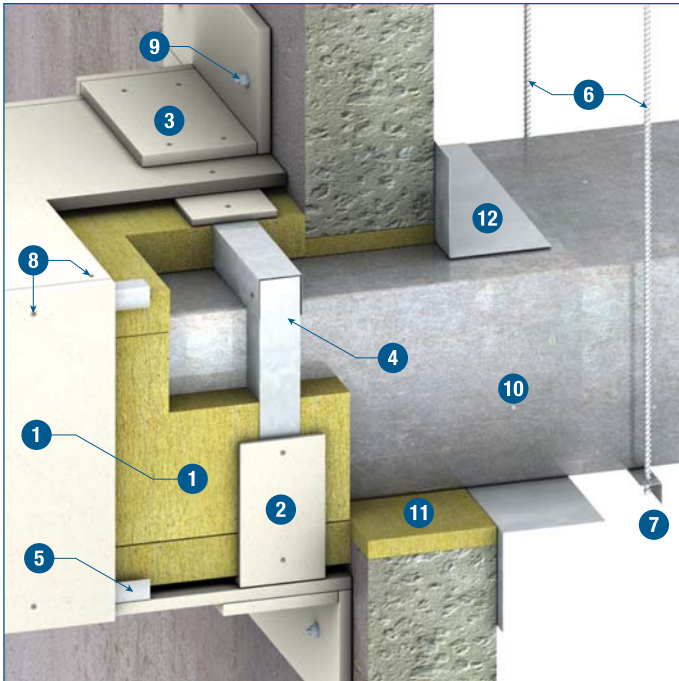
- 1 For FRL of -/120/120
1 layer of PROMATECT® 50 board 15mm thick with 1 layer of mineral wool 50mm x 100kg/m³ for maximum duct size up to 6000mm wide x 2500mm high
- 2 PROMATECT® 50 cover strips, 100mm wide x 15mm thick over internal support brackets 12.
- 3 PROMATECT® 50 collars, 150mm wide x 15mm thick, fitted around the duct on both sides on the wall forming an L-shape.
- 4 For duct span up to 3000mm
Steel channels 50mm x 35mm x 0.9mm thick around duct, spaced at centres in accordance to the width of the duct to ensure a maximum unsupported area not exceeding 1.5m².
- 5 Steel angles 50mm x 50mm x 0.6mm thick or
- 6 Duct hanger system, please contact Promat for details of stress calculation.
- 7 Steel angles minimum 30mm x 30mm x 4mm thick according to duct weight and size and maximum permitted stress levels
- 8 No.8 self-tapping screws at nominal 200mm centres, 35mm long at corners and 50mm long to steel collars.
- 9 M6 anchor bolts at nominal 300mm centres
- 10 Mild steel ventilation duct in accordance with DW144 or SMACNA construction requirements
- 11 1 layer of mineral wool tightly packed into aperture between substrate and the surface of the steel duct
- 12 For duct span between 3000mm to maximum 6000mm
Additional support brackets at mid span, please consult Promat Technical Department for construction details.



Details of steel channels around duct



Example of 3-bay duct span



Wall penetration at termination of fire resisting section of a duct system

There are multiple options available when joining galvanised steel ducts to PROMATECT® 50 duct sections. These include the use of flexible connections, especially when connecting the duct system to vibrating elements of machinery, e.g. fans. The flexible material should be held in place with flat bar steel strips of not less than 2mm thickness attached with suitable fixings. Where a proprietary brand of lightweight material is used, consideration should be given to the size of connection and how it is fitted. The more heavy weight type of flexible material may also be obtained, formed into a channel section with corners fitted and stitched to give a neat airtight joint. Please consult Promat technical department for details of the approved systems.

Sometimes it is necessary to connect a Promat duct to a circular steel duct section or a circular fan connector. To do so, the rectangular cross-section of the Promat duct must be fabricated larger than the diameter of the circular section to be connected. The end of rectangular PROMATECT® 50 duct is then blanked off with a section of Promat board with a circular hole the diameter of the circular duct or section to be joined.

If there is a requirement for services to be installed with the ductwork enclosure, care must be taken to ensure that the installed services do not compromise the fire integrity or insulation property of the PROMATECT® 50 ductwork. This can be achieved by using non-combustible material, and where the services penetrate the ductwork, appropriate fire-stopping measures are taken combustible plastics pipes and high-risk power cables should not be installed within the ductwork enclosures.

At wall penetrations, the gaps between the duct and the reveals of the opening must be filled with mineral wool, of minimum density 100kg/m³ and an L-shaped collar formed from the PROMATECT® 50 board around the duct on both sides of the wall. The minimum size of the collar is 150mm x 150mm and it is screwed to the duct cladding boards and bolted to the wall.

Minimum dimension of collars at penetrations seals will vary and is determined by fire resistance level and duct size. In general, collars should be constructed from boards of the same type and thickness as used for the duct. The minimum width of the collar can vary between 80mm to 150mm. Please consult Promat for details. Alternatively use a minimum width of 150mm horizontal and vertical collar.

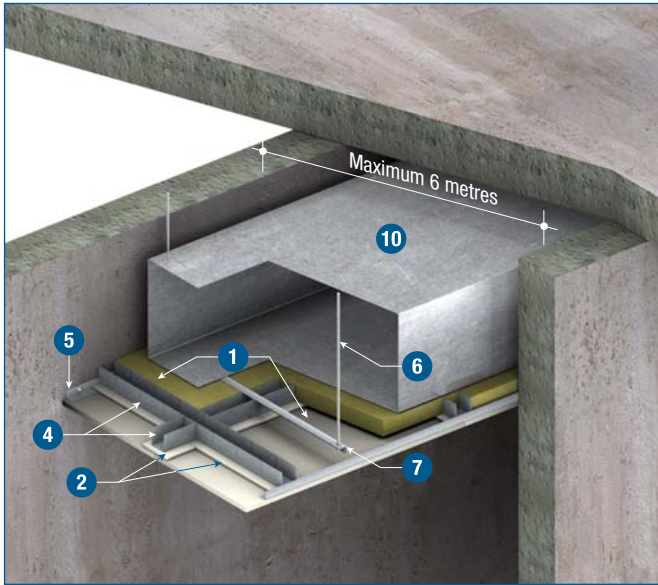
TECHNICAL DATA

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- 2** PROMATECT® 50 cover strips, 100mm wide x 15mm thick over internal channels **4**.
- 3** PROMATECT® 50 collars, 150mm wide x 15mm thick, fitted around the duct on both sides on the wall forming an L-shape.
- 4** For duct span up to 3000mm
Steel channels 50mm x 35mm x 0.9mm thick around duct, spaced at centres in accordance to the width of the duct to ensure a maximum unsupported area not exceeding 1.5m².
- 5** Steel angles 50mm x 50mm x 0.6mm thick
- 6** Duct hanger system, please contact Promat for details of stress calculation.
- 7** Steel angles minimum 30mm x 30mm x 4mm thick according to duct weight and size and maximum permitted stress levels
- 8** No.8 self-tapping screws at nominal 200mm centres, 35mm long at corners and 50mm long to steel collars.
- 9** M6 anchor bolts at nominal 300mm centres
- 10** Mild steel ventilation duct
- 11** 1 layer of mineral wool tightly packed into aperture between substrate and the surface of the steel duct
- 12** Steel angle 100mm x 100mm x 1mm thick fixed to steel duct using sealed steel rivets at 100mm centres
- 13** Volume control damper (VCD)
- 14** M6 anchor bolts, nuts and washer at nominal 250mm centres

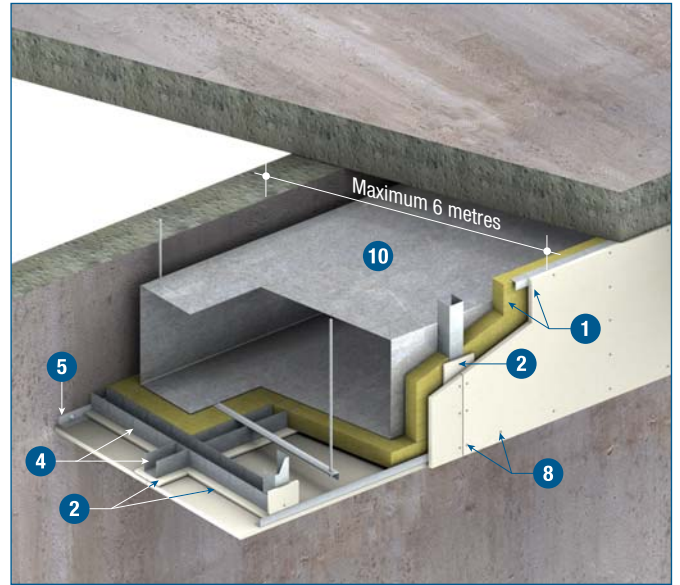
Fire resistant ducts can be formed where the substrate from which the steel duct is supported provides protection to some areas, thus 1, 2 and 3-sided solutions in combination with walls and ceilings are available. See opposite page.

The construction of fire resistant encasements around steel ducts is up to 1500mm wide in accordance with the criteria of BS476: Part 24, exposed to external and internal fire. However, PROMATECT® 50 duct systems are approved for up to 6m wide.

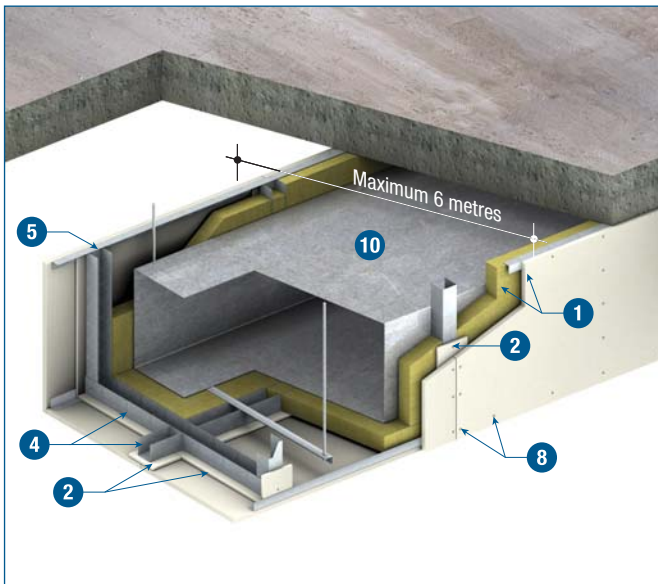
Example of 1-sided duct cladding



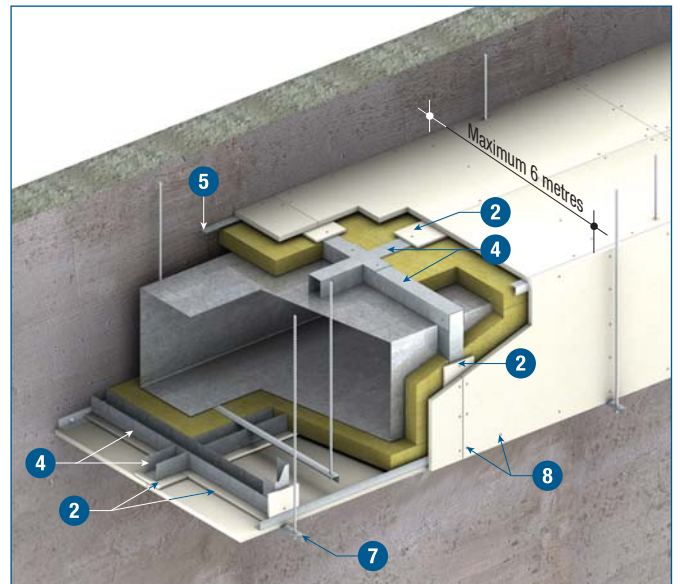
Example of 2-sided duct cladding



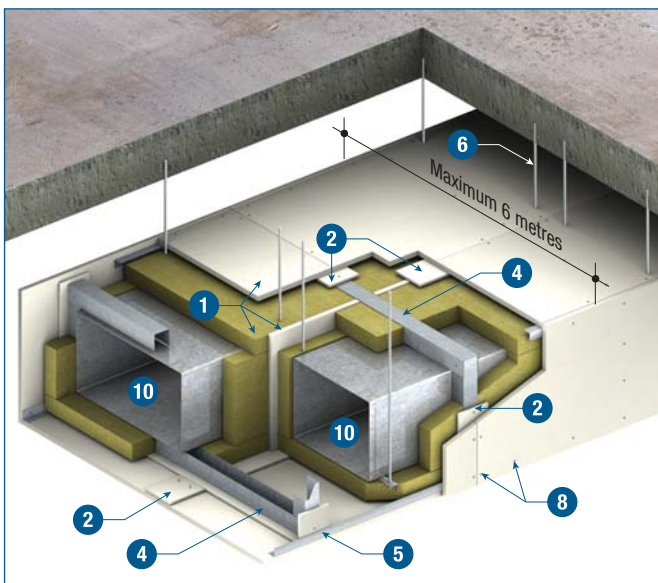
Example of 3-sided duct cladding (from the underside of the substrate)



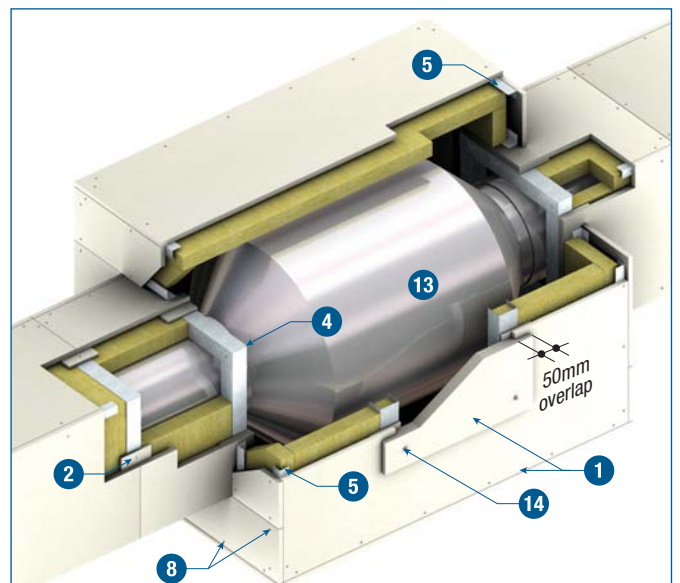
Example of 3-sided duct cladding (to the side of the substrate)



Example of cladding multiple ducts



Example of cladding protection for VCD, silencers etc



Main reasons to use PROMATECT® 50 in fire resistant ducts

PROMATECT® 50 boards can be applied to existing galvanised sheet metal ducts. Indeed, sheet metal is not required as fire resistant ducts can simply be created comprehensively from Promat board material itself.

Are Promat boards an alternative to cementitious spray or paint?

PROMATECT® 50 boards factory are produced to internationally recognised standards, under strict quality control systems. Their performance and dimensional characteristics are therefore guaranteed, unlike many spray and paint finishes which frequently rely on unskilled, on-site labour, which in turn has a direct impact on fire resistance performance. Board thickness is also easy to determine, even after installation, while sprays and paints are more difficult to determine without the use of special, often expensive, measuring equipment.

Promat board systems do not require surface preparation

PROMATECT® 50 is typical of all Promat board systems, it be applied directly around existing steel ducts with no additional surface preparation required. On the other hand, many paint systems need the surface to which they will be applied to be prepared first with degreasing agents, etching primers and more often than not, waterproof top coats to prevent oxidation and the growth of mildew and mould, particularly in high humidity locations. Where an insulated system is required, a method has also to be found to bind mineral wool to the duct without it falling away in the event of fire, an onerous task at best but especially difficult on larger ducts. In the case of cementitious sprays, a duct has to be primed, clad in wire mesh and then sprayed with all the associated problems of overspray and inconsistent thicknesses.

Promat fire resistant ducts do not need a steel liner

Most of the so-called fire resistant paints and fire resistant cementitious spray systems can only be applied to an existing steel duct. However, Promat board systems do not require such foundations. Fire resistant ducts can be constructed directly from Promat boards and these are generally described as self-supporting ducts.

Promat self-supporting ducts withstand high pressures

Promat self-supporting duct systems provide performance in excess of the requirements of DW 144 or SMACNA. For example, leakage rates are well below the allowable limits at 2000Pa to Class C of DW 144. Promat self-supporting duct systems are also subjected to and pass pressure testing while in the context of overall fire testing, something no paint or cementitious spray system has ever been exposed to.

Promat systems require no curing time

Promat fire resistant duct systems are ready to meet their fire performance requirements the moment the contractor installs the final screw. Unlike paints or cementitious sprays, no drying time is required for fire performance to be achievable. On the other hand, some cementitious sprays for 120 and 240 minute ducts are so thick they can take months to fully cure to a level at which they offer any effective fire resistance.

PROMATECT® 50 fire resistant ducts mean there are no corrosion issues

Like all Promat board systems, PROMATECT® 50 fire resistant duct systems are not subject to corrosion. They do not support mould growth and are unaffected by vermin. Galvanised steel ducts coated with paint or cementitious sprays can suffer corrosion problems unless appropriate anti-corrosion measures (in addition to standard galvanising) are taken. In locations with high humidity, especially where the ducts may be subject to condensation from chilled air, the resultant moisture provides an active breeding ground for the growth of mould and fungus. Many of these infestations occur “out-of-sight, out-of-mind” beneath the paint or cementitious spray, remaining dangerously invisible until a well advanced stage.

PROMATECT® 50 provides an attractive fair-faced finish

PROMATECT® 50 board systems are simply decorated to provide and maintain a fair faced finish.

PROMATECT® 50 board systems are quick and easy to apply

Slowness of application is an accusation often levelled unfairly at board systems, especially in the context of real “all in” work schedules involving paints, degreasers, etching primers, possible anti corrosion coating and elaborate fire resistant paint requirements completed by a waterproof top coat. Cementitious sprays also need lengthy time to apply steel wire mesh first followed by the slow build up of many coats to build a finished thickness. In comparison to these elaborate time lines, PROMATECT® 50 boards are fast and simple to install.

PROMATECT® 50 boards are not affected by vibration

PROMATECT® 50 board systems are unaffected by vibration from fans or other nearby mechanical sources. In most instances, this movement requirement is conveniently and sensibly designed into the duct system.

Few maintenance issues affect PROMATECT® 50 fire resistant duct systems

PROMATECT® 50 board systems are simple to maintain. Their relatively high density also offers extremely good impact resistance. Promat even offers duct systems resistant to high explosives.

No toxic fume emissions from PROMATECT® 50 boards

Unlike many paints and cementitious sprays, PROMATECT® 50 and Promat board systems generally emanate no toxic fumes or smoke emissions under fire conditions.

PROMATECT® 50 board systems are thoroughly tested, like all Promat products and systems to a wide range of internationally recognised ventilation, smoke extraction and kitchen exhaust duct test standards. As a matter of routine policy, Promat also perform a wide range of tests on larger than standard ducts to ensure systems are approved by reputable and experienced independent assessors. No other manufacturer of fire resistant duct systems offer such a range of independently approved fire resistant duct products and systems. Similarly, no other manufacturer offers such a range of test and approval data for large, wide and high ducts. PROMATECT® 50 fire resistant duct systems, like all Promat products and systems are tested, tried and proven.

Important Notes

Promat product data sheets and health and safety data sheets are regularly reviewed and are available on request. The successful use of this system is dependent on a number of factors. As the information contained in this literature can only be of a general nature, please consult Promat technical department if there is any doubt about the correct use of this system in a particular application. Promat technical representatives provide comprehensive technical and commercial assistance.

PROMATECT® 50 PromaX® technology Cement Bound Matrix board is manufactured under a quality management system certified in accordance with ISO 9001: 2008 Certification.

Promat Fire Protection

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