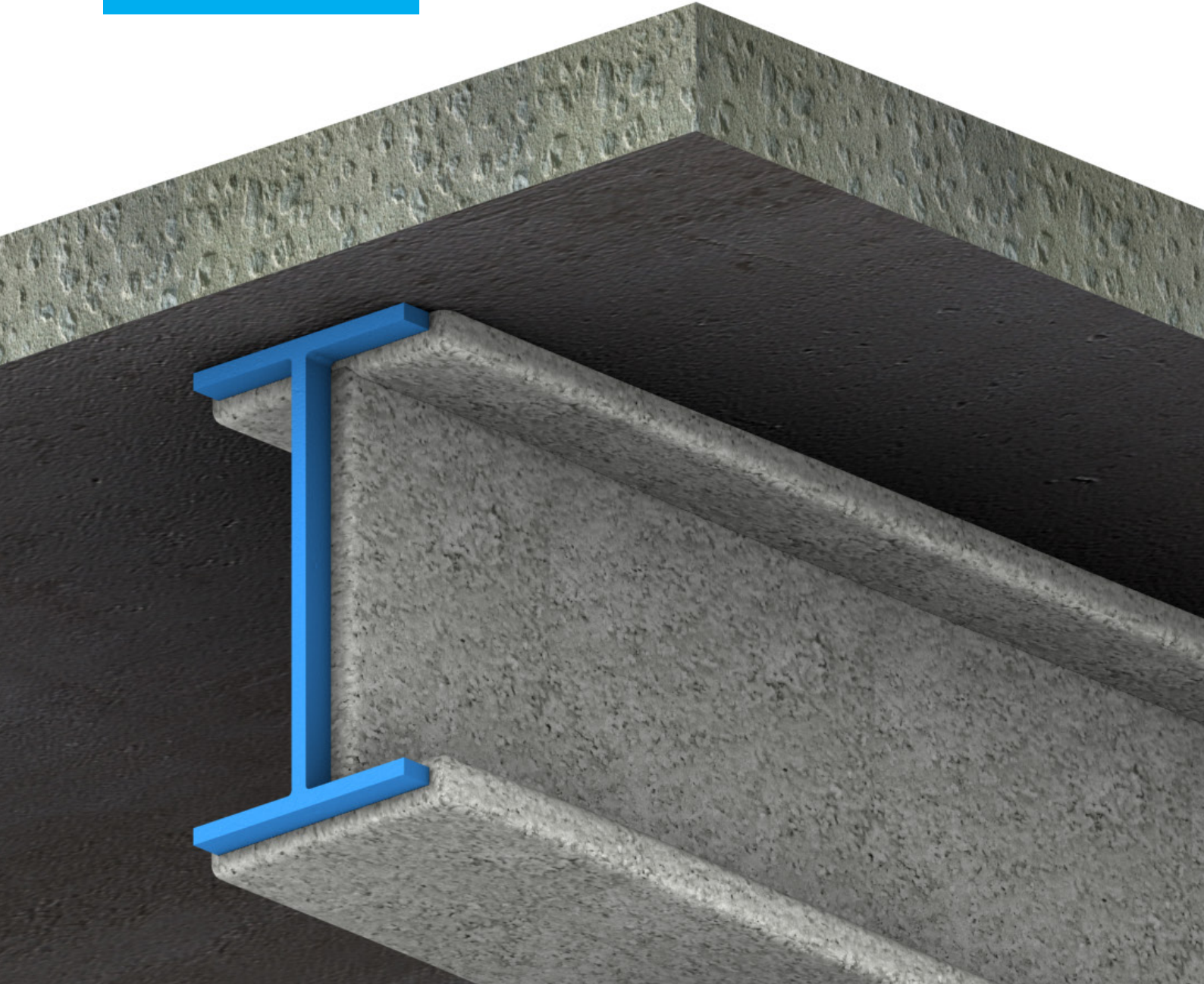


Promat



PROMASPRAY®-P400 Application Guidelines

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1. GENERAL

These instructions are intended as detailed guidance in the correct procedures for the application of PROMASPRAY® P400. Where it is considered that these instructions do not address a specific situation that may be encountered reference should be made direct to Promat Technical Services department.

2. PRODUCT DEFINITION

2.1 PROMASPRAY®-P400

PROMASPRAY®-P400 is a single package, factory controlled premix based on vermiculite and Portland cement, designed specifically for application by spray to structural elements in interior and limited exposure environments.

Structures protected with Promat's fire protective materials have been successfully tested internationally under cellulosic fire conditions for up to four hours duration.

2.2 Cafco FENDOLITE® MII

A vermiculite Portland cement mix for use with SBR Bonding Latex in preparation of keycoat and used on compatibly primed substrates.

2.3 SBR Bonding Latex delivered by Promat

A styrene butadiene rubber latex used with Cafco FENDOLITE® MII and applied as a keycoat.

2.4 PSK 101 delivered by Promat

A multi-purpose product designed to act as a primer sealer (when used over alkali sensitive/incompatible primers) and suitable keycoat prior to the application of PROMASPRAY®-P400.

2.5 Helical CD Weld Pins delivered by Promat

Helical CD weld pin, which require no clips, for use in conjunction with Plastic Coated Galvanised Mesh.

2.6 Plastic Coated Galvanised Mesh delivered by Promat

A plastic coated galvanised 50mm x 50mm hexagonal mesh.

2.7 TOPCOAT 200 ME delivered by Promat

TOPCOAT 200 is a single pack, water based acrylic polymer for use as a water vapour permeable topcoat with excellent adhesion. It may be applied by spray, roller or brush.

3. ON-SITE GENERAL GUIDANCE

3.1 Material storage

3.1.1 Bagged material

These materials must be kept dry until ready for use. They should be stored off the ground, undercover, and away from wet or damp surfaces or areas of very high humidity. Storage temperatures are not critical as long as dry conditions are maintained.

They can be stored for up to 12 months from date of manufacturing under good, dry conditions. Each consignment should be completely used up before the following consignment is started.

3.1.2 Water based coatings

These products should be protected from frost and temperatures above 35°C. They should not be stored in high ambient temperatures or in direct radiant sunlight.

3.2 On-Site application requirements

The applicator should ensure that adequate services are available on the site, eg. a suitable electrical supply, compressed air, clean water of drinkable quality, surplus water and waste disposal facilities, heating and lighting if required.

3.2.1 Weather protection

The materials must be protected from extremes of weather (freezing or warm drying winds, radiant heat or running water) during application and initial curing.

The materials should not be applied unless the substrate and air temperatures are at least 2°C and rising or if the substrate or air temperatures are less than 4°C and falling.

Maximum air and the substrate temperature is 45°C for PROMASPRAY®-P400 and PSK101. Surface temperature should be at least 2°C above dewpoint temperature.

3.2.2 Drying

Provision should be made for adequate ventilation during and after application until the coatings are dry.

3.2.3 Masking

In some cases, it may be necessary to mask off surrounding areas to protect from overspray.

3.3 Equipment

Equipment suitable for the application of Promat's materials is widely available throughout the world.

It is important, however, that any plant used should conform to the required technical specification indicated within this section.

Other types of equipment apart from those defined here may be satisfactory, e.g. certain types of continuous mixers and pistons pumps, but it is in the applicator's interest that such equipment is tested by practical trials and agreed suitable for use by Promat.

3.3.1 Equipment for the application of PROMASPRAY®-P400

- A spraying machine based on a metal rotor/flexible stator, e.g. mono pump is recommended. Pump speed to be in the range of 100 – 600 rpm.
- A mechanical mixer, e.g. paddle blade or drum type SFRM mixer should be used. Minimum capacity 150/100 litre (5/3 ½ cu ft).
- Rotational speed 20 – 30 rpm under load, maximum 35 rpm free running.
- Paddle blade mixers should be equipped with rubber (or synthetic equivalent) tipped blades to wipe the drum wall during mixing.
- Small capacity mixers and mixers with too high a rotational speed should not be used as they are detrimental to Promat's products.
- An air compressor of adequate capacity is required. This may form an integral part of the spray machine or stand along as a separate unit.
- A capacity of 0.42 m³ per minute (15 cfm) free air delivery (FAD) and a pressure at 3.5 kgf/cm² (50 lbf/in²) is normally suitable at the spray head.
- In cases where an air driven spray machine is utilised then reference should be made to the manufacturer to determine the necessary air capacity required to drive the equipment.
- A suitable sprayhead must be used in the application of Promat's sprayed cementitious materials. Promat produce a sprayhead tailor-made for this purpose and full details are available on request.
- Hopper gun - where it is impractical to use the main plant for the purposes of applying the Keycoat then a hopper gun should be used.
- Generally hopper guns are based on a gravity feed principle using a 10 mm (¾ inch) face plate, such as are available from Putzmeister.

3.3.2 Equipment for the application of PSK 101

- Airless Spray / Roller application.

Most industrial types are suitable. Use of 0.43 mm – 0.54 mm spray nozzle with appropriate filters. Typical angle of fan 30° – 60° subject to substrate shape.

It can be applied with lambswool roller also.

4. SITE PREPARATION

4.1 Background

It is the responsibility of the applicator to ensure that all backgrounds to be treated are in a suitable condition to accept the coating.

The substrate to be coated should be clean, dry and free from dust, loose mill scale, loose rust, oil or any other condition preventing good adhesion. The substrate should also be chemically resistant to Portland cement.

4.2 Substrates

4.2.1 Bare steel

PROMASPRAY®-P400 has excellent adhesion to bare steel and since it is alkaline in nature, is likely to provide some measure of protection against further rusting.

It is recommended that all steel is primed for exterior/semi exterior use. However, it is for the building designer to decide whether the risk of corrosion in the interior environment warrants the use of priming system.

4.2.2 Primed steel

Painted surfaces should be in a sound condition, fully cured and solvent released. The paint should have been applied in accordance with the paint manufacturer's instructions to the appropriate thickness.

4.2.3 Alkyd primed steel

In situations where an alkyd primer has already been applied to the structural steel, it will be necessary to apply PSK 101 to act as a barrier coat between the alkyd primer and the Portland cement contained in PROMASPRAY®-P400.

For information on the application of PSK 101 in this situation please refer to section 5.5 on page 9.

4.2.4 Galvanised steel

PROMASPRAY®-P400 has good adhesion to clean, hot dipped galvanised steel. A slight surface reaction can occur between PROMASPRAY®-P400 and the galvanising but this does not appear to have any significant effects on the PROMASPRAY®-P400 or the galvanised steel, unless the material is constantly in a wet environment.

Under these conditions, a more extensive reaction may occur and pre-treatment with a suitable coating is advisable (e.g. PSK 101), as well as the use of an external grade fire protection material.

4.2.5 Expanded metal or ribbed metal lath

Expanded metal or ribbed metal lath may also be used to provide a suitable background over unacceptable backgrounds.

4.2.6 Aluminium

Aluminium and aluminium alloy surfaces are alkali sensitive and require special treatment. It is recommended that a suitable etch primer be used.

Promat can offer advice to suit particular circumstances.

4.2.7 Concrete

Most regular concrete substrates are suitable as a background for PROMASPRAY®-P400. The concrete surface must be free from all release agents, contaminants and impurities. Special concretes with very high or very low suction properties or unusual thermal movement characteristics may require special treatment.

Consult Promat Technical Services department.

4.3 Technical application

Where substrates, primers / finishes or conditions other than those given above are encountered, advice should be sought from Promat Technical Services department.

5. APPLICATION OF PROMASPRAY®-P400

5.1 General

PROMASPRAY®-P400 is a factory controlled pre-mix which only requires the addition of potable water on-site to produce a mix of pumpable consistency.

5.1.1 PROMASPRAY®-P400 requires 26-30 litres/20 kg bag.

Prior to the application of any of the material the following points should be noted.

5.1.2 Sufficient material should be conveniently placed by the pump and mixing equipment to ensure continuity of feed supply.

5.1.3 Pump and mixing equipment should be positioned to optimise the spray area available.

5.1.4 Prior to application, substrate and air temperature readings should be taken where relevant, as the products may suffer permanent damage when:

- They are frozen before they are cured sufficiently to resist disruption by freezing, or
- Their cure is affected by rapid migration of moisture due to excessive heat.

5.1.5 The following factors may assist the application in cold weather:

- Warm mixing water may be used (up to 35°C).
- Shielding the work area from cooling winds.
- Using a heated enclosure. Care should be taken to prevent excessive evaporation of water.

Caution: Please see section "On-Site General Guidance" under the heading "Weather Protection".

- Any masking for the protection of sensitive areas should be carried out prior to commencement of application.

5.2 Mixing - PROMASPRAY®-P400

The following procedure is only applicable to conventional mixers and mono-pumps.

5.2.1 Make sure that the mixer and all tools are clean.

5.2.2 Ensure that mixing water is of a clean, potable quality.

5.2.3 Place most of the required mixing water into the mixer.

5.2.4 Partially set, frozen or lumpy material must be rejected.

5.2.5 Add the bagged material steadily. Add remainder of the mixing water slowly until air entrainment occurs, normally after 90 seconds from commencement of the mix.

5.2.6 Mixing time is 3 minutes to ensure correct properties of the mix. As a general rule do not vary from the recommended quantities of water.

Provided that mixing is almost continuous, the next batch can be prepared without washing out the mixer. The measured mixing water should be poured into the mixer so that it washes the remains of the previous mix from the walls of the mixer.

5.2.7 The workability of the mix will depend on ambient conditions. However, as a guide and based on an ambient temperature of 20°C and a relative humidity of 50% the following should be considered typical:

- PROMASPRAY® P400 - up to 1 hour (it can vary according to the ambient conditions).

5.2.8 If the mixer is to be left for an extended period of time then it should be thoroughly cleaned with water and left ready for further use.

5.2.9 Additional water must not be added to regain workability. Unworkable material must be rejected. Any partially set material left in the mixer must be cleaned out before further batches are mixed.

5.2.10 The following wet bulk density figures should be obtained at discharge from the mixer if mixing and water quantities are correct.

- PROMASPRAY®-P400 - 680-870 kg/m³ (43-54 lb/ft³)

5.3 Spray application of PROMASPRAY® P400

5.3.1 To Bare Steel or Galvanised Steel

PROMASPRAY®-P400 does not require a keycoat (or Bondseal) for application to bare steel or clean galvanised steel.

- Check the condition of the substrate to ensure that it is clean, dry and free from dust, loose mill scale, loose rust, oil or any other condition that would prevent good adhesion.
- Arrange the spraying machine and lines for convenient access so that the operator has freedom of movement over the area to be sprayed.
- Check that the spraying machine is clean and fully operational.
- Where a pump has not received a continuous supply of material e.g. morning start up, clean water should be passed through the pump, hose and sprayhead.
- When the mixed material is introduced into the pump sufficient material should be allowed to pass through the sprayhead to ensure that all traces of surplus pre-delivery water are removed and the correct mix consistency is reached.
- The correct amount of air introduced at the nozzle is essential to ensure consistency of texture and correct density of material. An air pressure of 2.1 – 3.5 kgf/cm², (30-50 lbf/in²) and in the case of the sprayhead 2.1 – 2.8 kgf/cm², (30-40 lbf/in²) at the sprayhead is suitable.
- Materials should be sprayed with minimum air pressure consistent with satisfactory application to give an even coating over the background building up in a series of passes. Even coats are obtained with steady sweeps of the sprayhead which is held, wherever possible, at 90° to the work surface. The sprayhead must not be held stationary.
- Wet bulk density at nozzle discharge should be:
 - PROMASPRAY®-P400 - 920 – 1000 kg/m³ (58-62 lb/ft³)
- The materials have been designed so that they pump easily but stiffen and become cohesive as they are placed on the desired surface. This enables the specified thickness to be built up with the minimum number of coats (often only one).

Do not apply a single coat of less than 8 mm. When reinforcing mesh is used, the minimum practical thickness of PROMASPRAY®-P400 that may be applied increases from 8 mm to 15 mm

- Coating thicknesses should be continuously checked to ensure that the correct thickness is applied.
- Where structures include a horizontal surface that requires coating on the top side (e.g. top of the bottom flange of a beam) the first spray pass should be made on to that surface. This will avoid the possibility of reduced bond strength resulting from application onto loose over spray which can sometimes occur from prior applications to the other surfaces.

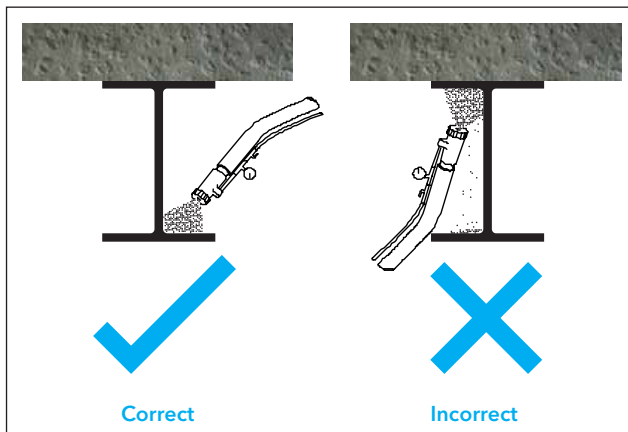


Figure 1: Appropriate spraying procedure for applying PROMASPRAY®-P400 to beams etc

- When applying the materials to beams and columns it is important that the coating thickness around the flange edges is the same as the thickness of the remainder of the section. Failure to observe this means that the full fire rating may not be obtained.

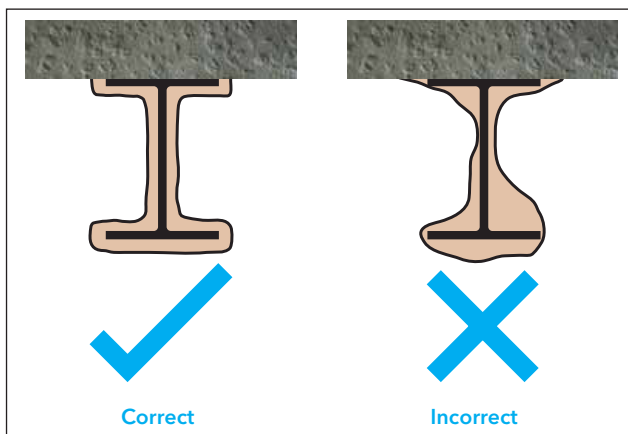


Figure 2: Uniformity of PROMASPRAY®-P400 coating thickness

- For situations where the materials are applied in more than one coat, the preceding coat should be left with a spray texture finish or well scratched to ensure good bonding of subsequent coats.
- The time between coats will be subject to the environmental conditions at the time of application, however, for guidance:
 - PROMASPRAY®-P400 - 2 - 6 hours

5.3.2 If the surface has become very dry, it should be well dampened with clean water before applying further coats, but must not exhibit a watery sheen. Ideally subsequent coats, if required, should be applied within 48 hours of the initial set of preceding coat.

5.4 To compatible primers

Given the range and complexity of priming systems currently available, their compatibility with PROMASPRAY®-P400 is an important consideration.

The following section outlines the procedures for application of PROMASPRAY®-P400 on COMPATIBLE AND INCOMPATIBLE primers.

A keycoat will be required for application of PROMASPRAY®-P400 on to a compatible primer e.g. a two pack epoxy.

Should there be any uncertainty with regard to primer compatibility or suitability, please refer to Promat Technical Services department.

Given that primer compatibility has been determined/confirmed the following procedures should be adopted prior to the application of the fire protective coating.

5.4.1 Keycoat

It is the responsibility of the applicator to ensure that the background to be treated is in a suitable condition to accept the Keycoat.

Surfaces to be coated must be dry and free from oil, grease, and visible moisture (including condensation), dirt, loose paint, dust or other materials or conditions likely to impair adhesion of the keycoat.

The applied primer should be in a suitable condition to receive the fire protective system, i.e. fully cured, bonded, solvent released and applied to a specified thickness.

The function of the keycoat is to provide a tough, textured, strongly adhering mechanical key under ambient conditions for subsequent coats of PROMASPRAY®-P400.

The keycoat is made up of a mixture of Cafco FENDOLITE® MII and SBR Bonding Latex diluted 50:50 with potable water.

PROMASPRAY®-P400 SHOULD NOT BE USED FOR TO MAKE THE KEYCOAT.

Preparation

- Make sure that the mixing equipment is clean.

Add one volume of mixing water and one volume of SBR Bonding Latex to the mixer i.e. replace 50% of the mixing water normally used for the mixing of Cafco FENDOLITE® MII with SBR Bonding Latex - typically, 17 litres of this mixture will be required per bag of Cafco FENDOLITE® MII

This is best achieved before the mixing procedure is undertaken, i.e. by removing 50% of the SBR Bonding Latex from its container and replacing it with water. This will ensure that the correct proportions of water/SBR are always introduced with the Cafco FENDOLITE® MII during the mixing procedure.

On no account should the SBR Bonding Latex be added neat to Cafco FENDOLITE® MII, dry premix as lumps will be formed.

- Add the Cafco FENDOLITE® MII slowly whilst mixing until a creamy pumpable consistency has been obtained.
- Mixing time 3 minutes.
- Unless a further mix is to be prepared immediately the mixing equipment should be thoroughly washed with clean water immediately after use.
- Given the degree of coverage achieved from a one bag mix of keycoat (minimum 25 m²) it may not be considered desirable to utilise the main mixing and spray plant. In such cases small quantities may be mixed in a bucket and applied by Hopper Gun (see Equipment in section 3) or PSK 101 may be applied following the procedure is given in section 5.5.

Application

- Spray the keycoat so as to give a 20 - 50% coverage of the background with blobs of material approximately 5 mm in diameter. The keycoat must be evenly applied over the total area to be protected.
- The keycoat must then be allowed to cure and dry thoroughly before proceeding with the application of the main fire protective coating. Since this is likely to take 10 - 36 hours, depending on drying conditions, it is advisable to complete as much of the keycoat as possible in any one area before subsequent application of the fire protective coating. Application of the keycoat is quickly completed so that good access and freedom of movement are provided.
- Clean up all overspray or spills with water before the keycoat sets as the cured material is very difficult to remove.
- Equipment used should be thoroughly cleaned immediately after the application is complete.

5.5 Application of PSK 101 to incompatible primers

The application of cementitious coatings onto incompatible primers such as alkyds gives rise to the risk of chemical reaction between the two materials, leading to partial or total bond failure.

PSK 101 has been specifically developed as an alternative Keycoat system for application in situations where an alkyd primer has already been applied to the substrate.

When applied following the procedures indicated below PSK 101 acts as a sealer coat between the two systems.

5.5.1 Surface preparation

Surfaces to be coated must be dry and free from oil, grease, and visible moisture (including condensation), dirt, loose paint, dust or other materials or conditions likely to impair adhesion of the PSK 101.

Old, unknown or suspected multi-layer paint systems MUST NOT be overcoated WITHOUT reference to Promat Technical Department.

5.5.2 Application

PSK 101 must not be thinned and should be applied by one of the following methods:

- Airless Spray - most types are suitable. Use 0.43 - 0.53 mm (17-21 thou) spray nozzle with appropriate filters. Typical angle of fan 30 - 60° subject to substrate shape. Rollers - use of lambswool roller or equivalent is recommended.
- Brush - for best results use a wide soft nylon brush, of the type recommended for use with water based coatings.

The use of brush should only be considered for very small areas of application i.e. less than 1m².

5.5.3 Limitations of application

Suitable surfaces which may be overcoated with PSK 101 include properly applied and cured alkyd primers.

The optimum time before overcoating with either a further coat of PSK 101 or PROMASPRAY®-P400 is 2 months

5.5.4 Number of coats

Normally one, but additional coats can be applied as required.

Optimum thickness	125 microns WFT 69 microns DFT
Thickness Range	69 microns DFT 55 - 82 microns DFT

- DO NOT APPLY LESS THAN 100 MICRONS WFT.

5.5.5 Recoating

Ensure that the surface condition meets the requirements of "Surface Preparation" and "Limitations of Application" above.

5.5.6 Preparation

Touch dry	½ - 1 hour at 20°C and 50% RH
Fully dry	2 - 6 hours at 20°C and 50% RH

Drying times will vary with ambient conditions, but high humidity and low air change will hinder cure.

Once dry, application of Promat's fire protective systems may take place following the procedures in section 5.

6. MESH REINFORCEMENT / RETENTION

6.1 General

The market that PROMASPRAY®-P400 is predominantly used in is supported exclusively by fire resistance testing undertaken in the USA and consequently by UL Fire Resistance Directory designs and recommendations.

Requirements for mesh reinforcement in particular under UL Designs are different to those used in Europe and consequently the applicators attention is specifically drawn to the requirements of this section.

The UL guidance for the use of mesh reinforcement state that unless specifically prohibited in the design, a sprayed fire protection material / coating may be applied to primed or un-primed steelwork (beams, columns CHS / RHS) providing:

- The beam flange width does not exceed 305 mm.
- The column flange width does not exceed 406 mm.
- The beam OR column web depth does not exceed 406 mm.
- The outside diameter (OD) of a pipe section or tube width does not exceed 305 mm.

If the substrate is painted however, adhesion testing/bond testing in accordance with ASTM E736 must be undertaken and a minimum average strength of 80% and a minimum individual bond strength of 50% should be achieved when compared to values obtained from testing PROMASPRAY®-P400 applied to a clean uncoated 3 mm steel plate.

If the dimensions of the steel section EXCEED those given above, and irrespective of whether the section is primed or un-primed, a mechanical break (reinforcement or expanded metal lath) must be provided. Such reinforcement may be one of the following types:

- Galvanised expanded metal lath (1.6 kg/m²) strips OR
- Galvanised hexagonal wire mesh with the size 25 mm - 50 mm x 19 Gauge (1 mm) strips.

The expanded metal lath or galvanised hexagonal wire mesh shall be secured to the substrate by mechanical fixings at maximum 305 mm centres on a staggered pitch such that clear (unreinforced) spans do not exceed the limits given above.

At least 25% of the width of an oversize flange or web must be covered by lath or mesh and no strip shall be less than 100 mm in width.

In addition to the lath / mesh requirements given above, PROMASPRAY®-P400 applied to oversize steel beams and columns (primed or un-primed) must still demonstrate satisfactory bond / adhesion to the substrate and bond testing as previously noted will still be required.

In addition to the reasons given above for use of mesh / lath, it will also be required:

- Where no re-entrant detail exists e.g. there is no opportunity for the fire protection to "lock around" the substrate.

- Where vibration, mechanical damage and a possibility of subsequent debonding exist.
- Where a continuous application is required between two adjacent but separate substrates (but not bridging a movement joint).

6.2 Recommend mesh types

- Galvanised hexagonal mesh of size 25 mm x 25 mm - 50 mm x 50 mm x 1.0 mm.
- Plastic Coated Galvanised Mesh - 50 mm x 50 mm hexagonal.
- Galvanised expanded metal lath BB264 (1.61 kg/m²).
- Riblath 271 (2.22 kg/m²).

Other galvanised expanded metal lath may be suitable but must be confirmed as such by Promat Technical Services Department in writing prior to their use on site.

6.3 Methods of use

The foregoing recommended mesh types fall into two categories:

- Reinforcing mesh
- Retention lath

6.3.2 Hexagonal reinforcing mesh may be required on an oversize steel beam, column or pipe/ tube section and will generally be fixed as a strip as indicated above but may also be fitted to and around the profile of the substrate. In either case, the mesh should be within the mid third of the applied coating thickness.

The partial meshing of oversize sections as noted in 6.1 is acceptable providing the following conditions are observed:

- The unmeshed portion of the web must not exceed 406 mm above or below the centralised meshed area.
- The unmeshed portion of the flange should not exceed 305 mm before re-entrant detail occurs.
- The minimum width of mesh reinforcement permitted on either web or flange is 100 mm.

6.3.2 Retention lath can provide a suitable mechanical break as an alternative to the use of hexagonal mesh on oversize sections and also as a background on unsuitable substrates, e.g. old, poor quality concrete or old steel sections with primer in poor condition should these be encountered.

Retention lath may also be used to bridge a gap between, for example, a pair of parallel beams (not over a building movement joint) or to bridge a gap between a steel beam or column and an adjacent wall where there is no possibility of protecting the back face of the beam.

PROMASPRAY®-P400 is suitable for application to the profile of a section. It may also be used over expanded metal lath providing the following limitations are observed.

- It may be applied to EML used to bridge gaps between parallel sections or a section adjacent to a wall where the back face of the beam cannot be protected.

Caution: The EML may be fixed to the steel section but must not be fixed to the wall.

- It may be applied to Riblath securely fixed to a soffit coated with an unsuitable finish.

6.4 Fixing methods

The reinforcing mesh should be fixed to the steel substrate using capacitor discharge (stud welded) pins or (where permitted) percussion type fixings at approximately 305 mm centres in a staggered pitch.

- Helical CD Weld Pins 2 mm diameter x 11mm long should be used to secure Plastic Coated Mesh.

Caution: No clips are required with Helical CD Weld Pins

- Mild steel pins of not less than 3 mm diameter (length to suit applied thickness) with galvanised non-return (speed fix) washers should be used to secure galvanised hexagonal reinforcing mesh.
- The welded pins should be capable of being bent once through an angle of 45° and back to their original position without failure at the welded joint or in the case of a helical pin, rotated through 90° and back to its original position without failure at the welded joint. (See section 12).
- Self-adhesive, glued or plastic pins must not be used without prior consultation and confirmation in writing by Promat Technical Services department, as their performance under fire conditions is generally inadequate for normal failure criteria.
- Such fixings may be approved by Promat Technical Services department when they act as a temporary fixing to assist location of reinforcing mesh where the fire protective material cannot fall away under fire conditions. Such applications must be approved in writing by Promat Technical Services department before the commencement of work.
- When the mesh is applied it must be overlapped by at least 50 mm at the joins. No more than 3 layers should overlap at any one point.
- For thickness of fire spray up to 45 mm the mesh may be applied prior to application. It is important that the mesh is not hard up against the substrate, therefore once secured by clips, the mesh should be pulled away from the substrate so as to lie substantially in the middle third of the thickness being applied.
- Where the thickness exceeds 45 mm the mesh may be fixed to a suitable length pin after application of approximately half the fire spray thickness.
- When the reinforcing mesh is used, the minimum practical thickness of PROMASPRAY®-P400 that may be applied increases from 8 mm to 15 mm.

7. SURFACE FINISH

7.1 PROMASPRAY® P400

PROMASPRAY®-P400 is designed for spray application to achieve a textured finish. In certain special circumstances, it may, however, be levelled after application; where it is deemed necessary to rectify any minor imperfections in profile for example. If it is necessary to reduce the thickness significantly it is better to cut the material with a tensioned wire or metal trowel.

Once levelled, if necessary an immediate application of thin spray coat of PROMASPRAY®-P400 will help to disguise any trowel marks.

8. THICKNESS CONTROL

8.1 Thickness

When each surface to be protected is required to have the same thickness, as in the case of steel I section columns and beams, at least one thickness measurement every 3 metres should be taken on each surface of the flanges and the web.

Where the thickness is found to be less than the specified thickness, the area may be reconsidered for acceptance, subject to the following conditions:

- The deficient area is not greater than 1 m², the thickness is not less than 85% of the specified thickness; no other deficient area occurs within 3 m of the area in question.

- The deficient area is not greater than 0.2 m², the thickness is not less than 75% of the specified thickness; no other deficient area occurs within 1 m of the area in question.

9. PROMASPRAY®-P400 REPAIR PROCEDURES

9.1 Repair

When site alterations etc. cause local damage during the application period, PROMASPRAY®-P400 is normally repaired by a further spray application.

If, however, subsequent damage occurs either accidentally or deliberately it is usually more convenient to effect a repair by the use of a hand applied PROMASPRAY®-P400 mix from Nozzle.

Caution: Hand patching to PROMASPRAY®-P400 is limited to areas not exceeding 1m².

10. ADDITIONAL SURFACE FINISHES

10.1 Surface finish

Additional surface finishes may be applied to PROMASPRAY®-P400 but they must be of a type approved by Promat (e.g. TOPCOAT 200 ME). Application of the wrong type can adversely affect the properties of the fire protective coatings.

10.2 Curing and drying

Before applying any surface finish other than TOPCOAT 200 the fire protective material should be allowed to cure and dry for as long as possible and at least until its colour changes from the grey colour of the wet material to a light grey of the drier material.

10.3 TOPCOAT 200 delivered by Promat

10.3.1 Topcoating of cementitious products with paints of low water vapour permeability can, due to variations in vapour pressure, result in blistering on the paint.

10.3.2 TOPCOAT 200 is a specially formulated coating of high water vapour permeability:

- To protect against ingress from washdown water, chemical spills, rainfall, sprinkler deluge systems.
- To reduce the carbonation rate of Portland cement based products thereby extending their corrosion protection properties for a longer time period.

10.3.3 TOPCOAT 200 is flexible, flame retardant and mould resistant with excellent resistance to CO² diffusion.

10.4 Other finishes

10.4.1 Emulsion paints

Emulsion paints may be used for purely decorative purposes. The paints should be of good quality and suitable for direct application to concrete substrates. The coating thickness should be kept to a minimum. The application is normally by airless or conventional spray.

10.4.2 For coatings other than those outlined above, please refer to Promat Technical Services department.

11. THEORETICAL COVERAGE

11.1 PROMASPRAY®-P400

The following theoretical coverage figures are given for guidance only. Practical coverage will be influenced by such factors as mixing, pumping and spraying techniques which can affect applied density and wastage, the degree of site control, size and shape of items being protected, the frequency of stoppages.

- PROMASPRAY®-P400 based on a density of 400 kg/m³ - 250 m²/tonne at 10 mm thick.
- Cafco FENDOLITE® MII Keycoat minimum 50 m²/bag (which requires approximately 8.5 litres of SBR Bonding Latex plus 8.5 litres water per bag see 5.4.1)

11.2 Water based coatings

The theoretical coverage figures quoted are calculated by a method adopted for paints. Practical coverage will depend on several factors e.g. surface texture, application techniques, substrate porosity and can best be determined by practical trial.

PSK 101	8.0 m ² /litre at 125 microns WFT
TOPCOAT 200 ME	6.7 m ² /litre at 200 microns WFT 5.0 m ² /litre at 200 microns WFT

11.3 Actual coverage rates

Promat will not be held responsible for actual coverage rates achieved on site or the extent of wastage as these matters are outside its control.

12. QA/QC PROCEDURES

These procedures are for the guidance of both the client and the applicator. They may be amended for specific contracts by agreement with Promat Technical Services department.

- 12.1** PROMASPRAY®-P400 is produced in modern, highly automated plant, subject to stringent quality control procedures. The effective utilisation of these products requires equal attention to site quality control.
- 12.2** The applicator is responsible for ensuring that all raw materials as delivered to site are of the correct type and in good condition. If there is any variation, he must consult with the client and/or Promat Technical Services Department for clarification. The applicator should produce a raw materials quality control sheet, indicating inspection of each delivery to determine acceptance. This sheet is to be made available to the Client and Promat Technical Services Department on request.
- 12.3** Once raw materials are accepted into the store at the site, the applicator is responsible for ensuring that they are stored in suitable conditions and are used within their prescribed storage life (where applicable).
- 12.4** The applicator should have on-site at least one person who has attended an introductory course in the application techniques of PROMASPRAY®-P400.
- 12.5** The applicator should appoint one person from his team on site to organise the QA/QC procedure as required.
- 12.6** A typical sample should be prepared as part of the contract to act as a reference in matters of mesh location and fixing

(where required), fire spray thickness and surface texture. This sample could either be a special item or, more usually, a site beam or column.

This typical sample area should be approved by the client's representative in writing and clearly identified so that it may be used as an aid to settle any subsequent disputes that may arise.

12.7 Quality control/inspection

12.7.1 Substrate inspection

Check that the substrate is in a suitable condition before proceeding. It should be dry and free from oil, grease, loose rust, dirt, dust, scale or any other material likely to impair adhesion.

12.7.2 Pin fixing (where required)

The welded pin areas shall be inspected for:

- Correct grinding of the surface to bright metal.
- Correct type, spacing and fixing of pins, including a 45 degree bend test for straight pins or a 90 degree rotation test for a Helical Pin, at not less than one test per square meter. The maximum allowable failure rate of not more than 10%.

12.7.3 Keycoat (for application to compatible primers)

Check the Keycoat has been applied correctly.

12.7.4 PSK 101 (for application to incompatible primers)

Check the PSK 101 has been applied in accordance with Promat recommendations.

12.7.5 Mesh fittings (where required)

The mesh should be expanded metal lath, a galvanised hexagonal or Plastic Coated Galvanised 50 mm x 50 mm x 1 mm - 1.6 mm wire diameter.

Check the fitting of the retention mesh / lath; ensure that clips are fitted correctly and that overlaps between sections of mesh are to specification. Prior to commencement of spraying, the mesh should be checked to ensure it is pulled away from the substrate to lie substantially in the middle third of the final coating thickness. The effectiveness of the entire retention system is negated if mesh is left hard against the substrate.

12.7.6 Weather conditions

Prior to application, substrate and air temperatures should be taken. Freshly applied wet cementitious products such as PROMASPRAY®-P400 may suffer permanent damage if they are frozen prior to their initial set taking place. The temperature during application should therefore be recorded.

The product should not therefore be applied unless the substrate and air temperature is at least 2°C and rising or if the substrate or air temperature is less than 4°C and falling.

The following factors may assist application in cold weather:

- Warm mixing water may be used (up to 35°C).
- Shielding the work area from cooling winds.
- Using a heated enclosure. Care should be taken to prevent excessive evaporation of water.

The maximum air and substrate temperature at which PROMASPRAY®-P400 should be applied is 45°C. The surface to be protected should also be at least 2°C above the dewpoint temperature.

12.8 Density measurement

12.8.1 Density measurement

During normal spraying operation, take a daily sample of material from both the mixer and spray nozzle working in the normal mode. The samples should be taken in a standard container of known volume (without the use of agitation to increase packing rate).

Using the edge of a trowel or a tensioned wire, level the top of the samples by cutting back immediately after spraying or sampling from the mixer.

Do not compress the sample.

Weight the samples within ten minutes and record the bag numbers, the time the samples were taken and from the weight and volume, calculate the wet densities and record these values.

12.8.2 Results

The values obtained by following the foregoing procedure should lie within the following ranges:

Density from mixer discharge	680-870 kg/m ³
Density at sprayhead	920-1000 kg/m ³

12.9 Surface finish

PROMASPRAY®-P400 is a fire protective coating for steel and other substrates. Its role is to provide enhanced fire resistance in a cellulose fire to commercial structures.

The specified thicknesses are a minimum requirement, minor thickness variations may occur.

The surface finish should be even with a fine textured spray. The aesthetic appearance of the surface is a matter of personal preference. However, if points above are recognised and control of thickness is maintained as described below, the result should be satisfactory. If a particular aesthetic standard is required, however, this should be clearly specified and allowed for in the typical sample area.

12.10 Thickness control

When each surface to be protected is required to have the same thickness, as in the case of steel I section columns and beams, at least one thickness measurement every 3 metres should be taken on each surface of the flanges and the web. On steel I sections, the spray coating on the flange should not be permitted to taper off toward the flange edge. Where there appears to be such tapering, the thickness should be checked across the flange and over the flange edges at the recommended nominal 3 metre intervals.

Where the thickness is found to be less than the specified thickness, the area may be reconsidered for acceptance, subject to the following conditions:

- The deficient area is not greater than 1 m², the thickness is not less than 85% of the specified thickness, no other deficient area occurs within 3 m of the area in question.
- The deficient area is not greater than 0.2 m², the thickness is not less than 75% of the specified thickness, no other deficient area occurs within 1m of the area in question.

12.11 Surface treatments

12.11.1 Topcoat Painting (where required)

Check the topcoat paint has been applied in accordance with the specification and/or the manufacturer's recommendations.

12.12 Completed areas

Completed areas should be checked by the client with the applicator in attendance and passed in writing as acceptable before the applicator vacates the area.

12.13 Repair work

If the applicator is requested by the client to return to a completed area for repair work, the repair should conform to the relevant requirements in this Application Manual.

The applicator should not return to a completed area to carry out repair work unless he has written confirmation that such repair work is released to him.

12.14 Independent quality checking

The client may appoint an independent testing house to carry out quality checking.

The following procedure for sampling and sample evaluation is the method recommended by CAFCO for checking the mix quality of PROMASPRAY®-P400. Any amendments or other methods of quality checking should be submitted to Promat Technical Services department in writing for evaluation.

12.14.1 Method of sampling

During normal application procedure, the sample should be sprayed into two moulds without any alterations to spray head or machine settings (305 mm x 305 mm x 75 mm mould size should be used). The moulds should be coated with a release agent prior to sample taking to allow for easy de-moulding after initial set.

The material in the mould should be equal to the depth of the mould. Any high spots should be removed with a cheese wire or cut with the edge of a trowel. The samples should not be tamped, vibrated or trowelled level.

12.14.2 Dry bulk density determination

- De-mould sample not less than 48 hours after initial spraying into the mould.
- Weigh sample and record.
- Allow sample to condition at room temperature for a minimum of 7 days.
- Place sample in oven at a temperature of 50°C (in accordance with BS 8202 : Part 1 : 1987 - Appendix B - Density Test).
- Weigh sample every 24 hours until three identical consecutive weights are obtained. The sample is then deemed to have reached equilibrium.
- The sample should be measured accurately using Vernier callipers and dimensions recorded.
- From the final dried weight and measurement of the sample, the dry bulk density of the sample can be determined.
- For PROMASPRAY®-P400 the dry bulk density should not be less than 340 kg/m³ for fire protective purposes.

13. HEALTH AND SAFETY

- 13.1** Health, Safety and Environmental information on our products is frequently reviewed and is available from Promat Technical Services department in the form of Safety Data Sheets (SDS's). Users of our products should make themselves familiar with the details contained in the SDS's, and on product packaging, before handling the products

The information given in this manual is based on actual tests and is believed to be typical of the products. No guarantee of results is implied however, since conditions of use are beyond Promat's control.

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