Introduction

Promat FENDOLITE® MII is used in the petrochemical industry to protect structural steel, storage vessels, vessel skirts and saddle supports for up to 240 minutes hydrocarbon fire protection.
The purpose of this document is to identify the inspection, maintenance and repair requirements of the spray applied Promat FENDOLITE® MII system.
PROMAT® Topcoat 200 (or other Promat approved vapour permeable topcoat paint systems) are used to provide an improved aesthetic finish to the cured Promat FENDOLITE® MII system, enhanced weather resistance, increased protection from wash down, chemical spillage and resistance to fungal and algal growth.
Promat FENDOLITE® MII is only applied by Promat CRA Contractors in accordance with the Promat FENDOLITE® MII and Promat FENDOLITE® TG Energy Industries Application Manual. The Promat CRA Contractor must take all necessary measures to provide a suitable surface for application of the Promat products and must store, mix and apply the products using suitable approved equipment according to Promat's, or other approved topcoat paint manufacturer's, instructions.
It is the responsibility of the Promat CRA Contractor to make detailed QA/QC records of all stages of application of the Promat FENDOLITE® MII system, including photographic illustration of progress where possible, including daily weather/temperature records, so that any future issues which may arise with the installation of the Promat FENDOLITE® MII passive fire protection system can be effectively investigated and resolved. Promat can offer on-site technical support during installation of all aspects of the Promat FENDOLITE® MII system.
Full technical details for installation of the Promat FENDOLITE® MII system are included in the Promat FENDOLITE® MII & FENDOLITE® TG Energy Industries Application Manual.

Inspection

The frequency, extent and method of inspecting passive fire protection will vary with the geographic location. Harsh climatic conditions will require that the Promat FENDOLITE® MII and PROMAT® Topcoat 200 are inspected on a more regular basis. Inspection intervals of maximum 1 year (annually) are typical, but must always be considered on a case-by-case basis.
Particular attention should be paid to the specific effects of local work activities and the level of environmental exposure.

Recognition of Significant Defects

Inspection must rely heavily on visual observation and although basic, much can be gleaned by tapping, brushing and probing the surface of coatings. There are no instrumental or automated techniques that can replace manual inspection methods.
The early recognition of defects and appreciation of their significance plays an important role in the pursuit of a successful maintenance programme. Defects may be present or may develop from the original installation. Those that occur during original installation should be detected and rectified via an effective quality control system.
The need to repair a passive fire protection system may arise through accidental damage or deliberate breaching, for example - removal for hot work during modifications.

Removal and Modification

Passive fire protection should be readily removable for making modifications and inspection. It is inevitable that such activities or other disturbance, for example, to modify steelwork will be required. It is important that removal should be confined to the local area and the system should then be accessible to full reinstatement.

Maintenance

The intrinsic properties of the various components are essentially fixed and any deterioration of the Promat FENDOLITE® MII cannot be reversed. Maintenance revolves around inspection of the PROMAT® Topcoat 200, or other topcoat paint system that has been used, and the condition of the Promat FENDOLITE® MII beneath, with timely recognition and repair of any surface damage to the coatings. Deterioration can occur as a result of topcoat damage or deterioration caused by environmental exposure, weathering, accidental damage or modifications of the structure and plant. The protective topcoat paint system that has been used must be maintained in an effective condition and both environmental and accidental damage must be identified for timely repair before the topcoat paint system deteriorates.

Promat FENDOLITE® MII Corrective Action Procedures

Light indentations or abrasions to the outer surface of the fire protective coating (maximum 10mm deep), where the retention system has not been exposed or disturbed need only have the protective surface coating reinstated. The total under thickness should conform to BS 8202: Part 1 1995.
Cut-outs and areas of damage should be inspected to ascertain if the original coating was applied in accordance with the manufacturer's application instructions. Particular attention should be paid to any keycoat and the mesh retention system and their correct installation.
Full technical details for installation of the Promat FENDOLITE® MII system are included in the Promat FENDOLITE® MII & FENDOLITE® TG Petrochemical Application Manual – this should be read in conjunction with the Corrective Actions A, B and C guidance detailed below.

Corrective Action A - Substantial Mechanical Damage and Cut-outs of Promat FENDOLITE® MII

General Procedure

1. Prepare cut-outs or damaged areas for repair.
2. Re-install the primer (anti-corrosion system).
3. Apply PROMAT® PSK 101.
4. Reposition or replace the mesh reinforcement system.
5. Prepare and apply Promat FENDOLITE® MII or Promat FENDOLITE® TG
6. Apply PROMAT® Topcoat 200 (or other Promat approved vapour permeable topcoat paint system) when the Promat FENDOLITE® MII has dried / cured. (Refer to EIDS 030)
7. Check condition of mastic seals and repair if necessary.

Detailed Procedure

For small areas of repair or areas where it is not possible to use a spray application, Promat FENDOLITE® TG (Trowel Grade) may be used to repair Promat FENDOLITE® MII.

NOTES:

- *Promat FENDOLITE® TG does not require a 3 minute mix in a mixer, it can simply be hand mixed in a bucket and is ready for trowel application.*
- *If Promat FENDOLITE® MII is being used for trowel repairs, it must have the 3 minute mix and be sprayed onto a hawk or into a bucket.*

1. Where damage to Promat FENDOLITE® MII does not extend to the substrate, cut away / remove any loose material and remove dust. If the mesh is still intact or if damage to mesh is minor (and a new piece can be attached to the remaining existing mesh) dampen the underlying Promat FENDOLITE® MII with clean potable water and reinstate the deficient thickness using sprayed Promat FENDOLITE® MII or hand / trowel applied Promat FENDOLITE® TG.
2. If damage to the mesh is extensive or the mesh is missing or if damage extends to the substrate, remove all loose material and extend repair by 50mm past damaged area and / or damage to primed substrate. Extending the repair site to a sound substrate is particularly important where paint damage has been caused by welding new steelwork in place.
3. If required, locally clean the substrate by blast cleaning or other approved surface preparation method. Locally grind to bright metal at 400mm centres to enable new stud welded pin fixings to be attached to the substrate. Attach PROMAT® Helical CD Weld Pins to the substrate all inn accordance with Promat FENDOLITE® MII & FENDOLITE® TG Energy Industries Application Manual.
   NOTE: PROMAT® Plastic Coated Galvanised Mesh can be attached to undamaged existing mesh exposed during preparation (without welded fixings) providing the new mesh / repair dimensions do not exceed 400mm x 400mm.
4. If required, apply a suitable primer / intermediate coat to the substrate / weld sites in accordance with the paint manufacturer's instructions and / or client paint specification and allow to dry and cure.
5. Apply one coat of PROMAT® PSK101 to the prepared substrate to a wet film thickness of 100-150 microns (55-82 microns DFT) and allow to dry.
6. Attach PROMAT® Plastic Coated Galvanised Mesh to existing exposed mesh using wire ties at 150mm centres (or twisting cut ends of mesh together) and to any new PROMAT® Helical CD Weld Pins and pull the mesh away from the substrate so as to be substantially in the mid third of the final applied thickness.
7. Mix and spray apply Promat FENDOLITE® MII or trowel apply Promat FENDOLITE® TG to the prepared areas to reinstate original applied thickness. If more than one coat is required, pull the mesh away from the first coat after it has started to stiffen so that the second coat will bond to the underlaying layer as well as be reinforced by the mesh. Allow some overlap onto the existing material and trowel finish the repair to match surrounding material.
8. Allow the repair to dry / cure until the characteristic colour change of dark grey of the wet material tom the off-white of the dry material is observed, which is likely to take a minimum of 5 days under good drying conditions before the application of any protective surface topcoat.

NOTE: If PROMAT® Topcoat 200 is applied it must be in accordance with the requirements of Energy Industries Data Sheet EIDS 030.

9. If the existing Promat FENDOLITE® MII coating has been installed for a number of years, the condition of the polysulphide or silicone mastic seals may have deteriorated. They should therefore be inspected, removed and replaced as required.

Corrective Action B - On-Site Completion of Existing Applied Promat FENDOLITE® MII

During the main Promat FENDOLITE® MII or Promat FENDOLITE® TG application it is not always possible to have access to all the steel work. Some areas will have to be left uncoated due to the positioning of scaffolding clamps or to allow for the installation of further steelwork. This procedure should be followed to complete these areas.

General Procedure

1. If required (and not applied during initial application) locally grind the substrate to bright metal and attach PROMAT® Helical CD Weld Pins at maximum 400mm centres. Repair / reinstate at the weld site and any other areas of damaged primer using an approved 'touch up' system and allow to dry and cure fully in accordance with the manufacturer's instructions.
2. Apply PROMAT® PSK101 after the primer has cured.
3. Reposition or install PROMAT® Plastic Coated Galvanised Mesh, or 50mm x 50mm x 1.4mm galvanised hexagonal mesh, whichever is required, onto the correct type of pins – galvanised or stainless (PROMAT® Helical CD Weld Pins are stainless steel and are used with PROMAT® Plastic Coated Galvanised Mesh. Galvanised pins must be used if galvanised mesh is used, stainless steel pins cannot be used with plain galvanised mesh).
4. Spray-apply Promat FENDOLITE® MII or trowel-apply Promat FENDOLITE® TG as required.
5. When Promat FENDOLITE® MII to cure and dry, shown a colour change (*minimum 5 days curing/drying time), apply the PROMAT® Topcoat 200, or other Promat approved topcoat paint system, as required. *Drying time based on warm summer weather. Poor ventilation, extreme humidity and low temperatures will extend the drying time. Refer to Energy Industries Data Sheet 030 for details.

Detailed Procedure

For small areas of repair where it is not possible to use a spray, Promat FENDOLITE® TG may be used to complete Promat FENDOLITE® MII applications by trowel application.

1. The steel priming system should be inspected and repaired if necessary. This is particularly important if new steelwork has been welded in place.
2. The existing Promat FENDOLITE® MII should be cut back by 50mm from any damaged paintwork, removing all loose friable material and chamfering any sharp edges.
3. In areas greater than 400mm x 400mm where PROMAT® Helical CD Weld Pins have not already been installed, it will be necessary to attach PROMAT® Helical CD Weld Pins at 400mm centres in a diamond pattern and reinstate the primer around the welded areas, allow to cure.

NOTE - PROMAT® Helical CD Weld Pins must be installed by the use of a Capacitor Discharge weld gun with appropriate chuck. The primer must be removed to bare steel locally in approximately 25mm diameter patches at 400mm staggered centres to allow the pins to be welded. Attempt to attach the pin on one side of the bare steel patch so that there is room for another attempt on the other side if the weld fails.

A sample of the PROMAT® Helical CD Weld Pins must be subjected to a 90 degree 'twist' test using an appropriate tool to check the strength of the welds. The specified primer must be reinstated locally around then pins to prevent rusting through the PROMAT® PSK 101.

4. Spray or brush apply one coat of PROMAT® PSK101 to a nominal wet film thickness (WFT) of 183 microns, allow to dry for minimum 2 hours.
5. Mesh the area with either existing mesh or a new piece of 50mm x 50mm PROMAT® Plastic Coated Galvanised Mesh. The mesh should be securely attached to the PROMAT® Helical CD Weld Pins. All mesh joints should be overlapped by a minimum of 50mm and tied together at 150mm centres using the mesh cut-ends or 1.4mm galvanised tie wire. Ensure that the mesh remains substantially in the mid-third of the final coating thickness.
6. Prior to installing the new Promat FENDOLITE® MII the existing material should be thoroughly dampened-down with clean potable water.
7. When Promat FENDOLITE® MII has cured/dried, shown a colour change (*minimum 5 days), apply the PROMAT® Topcoat 200, or other Promat approved topcoat paint system, as required. *Drying time based on warm summer weather. Refer to Energy Industries Data Sheet 030.
8. The drying / curing time of the Promat FENDOLITE® MII will depend on environmental conditions and applied thickness. Poor ventilation, excessive humidity and low temperature will extend the drying time.
9. If the existing Promat FENDOLITE® MII coating has been installed for a number of years, then the mastic polysulphide or silicone mastic seals should be checked - remove and reinstate the mastic seals if necessary.

Corrective Action C - Treatment of Cracks in Promat FENDOLITE® MII

Generally, if cracks occur, they are caused by shrinkage or thermal movement and are noticed at the surface of the Promat FENDOLITE® MII coating and may be in the form of fine hairline cracks in a crazed pattern or they may be more significant cracks. In either case it is important to try to establish the reason for the cracking, since without fully understanding the cause, any repair may be negated by a continuation of the problem.

Hairline cracks are aesthetic and are usually less than 1mm wide. These small cracks are not deep, will not affect the fire rating of the Promat FENDOLITE® MII but require filling with the topcoat paint system to prevent water ingress and to improve aesthetic finish.

Cracks greater than 1mm wide will require specific treatment to improve the aesthetic finish and also to prevent damage from water ingress into the cracks. Large cracks need to be filled with a sealant to prevent water ingress and maintain fire resistance.

General Inspection Procedure

1. Inspect the cracks for width, depth and adhesion of the Promat FENDOLITE® MII to the background and / or intercoat adhesion.
2. Inspect the substrate for corrosion and / or weld damage (if exposed).
3. Inspect the mesh to ensure that it lies substantially within the mid-third of the overall final applied Promat FENDOLITE® MII coating thickness.

Crack widths up to 1mm wide - Remedial Procedure

1. Areas previously painted with PROMAT® Topcoat 200 a) Ensure that the Promat FENDOLITE® MII surface is clean, dry and ready for painting. b) Apply PROMAT® Topcoat 200 into the crack using a brush or roller. c) Spray apply, or apply by roller, one coat of PROMAT® Topcoat 200 over the crack and the surrounding area (minimum 30mm overlap). For aesthetic reasons the whole surface may be painted with PROMAT® Topcoat 200. Each coat should be 150 - 200 microns WFT. *Refer to Promat Energy Industries Data Sheet EIDS 030.
2. Areas not previously painted a) Brush apply one coat of PROMAT® Topcoat 200 into the crack and surrounding surfaces. b) Apply two coats of PROMAT® Topcoat 200 over the whole Promat FENDOLITE® MII surface by spray or roller. The second coat should be applied at 90 degrees to the first coat. Each coat should be 150 - 200 microns WFT per coat. Refer to Energy Industries Data Sheet EIDS 030.

Cracks over 1mm wide - Remedial Procedure

Areas previously painted with PROMAT® Topcoat 200

1. Cut out a 'U'-shaped groove approximately 10mm wide and 10mm deep and clear away any loose material. It is better aesthetically to cut straight grooves where possible.
2. Apply one generous coat of PROMAT® Topcoat 200 into the line of 'U' crack by brush and allow to dry for 2 – 6 hours. Each coat should be 150 - 200 microns WFT.
3. Apply polysulphide or silicone mastic bead to the line of 'U' crack and blend in.
4. Spray or roller apply one coat of PROMAT® Topcoat 200 over the crack and the surrounding area. Each coat should be 150 - 200 microns WFT. For aesthetic reasons the whole surface may be painted. Refer to Energy Industries Data Sheet EIDS 030.

Areas not previously painted

1. Cut out a 'U'-shaped groove approximately 8mm wide and 8mm deep and clear away any loose material. It is better aesthetically to cut straight grooves where possible.
2. Apply one coat of PROMAT® Topcoat 200 into the line of 'U' crack by brush and allow to dry for 2 – 6 hours. Each coat should be 150 - 200 microns WFT.
3. Apply polysulphide or silicone mastic bead to the line of 'U' crack and blend in.
4. Apply two coats of PROMAT® Topcoat 200 over the whole Promat FENDOLITE® MII surface. Each coat should be 150 - 200 microns WFT per coat. Refer to Energy Industries Data Sheet EIDS 030.

The information given in this Application Procedure is based on practical experience, independent and other tests and represents, in Promat's opinion, the best technical advice available. Since the products

are applied under circumstances beyond our control, Promat can accept no direct or consequential liability, whether in contract or in tort, for the interpretation of such recommendations and reserves the right to modify the recommendations as necessary. Should it be unclear as to the meaning of any of the instructions given above, or if further information is required, please consult Promat.