Introduction

The following general application procedure is applicable to cryogenic horizontal storage vessels supported on steel saddles or concrete plinths and shall be read in conjunction with the specific requirements of the client as detailed in the guideline specification prepared for the project.

For insulated steelwork of small areas, Promat FENDOLITE® MII is applied over the foamglas and bonding to the vapour barrier is achieved by a keycoat, such as detailed in EIDS 008.

Unless directed to the contrary in this proposal, Promat FENDOLITE® MII shall be mixed and applied in accordance with the current Promat Promat FENDOLITE® MII & FENDOLITE® TG Energy Industries Application Manual.

During the Promat FENDOLITE® MII application process the vessel should be loaded to its maximum limit on-line or loaded with an inert substance (water). The load should not be removed until at least 5 days after the final Promat FENDOLITE® MII application.

Priming requirements

To ensure long term corrosion protection of the vessel and its supports and unless noted otherwise in the specification, Promat recommend that all surfaces are blast cleaned to SA 2½ in accordance with SIS 05 59 00 : 1967 and are primed and painted with a two-pack epoxy system, applied and cured in accordance with the manufacturer's recommendations.

Inspection of the primed steel surface

All uninsulated steel surfaces to be protected shall be free from oil, grease, dirt, dust, grime or any other material likely to impair adhesion of either PROMAT® PSK 101.

Application of PROMAT® PSK 101

Apply one coat of PROMAT® PSK 101 to uninsulated primed steel surfaces at a wet film thickness of 100-150 microns (55-82 microns DFT) and allow to cure and dry. The purpose of PROMAT® PSK 101 coating is to create adequate bonding of the Promat FENDOLITE® MII to the primer.

Application of foamglas insulation

The calculation of the required Foamglas insulation thickness is beyond the scope of this document and should be calculated / recommended by others. The thickness of insulation shall be sufficient to provide an interface temperature (Foamglas / Promat FENDOLITE® MII) of at least 4 °C. Installation of the Foamglas shall be carried out strictly in accordance with the manufacturers recommendations and be followed by a suitable vapour barrier.

Application of continuous keycoat

For small surface areas a continuous "mist" coat can be applied as detailed in EIDS 008.

Application of expanded metal lath around the foamglas

For larger surface areas it is recommended to apply a galvanised expanded metal lath reference BB264 (or equivalent) or inverted Riblath 271 (or equivalent) instead of a keycoat. The metal lath should be attached to the previously fixed galvanised steel banding straps using 1.6mm galvanised wire ties at maximum 300mm centres. Alternatively, stud welded pins of sufficient length to pass through the mineral wool, metal lath and half the Promat FENDOLITE® MII thickness may be attached to steel banding, at 450mm centres prior to securing the mineral wool around the vessel. The mineral wool and metal lath should be secured on the pins with nonreturn (Speedfix type) washers. Ensure the EML / Riblath is overlapped and secured in accordance with the manufacturers recommendations. Spacers of suitable thickness may be used under the metal lath at the top of the vessel to prevent crushing of the mineral wool.

Application of Promat FENDOLITE® MII collars and bands

The purpose of Promat FENDOLITE® MII collars and bands is to ensure that the wire reinforcement is consistently "stood off" the vessel and in the correct position. Collars and bands shall be formed using Promat FENDOLITE® MII which shall be spray applied as vertical collars around the vessels along their complete length at not less than 500mm and no more than 1000mm centres. At the dished ends on the vessel, the collars are replaced by horizontal bands at 500mm centres. The collars and bands should be 200 - 300 mm in width and may be levelled off (if necessary) to approximately 50% of the specified Promat FENDOLITE® MII thickness using a wooden float fitted with spacers or a suitable alternative. The collars/bands may be applied in more than one pass, if necessary. The surface must be left with a rough texture. The Promat FENDOLITE® MII must be left for **at least 24 hours** to gain strength before proceeding further.

Installation of mesh retention system

Promat assume that welding is not permitted on vessels and therefore the mesh support system outlined below does not rely on welded fixings. The proposed system is based on the concept of a monolithic reinforcement of sufficient tensile strength to support the Promat FENDOLITE® MII with a safety factor. Promat FENDOLITE® MII bonds well to a variety of substrates but for calculation purposes, it has been assumed that Promat FENDOLITE® MII is not bonding to the vessel. The tensile strength of the Promat FENDOLITE® MII has also been ignored.

Mesh type

Promat recommend the use of 100mm x 100mm x 2mm galvanised hexagonal mesh.

Installation of mesh on vessel

Unwrap a sufficient length of mesh to pass around the circumference of the vessel. Starting at the bottom of the vessel, pass a length of mesh over the top of the vessel. Overlap the ends of the mesh by a minimum of two mesh apertures tensioning as necessary and join the mesh on the underside of the vessel with 1.6mm galvanised wire ties or galvanised hog rings at a maximum 150mm staggered pitch. If utilised, mesh may also be attached to the pre-welded pins with non-return washers.

Moving along the vessel, repeat the procedure with another length of mesh overlapping the first length by a minimum of two mesh apertures. Join the sidelaps with 1.6mm galvanised wire ties or galvanised hog rings at 150mm intervals as previously described. In order not to have a continuous join along the underside of the vessel, overlap of mesh should be staggered. Add additional lengths of mesh, taking care to ensure a staggered join until only the vessel ends are not covered with mesh.

To vessel dished ends

As an alternative to the recommended 100mm x 100mm x 2mm galvanised mesh, the mesh used for the dome end areas can be PROMAT® Plastic Coated Galvanised Mesh (50mm x 50mm x 1.4mm), for ease of installation onto the dome ends. The mesh must be overlapped on to the existing mesh by a minimum of two mesh overlaps (100mm) and secured with 1.6mm diameter galvanised wire ties of galvanised hog rings at 150mm centres.

To saddle or plinth supports

To secure reinforcing mesh in place Promat recommend the use of stud welded pins (for steel saddles) or shot-fired (or drilled) fixings for concrete plinths. In the case of stud welded fixings to steel, this will entail local removal of primer in order to effect a correct weld. If welding is not permitted, adhesive pins may be used to temporarily locate the mesh. The same hexagonal reinforcing wire may be used on the supports as is used on the vessels. It must be overlapped by a minimum of two mesh apertures onto itself and where applicable, onto the existing wire on the vessel and joined with 1.6mm galvanised wire ties or galvanised hog rings at 150mm centres. Care must be taken to ensure that the mesh lies substantially in the mid-thickness of finished Promat FENDOLITE® MII. **Joins and overlaps may need to be staggered so as that no more than 3 layers of mesh overlap at any one point.**

If the support is a fixed support, the mesh and Promat FENDOLITE® MII shall be continuous. If the support is a moving (sliding) support, the mesh and Promat FENDOLITE® MII of the vessel and the support shall be discontinued and a joint left open, to be filled afterwards with mastic sealant.

Refer to EIDS 015 for more information on the application of Promat FENDOLITE® MII to insulated vessel saddles.

Application of subsequent coat(s) of Promat FENDOLITE® MII

Mix and spray apply Promat FENDOLITE® MII in the normal manner to the specified thickness on the vessel and its supports. Application may commence at the base of the vessel and proceed upwards or may commence at the top of the vessel and proceed downwards, but it application commences from the top of the vessel, **it is essential that any day joints are cut back to create a positive rake of not less than 30°**. Where possible, the Promat FENDOLITE® MII should be applied as a single coat to the required thickness. It may be applied in more than one pass, however (i.e. a pass of material may be left for up to two hours to stiffen before application of another pass). If the material is allowed to set, the next layer is defined as another coat. The final coat shall be at least 8mm thick to avoid cracking.

Promat FENDOLITE® MII **must not be trowelled flush with the reinforcing mesh** as this can create a plane of weakness. The suggested finishing technique is to level the surface with a steel float to close down the surface. A suitable expansion joint should be constructed at the vessel / plinth or saddle junction.

Water shedding and sealing of Promat FENDOLITE® MII / steel junctions

Top surfaces shall be sloped to shed water. All terminations of Promat FENDOLITE® MII against steel must be sloped to shed water. Promat FENDOLITE® MII / steel junctions shall be sealed by cutting a 'U' into the material and applying a polysulphide or silicone based mastic sealer.

NOTE: Promat recommend that the mastic seal is not applied until after final surface treatment.

Final surface treatment

Promat propose that on curing and drying of the Promat FENDOLITE® MII, the surface is treated with a Promat approved topcoat paint system. The selected topcoat system must be applied strictly in accordance with the manufacturer's recommendations. It is necessary to maintain the correct environment conditions as stipulated in our current Promat FENDOLITE® MII & Promat FENDOLITE® TG Energy Industries Application Manual immediately before, during and after the particular application. Refer to Energy Industries Data Sheet EIDS 033 - Sikalastic (Decothane) Application Procedure.

NOTE: Ideally, all repair work should be carried out prior to application of the final surface treatment (refer to the current Promat FENDOLITE® MII & FENDOLITE® TG Application Manual).

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.