Polibrid 705E
Application Guidelines

Prepared by: M&PC Technical Support

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The International Paint Application Guidelines have been produced and revised in line with the Worldwide Protective Coatings Product Range. The purpose of the guidelines is to ensure that the product, as applied, provides the required level of durability.

Successful in-service performance of a coating system depends upon both the correct choice of product(s) and the adoption of the correct guidelines for surface preparation and paint application.

The responsibilities for achieving the specific standards outlined, and for carrying out surface preparation and paint application, rest with the Contracting Company. Under no circumstances do these responsibilities rest with International Paint. We will generally provide for the presence of a Technical Service Representative at key stages during the performance of the contract. The role of the International Paint Technical Service Representative is advisory only unless otherwise specified in the terms and conditions of the contract. The information contained herein presents guidelines for the application of Polibrid 705E to correctly prepared surfaces.

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1. POLIBRID 705E SPECIFICATION

1.1 Surface Preparation

In common with most protective coatings schemes, the performance level of Polibrid 705E is ultimately determined by degree of surface preparation. The higher the degree of surface preparation achieved, the greater the long-term performance. For optimum performance, all surfaces to be coated should be clean, dry and free from contamination including dirt, salts, oil and grease.

Steel

Prior to paint application all surfaces should be assessed and treated in accordance with ISO 8504:2000. Where necessary, remove weld spatter and smooth weld seams and sharp edges (see Appendix 1). In cases where the substrate is corroded or pitted, it may be necessary to fresh water wash the areas after abrasive blasting, then re-blast, in order to ensure complete removal of soluble corrosion products.

The maximum allowed total soluble salt contamination on the steel before application of the Polibrid 705E is 10µg/cm^2. Acceptable levels of soluble salts are

- Chlorides : Less than 3µg/cm^2 (3ppm)
- Sulphates : Less than or equal to 5µg/cm2 (5ppm)
- Nitrates: Less than or equal to 5µg/cm2 (5ppm)

See section 3 for more details regarding measurement.

All steel surfaces to be coated should be correctly prepared prior to application of the coating system.

Abrasive grit blast the steel to be coated to a minimum of ISO Standard 8501-1:2007 Sa2½ or SSPC SP10. A sharp and angular surface profile of 90 microns (3.6 mils) minimum is required. Polibrid 705E may not be applied to flash-rusted surfaces or to existing coatings.

Examples of abrasive that may be used to achieve a sharp, angular profile of 90 microns include (but not limited to):

Unrecycled 20-40 garnet
Unrecycled 12-25 garnet
Steel grit G24 or higher

Concrete

New concrete shall be properly cured prior to the application of Polibrid 705E; minimum cure time is 28 days or until which time the moisture content test is passed according to ASTM D4263 'Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method'. Laitance and efflorescence shall be removed. Moisture content must also be checked to make sure it is below 7% prior to coating application or by the method described in ASTM D 4263,. Direct application to old concrete surfaces which are damp, but not moist or wet requires the use of a geotextile fabric reinforced Polibrid system. The tensile strength of the concrete should be minimum 2MPa (300psi).

The presence of oil, grease and release agents in concrete may cause loss of coating adhesion. Although the surface may appear free of any oil, solvents in the coating material can draw the oil from within the concrete to the coating/concrete interface. Surface preparation of concrete should be done in accordance to SSPC-SP13/NACE 6. All chemical contamination must be removed prior to the application of Polibrid 705E or optional Polibrid 670S primer. Contamination includes efflorescence, laitance, oils, chemicals, acids, salts, alkalis, curing compounds, form release agents, and microorganisms.

All existing coatings and sealers must be removed to ensure proper bond between the concrete substrate and lining. Only small sections of existing coatings that are very firmly adhered and greatly resist removal may remain, however, these sections shall be thoroughly abraded to provide a roughened surface. The use of the geotextile method (see section 3.4) may be possible directly onto degraded concrete substrates without the need for resurfacing compounds. Contact International Protective Coatings for more specific advice. Any rebar corrosion must be restored to provide a uniform and stable substrate for the coating.

The presence of severe hydrostatic forces may disbond the coating. The concrete substrate should have a vapor barrier on the soil side to prevent hydrostatic forces. Consult a qualified engineer to determine if these forces are present. If so, it is recommended that a test patch be applied to test the bond strength and evaluated over a reasonable period of time.

Abrasive Cleaning & Decontamination

A good blast profile is required to ensure the adhesion of coatings. Depending on condition of the concrete, a combination of chemical cleaning and/or abrasive blasting may be required. Previously applied coating will require abrasive blasting for removal. Dry blasting is recommended. Blasting will remove loose and powdery concrete and surface laitance. The resulting surface must be hard, with surface voids open and with a profile that is satisfactory for coating adhesion. Small voids (or bug holes) can be filled with Polibrid 705E and a trowel at application, however, large voids must be filled with an epoxy based grout. At expansion joints, if any, filler compound shall be roughly flush with or lower than concrete surface.

Wet abrasive blasting shall be allowed provided that water produced does not hinder application of materials. Water blasting alone shall not be allowed, except for decontamination.

Acid etching is never acceptable.

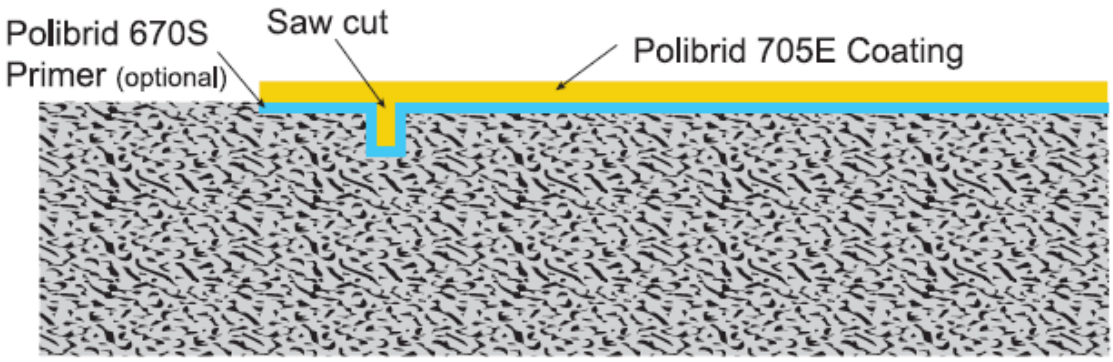
The blast nozzle must be kept at a distance that will provide good results without gouging the concrete. The resulting surface should be at least as rough as 60 grit sandpaper or refer to ICRI profile standards surface profile CSP4 as a minimum. All dust and debris must be removed after abrasive blasting.

Dry, oil-free air must be used for the blasting operation. Use ASTM Method D4285 for determination of oil and water in compressed air sources.

Final cleaning methods must ensure that the surface is free of any cleaning agents or other surface contaminants. This may be accomplished by a clean compressed air blow down, vacuuming, dry wipe down or other appropriate final cleaning methods. The surface must be allowed to dry adequately for compatibility with the coating material. If present, all leaks and infiltrations shall be repaired and eliminated as directed by an Engineer.

Treatment of leading edges: During surface preparation, a saw-cut shall be made along each proposed leading edge of coating application. Saw-cuts (sharp edges shall be rounded or trimmed) shall be 15 to 25 mm (0.59 to 0.98 inches) deep and 3 to 6 mm wide (0.12 to 0.24 inches) and saw-cut cavity shall be vacuumed to a dry, dust-free condition. Adjacent surfaces not to be coated shall be protected from overspray by taping-off in a neat manner. (Note: When applying Polibrid 705E to the leading edge, a liberal amount of the Polibrid 705E coating material shall be spray-applied to saw-cut area, then pressed with trowel or putty knife into the saw-cut cavity, and smoothed level and sprayed over, mechanically anchoring the leading edge to the substrate. After coating sets up, but remains “tacky”, it shall be razor-cut to remove the protective tape, leaving a straight, neat leading edge.)

Polibrid 705E Coating
Leading Edge Treatment



1.2 Typical Direct-to-Substrate Specification

Coat	Product	DFT (microns)			DFT (mils)		
		Spec	Min	Max	Spec	Min	Max
Stripe *	Polibrid 705E	-	-	-	-	-	-
Primer**	Polibrid 670S	150	*(100)*	*(250)*	*6*	*(4)*	*(10)*
Full	Polibrid 705E	2000	*(500)*	*(5000)*	*80*	*(20)*	*(200)*

*All areas itemised in Section 6.10 are to receive a stripe coat. Wet-on-wet is possible.
The use of geotextile fabric is dependent upon service end use. (see section 3.4)
**The use of Polibrid 670S primer is intended for use over concrete and is optional.

1.3 Notes on specification

The detailed project coating specification provided by International Protective Coatings must be followed at all times. This will include specific details with regard to surface preparation, dry film thickness requirements and use of the geotextile fabric.

Specific project requirements will be dependent upon the service end use, substrate conditions and expected design life. Where chemical resistance is required, always consult International Protective Coatings to confirm that Polibrid 705E is suitable for contact with the product to be stored.

Refer to the Polibrid 705E datasheet for precise overcoating intervals, pot life and curing requirements.

2. ENVIRONMENTAL CONDITIONS FOR APPLICATION

Application of Polibrid 705E should always take place in good climatic conditions. For maximum performance, ambient temperatures should be between 4-49ºC (39-120ºF), with substrate temperatures between 6-60ºC (43-140ºF). Application should not take place when the surface temperature is less than 3ºC (5ºF) above the dew point.

Dehumidification, air conditioning and/or heating equipment may be necessary to control environmental conditions but care should be taken when choosing heating methods, as some heaters can increase the local relative humidity.

For higher temperatures, for example those found in the Middle East and tropical areas, it is recommended that application is scheduled for cooler parts of the day and material is protected from exposure to direct sunlight. Consult your regional International Paint Technical Department for further advice.

3. POLIBRID 705E APPLICATION PROCEDURE

3.1 Steel:

Defective steelwork, prior to contract commencement, should be repaired in line with the guidance notes given in the Appendix of this document (Fabrication Rectification)

Microclimate should be monitored in between applications. Changes in microclimate may affect overcoating intervals.

For steel surfaces, grit blast the steel to be coated to a minimum of ISO Standard 8501-1:2007 Sa2½ or SSPC SP10. A sharp and angular surface profile of 90 microns (3.6 mils) is required.

Upon completion of the surface preparation process, and following inspection by the Contractor Quality Control Department, an International Paint Technical Service Representative may also inspect the whole area and mark up any substandard areas if agreed as part of the contract.

For steel substrates: before coating of the blasted surfaces commences, the amount of residual salt should be measured using an appropriate method such as the Bresle Patch (ISO 8502-6), Chlor*Test CSN Salts test kit or similar. The number of tests to be carried out is dependent upon the size of the tank. If the residual salt level is greater than that agreed, the entire area to be coated should be fresh water washed and retested.

All marked areas shall be brought up to the required standard. The whole blasted area is to be blown down and tank floors vacuum cleaned to remove all dust and contamination.

Ensure, prior to application, that the minimum environmental conditions specified in Section 2 are achieved. Provision should be made to ensure these conditions are maintained throughout the painting program.

Stripe Coat: All areas itemised in Section 6.10 are to receive a stripe coat. It is usually easiest to spray apply the Polibrid 705E directly onto the area then use a brush, broad knife, trowel or squeegee to quickly work the material to stripe coat and remove any excess. Wet-on-wet application is possible.

Full Coat: All the areas are to receive the full specification of Polibrid 705E to the specified dry film thickness. Each coat shall be applied at specified film thickness in a single application, which may consist of several increments, accomplished by one or more passes of the spray gun, all applied within recommended recoat times to a specific area. High profile areas shall be coated using 4-way passes of the spray gun to ensure complete coverage. If necessary, film thickness may be increased as needed, until a holiday-free membrane is achieved.

Under certain circumstances, Polibrid 705E can be applied to steel using the geotextile fabric method.

When fully hard dry, and accepted by the Contractor Quality Control Department, an International Paint Technical Service Representative may confirm the dry film thickness if agreed as part of the contract.

Any areas of under thickness are to be brought up to the minimum thickness specified. This must be carried out within the overcoating intervals specified for the product. See section 3.5 for re-coating advice.

Unless otherwise advised, all damages are to be either vacublasted to Sa2½ (ISO 8501-1:2007) or SSPC SP10. All damages are to be touched up with Polibrid 705E to the specified minimum dry film thickness as per the project specification. For overlap areas, hand abrasion to produce a mechanical key is acceptable.

Ensure that fresh containers are used after each unit is sprayed – do not refill the old containers.

For potable water applications, please consult the relevant approval, e.g. NSF, AWWA, etc for details on any required rinse-out or conditioning procedure which may apply, prior to commissioning the tank.

3.2 Concrete:

For concrete surfaces, carry out appropriate preparation as described in Section 1.

New Concrete

Polibrid 705E shall be spray-applied while the concrete is in a cooling cycle, i.e. when the concrete is cooling in temperature. Concrete temperatures shall be recorded with a suitable probe and logged. During daylight hours the cooling cycle normally starts after 5.00pm. ***Note:*** This is not applicable when utilising the geotextile method.

Each coat shall be applied at specified film thickness in a single application, which may consist of several increments, accomplished by one or more passes of the spray gun, all applied within recommended recoat times to a specific area. High profile areas shall be coated using 4-way passes of the spray gun to ensure complete coverage. If necessary, film thickness may be increased as needed, until a holiday-free membrane is achieved. To minimize the creation of pinholes / bubbles due to out-gassing of air from porous concrete surfaces, coating shall be applied during a cooling trend in the concrete's surface temperature and in multiple increments of 500 to 750µm (20-30 mils).

Application of Polibrid 705E shall be direct to dry concrete surfaces. Direct application of Polibrid 705E to concrete surfaces that are damp, but not moist or wet, shall be allowed when followed by geotextile fabric.
To control the amount of outgassing and pin-holing that can occur in the final Polibrid paint film, Polibrid 670S primer can be applied prior to the application of Polibrid 705E. Follow the guidance on Polibrid 670S datasheet for installation and mixing procedures.

Polibrid 705E may also be applied to new concrete using the geotextile fabric method.

3.3 Treatment of Expansion Joints

Geotextile fabric shall be used to produce floating bond-breaking systems over all expansion joints.

The fabric material will be a non-woven, 100% polypropylene fabric, and "heat-set" on one side, shall weigh 8 to 10 oz./yd.² (250 to 313 g/m²) and be approved by International Protective Coatings.

The steps to be followed are:-

- Two saw cuts (6mm deep x 6mm wide, ¼" x ¼") are made along both sides of the expansion joint. The total width between saw cuts should be no more than 300mm (12"), centred on the expansion joint.
- The area between the saw cuts, plus areas extending about 150mm (6") beyond the saw cuts shall be decontaminated, abrasive cleaned and vacuumed to remove all dust and debris.
- If expansion joint compounds are not in place, then the cavity shall be cleaned, filled and treated as specified by the civil engineer, before surface preparation of the adjoining areas. If expansion joint compounds and backing rods are already in place, they must be protected from damage by abrasive cleaning.
- Ensure all surfaces to be coated are dry.
- If using Polibrid 670S primer, apply one coat in accordance with guidance listed on the datasheet.

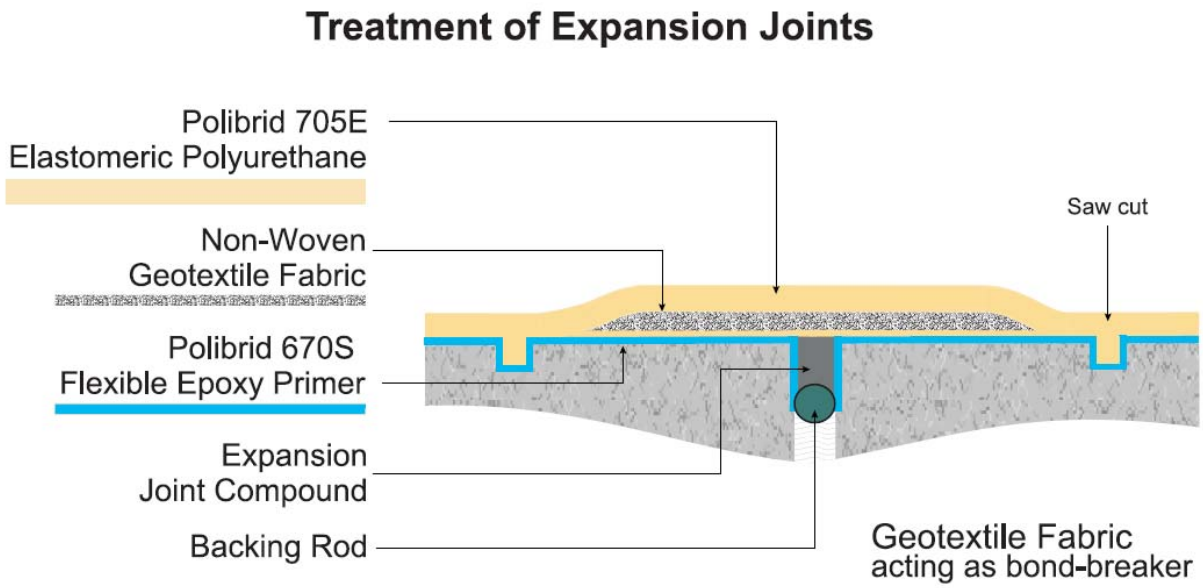
- Fill the saw cut cavities by either pouring or spraying sufficient Polibrid 705E into the cavity, ensuring it is completely filled with no air pockets. Using a clean trowel or spatula, quickly level the excess amounts of coating before it hardens.

- Spray apply Polibrid 705E at a minimum of 1000µm (40 mils) WFT to the treated area making sure that the outermost edges of the coating DO NOT extend beyond the prepared surfaces. Evidence of uncoated, but prepared surfaces about 75mm (3") beyond edges of the applied coating is recommended.

- Place a pre-cut length of geotextile fabric, 300mm wide (12"), and press it evenly into the still liquid Polibrid 705E coating. Make sure the fabric is centred directly over the expansion joint ("heat-set" side facing out, "fuzzy side" facing down) and that the edges of the fabric do not extend beyond the saw cuts. Use a clean, non-stick, polyethylene covered nap roller to lightly and evenly press the fabric into the still liquid coating. Alternatively, a non stick squeegee or trowel could be used.

- Topcoat the installed fabric (heat-set side) with Polibrid 705E at 2000 - 3000µm (80 - 120mils) at the same time as coating the rest of the structure. Exposed fabric fibres or edges, or other discontinuities, are not acceptable.

- See diagram below.



3.4 Application to Concrete using the Geotextile Method

This system is often referred to as a "Bonded Geo-membrane" consisting of a geotextile fabric embedded between two layers of Polibrid 705E. The pre-cut, heat-set fabric is pressed onto a still fluid Polibrid 705E 1st coat layer, then the fabric is overcoated with a 2nd coat of Polibrid 705E. It is especially suitable for vertical, poured-in-place concrete walls. A typical specification is below

Coat	Product	DFT
1st	Polibrid 705E Geotextile Fabric	500µm (20 mils)
2nd	Polibrid 705E	2000µm (80 mils)

Advantages of using the Geotextile Method

The fabric itself provides an additional level of overall dry film integrity resulting in:-

- Much improved tolerance to moisture which eliminates out-gassing issues and renders the film unaffected by hydrostatic conditions
- Much improved film strength which allows for crack bridging, treatment of expansion joints, resistance to dynamic cracking and increased tear resistance.
- Eliminating the need for resurfacing compounds as the overall reinforced system has more tolerance to less than ideal concrete surfaces.

Procedure

Application of Polibrid 705E shall be direct to dry or damp (see surface preparation for definition), but not moist or wet concrete surfaces or to Polibrid 670S primer (optional). Application to concrete surfaces shall be followed by geotextile fabric.

This option may be utilized on suitable vertical and horizontal surfaces, when a reinforced system is desired, or as an alternative to resurfacing before installing the Polibrid 705E Coating System.

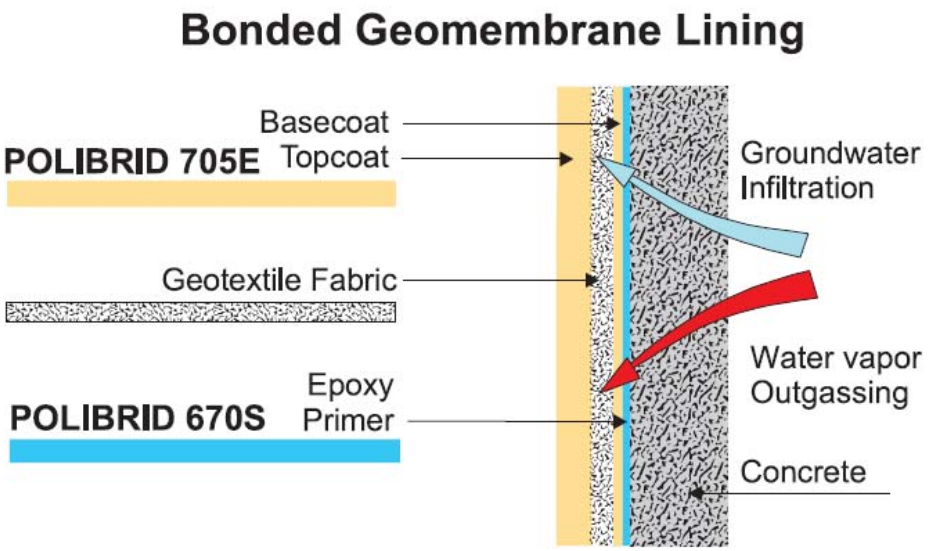
The fabric material will be a non-woven, 100% polypropylene fabric, and “heat-set” on one side, shall weigh 8 to 10 oz./yd.² (250 to 313 g/m²) and be approved by International Protective Coatings.

Polibrid 705E will be applied, at 500 µm (20 mils) minimum, to the suitably prepared concrete surface. Pre-cut fabric panels shall be firmly pressed and embedded, ”heat-set” side facing out (the “fuzzy” side should be facing down), into the Polibrid 705E basecoat while it remains in a semi-liquid state. Fabric shall be evenly pressed with a non-stick roller, squeegee or trowel to ensure that it is adhered flat against the basecoat in all locations. **DO NOT SATURATE THE FABRIC.** Over irregular surfaces, fabric shall be pressed by hand (use suitable protective gloves) to maximize contact with basecoat. Adjoining panels shall be overlapped by 5cm and bonded together with Polibrid 705E, spray-applied between the overlapping fabric. Suitable measures must be taken to prevent the roughing up of fibres from the heat sealed surface.

Embedded fabric panels may, when conditions require, be mechanically fastened to the concrete substrate using 5mm diameter x 50mm long suitable stainless steel anchor bolts with 40mm diameter stainless steel washers, installed at 1m centres, or as appropriate for intended use.

Polibrid 705E topcoat shall be spray-applied directly to the exposed “heat-set” side of the embedded fabric to produce complete coverage in all locations, to a minimum of 1500µm (60 mils), target 2000µm (80 mils). Exposed fabric fibres or edges, or any other discontinuities shall not be acceptable. If necessary, the applied film thickness shall be increased as needed (beyond specified thickness), in discussion with International Paint, to produce complete coverage and sealing of the geotextile fabric.

Where the geotextile system is used on 100% of the surface, no special treatment of the expansion joints is required.



3.5 Recoating

Fresh coating may be sprayed over previously applied coating as long as undercoat remains wet or tacky to the touch, or has not exceeded 4 hours at 21°C (70°F) substrate temperature since application. Higher temperatures shorten the recoat window and colder temperatures extend the recoat window.

If recoat time is exceeded, undercoat shall be brush blasted or sanded to remove gloss, then vacuumed or solvent-wiped to dust-free condition, allowing all solvent to dry, before application of fresh coating.

For transitions between coating sections applied on different days, a minimum of 30 cm of the undercoat shall be brush blasted or sanded and prepared as described above, and fresh coating shall be feathered in at least 15 cm. Avoid application to glossy surfaces, making sure there is plain evidence of brush blast beyond leading edge of fresh coating. Coating applied to improperly prepared surfaces shall be removed immediately.

3.6 Return to Service

Water Immersion

Polibrid 705E may be placed in service upon satisfactory inspection, as required. Minimum cure time for water immersion is 1 hour at 29°C (84ºF), 2 hours at 22°C (72ºF), or 4 hours at 16°C (61ºF). Polibrid 705E is designed for ambient temperature immersion and 40°C (104ºF) shall not be exceeded.

Potable water service (Australia ONLY)

Polibrid 705E may be placed in service upon satisfactory inspection as required, and after vessel is treated to satisfy ANSI Standard C652 “Disinfection of Water-Storage Facilities”. Minimum cure time for immersion is 1 hour at 29°C (84ºF), 2 hours at 22°C (72ºF), or 4 hours at 16°C (61ºF).

Abrasive or chemical environments

Polibrid 705E may be placed in service upon satisfactory inspection, as required. Minimum cure time is 7 days at 22°C (72ºF) average substrate temperature. Allow more time for cooler temperatures.

4. POLIBRID 705E APPLICATION NOTES

4.1 Duel feed application

Polibrid 705E must always be applied by heated plural component airless spray, designed for working with fast curing, short pot life materials, especially when lining large areas and applying at lower temperatures.

Coating shall be spray-applied by qualified technicians, using plural-component, high-pressure, airless spray equipment, that automatically proportions the Part A and B components, blends them via in-line static mixers and sprays the mixed coating material at a fluid pressure of 2,500 psi. Coating materials shall be maintained between 27°-32°C (80-90ºF) from drums to spray gun.

Higher paint temperatures will reduce viscosity to help application through long hoses or vertically upwards, but it is recommended that paint temperatures do not exceed 50ºC (120ºF).

Use of in-line static mixers (or “worm”) are recommended.

All spray equipment must be in good working order.

In cold and/or windy weather, insulate the exposed pumping equipment using pipe insulation or similar insulating material to reduce unit heat loss.

A pump capable of accurately delivering the mix ratio stated in the product data sheet is essential (45:1 or greater power ratio is recommended).

Tips should typically be the size range 25-35 thou (0.64 – 0.89mm) – reversible tips are suggested – depending upon target film thickness. For lower thicknesses, e.g., 500µm (20 mils) use of a 21 thou (0.53mm) tip is possible.

Plural component application requires volumetric check of the mix ratio (utilizing a ratio monitoring system) before and during the application process.

The plural component unit should have facility for heating of the base and curing agent components. The use of trace heated lines or an inline heater may be required to maintain the temperature required for application.

Cleaning of equipment

It is good practice to first clean out the equipment with GTA203, followed by a final purge of GTA004 or mineral spirits to ensure any moisture is removed from filters, hoses etc. Note: Any moisture present within the equipment could cause reaction with the Isocyanate and may cause “lumping” which could block valves and filters.

Important Note: A pressure drop is associated with paint lines. This pressure drop needs to be considered and depends upon the following factors.

- The viscosity of the paint. Higher viscosity paints produce greater pressure drops than low viscosity paints.
- The length of the paint line. Longer lines produce greater pressure drops.
- The internal diameter of the paint line.
- Flow rate of paint through the line.

4.2 Cartridge pack application

In some countries, Polibrid 705E is available in twin cartridge packs. These cartridges represent a highly portable application method, with reduced equipment requirements compared with traditional plural airless spray.

4.2.1 Requirements for application:

- 7 bar (100psi) compressed air with supply available up to a flow rate of 50 cubic feet per minute;
- A *Sulzer MixCoat™ Spray* cartridge gun;
- Polibrid 705E cartridges fitted with a static mixer. The static mixer must include a non-return valve as part of the mixer coupling. This is visible at the supply end of the static mixer as a metallic object.

4.2.2 Configuring the spray gun for use with Polibrid 705E

- Assemble the spray gun as per manufacturers' instructions.
- The cartridge gun is supplied with replaceable plunger parts to accommodate cartridges of several ratios. For use with Polibrid 705E, connect the 2:1 plate to the plunger assembly. For guidance, refer to the spray gun manufacturers' instructions.
- There are two air flow adjustments on the spray gun located on the handle: one which controls the plunger speed (product delivery rate) and a second which adjusts the volume of atomising air. Most successful application is normally achieved by adjusting the plunger speed to slow and setting the atomising air to a low – mid setting. Atomising air should be adjusted as necessary to achieve a good spray pattern once the cartridge has been installed.

4.2.3 Preparing for application

- The cartridge pack must be mechanically shaken until part A becomes a consistent buff colour. This may be possible to complete off-site in advance of application.
- Pre-heat cartridges to achieve a product temperature of 28-35 °C (82-95°F). The optimal temperature for application will depend on the age of the material being applied where older material will require temperatures closer to the top end of the range and new material temperatures at the lower end of the range.
- Fit the static mixer to the cartridge

Insert the cartridge in the spray gun as per manufacturer's instructions. The cartridge locks into the spray gun securely

4.2.4 Product application

- Purge air tapped inside the B cartridge into a suitable receptacle by slowly squeezing the trigger. The output of the gun when completing this procedure should disposed of as the mix ratio would be incorrect.
- Once the mixing process has been started, the contents of the spray pack should be applied within 5 minutes to prevent blockages forming in the static mixer.
- Adjust the spray fan to deliver a light splatter appearance which flows into a smooth film. It may not be possible to achieve a fully atomised spray pattern without compromising the shape of the spray pattern or delivery to substrate. A less atomised fan is likely to provide better application control and reduce overspray.
- Best performance is achieved when the entire cartridge is used in one continual delivery. Releasing the trigger and continuing application may result in non-ideal mix ratios being delivered.
- Where required, thicknesses up to 5mm can be achieved by applying Polibrid 705E to an area, allowing the applied material to thicken over the course of approximately 5 minutes and then applying additional material. Several applications may be required to achieve very high thickness.
- The applied film should be a consistent buff colour and not show areas where colour is inconsistent. Lighter areas indicate excess part A whereas darker areas indicate excess part B. Splatter of inconsistent colour is also an indicator of mix ratio issues. If there are any issues with the mixing of the product, contact IP for guidance

4.2.5 Post application

- Remove the cartridge from the spray gun including the static mixer and dispose of as per local regulations.
- Do not reuse the static mixer as this will likely result in product application issues due to the short curing time of Polibrid 705E.
- Ensure all spray gun parts are free from Polibrid 705E. The connector at the end of the atomising air tube should be cleaned to remove any product build-up which has occurred during application. GTA203 can be used to remove this material before it has fully cured. It may be necessary to clean the connector between application of each cartridge.

4.2.6 Trouble shooting

- Known issues and causes include:
    - Inconsistent colour and of work piece caused by:
        - Cartridges have not been pre-heated or preheated to a suitable temperature or not pre-heated for long enough to achieve a consistent internal temperature; or
        - Cartridges have not been shaken or shaken sufficiently prior to use; or
        - Not pre-purging air from the part B cartridge; or
        - A combination of the above
        - Inconsistent colour may be indicative of a mixing issue which in turn may reduce product service life.
    - Low film hardness when measured 24h after application. This is typically an effect of off-ratio application and has the same causes as above.
    - Air entrapment in wet film. This may be caused by
        - Excess atomising air – reduce the atomising air pressure or flow.
    - Inability to achieve a suitable spray pattern
        - Cartridges may be too hot if the spray pattern tends towards a ‘pencil’ in appearance
        - Cartridges may be too cold if atomisation is poor
        - Inlet pressure too high or low
    - Rough film appearance with complete mixing
        - Temperature of cartridges too high and flow of product too fast
        - Poor spray pattern
        - Spray nozzle is too close to substrate
- For any other issues, please contact International Paint.

5. TECHNICAL INSPECTION

Project control via regular inspection and agreement on any future action is vital to a successful coating project, and in maximising the potential of a lining system.

All parties involved in the coating work must agree an inspection procedure prior to work commencing, this should outline how and when both work and inspection will be undertaken.

Prior to commencing the project, the contractor(s) must be provided with copies of the relevant product data sheets. Attention should be drawn to pack sizes, mix ratios, thinning restrictions, required application conditions etc.

Inspection equipment for measurement of profile depth, humidity, wet and dry film thickness, etc should be of suitable type and should be within calibration limits.

NOTE: When measuring the dry film thickness of coatings, the d.f.t. gauge must be calibrated prior to use as follows:

1. Check that the probe is clean.
2. Place the probe on a sample of millscale-free smooth steel of thickness greater than 1mm.
3. Calibrate the instrument to zero.
4. Select a certified shim of similar thickness to that expected for the coating under test.
5. Calibrate the gauge to the shim thickness.
6. Check that the gauge reads zero when replaced on the smooth steel sample.

Measurement of dry film thickness is described in ISO Standard 2808:1991 - Method 6A. or SSPC PA2

Holiday Detection on Concrete

The coating shall be inspected in accordance with ASTM D-4787 “Continuity Verification of Liquid or Sheet Linings Applied to Concrete Substrates”, using high-voltage spark testing equipment with variable settings. Test voltage shall be set at an initial 4,000 volts per mm (39.4mils) of specified film thickness, then increased as needed to compensate for relative conductivity of the concrete substrate by spark testing an induced holiday at furthest extension of test probe from grounding location. Once test voltage is determined, it shall be used throughout that area, then re-determined again every time a new ground is made. Detected holidays shall be marked and repaired as per International Protective Coating repairs recommendations.

Holiday Detection on Steel

Holiday testing should be carried out to ensure the coating is free from voids according to NACE SP0188-2006 High Voltage Spark Testing at a test voltage of 100 volts per 25µm (1 mil). Detected holidays shall be marked and repaired as per International Protective Coating repairs recommendations.

For bonded geotextile fabric membranes, similarly test voltage shall be set at an initial 4,000 volts per mm of total system thickness – including the geotextile fabric.

The fully cured lining system should be uniform in colour and gloss and be relatively free of any runs, sags, porosity, pinholes, fisheyes, soft spots and debris.

6. GENERAL NOTES

6.1 Steel Condition

Prior to commencement of gritblasting it is essential that the steel is clean, dry, and in a condition suitable for surface preparation and application of the coating scheme. All grease and oil must be removed from all surfaces and all hot work must be complete.

Defective steelwork, prior to contract commencement, should be repaired in line with the guidance notes given in Appendix 1.

6.2 Steelwork Preparation

Preparation grades of welds, cut edges and surface imperfections are described in ISO 8501-3. Preparation to P3 grade of this standard will provide surfaces which will ensure optimum paint performance. Please see Appendix concerning rectification of fabrication faults.

6.3 Heating

If heating is necessary to satisfy the painting specification, it should be by means of a heat exchange system, i.e. air admitted to the encapsulated area should not pass directly through a combustion chamber.

6.4 Lighting

Lighting during painting must be electrically safe and provide suitable illumination for all work. As a general guide, lighting may be considered suitable if this text can be read at a distance of 30 centimeters from the eye.

Ideally, the lighting should be powerful mains supplied spotlight with background lighting on at all times in the interests of safety.

Powerful mains spotlighting must be provided when inspection work is being carried out.

6.5 Storage of materials

For maximum shelf life, it is recommended that Part B is stored at temperatures between 25°C (77°F) and 40°C (104°F). Absolute minimum storage temperature is 15°C (59°F).

Do not expose material to direct sunlight.

6.5.1 Storage at point of application

Provision must be made for heated storage, (e.g. via use of heated blankets), of the Polibrid 705E to ensure a temperature of 35°C (95°F) is achieved for the part A and 30°C (86°F) for the part B prior to application. If this is not possible, material should be re-circulated within the lines to warm material up. Temperature of material must not exceed 50°C (122°F)

6.6 Weather Shelters

Weather shelters should be made available to cover application equipment during mixing and application of material. This should also prevent contamination from entering the area where application is underway.

6.7 Abrasive Grit Blasting

The steel surface should be grit blasted to a minimum standard ISO 8501-1:2007 Sa2½ or SSPC SP10.

In cases where the substrate is corroded or pitted, it may be necessary to fresh water wash the areas after abrasive blasting, then re-blast, in order to ensure complete removal of soluble corrosion products.

The maximum allowed total soluble salt contamination on the steel before application of the Polibrid 705E scheme is given in Section 1.1 'Surface Preparation'.

Air used for blasting must be clean, oil free and dry. The pressure should be at least 8kgcm-² (120psi) at the nozzle.

Abrasives used for blasting must be dry and free from dirt, oil, and grease and suitable for producing the standard of cleanliness and profile specified. The abrasive must therefore be in accordance with the specifications given in ISO 11126 - Parts 1 to 8 and each delivery should carry a certificate of conformity to this specification. Abrasives should also meet local environmental control specifications.

If blasting abrasive is supplied on site without a certificate of conformity, the material should be tested by the yard or contractor in accordance with the methods given in ISO 11127 - Parts 1 to 7.
Particular attention should be given to ISO 11127 - Part 6, where the level of water soluble contaminants must not give a conductivity value greater than 25mS/m, and ISO 11127 - Part 7, where the level of water soluble chlorides must not exceed 0.0025% by weight.

Iron or steel abrasives can be used for in-situ open blasting. Specifications for metallic abrasives are given in ISO 11124 - Parts 1 to 4 and the corresponding test methods in ISO 11125 - Parts 1 to 7. If used, careful and thorough cleaning must be carried out at all stages of the operation to ensure that no abrasive remains on the steel as this may subsequently corrode.

Measurement on site should be by profile replica tape or other mutually agreed instruments. Measurement of surface profile using comparators is described in ISO 8503-2 using comparators detailed in ISO 8503-1. A course 'G' type comparator should be used and a value of 100-150 microns (4 to 6 mils) is acceptable when measured by:

ISO 8503-3: Focusing microscope
ISO 8503-4: Stylus

When using a needle gauge such as the Elcometer 123, a value of 90 microns (3.6 mils), taking a maximum of 10 determinations, is suitable.

6.8 Cleaning

Prior to initial blasting inspection, the bulk of spent grit should be removed.

Any substandard areas should be identified and should be brought up to the specified standard.

Following provisional approval of the blast standard, ALL remaining traces of grit and dust should be removed from all areas by vacuuming; sweeping alone is not acceptable and blowing-down with compressed air may increase potential for contamination.

Final approval of a substrate for coating application should be confirmed after final cleaning.

6.9 Mixing

Part A and B components shall be delivered to the site in their original unopened steel drums with labels intact. Drums shall be stored indoors, off the floor, in cool and dry conditions, protected against excessive moisture, heat, or cold, in accordance with manufacturer's recommendations.

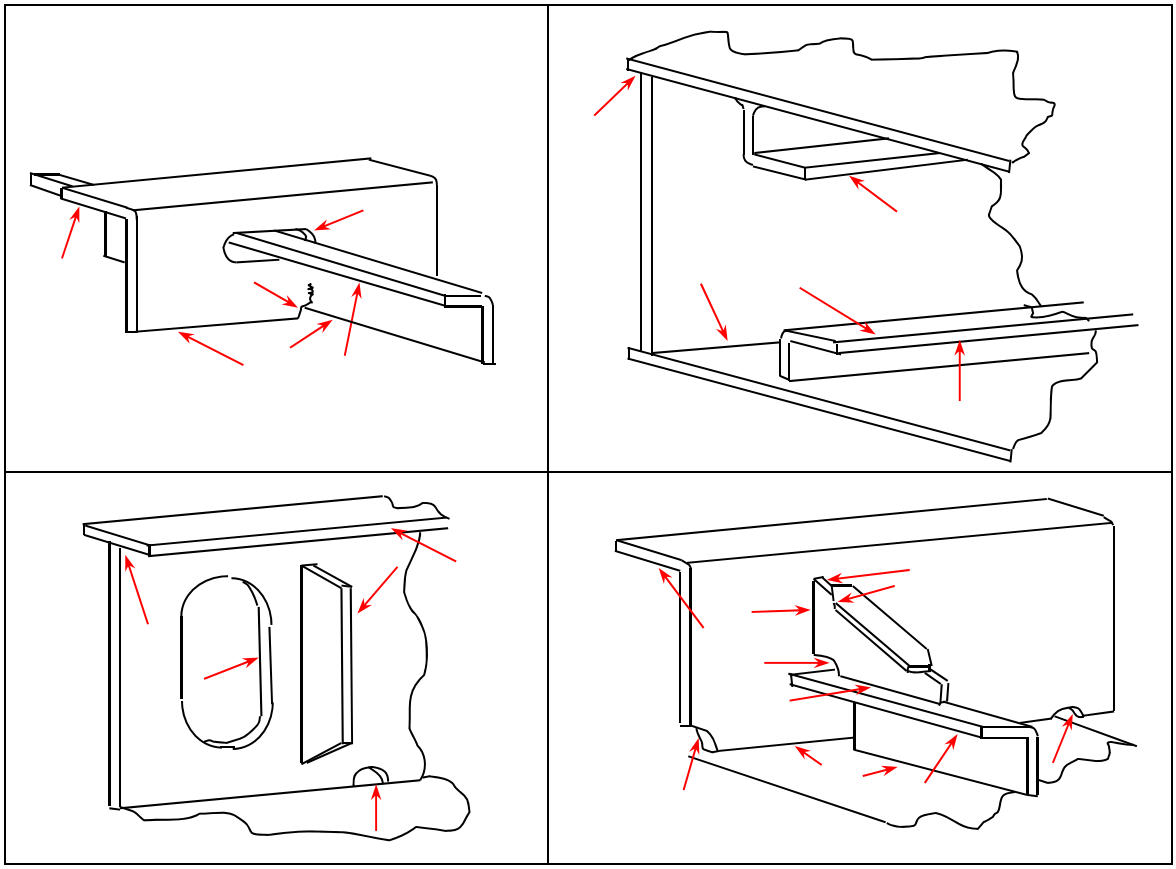
Each component (Part A and Part B) shall be mixed using air driven agitators until the mixture is homogenous (no layering, settling, separation etc.) before each use.

Consult with local sales and/or customer service for available kit sizes for both Part A (Resin) and Part B (Activator).

6.10 Stripe Coats

Stripe coating is an essential part of good painting practice. Typical areas where stripe coats must be applied include behind bars, to plate edges, cut outs (i.e. scallops, manholes, etc), welds/chimes and seam areas, areas of difficult access, small fitments of difficult configuration and areas of pitting.

Note: The above list is not comprehensive, all areas must be included. The following diagrams indicate key areas requiring stripe coating:



In general, stripe coats should be applied by brush. Application by roller should be limited to the inside of scallops.

In exceptional circumstances it may be acceptable to apply a stripe coat to the backs of angle bars by narrow angle spray. The use of spray applied stripe coats however, must be discussed and agreed with the International Paint representative on site. The stripe coat may be overcoated immediately “wet on wet” with Polibrid 705E

7. REPAIR PROCEDURE USING POLIBRID 705E REPAIR KIT

The repair area shall be decontaminated and deficient sections shall be removed until properly applied, firmly adhered coating materials are reached. Exposed surfaces shall be treated to satisfy applicable requirements. Coating material surrounding repair area shall be abraded to remove gloss, then solvent-wiped to dust-free condition and allowed to dry, before application of repair materials. Extent of abraded area shall depend on whether repair materials are spray or hand-applied, but in either case, no repair material shall be applied beyond abraded areas.

Note: The standard Polibrid 705E material supplied for spray application should not be used to make repairs using hand mixing unless absolutely necessary. A Polibrid 705E Repair Kit is available which is specifically designed for repairing small areas via trowel, broad knife or putty knife with improved workability so as not to "set-up" as fast as the standard spray applied material.

7.1 Polibrid 705E Repair Kit for small area repairs

POLIBRID 705E Repair Kits are designed for hand patching relatively small areas of previously applied Polibrid 705E. Except for slightly extended workability, as compared to standard spray-grade Polibrid 705, the products are identical.

The repair kit is supplied in 3 Quart kits (2:1 mix ratio Part A : Part B) in 3 x 1 Quart containers.

General Repair
Remove deficient coatings until sound, well adhered coating remains. Decontaminate the repair area by any acceptable method to remove oils, grease, dirt or other contaminants. Prepare any exposed steel to St3 (ISO 8503) or SSPC SP3 power tool cleaning. Prepare any exposed concrete to SSPC SP7 Brush off blast cleaning. Abrade sections of the existing coating surrounding the repair area to remove all gloss and produce a "well-etched" surface, then solvent wipe and/or power vacuum to remove all dust and contaminants just prior to application of patchning materials.

Pinhole repair
Decontaminate the repair area by any acceptable method to remove oils, grease, dirt or other contaminants. Abrade sections of the existing coating a minimum of 2.5cm (1 inch) in diameter immediately surrounding the pinhole to remove all gloss and produce a "well-etched" surface, then solvent wipe to remove all dust or contamination just prior to application of patching materials. A hand held grinder with a conical tool may be used to countersink each pinhole, possible speeding up the repair process.

Mixing the Repair Kit
Agitate contents of resin container prior to use. Measure 8 oz. (240 ml) of resin (Side A) and 4 oz. (120 ml) of catalyst (Side B) to produce 12 oz. (360 ml) volume of mixed coating. Pour pre-measured components into clean 16 oz. (480 ml) styrofoam cup. Hand-stir vigorously with wooden mixer or tongue depressor until blend of uniform color is produced. Use immediately once blended. Pot life is typically 5 – 10mins. (Mixing greater amounts will substantially reduce pot-life and may produce uneven mixing and unsatisfactory results)

Application
Using a small brush or putty knife, quickly and evenly spread the mixed coating material over the repair area and feather into the surrounding scuffed areas. If applied to glossy, untreated areas, remove immediately. Use mixed coating material until it can no longer be neatly and easily spread and discard remainder appropriately.

8. HEALTH & SAFETY

8.1 Introduction

The following recommendations should be adopted to prevent unsafe exposure to MDI and other isocyanates during spray application of Polibrid:

- A full face, air fed respirator with a minimum assigned protection factor of 40 should be used by all personnel within 30 meters of the point of application indoors and within 10 meters of an application outdoors. The respirator should include a full face piece supplied in a positive pressure mode from a compressed air supply

- Polibrid should be sprayed by a single applicator for no longer than 5 hours in an 8 hour working period during an indoor application. For outdoor applications, Polibrid may be applied by an applicator for a full 12 hour shift.

- Where possible non essential personnel should be excluded from the work area. Where this is not possible an 'exclusion zone' should be set up with a minimum radius from the point of application of 30 meters for indoor applications and 10 meters for outdoor applications.. Personnel not wearing the correct PPE, including the air fed respirator mentioned above, should be prohibited from entering.

- Positive ventilation and extraction of air must be in operation around the spray area, both during and for a period of time after Polibrid application.

- Personnel with the potential to come into contact with Polibrid should be trained in managing the associated risks.

- Potential routes of exposure to isocyanates via other routes (e.g. skin) should be addressed by close adherence to PPE requirements itemised in the product MSDS.

- The use of PPE and RPE must be strictly enforced by establishing a suitable management practice.

8.2 Danger of Explosion or Fire

The key factors in preventing an explosion or fire are:

Adequate ventilation.
Elimination of naked flames, sparks and any ignition sources.

8.3 Ventilation

Ventilation is necessary during abrasive blasting operations to ensure adequate visibility. Flexible trunking should be used to allow the point of extraction to be reasonably close to the personnel carrying out the blasting.

During and after coating application it is essential that solvent vapours resulting from any line cleaning/flushing are removed to ensure that the level present in the atmosphere does not rise above that recommended in the section (6.2) dealing with "Danger of Explosion and Fire". This means that the ventilation system must be arranged such that "dead spaces" do not exist. Particular care must be taken to ensure that solvent vapour, which is heavier than air, does not accumulate in the lower areas of the tanks.

8.4 Elimination of Ignition Sources

Safety is the overriding consideration with this type of coating work, and the Site Safety Department must be made fully aware of all aspects of the operation.

Welding, cutting or grinding in the immediate vicinity should be forbidden until paint fumes are totally dispersed. Lights, including hand torches, must be certified by the manufacturer as flash proof and suitable for use in solvent laden atmospheres.

Smoking must be prohibited in the area or near to extraction systems.

No electrical junction boxes should be allowed in the area where application is carried out.

Airless spray equipment must be earthed (because of the danger of static electricity build-up). Mobile telephones, electrical cameras, and any equipment that is not intrinsically safe, must not be used in the area or near to extraction systems.

8.5 Solvent Vapour and Paint Mists - Protection of Painting Personnel

No ventilation system can reduce solvent vapour levels to below the Occupational Exposure Limit for solvents whilst coating is in operation. Painters should, therefore, wear air fed hoods or pressure fed masks with additional eye protection. (Please note: air fed hoods which provide a curtain of air across the visor are available. These help to prevent settlement of spray mist on the visor). Normal protective clothing must be worn, e.g. overalls, gloves, and suitable footwear of non-spark type.

8.6 Skin Irritation

If proper protective clothing has been worn, e.g. overalls, gloves, air fed hood etc, no discomfort should be experienced from skin irritation. Any small areas not protected by clothing, e.g. wrists or neck, can be treated with a non-greasy barrier cream. (Petroleum jelly is not recommended as this can assist the transport of solvents into the skin).

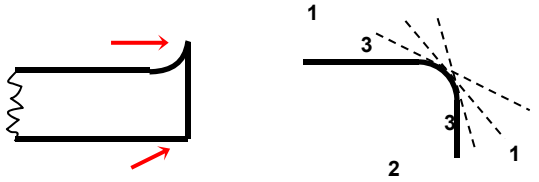
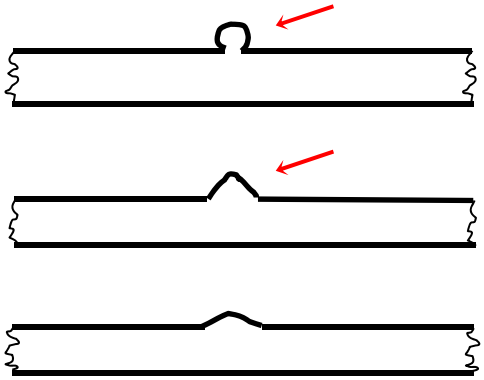
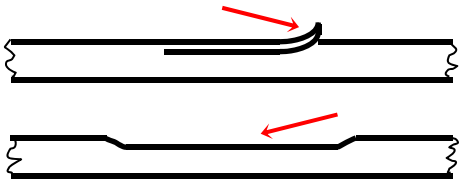
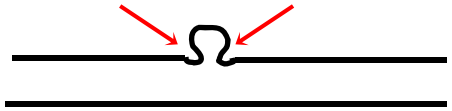
Any areas of skin accidentally contaminated with paint must be thoroughly washed with soap and water. A skin conditioner that is designed to replace the natural oils in the skin can be used.

Note

1. The preceding safety information is given for guidance only.

2. It is imperative that, prior to the commencement of any tank coating project, local Regulations regarding Health and Safety be consulted.

APPENDIX – FABRICATION RECTIFICATION

ITEM	PROBLEM/SOLUTION
Sharp Edge	Remove sharp edges or gas cutting edges with grinder or disc sander to achieve a radius of 1.5mm-2.0mm 
Weld Spatter	Remove spatter observed before blasting by grinder, chipping hammer etc. (a) For spatter observed after blasting: Remove with chipping hammer /scraper etc. (b) Where spatter is sharp, use disc sander or grinder until obtuse Obtuse spatter – no treatment required (c) 
Plate Lamination	Any lamination to be removed by grinder or disc sander 
Undercut	Where undercut is to a depth exceeding 1mm and a width smaller than the depth, repair by welding or grinding may be necessary 
Manual Weld	For welding bead with surface irregularity or with excessive sharp edges, remove by disc sander or grinder 
Gas Cut Surface	For surfaces of excessive irregularity, remove by disc sander or grinder