

Interline 9001 Application Guidelines

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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 Interline 9001 to correctly prepared surfaces.

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1. INTRODUCTION

This document covers applications to ISO tanks carrying approved cargoes detailed in the Chemical Resistance Guide.

1.1 Surface Preparation

In common with most protective coatings schemes, the performance level of Interline 9001 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 and Stainless Steel

This product is suitable for application to new and lightly pitted steel and stainless steel.

Tanks must be structurally sound and gas free, with all inlet pipes blanked off. Surfaces should be de-sludged and residues removed from the tank. Oil or grease must be removed from all surfaces to be lined. Heavy scale or other debris must be removed from all surfaces, including the roof. For heavily scaled or contaminated surfaces rough cleaning by sweep blasting may be required. Corroded steel that is heavily contaminated may require additional cleaning, e.g. steam cleaning or high pressure fresh water washing, before surface preparation starts. (Note: Interline 9001 is not suitable for application over heavily pitted steel. If in doubt, always consult International Paint for further advice)

Prior to paint application all surfaces should be assessed and treated in accordance with ISO 8504:2000. Where necessary, remove weld spatter, smooth weld seams and treat sharp edges or other fabrication faults; see Appendix 1 of this document, ISO 8501-3 grade 3 and/or NACE RP0178 grade C. 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. Where aqueous cargoes (e.g. distilled water) are to be stored, the maximum allowed total soluble salt contamination on the steel before application of the Interline 9001 scheme is $2.5\mu\text{g}/\text{cm}^2$, in order to prevent premature failure due to osmotic blistering. For other cargoes, the maximum allowed total soluble salt contamination on the steel before application of the Interline 9001 is $5\mu\text{g}/\text{cm}^2$.

All surfaces to be coated should be correctly prepared prior to application of the coating system. For carbon steel; the preferred method of preparation is abrasive blast cleaning to Sa3 (ISO 8501-1:2007) or SSPC-SP5 or NACE #1. Where service conditions are not at elevated temperature or for aggressive cargoes, a minimum standard of Sa2½ (ISO 8501-1:2007) or SSPC SP10 or NACE #2 may be acceptable; please contact International Paint technical representative for further advice. For stainless steel, abrasive blast with an appropriate non-metallic and chloride-free abrasive, to achieve a clean and profiled surface.

Compressed air used for blasting must be clean, oil free and dry. The pressure should be at least $7\text{kg}/\text{cm}^2$ (100psi) 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 required amplitude of the blast profile depends upon the type of coating to be applied. Measurement on site should be by profile gauge or other mutually acceptable instrument. **A minimum surface profile of 50-100 microns (2-4 mils) is recommended.**

Other Substrates

This material is not appropriate for application to concrete or other substrates.

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1.2 Typical Specifications

Coat	Product	DFT (microns)			DFT (mils)		
		Spec	Min	Max	Spec	Min	Max
Full	Interline 9001	150	120	225	6	5	9
Stripe*	Interline 9001						
Full	Interline 9001	150	120	225	6	5	9

Coat	Product	DFT (microns)			DFT (mils)		
		Spec	Min	Max	Spec	Min	Max
Stripe*	Interline 9001						
Full	Interline 9001	300	240	450	12	10	18

*All areas itemised in Section 6.7 are to receive a stripe coat.
See Section 4 for information on post-cure.

Wet-on-wet overcoating of stripe coats is **not** appropriate for this product due to increased likelihood of slumping of the topcoat.

The preferred manufacturing process for new tanks is that internal surfaces should be coated with a pre-construction primer prior to fabrication. The primer should then be removed after erection and hydrostatic testing. The benefits of this procedure are a reduced potential for steel contamination from soluble salts (either from corrosion or from the hydrostatic testing) and also that it is easier to achieve the specified blast standard detailed above.

1.3 Notes

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 and dry film thickness requirements.

Specific project requirements will be dependent upon the service end use and operating conditions of the tank or vessel. Always consult International Protective Coatings to confirm that Interline 9001 is suitable for contact with the product to be stored.

Refer to the Interline 9001 datasheet for precise overcoating intervals, pot life and curing requirements.

2. ENVIRONMENTAL CONDITIONS FOR APPLICATION

Interline 9001 will not cure adequately at ambient temperatures below 15°C (59°F).

Coatings should only be applied to surfaces which have been maintained in a dry condition with the steel temperature at least 3°C (5°F) above the dew point for more than one hour (in order to prevent condensation). The surfaces must be visibly dry and clean at the time of application. This condition must be maintained until the coating is cured. For all application steps, the surface temperature, air temperature should be between 15°C (59°F) and 40°C (104°F), with material temperature >20°C (68°F) prior to and during mixing and application.

During application and up to the first 48 hours after application of the final coat, the relative humidity must not exceed 50%. Good practice is to monitor conditions throughout the day. Application should not take place the surface temperature is less than 3°C (5°F) above the dew point. Consult the regional International Paint technical representative for guidance on application to substrates at higher temperatures.

Dehumidification and 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.

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

3. APPLICATION PROCEDURE

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

All areas itemised in Section 6.7 are to receive a stripe coat. The stripe coat should be applied within the overcoating intervals specified in the relevant product data sheet. Unless advised otherwise, all areas are to receive the full lining scheme to the specified dry film thickness as specified by International Protective Coatings.

When hard dry, the dry film thickness may be measured by all interested parties to confirm compliance with the specification. 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.

All damages are to be repaired in accordance with Section 7, according to size.

On completion of installation, the final coating should be inspected using a suitable non-destructive magnetic gauge to verify average lining thickness. Following testing, any defective area should be repaired in accordance with the guidelines outlined in this document.

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

For application by brush, it is recommended that flat head brushes be used, in order to minimise air entrapment.

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4. APPLICATION

Mix the Interline 9001 in accordance with the product data sheet. It is recommended that Interline 9001 is allowed a 15 minute induction period after mixing, prior to commencing application. Apply using recommended application method.

Available air pressure and capacity for spray equipment should be at least 5.5kg/cm² and 7.0m³/min (80 psi and 250 cfm). All spray equipment must be in good working order and be capable of performing to the output requirements defined in International Paint product technical data sheets. **DO NOT THIN.**

It is recommended that airless spray pump ratios of 63:1 or greater should be used. Leather packings are recommended. Remove all filters from the spray unit and airless spray guns. Tips should be the size range stated on the relevant product data sheet and be in good condition.

Overcoating of the Interline 9001 should be made in accordance with the overcoating information on the product datasheet. Areas of overspray should be sanded down prior to overcoating.

Marker pens are commonly used to mark-up areas of tanks, which require attention between applications of paint coats. The marks made on the underlying coat can cause blistering and detachment of subsequent coats – see photographs of test panels below marked using unapproved marker pens between coats. All marker pens used should be technically approved by the International Paint prior to use. Information on approved marker pens is available from IP Technical Service Representatives.



Detachment of topcoat following use of unapproved pen



Blistering of topcoat following use of unapproved pen

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. If the overcoating interval has been exceeded then the area should be abraded and cleaned prior to application of touch up.

Consult International Paint if application by methods other than single feed airless spray is intended. Stripe coats must be applied using brush or roller.

Exotherm Control

The product can 'exotherm' in a certain period following initial mixing of the paint unit. Exotherm is when the paint starts to produce white fumes, followed by bubbling and an increase in temperature. The following recommendations have been put in place to try to reduce the risk of exotherming:

- Working time with any unit of Interline 9001 should not exceed 60 minutes. Consult section 2.4 for guidance relating to pot life with varying temperatures.
- Remains of spray units should not be poured into freshly mixed units.
- Stripe coating:
 - o Only 5 litre units of Interline 9001 (pre-packed) should be used.
 - o The paint temperature must be a minimum of 20°C after mixing, during the induction period and throughout the application
 - o After the 15 minute induction period mix again
 - o Decant 5 litre mixed unit into separate smaller containers.
 - o Limit work to a maximum of 60 minutes.
 - o After the pot life has been reached, empty smaller containers into waste receptacle.
 - o Clean the small unit tin with solvent.
 - o Re-fill smaller container with freshly mixed 5 litre pre-packed unit of Interline 9001.

Post Curing

For Interline 9001, post cure is mandatory prior to carriage of any cargoes; this can be achieved through the use of hot dry air to achieve the specified steel temperature for a minimum of 4 hours:

Steel Temperature (°C)	Duration (Hours)
120	4
150	4

The required steel temperature is dependent on the cargo to be carried; please contact your International Paint Representative for guidance.

It is essential that the following conditions are observed when post curing Interline 9001:

- There should be a gradual steel temperature increase (maximum 20°C per hour) until the target specified steel temperature has been achieved.
- The steel temperature should be held for a period of no less than 4 hours.
- The temperature drop after completion of post cure should be managed to ensure no large sudden drop in steel temperature (no more than 40°C per hour).

Notes:

It is a condition of the Interline 9001 guarantee that records of the steel temperature are maintained at all times during post-curing to ensure that the entire coated surface has attained the required minimum specified temperature/ time requirements. It is generally recommended that thermocouples attached to suitable dataloggers are placed around the tank (e.g. on reverse bulkheads) in order to monitor and record steel temperatures.

Curing Time (required prior to water or full immersion): for cargo, 4 days at all temperatures; for water, 2 days at all temperatures.

5. TECHNICAL INSPECTION

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

All thicknesses are to be checked by the coatings inspector on site. Inspection equipment for measurement of profile depth, humidity, wet and dry film thickness, etc., should be within calibration limits. Note: when measuring the dry film thickness of coatings, the DFT gauge must be calibrated in accordance with the manufacturer's instructions.

Measurement of dry film thickness is described in ISO Standard 2808:2007 - Method 6A or SSPC PA2 Level 3. Any substandard areas are to be rectified.

'Spark' testing (holiday testing) will detect cracks, holidays and thin spots within a coating and should be carried out in accordance with NACE SP0188. Due to the destructive nature of the test, spark testing should only be done once, prior to the actual use of the coating under projected service conditions and at the recommended voltages, 150 volts per 25µm is recommended. Wet sponge holiday detection can also be performed in accordance with SPO188-2006, providing the average DFT applied is less than 500 microns (20 mils).

6. GENERAL NOTES

6.1 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 vapour is removed to ensure that the level present in the atmosphere does not rise above that recommended in the section (8.2) dealing with "Danger of Explosion and Fire". This means that the ventilation system must be arranged such that "dead spaces" do not exist. The ventilation must be continued both during the time that application is proceeding and also whilst solvent is released from the paint film during the drying process. 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. The extracted air must be balanced with fresh air being introduced into the encapsulated area.

Equipment used must not re-introduce abrasive dust, solvent vapour etc., into the area where the coated articles are stored.

Ventilating to 10% of the LEL is considered to provide a reasonable margin of safety to allow for possible higher local concentrations. Care should be taken when setting up ventilation/extraction systems, to ensure that 10% figure is not exceeded. Responsibility rests with the contractor to ensure that the requisite equipment is available and operated in such a way that these requirements are met. International Paint will provide all of the information needed to allow the contractor to calculate ventilation requirements. However, International Paint does not accept responsibility for the equipment, its operation, or the monitoring necessary to ensure that the requisite ventilation requirements are met.

All equipment used after the commencement of paint application must be electrically safe in operation.

The amount of air per minute for ventilating to 10% of the LEL (lower explosive limit) can be regarded as the required air quantity multiplied by rate of application per minute. The required air quantity is the amount of air needed for each litre of paint to ventilate to the required level. International Paint should be contacted for RAQ and LEL values for the appropriate products. In the event of a failure of the extraction/ventilation system paint application must be stopped and the area evacuated of personnel immediately.

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The level of ventilation employed must take account of the Lower Explosive Limit (LEL) of the product being applied and comply with local legislative requirements. International Paint recommends that this is such that vapour concentrations do not exceed 10% of the LEL.

6.2 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, to avoid an increase in humidity.

6.3 Dehumidification

Surfaces to be lined must have a temperature at least 3°C (5°F) above the dew point, immediately following blasting and priming, and during lining application, and must also remain in this condition during curing of the lining. To achieve this requirement heating/dehumidification may be necessary.

The requirement for dehumidification is dependent on prevailing environmental conditions and the actual lining being applied, (see section 2 above). When dehumidification is being used, provision must be made for continuous 24 hour operation to maintain the environment at the required levels throughout the contract.

6.3 Lighting

Lighting during painting must be electrically safe and provide suitable illumination for all work. As a guide, lighting may be considered suitable if this text can be read at a distance of 30 centimeters (12 inches) 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.

6.4 Storage of Product at Point of Application

The paint must be stored out of direct sunlight so that the temperature of the material will not exceed 35°C (95°F) for prolonged periods of time. Interline 9001 should be brought up to a minimum of 20°C (68°F) prior to mixing and application.

When ambient temperatures can be expected to fall below 25°C (77°F), both part A and part B must be stored in premises which are heated to a temperature in excess of 25°C (77°F) for a period of not less than 48 hours immediately prior to use (unless stated otherwise on the product technical data sheet).

Interline 9001 is prone to crystallisation if stored at temperatures below 10°C (50°F). If this occurs, then it should be held at 25°C (77°F) for a minimum of 48 hours prior to use and inspected for signs of crystallization prior to use.

6.5 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.

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

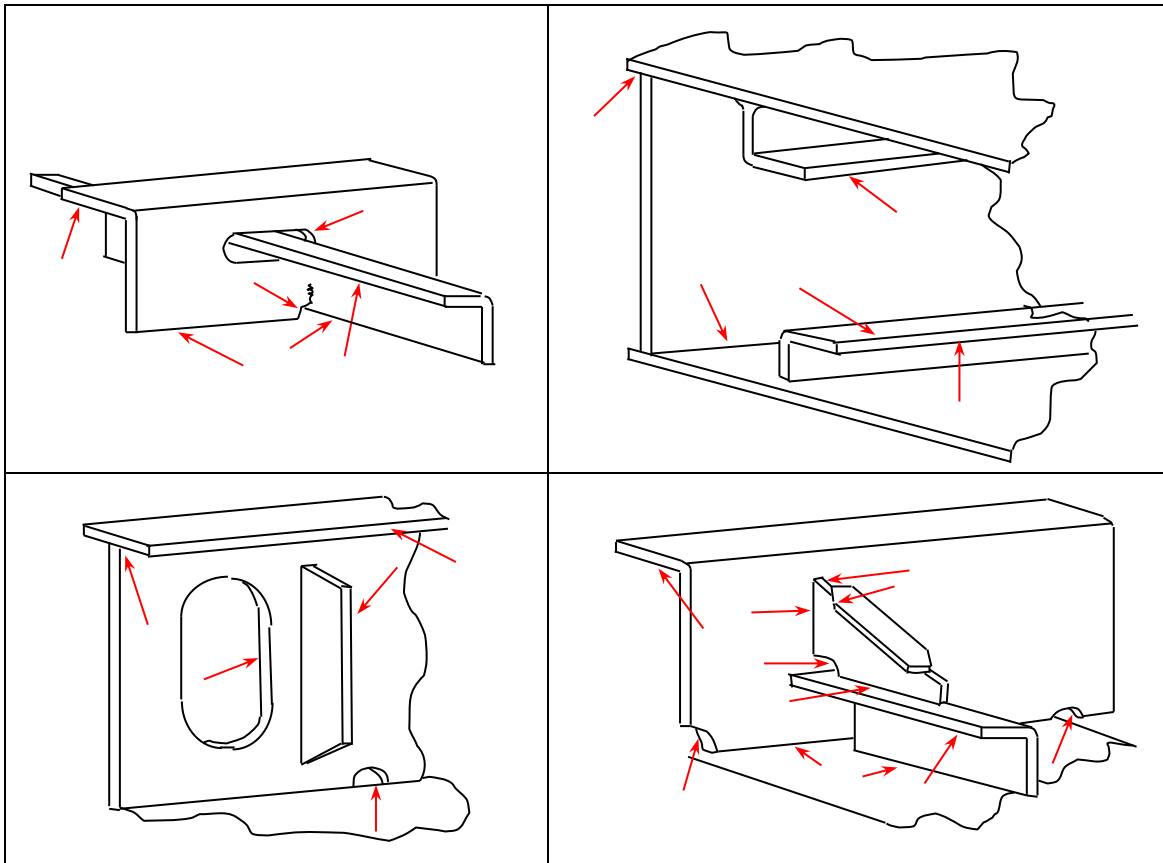
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6.7 Stripe Coating

Stripe coating is an essential part of good painting practice. Typical areas where stripe coats must be applied include:

- behind bars
- cut outs e.g. scallops, manholes etc.,
- welds
- areas of pitting
- plate edges
- areas of difficult access
- small fitments of difficult configuration

Note: The above list is not comprehensive, all areas must be included. The diagrams following 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.

7. REPAIR PROCEDURES

These repair procedures are recommended for damages either at the initial coating stage or where breakdown of coating has occurred during service.

Minor Repairs

Minor repairs are areas damaged either at the initial coating stage or caused during service, of an area up to approximately 40 square inches. The principal requirements are:

The area to be repaired must be fresh water washed and dry.

Remove any corrosion and coatings back to a firm tight edge by means of either:

- vacuum blasting (to achieve the profile specified for new substrates)
- hand tools, i.e. disc sander and grinder (to a standard of SSPC SP11 with a profile of 40-50µm (1.6-2 mils)).

Any pits which do not need re-welding should be prepared by cone shaped grinder.

Abrade area immediately surrounding repair to provide key for subsequent paint application. Apply the paint system in accordance with our recommendations. If small areas are involved and application is by brush, several coats may be required to achieve the correct dry film thickness.

Touch up of damage caused during de-staging is to be done by brush with Interline 9001 to a minimum dry film thickness of 240 microns (10 mils). This will require multiple applications to achieve.

Any repair area more extensive than this should be treated as for new surfaces; i.e. re-blast to the specified standard and apply the full specification.

8. HEALTH AND SAFETY

8.1 Introduction

Some coatings contain volatile flammable organic solvents which can form explosive mixtures with air. Safety precautions must be taken whilst applying this type of coating in enclosed areas. Detailed attention must be given to the following points:

- Danger of explosion or fire
- Provision of a suitable breathing environment for workers.
- Prevention of skin irritation problems.
- Use of paints which have been specially formulated for use in tanks.

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.

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Any organic solvent based coating could, merely by the normal process of drying, give off sufficient solvent vapour to produce an explosive mixture in an enclosed area when the vapour concentration reaches or exceeds 1% by volume in air. However, at 1% the solvents in the coatings produce an intolerably unpleasant odour, (often with irritating skin effects) and smarting of the eyes. These symptoms must be taken as a warning sign that better ventilation is needed. 0.1% solvent vapour in air is normally recommended to give a tenfold safety margin and at this concentration, no explosion can occur and no operator effects should be noticed.

8.3 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.

8.4 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.


8.5 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.

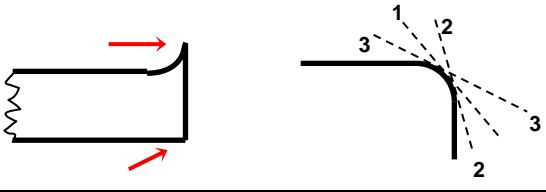
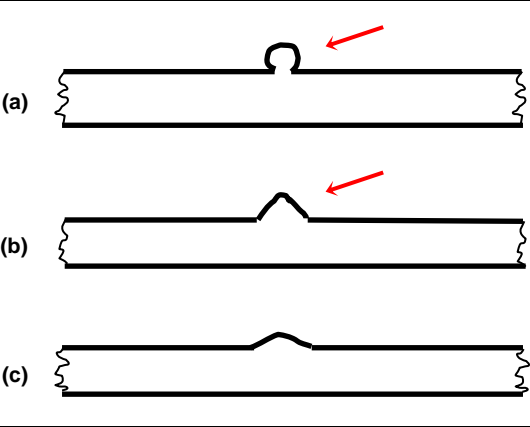
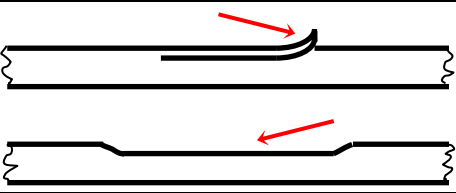
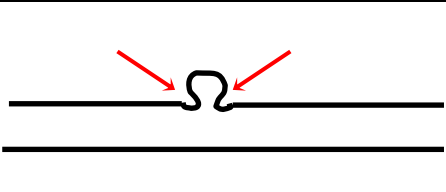
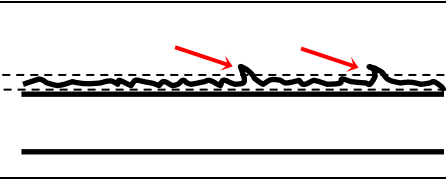
Note

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.

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APPENDIX A – FABRICATION RECTIFICATION

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