

# International® Fast Cure Epoxy Technology Application Guidelines

## Intergard® 3210

Prepared by: M&PC Technical Operations Department

International Paint Ltd.  
[www.international-pc.com](http://www.international-pc.com)

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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 Intergard 3210 to correctly prepared surfaces.

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## APPENDIX 1 – FABRICATION RECTIFICATION

## 1. INTRODUCTION

Intergard® 3210 Fast Cure Epoxy Technology is a high performance coating that is intended as a zinc phosphated primer to provide anti-corrosion as part of a two or multiple coat paint system in moderate-to-high corrosive environments, designated C1 to C4 by ISO 12944:1998.

Once applied and dried, it is capable of leaving a smooth surface onto which the topcoat is applied to achieve a cosmetic finish. It provides corrosion protection to steel as soon as it is hard dry (please see the relevant Technical Datasheet).

This document gives detailed guidance on the use and application of Intergard® 3210 Fast Cure Epoxy Technology and should be read in conjunction with the relevant Technical Datasheet and Material Safety Datasheet (MSDS).

## 2. WHERE TO APPLY INTERGARD 3210

Intergard® 3210 Fast Cure Epoxy Technology is designed for use as a primer to protect construction and mining heavy machinery, agricultural equipment, railcars, transportation vehicles, material handling and lifting equipment, pumps, valves, gear units and other small motors and machinery.

It is particularly suited for use where fast handling times, high cosmetic standards or long anti-corrosion performance is required from a coating system.

The main features of Intergard® 3210 Fast Cure Epoxy Technology are:

- Single coat (one layer) application up to 80µm dry film thickness;
- Smooth film formation at dry film thickness as low as 40µm;
- Good adhesion, mechanical and chemical resistance properties over properly prepared substrates;
- High volume solids to minimise paint consumption;
- Versatility to apply with various application set ups including electrostatic spray application.

## 3. STORAGE OF MATERIAL

Intergard® 3210 Fast Cure Epoxy Technology should always be stored in a dry location. If the outside of the tin becomes wet it should be thoroughly dried before opening to ensure no contamination occurs.

Ideal storage temperature ranges from 5°C- 30°C.

At lower temperatures the base component will become more viscous and may require warming or thinning prior to application. At higher temperatures, materials will flow more easily and dry faster.

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## 4. ENVIRONMENTAL CONDITIONS FOR APPLICATION

Intergard® 3210 Fast Cure Epoxy Technology is affected by temperature including both the rate of drying and the pot life. Environmental monitoring is therefore important. The following parameters apply:-

- Application should ideally be carried out in a controlled environment and the product should not be exposed to external weather conditions until hard dry properties have been achieved.
- Preferred application temperature is between 15°C and 25°C; however, it is feasible to apply at higher and lower ambient temperatures.
- The surface onto which the product is to be applied must be clean, dry and free from contaminants. Steel temperatures must always be 3°C above the dew point.
- Relative humidity (RH) during application and curing should ideally be between 40% and 80%.
- Ambient conditions should be measured at regular intervals, particularly if conditions are variable.

## 5. SURFACE PREPARATION

In common with most protective coatings schemes, the performance level of Intergard® 3210 Fast Cure Epoxy Technology is ultimately determined by the standard of surface preparation achieved.

All surfaces to be coated should be clean, dry and free from contamination including dirt, salts, oil and grease. 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.

### **Abrasive Blast Cleaning**

All steel surfaces to be coated should be correctly prepared prior to application of the coating system. The preferred method of preparation is abrasive blast cleaning to Sa2.5 (ISO 8501-1:2007) or SSPC-SP6.

- As a general guideline, the blast profile is recommended to be 1/3 of the total specified scheme dry film thickness.
- It is recommended that the blast profile is measured to ensure that it does not exceed half of the total specified scheme dry film thickness applied (Intergard 3210® + topcoat) – e.g. a target blast profile (surface roughness) of 40 - 60µm would be suitable for a total scheme dry film thickness of 120-150µm. Failure to achieve this may result in a reduction in gloss measurement readings and/or inferior anti-corrosive properties.

The following table gives a brief guide to typical roughness profiles obtained using various types of abrasive.

Type of Abrasive	Mesh Size	Max. Height of Profile
Very fine sand	80	37 microns (1.5 mils)
Coarse sand	12	70 microns (2.8 mils)
Iron shot	14	90 microns (3.6 mils)
Typical non metallic "copper slag" 1.5-2.0mm grain size	-	75-100 microns (3-4 mils)
Iron grit No. G16	12	200 microns (8.0 mils)

Weld seams and damaged areas should be blast cleaned to Sa2.5 (ISO 8501-1:2007) or SSPC-SP6. Where this is not practical then prepare to a minimum of SSPC-SP11, ensuring that the steel does not become polished.

## 6. MIXING

This product is supplied in two components; a pigmented base (Part A) and a curing agent (Part B); both tins should be kept dry until used. On opening the base, it should be slowly mixed with a pallet knife (or similar implement) to reincorporate any liquid that may have separated out to the surface. The sides and bottom of the container should be scraped to ensure all settlement and residue is combined. It should then be mixed with a mechanical agitator (air-powered equipment) for a few minutes to ensure full incorporation.

The curing agent should then be added to the base in its entirety and power mixed with a mechanical agitator for several minutes until a uniform paint is obtained. When power mixing, care should be taken to avoid air entrapment. **The importance of thorough and correct mixing cannot be over-emphasized and is essential in order to ensure that the full properties of the coating are achieved.** Do not mix more material than can be used within the pot life of the paint.

## 7. POT LIFE

With Intergard® 3210 Fast Cure Epoxy Technology, no significant increase in viscosity is observed after mixing, even after long periods. However, if the stated pot life is exceeded then the final coating film may have inferior properties and will not give the expected level of performance.

**Note:** Temperature can affect the pot life. Generally, the higher the temperature, the shorter the pot life. Measurements should be made before and during application as to the exact environmental conditions.

## 8. AIRLESS SPRAY AND AIRMIX SPRAY APPLICATION

Airless or Air-assisted airless spray (Airmix) is the preferred method of application to give the optimum cosmetic appearance of the product.

The airless spray equipment should be in good working order. Pump ratios of 30:1 up to 60:1 which are capable of producing a minimum output pressure of 180 bar (184kg/cm<sup>2</sup> or 2611 psi) at the tip are recommended and lines should have an internal minimum diameter of 9.5mm (3/8”).

The following table gives a brief guide to recommended tip size and application pressure, depending on application requirements. Tip angles will depend on the profile and area of the steelwork to be coated but lower tip angles are preferable, i.e. less than 50°, to assist in better wet film formation and reduce the potential for overspray.

Airless spray pressure at the tip	Tip size	*Recommended Thinner Requirements	Air pressure (only relevant for Airmix)
>180 bar / >184 kg/cm <sup>2</sup> / >2611 psi	13-19 thou	none required	≥ 2 bar
180 bar / 184 kg/cm <sup>2</sup> / 2611 psi	15-17 thou	none required	≥ 2 bar
150 bar / 153 kg/cm <sup>2</sup> / 2176 psi	11-13 thou	1-2% v/v if necessary	≥ 2 bar
150 bar / 153 kg/cm <sup>2</sup> / 2176 psi	15-17 thou	5% v/v may be needed	≥ 2 bar
<150 bar / <153 kg/cm <sup>2</sup> / <2176 psi	13-15 thou	5% v/v may be needed	≥ 2 bar

\*Thinner requirements are not prescriptive and may differ depending upon application method / skill.

Airless gun type used should be rated above the maximum working tip pressure anticipated.

It is essential to flush out all application equipment with International® GTA220 thinner prior to application to ensure that there is no contamination and/or moisture in the lines. All equipment should be cleaned immediately after use. It is good working practice to periodically flush out spray equipment during the course of the working day.

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## 9. ELECTROSTATIC APPLICATION

Use of an electrostatic spray gun enhances edge coverage, reduces paint consumption and minimises overspray.

The electrical resistivity of paint determines the efficiency of atomised paint particles being charged.

Paint resistivity of 750-1000 kilo-Ohms is usually suitable for electrostatic paint application. However, many electrostatic spray guns are designed to cope with a wider range of paint resistivity levels. It is important to ensure that the electric voltage on the spray gun is set at the necessary voltage level.

Balance between specific gravity, viscosity and application pressure of paint determines the efficiency of the electrostatic 'wrap-around' effect. It is always recommended that appropriate trials are carried out to optimise product viscosity and equipment settings to ensure satisfactory product performance.

### ***Viscosity & "Wrap-Around"***

The application properties will be improved by pre-conditioning Intergard® 3210 at 30°C overnight prior to use. This would help to reduce the viscosity further therefore improving the electrostatic wrap-around properties.

It is recommended to set the temperature on the spray pump at 30°C when using a plural component application pump with a temperature control. Again, this will help to reduce the viscosity.

The lower the viscosity, the better the atomisation at low application pressures.

### ***Application Pressure & "Particle Velocity"***

The lower the application pressure, the lower the velocity of atomised paint particles as they move towards the substrate to be coated.

At lower velocity, there is increased control of charged paint particles as they move towards the substrate. At higher velocities (increased application pressure) there is an increased chance that particles will be forced away from the substrate. This has a negative effect on efficiency.

Therefore it is recommended to spray at the lowest application pressure that would give the best atomised particles and spray fan. Trials are important to get the right balance of viscosity and application pressure to give the required results.

### ***General Guidelines for Electrostatic Spray – Always consult equipment manufacture instructions***

Before electrostatic application, make sure that the substrate to be coated is earthed properly and clean metal-metal contact is achieved. Sometimes earthing clips or the part of the substrate where the earthing clip is attached becomes covered with paint which stops the electrostatic attraction between the substrate and the charged paint particles.

For electrostatic equipment where the air turbine and generator is in the spray gun, the electrostatic spray gun trigger needs to be pulled for about 10-15 seconds before aiming the gun at the substrate for electrostatic spray. It usually takes about 10-15 seconds for the gun to charge atomized paint particles once the trigger has been pulled. For electrostatic equipment with an external generator supply, this is not required as the charge is applied immediately.

Once the electrostatic spray application starts, the trigger should be pulled continuously until the completion of coating the target area. Spraying in a discontinuous manner would cut off the transfer of charge onto atomized particles, which would in return negatively affect electrostatic application behaviour.

It is difficult to electrostatically spray into corners or metal parts designed/welded very closely to each other. This is called the Faraday cage effect – please see below for details. To be able to coat these types of areas, voltage should be set to

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0kV (e.g. non-electrostatic application) and spray non-electrostatically to fill the corners and then continue electrostatically by setting the voltage at the necessary level for the rest of the object.

The Faraday cage effect is the electrostatic force that prevents charged particles from penetrating into recessed areas. Charged paint particles are attracted to the closest grounded surface.

For Intergard® 3210, no thinning is normally required to enable electrostatic application. However, it may be necessary to thin the product with 2-3% v/v GTA220 to enhance the electrostatic “wrap-around” effect especially if the material has been stored in cold or the ambient application temperature is <15°C.

## 10. BRUSH AND ROLLER APPLICATION

Brush and roller are suitable methods of application for Intergard® 3210, although the standard of cosmetic appearance may be reduced. They are recommended for small areas of touch-up or stripe coating, where minimal overlap to other areas is required and where local site access prevents spray application. When using a brush/roller technique it may be necessary to apply multiple coats to achieve specified system dry film thickness. Typically, 40 – 50 microns dry film thickness can be achieved. Dry film thickness readings should be measured upon completion and any low areas should be brought up to specification. Attention should be given to the pot life for this product when applying by brush and roller. Periodic cleaning (using recommended International® cleaners as specified on the Technical Datasheet) will be required to prevent build-up of paint on the equipment and maintain efficiency of transfer from brush/roller to steel and aesthetic requirements.

## 11. STANDARD OF COSMETIC FINISH

Intergard® 3210 has been designed to provide a smooth primer surface onto which the topcoat can be applied to provide a high cosmetic finish. The degree of cosmetic finish attained is dependent on the quality of application, applicator experience and the equipment employed.

The applicator is advised to use the maximum/minimum film thickness guidelines and avoid using a mixture of application techniques whenever possible.

Airless spray and Airmix applications will generally give the best results in terms of uniform films. The level of surface finish may be affected when using other techniques such as brush/roller application, which creates a more uneven appearance due to the presence of brush marks.

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## 12. POSSIBLE FILM DEFECTS

A number of potential defects are detailed below together with recommended remedial treatment.

### **Gloss Reduction**

This is normally not a concern for Intergard® 3210 as such considerations are not relevant for primers. However, it is still useful to underline issues related to surface preparation and/or application techniques which may reduce the overall gloss level of the finished paint system:

- Overspray or dry spray may lead to an uneven primer surface which may adversely influence the topcoat cosmetics.
- Excessive blast profiles on substrates (e.g. those higher than half of the total film thickness applied) may lead to lower gloss measurement reading which would be in relation to the uneven film surface. To overcome this problem, either the blast profile should be monitored and reduced or the dry film thickness of Intergard® 3210 should be increased.

### **Over-Application**

Intergard® 3210 is tolerant to some over-application. However, excessive film thickness may lead to extended cure times.

### **Under-Application**

If insufficient coating is applied then the film may not adequately coalesce or the blast profile will be clearly visible beneath the coating. This would reduce the general aesthetics of the film as well as leading to possible inferior anti-corrosion properties.

Stripe coats should be applied to bolts, welds, sharp edges and areas of difficult access which are likely to receive less than the specified film thickness. When the material is theoretically up to specified thickness, film thickness readings must be taken and any low areas brought up to specification.

### **Overspray / Dry Spray**

Overspray can be minimized by good work planning, good spray technique, electrostatic spray, thinning, reduction of air pressure, appropriate tip size, etc., depending on the structure to be sprayed. If the effect is severe leaving a rough, uneven surface, a further thin coat may be applied on top of it once it has dried sufficiently.

For large areas or areas where overspray is unavoidable, it is advised that the adjacent steelwork should be covered or taped to prevent overspray damaging cosmetic appearance.

### **Pinholes**

Pinholes may occur as a result of application over porous substrates, hand-prepared substrates, surfaces that are suffering from overspray/dry spray or poorly cleaned surfaces containing dust debris. Surfaces should be suitably prepared before application commences. Pressurised air may be used to blow down the surfaces but it should first be checked for cleanliness to avoid further contamination of the substrate. Where pinholing is identified, the surface should be lightly abraded and a thinned coat applied to seal the pores. A full coat may then be required to bring up to specification.

### **Sagging**

This is the result of excessive film thickness, poor spray technique or over-thinning. If the areas are greater than 100mm equivalent diameter, the coating should be removed and reapplied.

### **Soft Films**

Films which show signs of being soft after the hard dry time indicate a lack of curing. This may be as a result of poor mixing or even omission of the curing agent and affected areas will require coating removal and re-application. Film hardness can be affected by temperature, as at lower temperatures the film will need further time to reach hard dry properties.

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## 13. INSPECTION AND REPAIR

### ***Damage Down to Steel***

For small areas of damage:

Clean down to remove all dirt, grease, oil or other deleterious matter. Remove any loose coating and/or corrosion products by abrading the surface to a minimum of SSPC-SP11, feathering back the edges of sound coating by 50mm to provide a suitable overlap area. Care must be taken not to polish the steel. The bare areas should be patch-primed with Intergard® 3210 thinned by 5% (with the appropriate International® thinner) using brush application, ensuring that it is worked into the profile of the steel to allow good adhesion. The coating can then be reinstated with unthinned paint by roller application to the required dry film thickness overlapping onto feathered areas. Multiple applications may be required to achieve the specified thickness, taking care to observe the relevant overcoating interval.

For large areas of damage:

Surface preparation should be carried out as per the original standard, i.e. spot blast to ISO 8501-1:2007 Sa2.5 (SSPC-SP6), followed by reinstatement of the original specified protective coating scheme. It is advised that adjacent areas to the repair site should be masked off with tape to help prevent fine pinholing at the edges of the repair site.

It is important to limit the amount of damage and subsequent repair work as much as possible so as not to detract from the overall appearance of the coating. By ensuring that the correct film thickness is applied first time and that the hard dry properties are attained before handling, the amount of repair work required can be minimised.

### Low Film Thickness

If, at site, areas of low DFT are reported then it is essential to repair in accordance with the following recommendations.

Intergard® 3210 Fast Cure Epoxy Technology produces a hard film which could have a detrimental effect on the adhesion of subsequent coats and should be first treated by light surface abrasion, sweep blasting, or other suitable process which will not cut through or detract from the performance of the underlying coating. Once the surface is suitably abraded, solvent wash to remove any surface contamination and then apply a fresh coat of the product in accordance with the Technical Datasheet.

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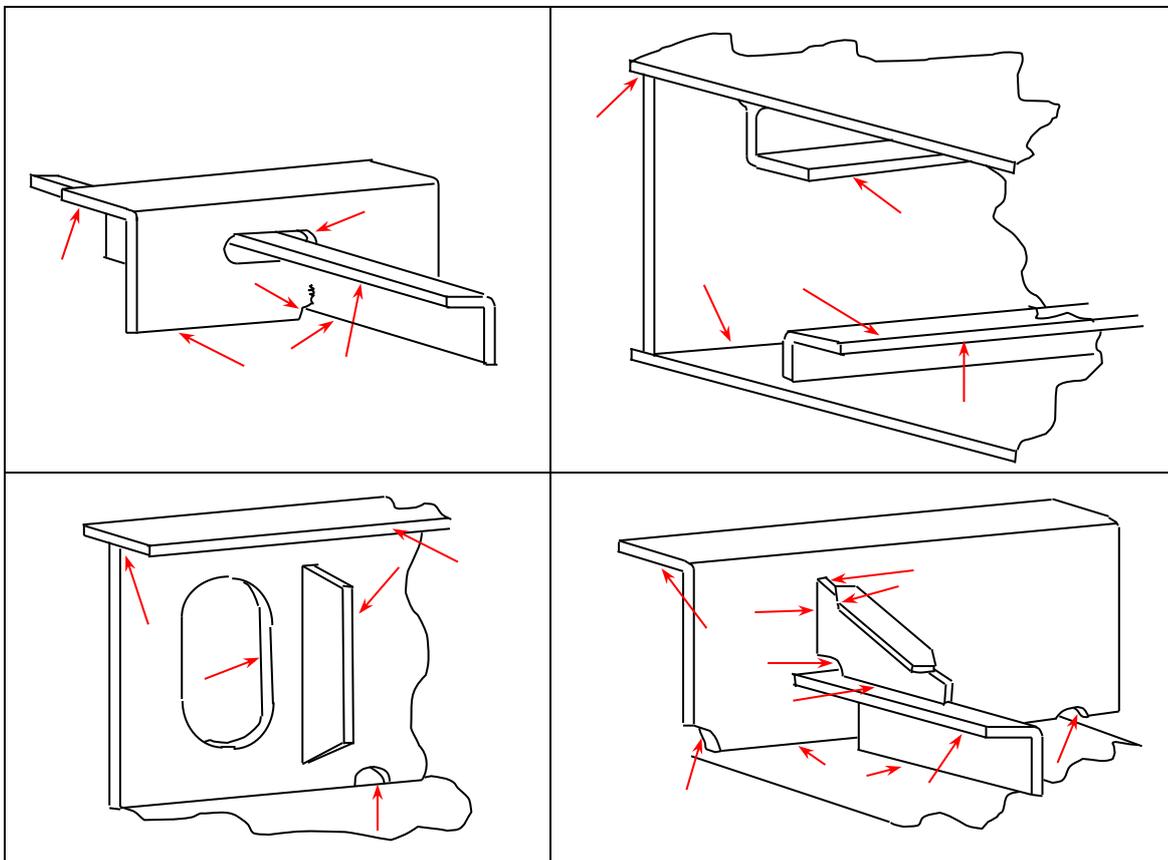
## 14. GENERAL NOTES

### **Stripe Coating**

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

1. Behind bars
2. Plate edges
3. Cut outs i.e. scallops, manholes etc.
4. Welds
5. Areas of difficult access
6. Small fitments of difficult configuration
7. Areas of pitting

**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.

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.

## 15. HEALTH AND SAFETY

Intergard® 3210 Fast Cure Epoxy Technology is intended for use only by professional applicators in industrial situations in accordance with the advice given in this document and on containers, and should not be used without reference to the Material Safety Datasheets (MSDS) which International® Protective Coatings has provided to its customers. If for any reason a copy of the relevant Material Safety Datasheets are not immediately available, the user should obtain a copy before using the product.

**Air-fed respirators should always be used during application, to prevent inhalation of the spray mist.**

- Ensure that in addition to air-fed breathing apparatus, all recommended personal protective equipment is used, e.g. overalls, gloves, goggles, face mask, barrier creams etc.
- Provide adequate ventilation.
- If the product comes into contact with the skin wash thoroughly with lukewarm water and soap or suitable industrial cleaner. Do not wash with solvents. If the eyes are contaminated flush with water (minimum 10 minutes) and obtain medical attention at once.
- These coatings contain flammable materials, keep away from sparks and open flames. Smoking should be prohibited in the area.
- Observe all precautionary notices on containers.

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APPENDIX 1 – FABRICATION RECTIFICATION

ITEM	PROBLEM / SOLUTION	
<p><b>Sharp Edge</b></p>	<p>Remove sharp edges or gas cutting edges with grinder or disc sander to achieve a radius of 1.5mm-2.0mm</p>	
<p><b>Weld Spatter</b></p>	<ol style="list-style-type: none"> <li>1. Remove spatter observed before blasting by grinder, chipping hammer etc.</li> <li>2. For spatter observed after blasting:               <ol style="list-style-type: none"> <li>a) Remove with chipping hammer /scraper etc.</li> <li>b) Where spatter is sharp, use disc sander or grinder until obtuse</li> <li>c) Obtuse spatter – no treatment required</li> </ol> </li> </ol>	
<p><b>Plate Lamination</b></p>	<p>Any lamination to be removed by grinder or disc sander</p>	
<p><b>Undercut</b></p>	<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>	
<p><b>Manual Weld</b></p>	<p>For welding bead with surface irregularity or with excessive sharp edges, remove by disc sander or grinder</p>	
<p><b>Gas Cut Surface</b></p>	<p>For surfaces of excessive irregularity, remove by disc sander or grinder</p>	