APPLICATION GUIDELINES

EXTERIOR DECK SYSTEM

Intershield® 851

Revision 5

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1. SCOPE AND PURPOSE

The purpose of these guidelines is to ensure that the coating system, as applied, provides adequate protection against mechanical damage and corrosion.

Successful in-service performance of a deck coating system depends upon both the correct choice of coating and the adoption of the correct procedures 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 and Shipyard. Under no circumstances do these responsibilities rest with International Paint. If International Paint provide for the presence of a Technical Service Representative, their role is advisory only unless otherwise specified.

2. PRODUCT SPECIFICATION AND PRODUCT CURE GRAPHS

2.1 SURFACE PREPARATION

2.1.1 New Installation

All surface preparation shall include at least 2-3 inches (50-75mm) up on all bulkheads, coamings, pipes and other vertical surfaces.

Paint only clean, dry surfaces. Remove all salts, grease, oil, soluble contaminants and other detrimental foreign matter by "solvent cleaning" (SSPC-SP1).

Steel: For optimum performance blast to ISO Standard 8501-1 (2007) - Sa2$^{1}/_{2}$. The equivalent in the USA is "Near White Blast Cleaning" (SSPC-SP10).

Alternatively, water jet to International Paint Hydroblasting Standard HB2½ with flash rusting no worse than HB2½L. See Section 5.5 for equivalent Water Jetting standards.

Aluminum: For aluminum and light alloys the surface should be solvent cleaned according to SSPC-SP1 then physically etched by abrasive blasting using a non-metallic abrasive.

A minimum surface profile of 3 mils (75 microns) is required.

For fibreglass or wooden substrates please consult International Paint.

2.1.2 Repair

All surface preparation shall include at least 2-3 inches (50-75mm) up on all bulkheads, coamings, pipes and other vertical surfaces.

Full Deck Application: Remove existing coating and grit blast to ISO Standard 8501-1 (2007) - Sa2$^{1}/_{2}$

Touch Up: Spot blast rusted areas or power tool, and sweep blast or disc existing coating to ISO Standard 8501-1 (2007) - Sa2. Alternatively water jet to International Paint Hydroblasting Standard HB2M/H. See Section 5.5 for equivalent Water Jetting standards. Surface to be free from oil, dirt and salts. All surfaces should be clean and dry prior to applications.

Recoat of self: HPFWW, degrease and apply. All surfaces should be clean and dry prior to application.

2.2 SPECIFICATION

2.2.1 Weather Decks

Product	Alternative	Dft (microns)		
		Spec	Min	Max
Intergard 5000	Intershield 300 Consult International Paint	150	125	175
Intershield 851		600		

DEF-Stan 80-134 Type 1 Scheme

Product	Alternative	Dft (microns)		
		Spec	Min	Max
Intergard 5000	Consult International Paint	150	125	175
Intershield 851		400		

2.2.2 Flight Decks

Product	Alternative	Dft (microns)		
		Spec	Min	Max
Intergard 5000	Intershield 300 Consult International Paint	150	125	175
Intershield 851		500	(450)	(550)
Intershield 851		500	(450)	(550)

DEF-Stan 80-134 Type 2 Scheme

Product	Alternative	Dft (microns)		
		Spec	Min	Max
Intergard 5000	Consult International Paint	150	125	175
Intershield 851		300		
Intershield 851		300		

2.3 NOTES

2.3.1 Intershield 851 is a non-skid coating and, as such, it is not possible to accurately measure wet film thickness.
As an example, to achieve a dry film thickness of 500 microns Intershield 851 should be applied to give coverage of 1.07sq.m/litre using volume area control.
It is vitally important to avoid over-application (see section 5.7).

2.3.2 Refer to the accompanying graphs for recommended overcoating intervals, pot life and curing requirements. (see section 2.4)

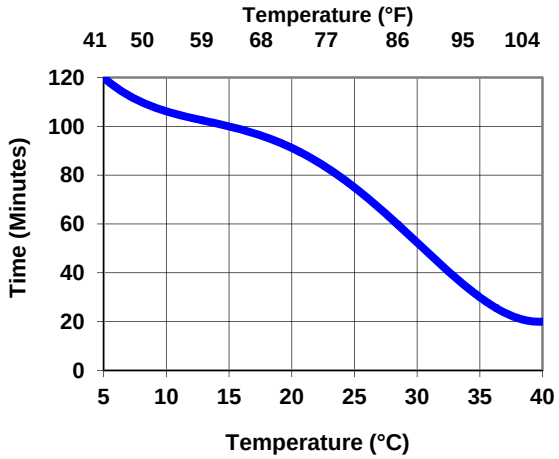
2.3.3 The drying times quoted refer to a single coat applied at 500 microns dry film thickness in the table above. At higher film thicknesses drying times may be extended, particularly at low temperatures.

2.3.4 For maximum performance, the curing temperature should be above 10°C.

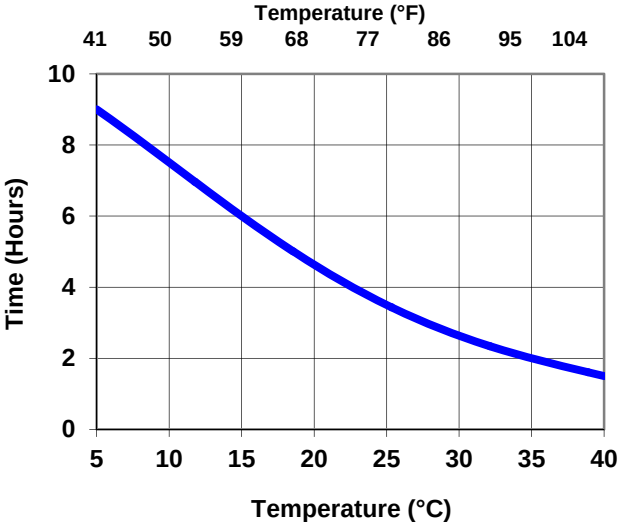
2.3.5 Interthane 990 or Intershield 852 may be used for colour marking purposes.

2.4 PRODUCT CURE GRAPHS

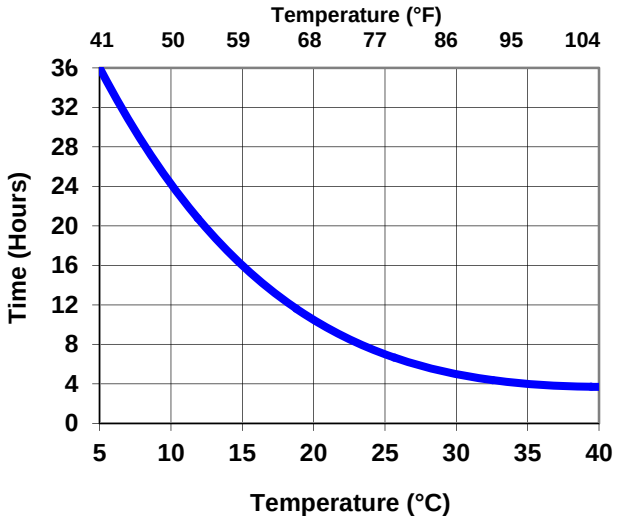
Intergard 5000: Pot Life



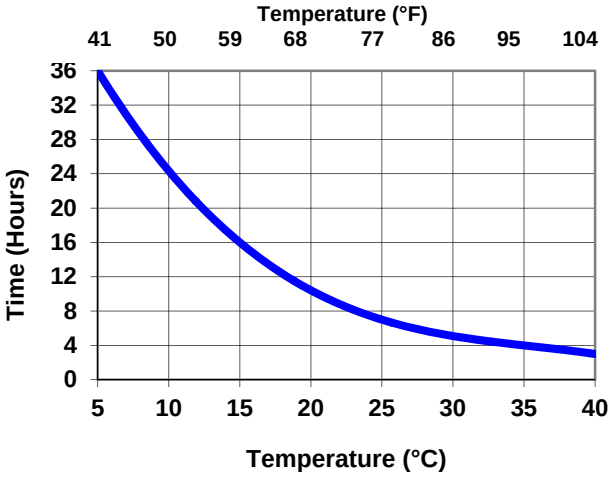
Intergard 5000: Touch Dry



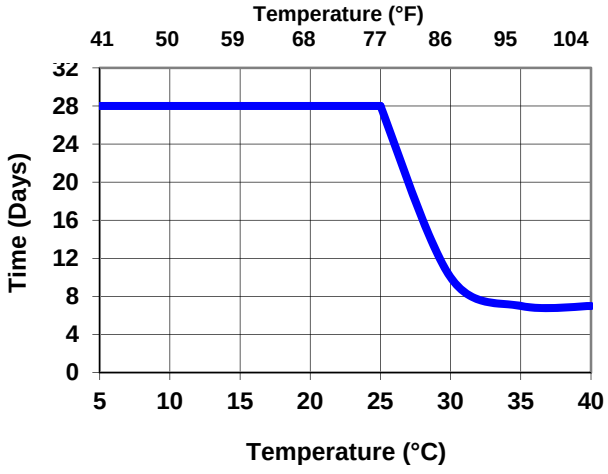
Intergard 5000: Hard Dry



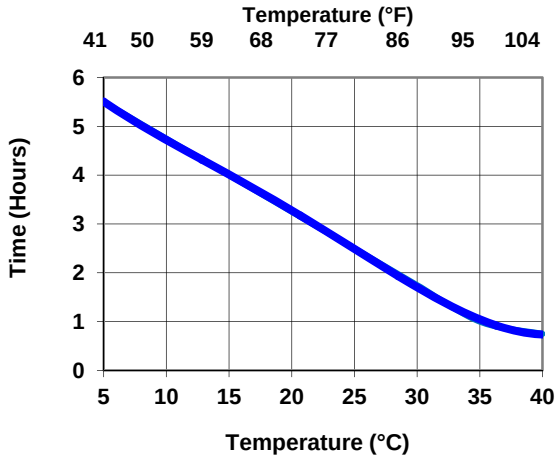
Intergard 5000: Minimum Overcoating



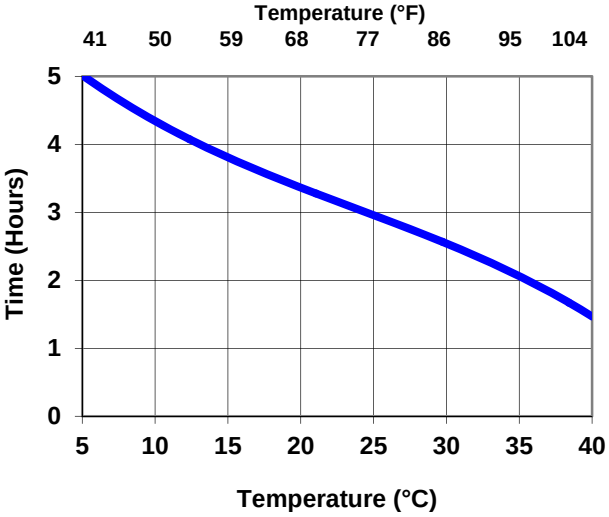
Intergard 5000: Maximum Overcoating



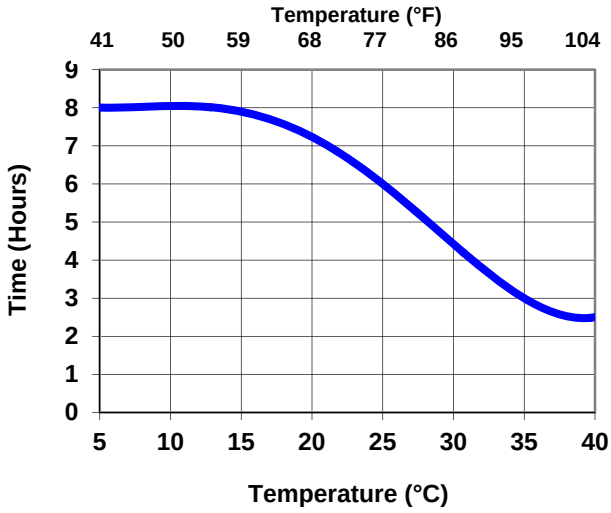
Intershield 300: Pot Life



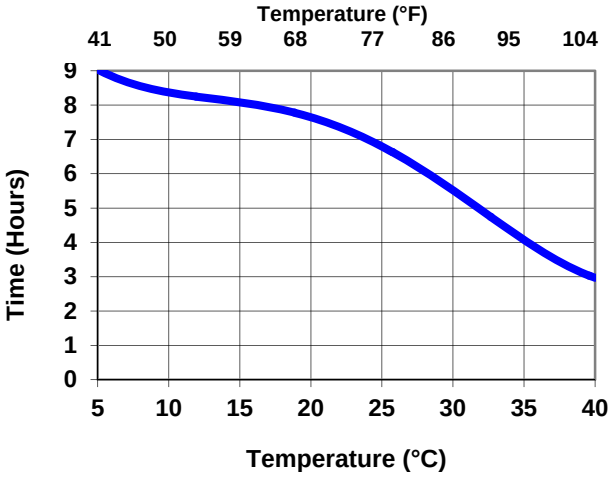
Intershield 300: Touch Dry



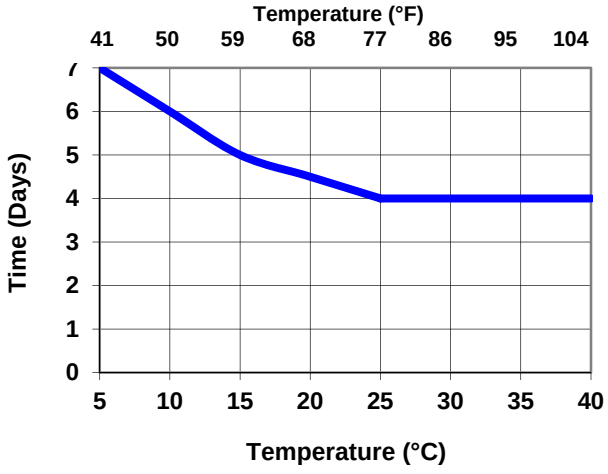
Intershield 300: Hard Dry



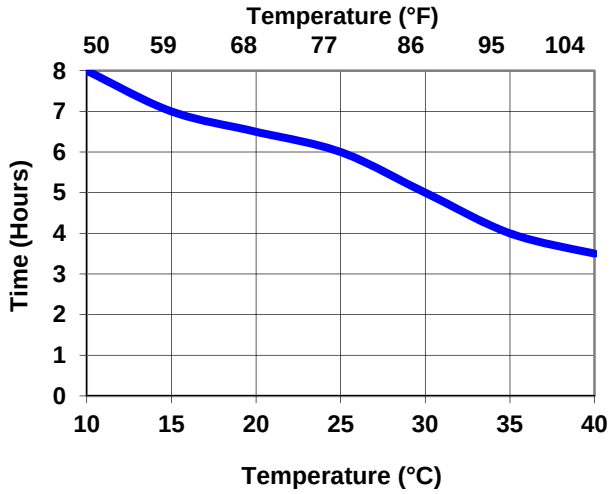
Intershield 300: Minimum Overcoating



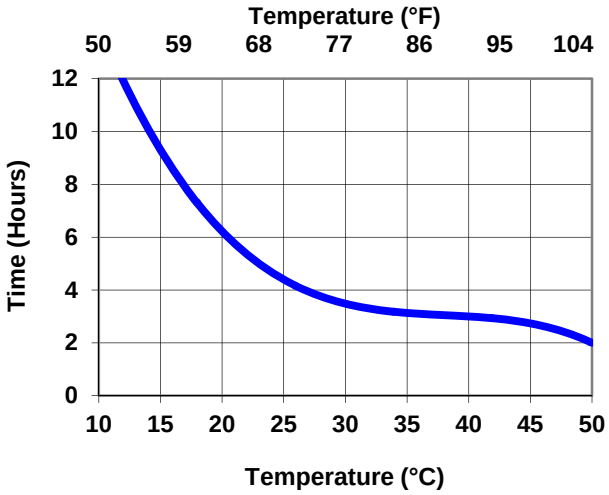
Intershield 300: Maximum Overcoating



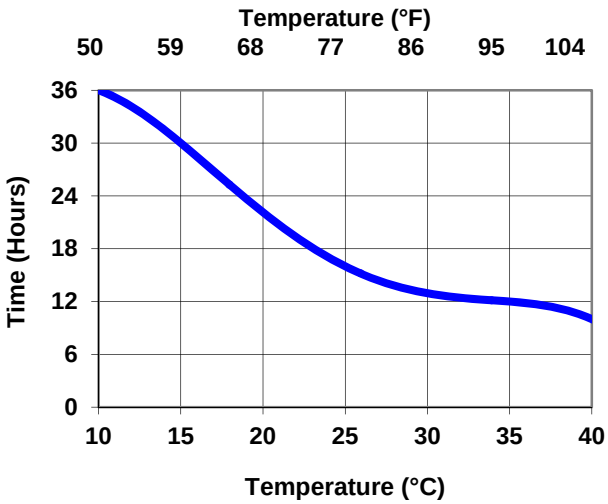
Intershield 851: Pot Life



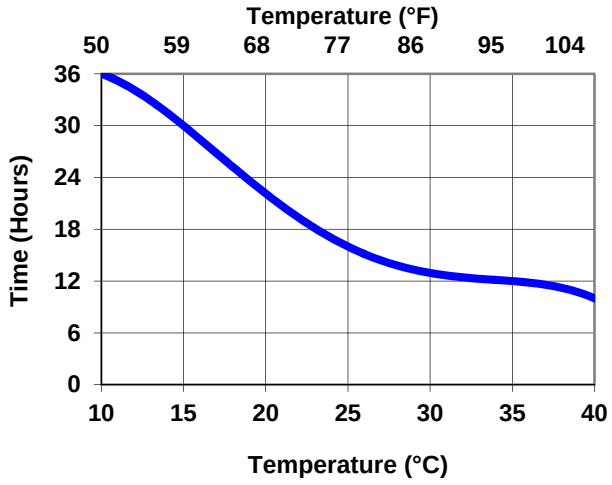
Intershield 851: Touch Dry Time



Intershield 851: Hard Dry Time



Intershield 851: Minimum Overcoating Time



Intershield 851: Maximum Overcoating Time

Intershield 851 may be applied over itself for an indefinite period, providing that the surface to be overcoated is intact, clean, dry and free from all contaminants.

3. COATING APPLICATION PROCEDURES

3.1 NEW INSTALLATION

3.1.1 Prepare all surfaces to be coated to the standard detailed in section 2.1 of this procedure.

3.1.2 Upon completion of the surface preparation, and after inspection by the Contractor Quality Control Department, the International Paint Technical Service Representative (if present) will also inspect the whole area and mark up any substandard areas.

3.1.3 Remove all dust and abrasive from the surface prior to coating. Coat before corrosion or contamination occurs. Care must be taken not to contaminate the properly prepared surfaces.

3.1.4 Thoroughly mask any areas to which the Intershield 851 Exterior Deck System is not to be applied, e.g. hatches and deck drains.

3.1.5 Apply a stripe coat of Intergard 5000 (or Intershield 300) to weld seams at the specified film thickness.

3.1.6 Apply a full coat of Intergard 5000 (or Intershield 300), or an alternative primer if specified, to the specified film thickness. Apply up 2-3 inches (50-75mm) on all vertical surfaces. When applying over a stripe coat, full coat may be applied while the stripe coat is still tacky.

3.1.7 Allow to dry (depending upon temperature – see hard dry time graph in section 2.4) before inspecting the applied coating and checking the dry film thickness.

3.1.8 Apply a full coat of Intershield 851 at the specified coverage rate. See section 5.7 for application method. **Note that thick, carelessly applied coats will result in over consumption of product and could be subject to mud-cracking and/or blistering**.

3.1.9 When hard dry, inspect the surface profile of the applied coating.

3.1.10 Ensure that the completed deck area is kept free of all traffic until the coated areas have fully cured.

3.1.11 Remove all masking.

3.2 REPAIR

3.2.1 Prepare the surface to be repaired according to the guidelines given in section 2.1 of this procedure.

3.2.2 When the area to be repaired is clean and dry, apply a full coat of Intergard 5000 (or Intershield 300), or an alternative primer if specified, to the specified thickness.

3.2.3 Allow to dry (depending upon temperature – see hard dry time graph in section 2.4) before inspecting the applied coating and checking the dry film thickness.

3.2.4 Apply a full coat of Intershield 851 to the specified coverage rate. See section 5.7 for application method. **Note that thick, carelessly applied coats will result in over consumption of product and could be subject to mud-cracking and/or blistering**.

3.2.5 To complete repairs, continue to 3.1.9 of the **New Installation** application procedure.

4. TECHNICAL INSPECTION AND PROJECT CONTROL

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

All parties involved in the deck 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 etc.

The International Paint Technical Service Representative (if present) should supervise initial mixing of the first drums of product to be applied to ensure that all parties are aware of mixing and application characteristics.

Daily meetings should be arranged to confirm performance of the work and inspection schedules, minutes of these meetings must be taken and circulated to all participants. Representatives of the contractor, shipyard and ship owner would normally be present at these meetings.

In the event of work continuing at any stage without the approval of International Paint, the Company cannot be held responsible for any subsequent failure of the deck coating system on the areas concerned. Such an event is termed an EXCEPTION. All parties MUST be officially informed in writing using the standard Exception Report Form immediately following the occurrence.

International Paint, and any other authorised personnel, may inspect any stage in the process.

Contractors must supply interpreters if necessary.

On completion of the project all relevant documentation must be retained, and safely archived, by the Local Technical Service Manager.

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

5. GENERAL NOTES

5.1 DECK CONDITION

5.1.1 New Installation

Prior to commencement of gritblasting or water jetting it is essential that the deck is clean, dry, and in a condition suitable for surface preparation and application of the deck coating. The following briefly outlines the minimum requirements:

All grease and oil must be removed from all surfaces.

Defective steelwork, prior to project commencement, should be repaired in line with the guidance notes given in 5.2 (Steelwork Preparation).

5.1.2 Repair

Prior to the commencement of blasting it is essential that the deck is clean, dry, and in a condition suitable for surface preparation and application of the deck coating. The following briefly outlines the minimum requirements:

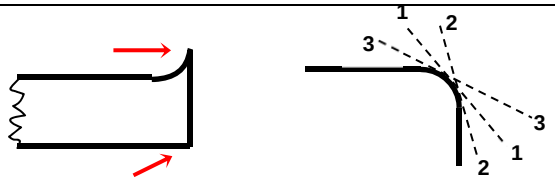
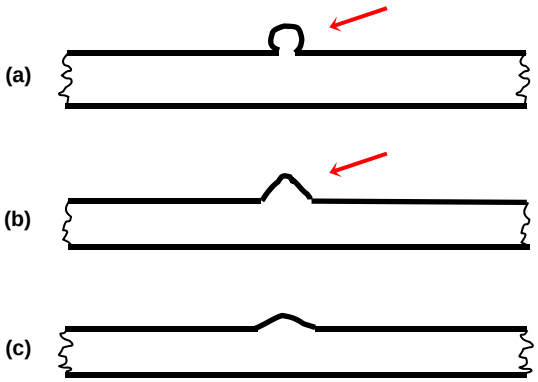
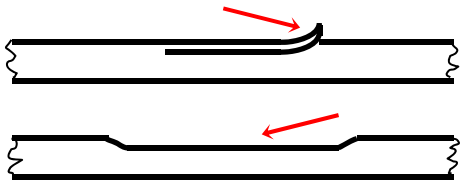
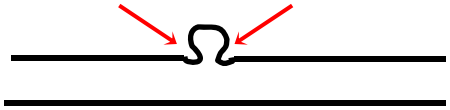
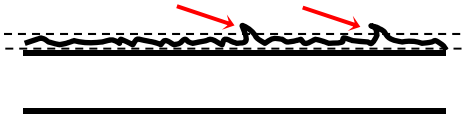
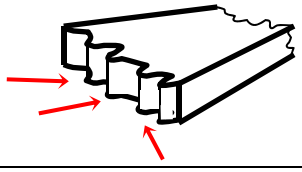
Heavy scale must be removed from all surfaces.

All grease and oil must be removed from all surfaces.

Any areas of steel renewal should be prepared in the manner described in 5.2 Steelwork Preparation.

5.2 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. International Paint recommend the following methods and minimum levels of preparation on any new steelwork:

ITEM	PROBLEM / SOLUTION
Sharp Edge	**Remove sharp edges or gas cutting edges with grinder or disc sander:** 
Weld Spatter	**1. Remove spatter observed before blasting by grinder, chipping hammer etc.** **2. For spatter observed after blasting:** **a) Remove with chipping hammer /scraper etc.** **b) Where spatter is sharp, use disc sander or grinder until obtuse** **c) Obtuse spatter – no treatment required** 
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** 

5.3 STORAGE (AT POINT OF APPLICATION)

The paint must be stored out of direct sunlight so that the temperature of the material will not exceed 25°C (77°F) for prolonged periods of time.

In winter months, when temperatures can be expected to fall below 10°C (50°F), base and curing agent must be stored in premises, (storeroom, hut, etc), which are heated to a temperature in excess of 10°C (50°F) for a period of not less than 48 hours immediately prior to use (unless stated otherwise on the product technical data sheet).

5.4 GRIT BLASTING

5.4.1 General

Two main universal standards of surface preparation are normally specified for deck coatings - ISO Standard ISO 8501-1 (2007) - Sa2 and Sa2½.

In general, the following comments apply to these standards.

Sa2 - the resulting steel surface should be free from most of the rust, old coating and foreign matter. Any residual old coating should be firmly adhering

Sa2½ - in practice, this is considered to be the best standard a skilled blasting operative can consistently achieve.

Comparative Standards

ISO 8501-1: 2007	Japanese Standard on new steel	SSPC Standard
Sa2	Not applicable	SSPC-SP6
Sa2½	JA SH2	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.

5.4.2 Compressed Air

Air used for blasting must be clean, oil free and dry. The pressure should be at least 7kg/cm² (100lb/sq inch) at the nozzle.

5.4.3 Abrasive

Abrasives used for blasting must be dry and free from dirt, oil, 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.

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.

ASTM D4940-89(94) also provides a method for quantifying the level of water-soluble ionic contaminants. This standard does not provide limits of acceptability for blasting abrasive but does give a typical value for a low level of contamination as 50 µmho/cm.

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 in the tank as this may subsequently corrode.

Although not recommended, recycled grit may be used providing it is dry, has been shown to be free from contamination by dirt, oil, grease, and has been tested in accordance with the above ISO standards.

5.4.4 Blast Profile

The amplitude of the blast profile depends upon the type of coating to be applied, measurement on site should be by profile gauge or other instruments mutually acceptable.

Measurement of surface profile using comparators is described in ISO 8503-2. The comparators themselves are described in ISO 8503-1. A medium 'G' type comparator should be used and a value of 75-112 microns (3.0-4.5 mils) is acceptable when measured by:

a) ISO 8503-3: Focusing microscope
b) ISO 8503-4: Stylus

When using a needle gauge such as the Elcometer 123, a value of 75 microns (3.0 mils), taking a maximum of 10 determinations, is ideal.

For projects taking place in the USA:

- Measurement of surface profile using comparators is described in ASTM D4417 Method A
- Measurement of surface profile using a needle gauge is described in ASTM D4417 Method B
- Measurement of surface profile using replica tape is described in ASTM D4417 Method C and NACE RP0287-91

5.5 WATER JETTING (HYDROBLASTING)

Only fresh water is to be used for water jetting. Salt water is unacceptable for substrate preparation. Chemical corrosion inhibitors must **not** be added to blasting water. See note 5.6 of the International Paint Hydroblasting Standards. In order to achieve acceptable residual salt levels, water of a conductivity of no greater than 400 microSiemens should be used.

All areas are to be water jettted to a minimum standard of HB2½ 'Very Thorough Hydroblast Cleaning' from International Paint Hydroblasting Standards. This states:

"When viewed without magnification, the surface shall be free from visible oil, grease, dirt and from most of the rust, paint coatings and foreign matter. Any remaining contamination and staining shall be firmly adhered. See notes 5.9 and 5.10".

A test area will be water jetted before the main tank, and inspected before flash rusting has occurred; see note 5.3 of the International Paint Hydroblasting Standards. Agreement will be reached by the Owner's representative, the International Paint representative (if present) and the Contractor's representative on the agreed standard before the main tank area is water jetted.

For areas difficult to water jet, it is advisable to mechanically clean to St3 standard of ISO 8501-1 (2007) (SSPC-SP11) after water jetting.

Rust, scale and old paint debris must be removed from the deck prior to inspection and mark up by the Contractor's Quality Control Department. The International Paint representative (if present) will then inspect the whole area and mark up any substandard areas.

All marked areas shall be rejetted and brought up to the required standard.

If flash rusting is too heavy, it can be removed by high-pressure washing. Upon drying, the surface must have an acceptable level of flash rusting for overcoating. See note 5.7 from the International Paint Hydroblasting Standards.

Comparative Standards

International Paint Hydroblasting Standard	ISO 8501-4 (2006)	NACE No. 5/ SSPC-SP 12
HB2	Wa2	WJ-3
HB2½	Wa2½	WJ-2

Three flash rust grades, designated L, M, and H are specified in each of the above standards.

5.6 CLEANING

Prior to initial blasting inspection, the bulk of spent grit (and old paint debris if applicable) must be removed from the deck area to be coated.

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

All marking paint, chalk, etc, used to identify substandard areas must be removed after substandard areas are rectified. If marking pens are used which cannot be removed then they must be technically approved by Worldwide Marine Laboratories prior to any overcoating taking place.

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

It is recommended that all personnel working on the prepared decks wear overshoes.

5.7 PAINT APPLICATION

Efficient mechanical stirrers for the correct mixing of paint must be used.

Intershield 851 should be applied using conventional spray equipment.

A straight through plaster type gun with 6-10 mm nozzle is recommended.

Pressure pot equipment is recommended with bottom paint delivery to the gun, as this reduces the risk of paint blockages. A working pressure gauge and pressure adjustment mechanism is essential.

Gravity fed hopper guns (eg Sagola) are also suitable for application. However a large hopper is required for a reasonable work rate and even then it needs to be topped up regularly. Hopper guns are relatively free from material supply problems (blockages).

Available air pressure and capacity for spray equipment should be at least 80 psi and 50 cfm (5.5kg/cm^2 and 1.4m^3/min).

Wide bore material lines are required to improve the flow.
Note: Prior to loading the non-skid material the lines should be lubricated by first passing solvent through the system.

All spray equipment must be in good working order and be capable of performing to the output requirements defined in International's product technical data sheets.

Tips should be the size stipulated on the product technical data sheet. Tips must not be in a worn condition.

Intershield 851 may be applied by roller but this is recommended for small areas only. It is recommended that rollering should take place in one direction, with approximately 3 inches (7.5 cm) overlap onto the previously applied adjacent strip. Apply firm downward pressure on the roller during application. When applying over welds, roll across the welds, not along them, in both directions to ensure even coverage. For flight decks, any ridges should run bow to stern such that aircraft tyres run along the ridges and avoid contact with pooled water or spilled lubricants.

Specific paint application considerations for Intershield 851 are as follows:

5.7.1 Settings

- The pressure on the pot should be sufficient to give a steady flow of material but it should not squirt from the end of the nozzle. A pressure of 2-3 bar should be sufficient.
- The pressure of the spraying air should be less than the pressure in the pot. If necessary the air-valve on the "gun" can be used to adjust the spraying air but a separate regulated supply is preferred.
- A spatter cone rather than a spray-fan is produced
- If the spraying pressure is too low the "lumps" of paint are too big. If the pressure is too high the grit bounces off the surface being sprayed. If the pressure is just right the paint is spattered onto the surface.

5.7.2 Technique

- The distance between gun and substrate should be around 50cm-60cm. This should result in a spray cone with a base diameter of around 15 cm.
- The gun should be moved in small circles essentially doubling the size of the spray cone base.
- Off the job trials with pressure and technique adjustments are essential in order to achieve an even aesthetically pleasing non-skid finish.
- Intershield 851 should be applied at approximately 3-4 sq. metres/minute
- If the pressures are right there should be no loose grit created ahead of the spray line. If this occurs it should be removed and the spray pressure reduced.

5.7.3 Controls

- It is not possible to measure the wet film thickness. A good non-skid surface with no holidays and an even finish should be the target. There are some merits at start-up / off the job trial stage of coating up glass panels and viewing them against a strong light. This shows up holidays / low dft areas that are not always apparent.
- Check the consumption (how many square metres you get out of the first drum) and fine-tune the technique to get the right spreading rate (volume area control but it must be remembered that there will be no access for later adjustments / flash-ups beyond a couple of metres in).

Control is the key to success and over-application / uneven applications must be avoided. Not only will such applications have poor aesthetic appearance and have a variable non-skid finish the resulting scheme could also crack in service.

Intershield 851 must be applied in a tight, thin coat to provide the resiliency required. **Thick, carelessly applied coats will result in minimum coverage and be subject to mud-cracking and/or blistering.**

6. HEALTH & SAFETY

6.1 INTRODUCTION

Some coatings contain volatile flammable organic solvents which can form explosive mixtures with air. Definite safety precautions must be taken whilst applying this type of coating. 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.

6.2 DANGER OF EXPLOSION OR FIRE

The key factor in preventing an explosion or fire, when considering the application of coatings in open air is elimination of naked flames, sparks and any ignition sources.

Welding, cutting or grinding in the vicinity of paint application should be forbidden until paint fumes are totally dispersed.

Smoking must be prohibited in the vicinity of paint application.

Airless spray equipment must be earthed (because of the danger of static electricity build-up).

Mobile telephones and electrical cameras must not be used in the vicinity of paint application until paint fumes are totally dispersed.

6.3 SOLVENT VAPOUR AND PAINT MISTS - PROTECTION OF PAINTING PERSONNEL

Painters must wear protective clothing, e.g. overalls, gloves, and suitable footwear of non-spark type.

6.4 SKIN IRRITATION

If the correct 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 hold coating project, local Regulations regarding Health and Safety be consulted.

3. Consult the relevant Product Health & Safety Data Sheets prior to use.