

# APPLICATION GUIDE ECOSHIELD® FOR STEEL SURFACES

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**STORAGE** Very important: maximum storage temperature of Ecoshield® is 20 °C.

**PREPARATION** This procedure supplements recognised near-white metal grit blasting standards to provide control of surface profile, surface cleanliness and environment.

Oil and grease shall be removed by solvent cleaning prior to grit blasting. Use dry wiping and scraping to remove heavy deposits of oil and grease followed by localised wiping with clean rags dampened with solvent. Avoid spread of contaminants. Sharp edges, fillets, corners and welds shall be rounded or smoothed by grinding (minimum radius of 2 mm).

The surface shall be grit blasted to minimum Sa 2½ standard. The surface profile shall be minimum 75 microns (Rz).

The particle size of all abrasives used for blast cleaning shall be capable of producing the above surface profile. Blast products and debris shall be removed from the surface of blast-cleaned steel by high-pressure air and/or vacuum cleaning. Compressed air used for blasting shall be clean, dry, and free from oil and water.

Separators shall be placed as close as possible to the blast cleaning equipment. Removal of contaminants such as oil, grease, handprints and other foreign matter from blast cleaned steel by solvent. Re-blasting to specification shall follow cleaning. An inhibitive treatment shall not be applied to blast cleaned steel.

**MATERIAL MIXING** Ecoshield® is a two-component coating. The quantity of catalyst used can be varied to suit the ambient temperature, and rate of cure desired. The range is from 1% to 2% for spray application. The ambient temperature will govern the pot life of the material and batch size should be determined accordingly.

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Mixing should be by powered equipment such as a drill motor with an appropriate whip. Carefully measure the required amount of material into the mixing container, measure the required amount of catalyst and add to the material. Mix thoroughly to ensure full dispersal of catalyst, and any thinner if required. Mix for approximately 3 minutes.

## REQUIRED AMOUNT

### Catalyst (Butanox LPT)

T ambient	Mixing ratio	For 20 litre	For 1 litre	Overcoat time
< 25 °C	2 %	400 ml	20 ml	Minimum 3 hours
> 25 °C	1 %	200 ml	10 ml	Minimum 3 hours

### Thinner (Styrene) – if required

Mixing ratio	For 20 litre	For 1 litre	Overcoat time
2.5 %	500 ml	25 ml	Minimum 3 hours

## CLEANING

Recommended cleaning solvent for the pump installation is Acetone.

## APPLICATION

### First coat

Using spray equipment to apply one full coat of catalysed material to a DFT thickness of 500 microns (WFT thickness of 616 microns). Allow to cure. The second coat can be applied as soon as the first coat is cured, approximately 3 hours at a temperature of 20 °C.

### Second coat

Using spray equipment to apply the second full coat of catalysed material to a DFT of 500 microns (616 microns wet). The total DFT shall be minimum 1000 microns.

A long soft bristle brush may be allowed to apply Ecoshield® on small areas and to perform repairs. An approval from Subsea Industries is necessary prior to any brush application.

On inspector's request welds and corners may be stripe-coated with one coat of Ecoshield® in between the first and second coats. For brush application please refer to the notes at the end of this procedure.

## SPRAY EQUIPMENT

Airless Spray Pump 63:1 or higher is recommended. Spare packing should be available on all large contracts.

There should be no filters or strainers in the pump unit, the fluid lines or the gun, nor should there be diffusers in the tip. No foot extension should be used on the pump.

This is all to promote the free flow of the material and to prevent packing of the glass platelets, which can cause blockages leading to premature curing in the body of the spray pump.

NOTE: if there is no pressure release valve in the system, caution should be exercised when removing lines/guns. Bleed off the remaining pressure carefully.

The fluid hose should be 3/8" internal diameter and the shortest length suitable for practical application to promote free flow of the material and minimise pressure loss. No restrictive couplings should be used on the fluid hose; the gun should be hooked up directly to the line. A swivel hook-up is a must and will give easy manoeuvrability of the gun when spraying.

An airless spray gun of 500 bar (high volume) without diffuser is recommended. This should be used in conjunction with a 'Reverse-A-Quick' head with a 631 tip, again with no strainers or diffusers.

## **SPRAY PROCEDURE**

Ecoshield® cures by chemical reaction, which starts as soon as catalyst is added and then proceeds quite quickly. When spraying use the minimum amount of catalyst permissible i.e. 1 % by volume.

If the correct equipment is used, Ecoshield® can be applied at high application rates. It is a simple material to apply if the recommended procedure is followed.

Perform a test spray procedure prior to the actual application, using no catalyst.

1. Assemble full equipment and flush through with solvent.
2. Remove the gun and circulate material through lines.
3. Attach gun and check that the spray pattern is satisfactory by adjusting the pressure.
4. Remove gun from the line, and the pump from the material.
5. Mix material as detailed above and replace the pump.
6. Circulate material back into the mix container until all un-catalysed material has been removed from the lines.
7. Re-attach gun and trigger and remove solvent from gun and line.
8. The equipment is now ready for use.

NOTE: Do not add Acetone solvent to material.

#### REMEMBER

- Avoid airlocks by ensuring that the fluid leg is always immersed.
- As always extreme care should be taken to avoid contamination of the material and the working equipment to minimize the possibility of foreign matter entering the system and causing blockages.

This will ensure a continuous flow of the material and reduce the possibility of premature curing in the equipment.

- The material should be sprayed at distance of approximately 2 feet from the surface. Passes should be made keeping the gun at an even distance from the surface. At least 2 small passes will be required to attain the specified thickness. Successive passes should be at right angles to previous pass.

#### CLEANING

1. First cut off the air pressure at the pump and bleed carefully to release the pressure on the fluid line and gun. Remove the Reverse-A-Quick head from the gun and clean with solvent.
2. Flush out the pump, line and gun with solvent and allow this to circulate for 5 minutes at least.
3. To recommence spraying, purge line and gun with material before replacing tip.
4. It is recommended to flush pump and lines by the above procedure every 30 minutes.
5. When spraying is complete or before down time, it is essential to clean the equipment thoroughly by the above procedure but allow solvent to circulate for 20 minutes, finally flushing with clean Acetone.

**NOTE:** Do not leave catalysed material standing in the pump, line or gun.

If these procedures are followed clogging or packing should not occur. Should blockages arise, these must be dealt with swiftly by progressively cleaning the tip, gun, line and pump as indicated in the cleaning procedure. If delays occur for any reason when the material is mixed and spraying has commenced, care must be taken not to exceed the pot life of the material. If there is any danger of this happening or the pump shows signs of labouring the pump unit, fluid lines and guns should be flushed out with solvent as described above. Depending on the length of time of the delay it may be necessary for a fresh drum of material to be mixed (after flushing) before continuing the operation.

## QUALITY CONTROL

**Ecoshield®** should not be applied when humidity is above 85%.  
**Ecoshield®** should not be applied when the temperature of the steel at the coldest point is less than 3 °C above the dew point.  
**Ecoshield®** should not be applied when the temperature of the steel surface is 60 °C or higher.  
**Ecoshield®** should not be applied when the surface temperature of the material to be coated is less than 0 °C.

During application, spot-check thickness with a wet film gauge for both coats.

After a minimum 12 hours cure, thickness DFT readings should be taken using an Elcometer gauge or similar. Final thickness should be 1000 microns DFT after application of the two layers.

Defect repair: Areas with less than the required DFT should re-coated following the general principles as explained above. Ecoshield® damaged after application should be repaired following our repair guide (available on request).

## WATER IMMERSION

Note that the minimum curing time of Ecoshield® before immersion in water is 24 hours after application of the final coat.

## NOTES

Airless spraying is the preferred method of application. When sprayed on at the correct thickness Ecoshield® will "flow" to form a smooth surface with a slight orange peel effect but when applied too thinly it will have a rough finish because the coating will be present as small blobs, which are not thick enough to join up and flow together.

When applying by brush it is difficult to achieve 500 microns per coat and you may need 3 or possibly 4 coats to get the correct thickness. Ecoshield® will not flow and give a nice finish unless at least 250 to 300 microns are applied per coat. The brush should be used to "lay" the material onto the surface, holding it at an angle of 45 to 60° from the vertical. This will ensure that the best possible thickness is applied.

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