



Protective coatings





Introduction

Steel is the material of choice for the construction of industrial installations as it is readily available worldwide, cost is relatively low and structural properties are ideal for building strong structures such as bridges, factories, tanks etc.

A drawback of steel is the fact that, if left untreated, it will corrode and the severity of corrosion is dependent on the location and climate. For instance, a constant high level of relative humidity has more corrosive effect than occasional rainfall in less humid climates. Air pollution, especially sulfur dioxide ("acid rain") has an even greater influence on corrosion.



At the construction stage corrosion threats can be reduced regardless of the choice of the right protective system. Corrosion phenomena generally start in areas such as cavities or corners where water or dust are easily collected, without any drainage opportunity. A skilled designer can always change the type or the position of the sections, to avoid such drawbacks.

For instance, all surfaces exposed to corrosion should be within easy reach, in order to allow facile access for inspections and maintenance.

By now it will be clear that protecting steel against corrosion requires a strategy where factors such as steel exposure conditions and intended functional use of steel structures have to be considered.

Painting steel is the most widely used method of protection. Anticorrosive paint systems typically consist of several layers which form a barrier against the penetration of water and contaminants through the coatings to the steel.

However, the paint systems' properties can only be done justice if they are well-applied and if a proper surface preparation has been carried out. It has been well established that the quality of surface preparation has a direct relation with the lifetime of a system.

A protective coating system should offer anticorrosive power whether by using active anticorrosive pigments such as zinc, or by using the barrier principle, aiming to prevent penetration of water or water vapour through the coating film.

It also should adhere firmly to the substrate but cohesion between paint layers must be appropriate too. The system must be resistant to corrosive agents and to the expected mechanical activities of the environment. Various factors can determine the choice of a system and in order to come to a decision, it must be clear which one has the highest priority.

ISO-12944 is a good reference standard to use as it describes the corrosion environment, provides good guidelines for structural design and suggests suitable paint systems for each corrosive environment.

Table 1 gives examples of the various corrosive conditions as specified by the standard. Part 5 of the standard suggest paint systems but the standard has not been updated since 1998 and therefore does not take into account the latest techniques in paint testing as well as paint formulating.



Table 1 gives the six atmospheric categories together with some typical examples of the environment.

Corrosion category	Steel thickness loss after 1 year exposure (if left unprotected)	Typical examples in moderate climates	
		Exterior	Interior
C1 very low	< 1,3 µm		Heated buildings in rural areas such as offices, hotels, public buildings.
C2 low	> 1,3 - 25 µm	Rural areas with low level of pollution.	Unheated buildings where condensation may occur such as warehouses.
C3 medium	> 25 - 50 µm	Urban and industrial areas with moderate sulphur dioxide pollution. Coastal areas with low salinity.	Industrial facilities with high humidity such as food processing industries, breweries.
C4 high	> 50 - 80 µm	Industrial and/or coastal areas with moderate salinity.	Chemical plants, swimming pools, boat yards, ship interiors.
C5-I very high (industrial)	> 80 - 200 µm	Industrial areas prone to high humidity and chemical attack.	Facilities exposed to permanent condensation and chemicals.
C5-M very high (marine)	> 80 - 200 µm	High saline areas such as coastal and offshore areas.	Facilities exposed to permanent condensation and chemicals.

At the same time, Transocean Coatings researchers are continuously engaged in development programs to develop new products, improve existing ones and to evaluate new raw materials and techniques that could be of benefit to customers.

One fine example is a new analysis technique called EIS or Electrochemical Impedance Spectroscopy which is introduced by Transocean to its customers.

In short, the EIS technique makes it possible to measure the barrier properties of a coating (and therefore corrosion resistance) without destructing the coating.

Corrosion resistance of paint is typically tested by using accelerated salt-spray, a test which has poor correlation with practice and is time consuming as often a full test requires 6 months.

By using EIS, only a short period of 1 day up to 3 weeks is required to establish the intrinsic anti-corrosive properties of a paint.

EIS also offers tremendous advantages for field inspection as it is non-destructive and is able to detect corrosion processes beneath a coating system before it is even visible from the outside.

As such, by using EIS as an inspection or monitoring tool, it provides reliable information that can be used in maintenance planning programs.

Transocean Coatings has worked with its customers to introduce EIS as a monitoring and evaluation tool and as such companies like Tata have introduced EIS in their paint specifications.





Transocean solutions

At Transocean Coatings we have the experience and knowledge to provide you with a suitable paint system to protect your structure. Important in selecting the right system are factors such as the desired lifetime expectation, possible access for future maintenance and, above all, the available budget.

In Maintenance situations, the choice of surface preparation plays a major role too. Obviously, blast cleaning provides the best possible substrate for painting but due to operational constraints, in many cases this is simply not possible. Other methods as High Pressure Water jetting and mechanical power tooling are well established but have their limitations, especially in the case of using mechanical methods such as wire-brushing or disc sanding which have the risk of polishing the surface resulting in possible adhesion problems of the paint system.

Transocean therefore offers its customer the services of Transocean's Technical Team who will ensure that your facility will receive an excellent treatment.

Primers



For new structures, often the first step in long lasting coating system is to apply a zinc rich primer. When exposed to the elements, zinc will react to form an insoluble layer which will protect the steel

from corrosion.

The Zinc dust is typically dispersed in resin matrix of epoxy resins or silicate resins. Zinc silicate paint offers better corrosion protection than zinc epoxy primer but zinc epoxy primers are often easier in application, surface preparation and handling.

Transozinc Epoxy Primer is an excellent epoxy primer pigmented



with a high content of zinc and is used in systems for offshore- and onshore applications.

Transozinc Silicate 1.52 with a zinc content of more than 85% in the dry film is the zinc silicate product of choice for the protection of industrial installations. The product has unique features as the zinc is mixed with the silicate binder in the form of a zinc paste. Using a zinc paste has tremendous advantages over mixing the silicate binder with zinc powder. First handling and mixing of zinc powder is cumbersome as workers are exposed to zinc fumes which is not healthy. Secondly, agglomerates if zinc are often formed resulting in clogging of application filters. Using Transozinc Silicate will overcome all these practical issue while still obtaining an excellent application result and a long lasting protection.

Transpoxy Uniprimer is a versatile epoxy polyamide primer offering excellent adhesion to all metals including aluminium, galvanised steel and stainless steel. The product is compatible with high pressure water jetting as surface preparation.



Multipurpose Anticorrosives

Transpoxy Barrier products are high build polyamide epoxy primers for all areas and have been in the market since the late 1970's. Although Transpoxy Barrier can be applied year round, specific versions for winter and summer are available to provide the best workability. Transpoxy Barrier has been approved as primer and buildcoat for all areas facing atmospheric exposure including decks and walkways.

The **Transpoxy Masterbond** Range consist of high volume solids epoxies ready for heavy-duty performance. With over 80% in volume solids, it meets VOC standards and reduces emissions. Due to its good wetting and adhesive properties, Transpoxy Masterbond is exceptionally suitable as a surface tolerant mastic for maintenance situations as well as for new construction projects. It also offers a good resistance to spillage of chemicals and meets Jet Fuel storage requirements according to Mil-PRF 4556 F.

Heat Resistance paints



Transpoxy MIO Primer is a mil-caceous iron oxide containing epoxy coating which is easy to apply and offers a long recoating period with itself and other products.

Transpoxy Tankguard 4.61 is a pure phenolic epoxy coating combining a good heat resistance with an excellent chemical resistance. Both paints are capable to be used at service temperatures up to 200 °C.

Transosil Aluminium HR is a pure silicone based coating offering heat resistance up to 600 °C. While silicone based systems may

have the drawback of requiring a heat cycle for full cure, **Transo-therm 5.81** is a very interesting product as it does not require heat to full cure.

Transo-therm offers heat resistance up to 500 °C and is based on inorganic resins. Dependent on climate conditions, product can reach full cure state within one day and therefore is ideal for those situations where shut down periods are short. In combination with **Transozinc Silicate** as a primer, Transo-therm forms a complete anti-corrosive system and as such has been approved by many companies including Shell.

Finishes



The final layer of any coating system is often judged by its esthetical qualities but in fact it contributes to the overall anticorrosive properties of the coating system.

Transurethane Shield is a high solids, polyurethane finish providing excellent durability and is available in a wide range of colours. The product

is suitable for new construction project as well as for maintenance jobs in marine- and industrial environments.

Transpoxy PX is a polysiloxane coating combining the toughness of epoxy systems with the long lasting colour retention properties of silicone resins. The product has high volume solids and therefore an ideal finish when solvent emissions are restricted.

Combined with Transpoxy Masterbond, Transpoxy PX offers a two coat anticorrosive system which meets stringent standards of Norsok M-501.

Transocean Product range

The product range of Transocean comprises a wide range of products designed to be used in a marine and industrial environment. Note that products are always part of a coating system. Please contact your local Transocean company for obtaining more information on our products and for advice on appropriate coating systems.



Transocean Anticorrosives

Beside our universal primers, Transocean offers many other products which can match a specific requirement on composition, usage and budget. Below a selection of products.

Transogard Primer	Alkyd primer
Transogard QD	Quick Drying modified alkyd primer
Transoweld Primer	low zinc silicate shop primer
Transoxy Primer	Epoxy primer
Transoxy Uniprimer	Universal epoxy primer for all substrates
Transoxy MIO Primer	Epoxy primer pigmented with Micaceous Iron Oxide
Transoxy EC Primer	Epoxy primer with unlimited recoatability
Transoprime	Epoxy primer for all areas
Transoxy ARC	Abrasion resistant pure epoxy
Transoxy Barrier FF	Universal epoxy primer/coating
Transoxy Barrier 218	High built epoxy coating
Transoxy Intermediate	Epoxy buildcoat
Transozinc Epoxy	Zinc epoxy primer
Transozinc Silicate	Zinc silicate anticorrosive
Transoxy Deep Tanks	Amine adduct cured chemical resistant epoxy
Transoxy Tankguard 461	Phenolic epoxy
Transoxy Tankguard 471	Solvent free, chemical resistant epoxy
Transoxy Masterbond	High solids, surface tolerant epoxy coating
Transoxy Masterbond Aluminium	Surface tolerant epoxy mastic Aluminium
Transoxy Masterbond GF	Glassflake epoxy
Transoxy Glascode	Glassflake epoxy
Transvinyopox HS	High solids acrylic epoxy coating
Transoxy Guard	Solvent free epoxy for potable water

Transocean Moisture cured range

Transocean MC-Primer	Surface tolerant primer pigmented with aluminium
Transocean MC-Zinc	High solids zinc primer
Transocean MC-MIO	Micaceous Iron Oxide pigmented sealer/finish

Transocean Finishes

Below a brief summary of the most popular Transocean Finishes.

Transunilac Finish	Alkyd finish
Transobox Coating	Single pack primer/coating for rapid refurbishment
Transoxy Finish	Epoxy finish
Transoxy EC Coating	Epoxy finish with unlimited recoatability
Transothane Finish	Regular build polyurethane finish
Transurethane Finish	High build polyurethane finish
Transurethane Shield	High solids, semigloss polyurethane finish
Transoxyl PX	Polysiloxane coating
Transofine Finish	Water borne acrylic finish
Transocean Aquapox	Water borne acrylic epoxy finish

Transocean Heat resistant products

Transolac Aluminium HR	Single pack coating up to 200°C
Transoxy MIO Primer	Micaceous Iron Oxide epoxy primer/coating up to 200°C
Transoxy Tankguard 461	Phenolic epoxy up to 200°C
Transosil Finish	Single pack silicone acrylic up to 250°C
Transotherm	Two pack, inorganic coating up to 450°C
Transosil Aluminium	Single pack silicone coating up to 600°C
Transofire	Intumescent coating up to 2 hours protection



Please visit **www.transocean-coatings.com** for more information about all Transocean products and our activities. Technical datasheets can be downloaded from the website too.



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The laughing dolphin guarantees worldwide local service. It's unique!

Since 1959, Transocean Coatings is active in the manufacture and supply of antifoulings, anticorrosives and other coatings for commercial ships, pleasure crafts and steel structures onshore as well as offshore.

Extensive research and development work has provided Transocean Coatings with a series of products which professionals acknowledge to be complete and of high quality.

Transocean Coatings has a network of manufacturers, producing its range of coatings in some 40 countries and subsequently distributing the paints to all continents.

Manufacturing takes place using stringent formulations. Whether a product is supplied in Europe, Asia, North- or South America, in Africa or Australia, the quality is guaranteed identical.

At any shore therefore, wherever in the world, you can rely on Transocean Coatings. And local service assures quick delivery of factory-fresh products at competitive prices.

That's unique!

Your local Transocean representative

WORLDWIDE NETWORK WITH LOCAL SERVICE

