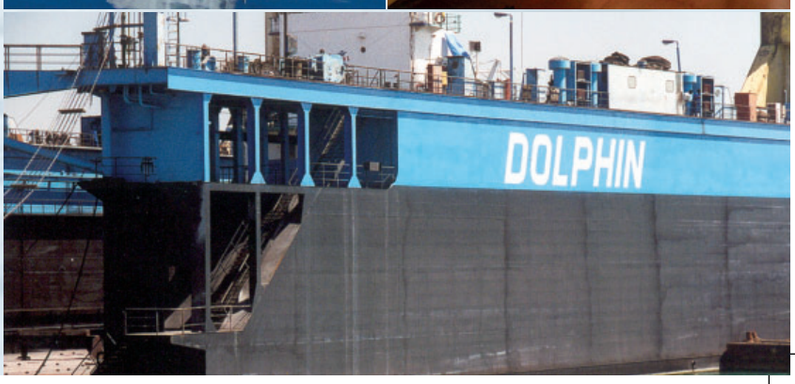
Marine Paints



TRANSOCEAN COATINGS

GROWEL

SINCE 1957

Introduction

Shipping is still the most important form of transportation of goods across the world. One of the major costs incurred by shipping companies is preventing corrosion of their vessels and as ships are constructed mainly of steel, cost for keeping corrosion at bay can account for a fair amount of the operational budget.
Corrosion is a natural reaction where steel under the influence of water and air transforms to rust. The speed of corrosion is enhanced by the presence of salt and as such it is clear that water, air and salt perfectly describe a marine environment.

Corrosion can also occur when steel comes in contact with corrosive chemicals even when at first sight this is not expected. For instance coal in its basic form is harmless but coal ore may contain sulphur impurities, which in combination with moisture forms sulphuric acid, a strong corrosive chemical.

Another type of corrosion that deserves mention is biological corrosion caused by organisms such as the sulphate reducing bacteria (SRB). SRB typically favour conditions which can be found when structures are submerged or buried in soil but also in water- ballast tanks where often a layer of mud is deposited on the steel. When present in such deposits, SRB use sulphate as their source of oxygen and in turn produce sulphide ions. Sulphide ions are highly corrosive and as a result steel corrodes to typical terrace-shaped craters with deposits of black iron sulphide on the crater bottom.

Clearly 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 is the most widely used means of protection. Marine 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. Even when using surface tolerant paints it cannot be emphasized enough that better surface preparation always results in longer lifetimes.

During new construction stage, it is relatively easier from the shipyard to achieve a good quality of surface preparation. In some cases, class rules like the IMO-PSPC even specifically describe which preparation standards are to be met.

However, in maintenance situations things can be different for example open-air grit blasting may not be possible in certain countries and can also be quite costly due to high cost for disposal of drydock waste.

Transocean executes raft testing of antifoulings worldwide.

High pressure – and Ultra high pressure water jetting is therefore the preferred method for maintenance shipyards as it not only results in less waste but also it leaves a good clean substrate for recoating.

Finally, on board maintenance by the crew presents problems of its own as time and tools for a proper surface preparation are usually limited.

In all these situations, marine paints are still expected to perform which is why development and production of marine paints is crucial for protection.

Transocean Coatings has taken up this challenge and since 1959, Transocean Coatings has supplied ship owners with high quality paints combined with an excellent service. Extensive research has resulted in products which have proven their worth in the market such as the Transpoxy Masterbond range of surface tolerant epoxies and the Cleanship line of antifoulings.

Research and Development is carried out on various locations in the world where Transocean Coatings researchers are 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.
Transocean applies stringent criteria before launching new products in the market. Apart from using well known accelerated test regimes like cycle corrosion testing, Transocean uses modern techniques such as Electrochemical Impedance Spectroscopy (EIS) in order to get a complete picture of the anticorrosive properties of every paint.

When lab testing has resulted in a prospective new product, it will require a number of validation checks before the products is finally introduced to the costumers. One example of a validation procedure is the fact that the claimed test results by the development lab of a new product has to be confirmed by another laboratory in the Transocean organisation. By doing so, it may take several years before a product is ready to be introduced in the market.
In the case of testing and development of antifoulings, this process is especially a time consuming task simply by the fact that there are no real accelerated test as there are for anticorrosives.
Transocean evaluates antifouling properties under natural conditions, which is by for instance immersion of panels on rafts. Since vessels trade worldwide, Transocean antifoulings are tested in various locations, each having a different seawater condition.
Other techniques in Antifouling research are SEM (Scanning Electrone Microscopy) and dynamic rotor testing which can be used to study the erosion rate of self-polishing antifoulings.

Transocean Range of Marine Products

Shop Primers and Primers

For the new building stage, **Transoweld 1.56** is the product of choice. It is a low-zinc silicate shopprimer which is easy to apply by manual spray as well as in automatic spraying lines. The product has welding certificates from various Class and complies to IMO-PSPC standard too.

Our range of primers is able to meet requirements of ship owners and shipyards alike. Apart from universal primers that can be used from flat bottom all the way to the funnel, Transocean has primers which are optimised to match corrosive challenges of specific vessel areas.

An example is **Transpoxy Uniprimer**; a versatile epoxy polyamide primer offering excellent adhesion to non-metal substrates such as GRP but also to all metal substrates including aluminium and stainless steel.

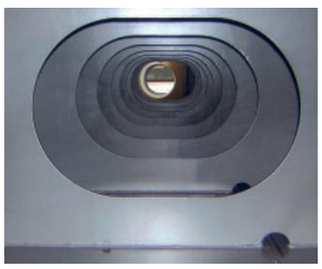
Abrasion Resistant Coatings

Transpoxy ARC is a high solids, self-priming buildcoat based on pure epoxy resins reinforced with extremely durable pigments. When cured, the high crosslink density network results in a tough coating offering a high level of abrasion resistance which explain why often Transpoxy ARC is selected for the protection of the outside hull, decks and cargo holds.

Multi Purpose Anticorrosives

Transpoxy Barrier products are high build polyamide epoxy primers for all vessel 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 is a recognised IMO-PSPC coating which makes it primer for all vessel areas. Moreover, Transpoxy Barrier is very suitable as maintenance coating too. It offers good adhesion to suitable prepared old coating system and is compatible with high pressure water jetting.



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. By selecting Transpoxy Masterbond, there is no compromise on corrosion protection since the product meets Norsok M-501, ISO 20340 and has been recognised as IMO-PSPC coating.

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.

Transothane Finish 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. Other suitable finishes for vessels are single pack paints like **Transacryl Finish** and **Transunilac Finish**. All finishes comply to the IMO FTP code for low spread of flame.

Antifoulings

If corrosion protection is the first priority for users of marine paints, fouling protection will follow shortly after. Any organism capable of attaching itself to a vessel can cause fouling. However, the following types are commonly found worldwide:

Slime- and Algae fouling: – initial settlement of bacteria is within minutes on any object immersed in the sea. Slime fouling can develop in the algae fouling and an example is the well-known Enteromorpha (`green algae').

Animal fouling - Barnacles are the most well-known example here. Once a barnacle larvae has settled on a substrate, a hard, calcareous shell is built. During the shell-growing process enormous powers are developed to such an extent that it can undercut hard epoxy coatings.

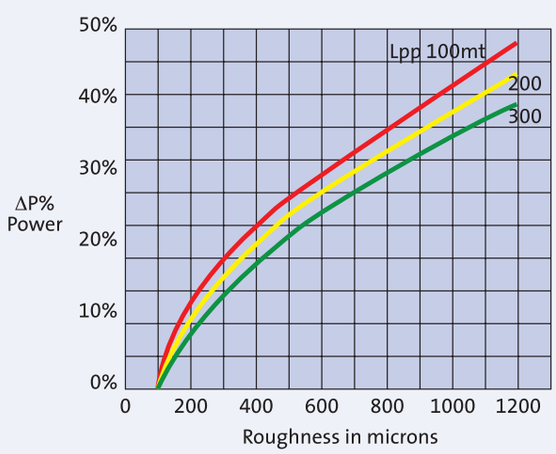
Effects of fouling

The most quoted effect of fouling on a ship hull is the increase in drag and hull roughness resulting in speed reduction resulting in lower fuel efficiency and thus higher operational cost for the ship owner. The average roughness of a new paint system on a blast cleaned hull is approx. 150 micron. However, if the vessel is fouled by for instance barnacles hull roughness can easily exceed 1000 micron resulting in higher fuel bills as the graph further illustrates. Using antifoulings is therefore an effective solution and a worthwhile investment.

There are two basic principles to how antifoulings work;

First is by the release of active compounds called biocides at the coating-seawater interface where they creates a hostile environment for fouling organisms. Fouling will therefore be prevented and any growth of fouling will be inhibited. Biocides have to be released in a controlled manner in order to obtain longer lifetime and avoid unnecessary excessive use of biocides.
Within the Transocean Coatings range of antifoulings, products will vary in biocide release mechanism, lifetime expectations and vessel suitability.

Second is the reliance on a physical interaction and not biocides. The coating presents a surface to which fouling organism can adhere too but not proceed to settling stage. As such, fouling can be easily removed by little force such as the speed of a sailing ship. Transocean Ultima system has excellent fouling release properties also under stationary conditions and does not impose limitations on vessel types or vessel speed.



The Graph shows the effect of hull roughness on the percentage increase in Power to maintain speed for several vessel lengths. It shows for instance that smaller vessels are more effected by increasing hull roughness.

Transocean Product Range

The product range of Transocean comprises a wide range of products designed to be used in a marine 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 for your ship.

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
Transvinyl Primer	Modified vinyl primer/sealer
Transoweld Primer	Low zinc silicate shop primer
Transpoxy Shopprimer	Epoxy shop primer
Transpoxy Primer	Epoxy primer
Transpoxy Uniprimer	Universal epoxy primer for all substrates
Transpoxy MIO Primer	Epoxy primer pigmented with Micaceous Iron Oxide
Transpoxy EC Primer	Epoxy primer with unlimited recoatability
Transoprime	Epoxy primer for all areas
Transpoxy ARC	Abrasion resistant pure epoxy
Transpoxy Barrier	Universal epoxy primer/coating
Transozinc Epoxy	Zinc epoxy primer
Transozinc Silicate	Zinc silicate anticorrosive
Transpoxy Deep Tanks	Amine adduct cured chemical resistant epoxy
Transpoxy Tankguard	Phenolic epoxy
Transpoxy Masterbond	Epoxy mastic
Transpoxy Masterbond BT	Epoxy mastic especially for ballast tanks
Transpoxy Masterbond GF	Glassflake epoxy
Transpoxy Glascote	Glassflake epoxy
Transvinypox HS	High solids epoxy tiecoat
Transpoxy Guard	Solvent free epoxy for potable water

Transocean Finishes

Although Transocean coating finishes are mostly judged by their esthetical qualities, one should take into account that the products do contribute to the overall performance of the anticorrosive system. Below a brief summary of the most popular Transocean Finishes. Note that all finishes offer low flame spread characteristics according to the IMO FTP-code.

Transunilac Finish	Alkyd finish
Transacryl Finish	Acrylic finish
Transpoxy Finish	Epoxy finish
Transpoxy EC Coating	Epoxy finish with unlimited recoatability
Transothane Finish	Regular build polyurethane finish
Transurethane Finish	High build polyurethane finish
Transurethane Shield	High solids, polyurethane finish
Transpoxyl Finish	Polysiloxane
Transofine Finish	Water borne acrylic
Transocean Aquapox	Water borne epoxy

Transocean Antifoulings

All Transocean antifouling comply to the IMO-AFS code and as such are certified by class.
Please note that due to local regulations some of the products stated below may not be available. Your local Transocean representative will be able to inform you exactly about the status in your region.

Transocean Optima	Ablative grades, suitable for drydock intervals of 18-24 months
Transocean Longlife	Mixed matrix type, for dry dock intervals up to 30 months. Not suitable for stationary, slow steaming vessels.

Transocean Cleanship

Comprises a range of selfpolishing antifoulings based on hybrid binder system. Dependent on vessel characteristics, drydock intervals up to 60 months are possible.

Cleanship 291	General purpose usage, optimal for high activity vessels
Cleanship 293	General purpose usage, optimal for slower speeds
Cleanship 295	General purpose usage
Cleanship 292	Special version for aluminium vessels

Transocean Armada

Selfpolishing antifouling based on hydrolysable silylacrylic polymers. Suitable for drydock intervals up to 60 months.

Transocean Ultima System

Biocide free, Fouling release system based silicone binder system. Extended drydock intervals are possible. Suitable for all vessel types.

Please visit **www.growel.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!

GROWEL
SINCE 1957

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Paints

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