COPPERPLUS

PURE METALLIC COPPER-EPOXY ANTIFOULING

THE EFFECTIVE LONG TERM ANTIFOULING WITH MICRO-POROUS TECHNOLOGY THAT IS VIRTUALLY MAINTENANCE FREE.

COPPERPLUS is the result of extensive research to improve the performance and reliability of metallic copper-epoxy antifouling. The research has resulted in the discovery of a unique non-toxic additive that renders the epoxy binder micro-porous. Although the sponge like epoxy binder is mechanically very strong it does not trap the copper but allows it to easily leach from the entire thickness of coating to the surface, where it forms a protective film that deters all forms of fouling. Recently a new hardener has been developed which enables Copperplus to be applied at any temperature without effecting its antifouling performance. Copperplus does not contain additional biocides because they would soon leach out to leave the coating less effective.

This photograph shows a trial strip of COPPERPLUS after two years on a tug moored in Fowey harbour in the South West of England. The COPPERPLUS was free of any hard fouling and only required washing with high pressure water before re-launching. The remainder of the vessel had been coated with a well known 30-month tin free product which required scraping to remove barnacles and mussels, pressure washing and re-coating.

- Micro-porous technology makes COPPERPLUS always effective, even in the severest fouling conditions.
- Suitable for use in all waters of the world.
- High copper content produces a dry film containing 80% of pure activated copper. It does not contain additional biocides that would leach out in a year or two.
- Very long life - up to 10 years when correctly applied.
- Two modes of operation provide a self cleaning effect that prolongs service periods.
- Economical - provides the lowest long term cost of any antifouling system.
- Almost maintenance free - only requires pressure washing during haul out.
- Extends the period between slipping because COPPERPLUS's self-cleaning property helps it remain clean for longer than other products.
- Provides a very hard, tough and abrasion-resistant surface.
- Easy to repair damaged areas.
- Can be applied in poor weather conditions in temperatures from 5°C to 40°C and up to 98% humidity
- Approved by HSE No. 7856

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COPPERPLUS

METALLIC COPPER - EPOXY ANTIFOULING

COPPERPLUS metallic copper-epoxy antifouling, developed and improved since 1995 now has the benefit of patented micro-porous technology that makes it effective every time, even in tropical waters. The micro-porous binder enables leaching of copper from the entire thickness of the coating rather than only from the surface as do other metallic copper antifoulings.

COPPERPLUS is environmentally friendly and does not contain tri-butyl-tin or any other chemicals which can leach out of the coating and poison marine life. It corrodes at a rate of between only 3 and 10 microns per year. The 28 day copper leaching rate for COPPERPLUS is 49.1 ug/cm^2/day.

COPPERPLUS is economical. When applied in accordance with the instructions one application of COPPERPLUS will last up to 10 years. COPPERPLUS is suitable for use on steel, GRP and wooden vessels, and because it is non-conductive it will not cause electrolysis.

COPPERPLUS is effective in all areas and when correctly applied and maintained it is largely self cleaning on vessels which are in regular use. It will carry on working after other products have fouled.

COPPERPLUS mode of operation. COPPERPLUS is more effective then conventional antifouling, because on exposure to sea water copper quickly reacts with oxygen in the water to form cuprous oxide which is a powerful antifouling agent. Further exposure to sea water converts the cuprous oxide to cupric hydrochloride, which does not adhere to the underlying cuprous oxide and easily washes away with any attached growth revealing fresh cuprous oxide. This self-cleaning action is unique to products containing a very high content of metallic copper or copper alloy. The process is facilitated by the porous epoxy binder that allows a constant supply of dissolved copper to leach to the surface.

COPPERPLUS is durable. The corrosion rate of copper antifouling in sea water depends on the speed and usage of the vessel but for commercial craft it will be between 3 and 10 microns per year. Consequently an application of COPPERPLUS 250 microns thick will last many years.

COPPERPLUS is virtually indestructible. The combination of tough epoxy binder and malleable copper produces a coating that is flexible and abrasion and impact resistant. Mechanical damage is easy to repair. Small areas can be re-coated by hand while larger areas can be spot blasted and re-sprayed.

COPPERPLUS requires very little maintenance. It usually only requires pressure washing and repair of any mechanical damage before re-launching.

COPPERPLUS is as easy to apply as conventional antifouling. When mixed it has a 8 to 10 hour pot life and unused material can be kept in a fridge overnight. COPPERPLUS can be applied outdoors in poor weather conditions and can be immersed at any time after application without danger of impaired antifouling performance. Its resistance to mechanical damage reduces or eliminates touching up.

TECHNICAL SPECIFICATIONS:

Colour	Natural copper
Coverage	2.7m^2 per kilo per coat
Solid content	90%
Copper weight content in dry film	80%
Copper volume content in dry film	31.5%
Density	2.7kg per litre
Re-coat time	3 to 8 hours, depending on temperature
Copperplus copper leaching rate, 28 day test	49.1 ug/cm^2/day

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METALLIC COPPER- EPOXY ANTIFOULING

HULL PREPARATION We recommend that all old antifoulings are removed from the hull before application of COPPERPLUS. However, COPPERPLUS has been successfully applied over existing conventional antifoulings that were in good mechanical condition.

PRIMER In order to be fully effective, epoxy bound copper antifoulings must be micro-porous to allow the copper to leach to the surface and to avoid trapping the copper within the coating. COPPERPLUS is therefore not a moisture barrier and will not provide protection against osmosis on GRP craft. To ensure adequate adhesion to the substrate we recommend the application of 1 thin coat of Safeguard PS as a primer. If protection from osmosis is desired two to four coats of SAFEGUARD EA or TSF epoxy moisture barrier coatings can be applied before application of two coats of COPPERPLUS.

APPLICATION COPPERPLUS and SAFEGUARD are weather tolerant and can be applied in adverse weather conditions in temperatures down to 5°C. COPPERPLUS's long pot life of 8 to 10 hours enables large packs to be used without fear of it setting in the pot. Unused mixed material can be kept in a refrigerator overnight for use the next day.

COPPERPLUS is easy to apply by roller or brush. A very smooth semi-gloss finish can be achieved with internal mix or high pressure airless spray equipment.

COPPERPLUS can be immersed any time after application and for best results it should be lightly burnished before the vessel is launched.

HOW MUCH WILL YOU NEED?

1 kilo of COPPERPLUS will cover approximately 2.7 square metres.

The easiest method for calculating the amount of Copperplus that you will require is to enter the dimensions of your craft into the form on our website at www.reactiveresins.com/articles&guides

Alternatively you can calculate the approximate amount of COPPERPLUS required with this formula.

Waterline length X (beam + draft) =

Multiply the result by the following factors to find the approximate amount of COPPERPLUS required in kilos for various types of hull.

Dimensions measured in:	feet	metres
Bilge keel yacht	0.059	0.63
Round bilge motor boat	0.055	0.6
Long keel yacht	0.045	0.48
Fin keel yacht	0.038	0.41

To find the litres of SAFEGUARD PS primer required divide the kilos of COPPERPLUS by 12
To find the litres of SAFEGUARD EA & TSF required per coat divide the kilos of COPPERPLUS by 6