COPPERSHIELD 2000

The COPPERSHIELD 2000 Resin & Hardener should be stored in a warm, dry environment with an ambient temperature of 15°C.

INTRODUCTION

This copper rich, water miscible epoxy system provides excellent long-term resistance to marine growth when applied to the underwater section of G.R.P., wooden, ferro-cement, aluminium and steel boats. The standard pack consists of 0.5kg of both resin and hardener and 2.0kg of pure copper powder. With the three components thoroughly mixed together a total volume of 1.2 litres is produced and, when applied to a hull by brush or roller, the filled epoxy produces a hard, smooth, durable coating when fully cured. The *COPPERSHIELD 2000* resin & hardener should be stored in a warm, dry environment with an ambient temperature of 15°C.

COPPERSHIELD 2000 is not an osmosis treatment in its own right, but can be done in conjunction with a West System osmosis treatment.

SURFACE PREPARATION

It is important that thorough surface preparation is undertaken to enable any epoxy to develop its maximum properties. The basic requirement is that the hull surface is clean, dry and thoroughly abraded after removing previous surface coatings e.g. paint, anti-fouling, varnish and any other hull coatings. Any contamination such as oil, grease, wax or mould release must be removed before sanding by wiping the surface with an aggressive solvent such as WEST SYSTEM 850 or clean acetone and then wiping with clean, dry paper towels before the solvent dries. The recommended preparation for specific hull surfaces is detailed below.

a) GRP Hulls

The bare surface of the GRP must be scrupulously abraded (after all existing coatings have been removed) with 80 grit paper to achieve a mat surface. After abrading, remove the dust and debris with a vacuum cleaner or wipe the surface with a clean dry cloth or paper towel. Apply one primer coat of WEST SYSTEM 105 Resin/205 or 206 Hardener.

b) Wooden Hulls

If the boat has not been treated with an epoxy then abrade back to bare wood using 80/100 grit paper; remove the sanding dust and wipe clean the surface with a clean dry cloth or paper towel. Apply at least three coats of WEST SYSTEM epoxy (105 Resin/205 or 206 Hardener) to the hull. Refer to WEST SYSTEM technical literature for handling and application instructions. Allow the first coat of epoxy to fully cure and sand fair with 120 grit paper. Remove the sanding dust before applying the second coat. As soon as this coat of epoxy becomes "tacky" to the touch – dependent upon temperature, but normally between 2 and 4 hours – apply the third coat. If necessary, apply additional epoxy coats in a similar manner.

If the boat has been previously coated with epoxy, abrade with 120 grit paper, remove the dust and debris and clean the surface with a clean dry cloth or paper towel. Apply one primer coat of WEST SYSTEM epoxy.

c) Steel Hulls

Ideally, steel hulls should be degreased and then blast cleaned to SA 21/2 but, if this is not possible, it must be thoroughly abraded with 60/80 grit paper. Immediately after cleaning, all dust and debris must be removed and WEST SYSTEM epoxy must be applied to the clean steel surface within 1 hour of blasting/abrading to minimise oxidation of the surface and the onset of corrosion. Allow this coat to fully cure before sanding fair with 120 grit paper and applying a second coat. This serves as the primer coat prior to the application of *COPPERSHIELD 2000*.

d) Aluminium Hulls

The surface must be well abraded using 60/80 grit paper and degreased. If practical, a light blasting is an alternative preparation technique. Ensure the surfaces are immediately cleaned with WEST SYSTEM 850 solvent or clean acetone and then thoroughly dried to minimise oxidation. It is most important to apply the WEST SYSTEM 105/205 or 206 epoxy within 30 minutes after cleaning to minimise problems with oxidation and corrosion of the surface. When this coating has fully cured, sand fair with 120 grit paper and apply a second coat of WEST SYSTEM epoxy. This acts as the primer coat prior to the application of *COPPERSHIELD 2000*.

e) Ferro-cement Hulls

Unsound concrete must be cut back to uncover sound material. All loose material must be removed by brushing or blowing lightly with compressed air and the surfaces thoroughly washed. If the surfaces are contaminated, scrub with detergent solution. Remove laitence and/or previous surface coatings with a wire-brush or by grit blasting. Ensure the surfaces are dry and sound before applying the priming coat of WEST SYSTEM 105/205 or 206 epoxy. When this application is fully cured, sand fair and apply a second coat. Full specification on epoxy treatment of ferro-cement hulls is available on request. Applications may vary depending on the age/condition of the hull.

MIXING THE EPOXY

a) Thoroughly mix WEST SYSTEM 105 Resin and either 205 or 206 Hardener after proportioning the two components in the ratio of 5 parts by weight of resin; 1 part by weight of hardener. The mixed epoxy can be applied to the hull with roller or brush.

Because of the exothermic reaction of WEST SYSTEM epoxy, it is recommended that batch sizes of resin/hardener mixes do not exceed 300g. (250g resin: 50g hardener). When using the calibrated WEST SYSTEM Pumps, this equates approximately to a maximum of 8 full depressions of both resin and hardener pumps.

b) *COPPERSHIELD 2000* epoxy. The resin & hardener is supplied in pre-weighed quantities (0.5kg of each component) and prior to application these two components should be warmed to approximately 20-25°C. This will aid dispersion of the copper powder and increase coverage. Blend the contents of the two containers and thoroughly mix the composition before slowly adding the copper powder and continue mixing until all the powder is incorporated into the epoxy. If using *COPPERSHIELD 2000* epoxy for the first time, it may be beneficial to blend half the contents of the two containers (resin and hardener) with half the copper content. By reducing the batch size in this way provides a longer working/application time until some familiarity/expertise is built up.

The mixed system has a pot life of approximately 1-hour at 18°C and must be used immediately after the mixing operation, because the copper powder will tend to settle in the mix, it is recommended that the epoxy be stirred occasionally during the application of each batch.

*NOTE: For mixing smaller quantities ensure that the correct resin/hardener/copper ratios are maintained as below:

- 1 part by weight of resin: 1 part by weight of hardener
- 1 part by weight of resin/hardener mix: 2 parts by weight of copper powder

APPLICATION

Allow the final coat of WEST SYSTEM epoxy to become soft to the touch but no longer tacky, before applying the first coat of *COPPERSHIELD 2000*. This application can normally take place within 1-3 hours of the application of the WEST SYSTEM epoxy, dependent on temperature. We do not recommend the use of other epoxies as a primer as those products may not be compatible with *COPPERSHIELD 2000*. Contact Marine & Industrial LLP for further information.

NOTE: If it is still possible to make an impression with your thumbnail, the WEST SYSTEM epoxy coating is not hard enough to sand and can still be coated without sanding. As a general time guide, if a period greater than 5 hours elapses between coating applications at room temperature (18°C) or if the surface feels waxy, allow the epoxy to cure overnight and then wash with WEST SYSTEM 855 cleaning solution followed by a further wash with fresh water. Dry the surface thoroughly and then sand before over coating with *COPPERSHIELD 2000*.

When applying at temperatures below 18°C, *COPPERSHIELD 2000* will be more difficult to apply and may cause "runs" in the coating. We recommend applying *COPPERSHIELD 2000* in a warm dry environment and these conditions can be achieved by tenting the hull and providing dry heat, such as a fan heater, to ensure good circulation of warm air. To achieve the ideal conditions during application, the humidity must be below 60%. By warming the resin and hardener to 20°C/25°C and applying the mix at temperatures above 18°C, it is easier to achieve thin even coats of *COPPERSHIELD 2000*.

NOTE: To eliminate any settlement of the copper powder, regularly stir the mix thoroughly, say at 10 minute intervals. When applying by roller, dispense small quantities from the mixing pot to the roller tray. This will again ensure the copper does not settle in the roller tray.

IMPORTANT OVER COATING INFORMATION
(data based at 20°C)

		Over Coating Time	
Stage	Product	Min.	Max.
Primer Coat	105/205 or 206	2 hrs	4 hrs
1st Coat	Coppershield 2000	4 hrs	12 hrs
2nd Coat	Coppershield 2000	4 hrs	12 hrs
3rd Coat	Coppershield 2000	4 hrs	12 hrs
Launch Time		7 days	None

If primer coat exceeds 4 hour over coating time, leave for at least 24 hrs abrade and repeat primer coat as previously described.
If *COPPERSHIELD 2000* over coating time exceeded, leave for up to 72 hrs to allow full cure of the epoxy prior to sanding. Depending on the ambient temperature this may be less. Contact our technical department if any queries on this point. DO NOT SAND EPOXY THAT IS NOT FULLY CURED.

COPPERSHIELD 2000 can be applied by brush, roller or spray* and best results are achieved when the epoxy is warmed and the surface is at room temperature. If applied uniformly, a coverage rate of $8m_2$ per litre or 9-$10m_2$ per 3kg (1.2 litre) pack can be achieved. When applying the first coat, it is often possible to see the hull surface through the coating. Complete coverage can only be obtained by the application of further coats. Normally, three coats are applied to provide many years of resistance to marine growth. It is easier to apply the filled epoxy mix in thin, even coats rather than in heavy applications which are more difficult to "work" and which will "run" or "curtain".
NOTE: In the vast majority of cases, the *COPPERSHIELD 2000* is applied with a roller or brush and, to achieve a consistent coat thickness, it is recommended that each application of the epoxy is "tipped off" using a small section of a roller cover. This technique is detailed in the WEST SYSTEM Technical Manual.
The first coating of *COPPERSHIELD 2000* must be allowed to cure for at least 4 hours at room temperature (18°C) before the application of the second coat. The hull may be left for 12 hours at this temperature before applying additional coats but if left for a longer period the surface must be abraded. When the final coat is fully cured and is hard enough to sand easily, a minimum of 72 hours after application, the surface should be lightly abraded to expose the copper. A 120 "wet & dry" grit is recommended for this purpose. The boat can be returned to the water after a period of 7 days from completion of application.
Note: dependent upon the type and extent of marine growth in the waters in which the boat is to be sailed, abrasion of the *COPPERSHIELD* coating to expose the copper particles may not be necessary. It may be worthwhile sailing the boat for a short season without abrading the final application – any fouling after one season will be light, can easily be washed and the *COPPERSHIELD* coating then abraded to provide future protection from marine growth.

SPRAYING *COPPERSHIELD 2000*
*It is possible to spray the *COPPERSHIELD 2000* epoxy and an excellent coating is achieved using a Devilbiss KB 622 Pressure Pot and hose assembly with a GTI-P-100-20 Spray Gun having a tip size of 2mm. Dependent upon temperature and thus the viscosity of the mix, it may be necessary to dilute the filled epoxy system with a small volume of water. However, the maximum quantity of water added must not exceed 15% by weight, i.e. 100 parts by weight of Resin/Hardener mix: 15 parts by weight of water.
Additions greater than this will cause the coating to "curtain" or "run".

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