

WATER RESISTANCE OF EPOXY COATINGS

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Epoxy coatings are claimed to be the most water resistant protective coatings commonly available, and therefore most suited to sealing and preservation of wood in timber and timber composite boats. Perhaps confusing for general users they come in two forms, very thin solvent based coatings which are claimed to penetrate the timber to considerable depth, and rather more viscous solvent free or 'high solids' epoxies. The question is : how relatively effective are these two types of products ?

To test this we have measured the rate of water loss through thin wall cardboard tubes coated with the relevant products. The tubes (40 mm diameter, 0.75 mm thick) were thoroughly coated internally, excess was drained out, and the bottom end was sealed. The epoxies were allowed to set and cure fully for 5 days before filling with water and covering to prevent evaporation from the top surface (see photograph). Any penetration of water through the coating would show as a loss of depth as the water would evaporate from the porous surface of the cardboard.



Figure 1 - Test set up for water resistance tests.

Products tested were:

High Solids Epoxies

Bote-Cote 1 coat

Bote-Cote/TPRDA 1 coat plus Bote-Cote 1 coat
(manufacturer's recommendation)

West Epoxy 1 coat

West Epoxy 2 coats (manufacturer's recommendation)

Solvent based Epoxies

Norseal 2 coats (manufacturer's recommendation).

Everdure 4 coats (manufacturer's recommendation).

Loss of water depth was measured over time, and showed a surprisingly significant penetration of water through the solvent based epoxy. The test has been repeated using a single cardboard tube cut into two lengths, one for each product type, to ensure there was no difference arising from different cardboard tubes, and identical results have been obtained. There was a small rate of water penetration through the high solids epoxies which appeared to stabilize over a period of 3 – 4 weeks. No differences were evident between the different brands of high solids epoxies.

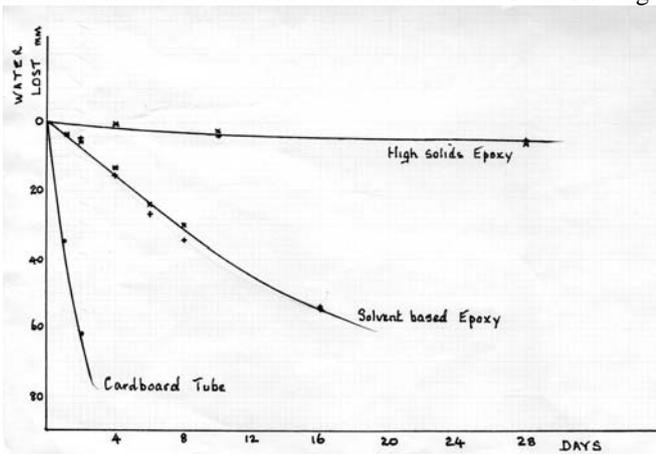


Figure 2 - test results from first test.

applied to the tubes after completion of the first tests, making 4 and 6 coats respectively. Both solvent based products now performed much better with the added coating thickness, but still not as well as the solvent free epoxies.

A further complication results from their penetration into the porous structure of the cardboard surface. (In some cases the liquid penetrated right through the cardboard). The solvents in the mixture become trapped in the pores and cannot evaporate away quickly enough before the epoxy cures. This then leaves a

It is clear that solvent based epoxy fails to present anything like the same water resistance as the high solids types. A possible reason for this is due to their high solvent/low epoxy resin formulations. According to their published MSDS's Everdure contains 63% solvent by volume (55% solvent by weight), while Norseal contains 60% solvent by volume (53.3% by weight). Therefore each coat will apply less than half the amount of resin delivered by the solvent free epoxies. To test this theory, two additional coats were

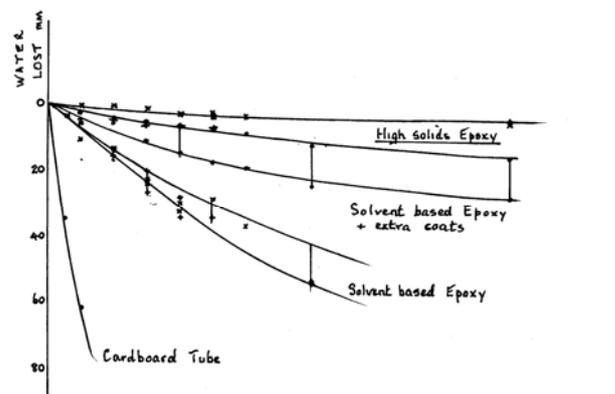


Figure 3 - Test results from 2nd set of tests.

