

COATINGS AND EPOXY NEWS FROM:

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FLEXIBLE EPOXIES

By Paul Oman
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Epoxies tend to form a brittle, plastic like mass. This is good for boatbuilding and many repair projects - people want rigid boats and solid repairs. But in some situations where there is sudden shock, movement, flexing, or large amounts of expansion and contraction, a flexible coating can mean the difference between a coating failure (cracking or 'popping' off) and a successful project. This problem is best illustrated with wood and epoxy. Wood expands and contracts with moisture content while epoxy and most other materials expand and contract with temperature. Put epoxy on one side of a piece of wood in a damp environment and the two materials could be fighting each other..... Another example, giant metal water tanks. One day they are full of tons and tons of water and the next they are empty with air temperatures inside the tank of over 100 degrees. That can mean lots of 'movement' (expansion and contraction) on the sides of the tank - it needs a coating that can 'move' with the metal.

By their nature epoxies are brittle. Some epoxies are more brittle than others and flexibilizers and plastizers can be added to epoxies to improve their flexibility. Generally hard brittle

surfaces have the best abrasion resistance while more flexible surfaces have better impact (or shock) resistance.

I do crude flex testing in two ways. I make small cubes or cylinders of epoxy and hit them with hammer or squeeze them in a vise. The really brittle ones turn to dust or break into a great many pieces. Less brittle ones will break into 2 or 3 or so pieces. I also apply the epoxy to a sheet of wax paper and let it cure. I then peel the epoxy off the wax paper and bend it. At some point it will snap and break. Note that epoxies many feel cured in a day or so, but take days (a week or longer) to fully cure so don't perform these tests right away. Give it a week or so before testing. Ditto for adhesion - you can probably pull off your epoxy/fiberglass repair the next day - don't! Give it time to bond....

For boatbuilding you want a rigid epoxy, but still not super brittle (our old Basic No Blush Version 1 was too brittle) that that is 'shatters' upon impact. Epoxy paints are about the same. Some give is nice but not too much. In other cases, such as the examples listed above, a lot of give is needed to prevent failure. In some cases a very rigid epoxy repair putty is a good thing, in other cases one with more give, sort of like a 'silicon caulking' is better.

HOW TO MAKE A FLEXIBLE EPOXY YOURSELF

Solvents such as acetone and MEK are often added to epoxies for several reasons: to extend pot life, lower viscosity (especially if spraying the epoxy), improve epoxy penetration (such as into wood - i.e. making a penetrating epoxy). Certainly some of the the solvent evaporates away but a lot of it gets trapped in the epoxy matrix. The end result is that solvent thinned epoxies tend to cure into a rubber (or at least flexible) state. Experts warn that over time (months or years) the solvents may finally work their way out of the epoxy and the epoxy may regain its brittleness. I have never been organized enough to test this (and I suppose temperature makes a big difference too as would the thickness of the epoxy).

We also sell a very unique product called TA 661 which will add flex to an epoxy. TA 661 feels like baby oil and is non evaporating. We sell it as a slow acting cleaner (solventless solvent????) for removing uncured epoxy or semi cured epoxy from tools etc. If troweling down epoxy/sand deck surfaces, it keeps the epoxy from sticking to the trowel. It will also blister and lift dried varnish and enamel paint (overnight or in a day or so). Anyway, a tiny amount of it mixed into an epoxy will also give it plenty of flex.

FLEXIBLE EPOXIES AND OTHER 'FLEX' COATINGS FROM PROGRESSIVE EPOXY POLYMERS

Note the most epoxies in general have a flex ('elongation') of about 4-8%.....

Our Coal Tar epoxy, like most coal tar epoxies, has an elongation in the range of 20-30%. Although still common, coal tar epoxies have fallen out of favor. Coat tar epoxy can be hard to recoat after it has weathered, it is smelly, and there are health concerns over the coal tar additive.

Our CM 15 epoxy is a general purpose epoxy paint with lots of flex, ideal for boat decks and wood surfaces. Also a really long pot life.

Our Crack Coat epoxy is also unique. We formulated it to fix leaks in cool, damp basement walls and floors. It is a bit too thick to brush on but certainly too thin to be called a putty. It is perhaps more of a gel. Anyway, thickeners can be added to it to make it more putty like without messing up its flexibility. It also works well as a bedding compound or caulking compound on dry or submerged surfaces.

As already mentioned above, our TA 661 is a convenient additive for adding some flex to any epoxy product.

Our 621 Epoxy Adhesive, which we have on clearance (11/26/04 - we are selling out, only small amounts left in stock - not a fast moving product) - has the most amount of flex (about 100%) and was designed originally for joints in concrete floors. It sort of looks and acts like Elmer's glue.

NON EPOXY FLEX COATINGS

Liquid Co-polymer Rubber paint - The next generation of coatings, this a snowy white mat/satin rubber paint that actually sticks to wax paper and retains all the movement of the wax paper. Originally was designed as a roof sealer. Color white only.

Co-polymer Rubber Deck - the same co-polymer as above, but with rubber grit in it for a professional looking, completely flexible, non-skid surface. White only.

COLD WEATHER EPOXIES

It's winter here in the Northeast! - boatbuilders should use our LTC 38 low temperature marine resin for winter projects. Contractors use our Corro Coat FC 2100 FAST for outdoor projects. Our '10 minute underwater' epoxy paste, Quick Fix 2300, has 'normal' potlife and working times when used in cold weather.

INDUSTRY PRO AVAILABLE - epoxy formulator with sales/marketing experience - flooring resins expert - seeks opportunities - located in Western Mass. 30 years industry experience. Contact directly at: tgldd@aol.com

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