Using Megapoxy & Timber

The advice given is general in nature and is intended to assist people working with Megapoxy and timber. If you require advice specific to your situation, it is better to ask for specific information as a leaflet cannot cover all possible circumstances.

General Guidelines

Follow rules industrial hygiene. Use of personal protection equipment reduces risks associated with using dangerous goods.

Epoxies are brittle. Some timber, especially if the timber has high moisture content, or is outdoors and subject to weather and greater temperature variation, moves a lot. Epoxies are not suitable in these situations as they are relatively inflexible. You can use epoxies as a top coat, however, bear in mind that due to their hardness, they tend to scratch more easily relative to an alternative such as a polyurethane varnish.

Epoxies tend to yellow with exposure to UV.

Epoxies should be mixed in the correct ratio. The epoxy parts need to be accurately measured prior to mixing. Sometimes people add more hardener to speed up curing – this is not recommended. With the surplus of either Part A or Part B, the chemical reaction required to form strong covalent bonds will not occur. This reduces the performance of the epoxy. Certain combinations, if sufficiently incorrect can produce dangerous substances, including fumes, excessive heat and, in all cases, compromised results. Buying either of the two parts separately is also less cost effective than buying a full kit.

Epoxy	Part A : Part B by Volume	Example
Megapoxy 69 Gel	1:1	1 scoop of Part A and 1 identically sized scoop of Part B, mixed on a flat board until completely uniform
Megapoxy H	3:1	300mL of Part A with 100mL of Part B added into a measuring cup and mixed until completely uniform to create 400mL of mixed epoxy
Megapoxy HX	3:1	As per Megapoxy H

Epoxies must be mixed thoroughly. The two pre-measured parts must be fully incorporated into each other for a uniformly successful chemical reaction. The sides and bottom of the mixing container should be thoroughly scraped, and the mixture must be mixed enough to achieve a completely homogenous substance. Care should be taken not to aerate the mixture (i.e. entrain air, introduce bubbles).

Epoxies Can Get Extremely Hot. This is predominantly a risk in liquid epoxies (Megapoxy H and HX, for example). Heat is generated (also called exotherm) during the chemical reaction (polymerisation). Excessive heat can- and should be avoided. Epoxy generating excessive heat is inherently dangerous, can emit fumes, bubble, expand and then subsequently crack when it shrinks/cools post chemical reaction. It will likely deform and cause residual timber moisture to discolour the epoxy.

Factors influencing rate of exotherm;

- Volume mixed (the larger the volume, other things remaining constant, the greater the exotherm). If you are casting a large void*, this will need to be achieved over several pours.
- Surface area (the smaller the surface area for a given volume, the greater the exotherm)
- Ambient temperature (the warmer the ambient temperature, the greater the exotherm)
- Temperature of the epoxy prior to mixing
- Addition of fillers (if fillers are used, then there is less epoxy material in a given volume, and thus the exotherm is reduced)
- Type of container epoxy is in (for example, a metal tin can help dissipate heat and extend the pot life, whereas heat is retained when the epoxy is encapsulated by timber)

* Casting large areas

Given the nature of the materials and labour intensive process of crafting using timber, it is better to err on the side of caution in terms of the volumes poured into cracks, holes and other voids found in character timber. In general, you should not pour more than 10 – 15mm depth where there are several cubic centimetres of epoxy together in a mass. Even this amount could create excessive heat if the epoxy is already hot (due to the ambient temperature and/or the mixed epoxy remaining in the container until it has become hot).

The minimum amount of time to elapse before subsequent pours is determined by how long it takes for the heat to dissipate from the chemical reaction of the previous pour. The maximum amount of time is a "full cure", after which, the surface should be abraded and then wiped down with a solvent which will evaporate off (such as acetone) to provide a dustless surface with improved mechanical key.

Small cracks or splits that are only 1mm – 2mm wide can usually be poured in one go – again, unless the temperature of the epoxy is already hot

If the weather is warm, for example, over 33 degrees celcius, it is recommended that you defer epoxy pours until the weather is cooler – usually possible with more favourable temperatures early in the morning, for example.

Trouble Shooter

I've got bubbles in my epoxy. This problem is predominantly a risk in Megapoxy H & HX and is best avoided, rather than rectified.

1) Porous substrates, including timber, can expel air. As the temperature rises, either due to the ambient temperature or the presence of reacting epoxy, air expands and is forced out of the substrate which may cause air bubbles to be trapped in the curing epoxy. It is difficult to predict when this will occur. One way to avoid problem this is to do a "primer" or sealer coat of the epoxy on the surface you will be filling or putting on a thicker layer of epoxy. If you do have an air bubble and it is safe to do so, you can try a blue flame to encourage bubbles to come to the surface – however, this will naturally increase the rate of the exothermic reaction (and naturally will only be effective before the epoxy has cured).
2) Do not shake the epoxy either in its individual parts or in order to mix. Use a flat stirrer, and mix in such a way as to be thorough but not entrain air bubbles. There is a product available, called Megapoxy Bubble Breaker, but this should not be required if proper mixing process is followed. If you let the mixed epoxy sit until it *starts* to warm up, and tap the container on a flat surface to encourage the bubbles to come to the surface and pop.
3) Sometimes bubbles are caused by moisture in the timber, rather than air, the epoxy may appear milky/white in areas where the water vapour has been trapped.
4) Another cause of bubbles besides mixing practise is inaccurate measurement, particularly the addition of too much Part B.

My epoxy is still tacky. The full cure time of epoxy (such that it reaches the specifications of the technical data) is 24 hours for the types listed in this leaflet, however, that data is specific to 25 degrees celcius. If the temperature is colder, especially below 10 degrees celcius, it may be that the epoxy takes longer than 24 hours to cure, especially if the epoxy is in a thin layer (with a large surface area relative to the volume).

Unfortunately, usually the reason why epoxy has not cured in line with expectations is due to an incorrect mixing ratio and/or inadequately mixed parts to enable a chemical reaction. This is easily done if you are distracted during the process – especially with Megapoxy H and HX, with both Part A and Part B being clear in appearance, and accurate measuring of the 3:1 ratio. Mixing small amounts requires very precise measuring, because a small error constitutes a larger percentage of the total material (relative to the same error in a larger volume). Because of the downside risks, choose a time to use epoxy when you have sufficient time to do each step properly and carefully – the extra effort will be time-efficient in the long run.

For further advice, please call Permatech (08) 9309 1777, and if we do not know the answer to your question immediately, we will endeavour to find it out for you.

Permatech - 36 Dellamarta Road, WANGARA, Western Australia, 6065

www.permatech.com.au