Handling Epoxy Resin Products

epidermix

Compounds are all multi-component materials. Each product has at least two components, base, activator and some have three, the third being the aggregate. The components are known collectively as a kit.
The base is composed of the epoxy resin and various modifiers. The activator contains those compounds which cause the epoxy resin to cure, i.e. hardener, accelerator, catalyst and where applicable coal-tar. Either component may contain fillers, pigments and solvents.

Proportioning

The components of a kit are supplied in carefully proportioned quantities. In many cases these proportions bear a simple volumetric relationship to one another, such as one part base to one part activator or two parts base to one part activator. Where such simple proportions exist, the mixing ratio is indicated in the relevant data sheet. This means that a kit may be split down on site so that smaller quantities than the whole kit may be mixed at one time.
Where no simple ratio exists, no attempt should be made to split a kit. This is clearly indicated in the instructions.

Splitting a Kit

If a kit is to be split, each component must be thoroughly stirred to disperse any settlement. A separate stirring device must be used for each component. Carefully measured volumes are then transferred to a clean container prior to mixing. In splitting a kit an accuracy better than 5% must always be maintained.
In non-splittable kits the entire activator component must be added to the entire base component.

Mixing Liquids

Before they are combined together, each component must be stirred to disperse any settlement of pigment or fillers.
The activator is then added to the base and the two are mixed together for a minimum of 5 minutes, or longer if necessary to produce a completely homogeneous material.
A rod, such as a dowel or piece of reinforcing rod must never be used as a mixing tool. A flat, stiff paddle of wood or steel provide an efficient blending action.

epidermix Mastics

epidermix mastics are too heavily bodied to be mixed in the can. After preliminary stirring, each component should be transferred to a clean plate or board before mixing commences. Blending should be carried out by means of a putty knife, spatula or small trowel and should proceed for a minimum of 5 minutes or even longer where heavy mastics are involved.

Mixing Mortars

epidermix mortars are usually three-component systems, base and activator that are both normally liquids and a pre-measured quantity of aggregate filler.

Base and activator are pre-measured before being blended with the aggregate and filler.

Assuming that only hand mixing is available a large shallow pan, at least three times bigger than the batch size, such as bottom 150mm of a clean 200 litre drum should be used to retain the epoxy components.

Add the mixed liquids to the pan and then run in the finest fraction of filler. Once this has been mixed to fluid consistency, it is possible to add coarser material without greatly increasing the viscosity of the mixture. If a single – sized or premixed aggregate is used this blend is added to the mixed liquid.

Where no pan is available hand mixing will have to be done on a board. This entails making a thorough mix of the dry material before the liquid is added. Care must be taken to see that little, if any, of the liquid runs away. This is without doubt the most difficult method of mixing mortars but if it is carefully controlled it can produce good results.

Mechanical Mixing

Various methods of mechanical mixing are available. For epoxy-tar road mixes a concrete mixer may be used but where the smaller mixes needed in flooring or grouting operations are involved, mechanical mixers based on rotating 20 litre drums are available.

As with hand mixing, the liquids are introduced into the drum followed by the finest fraction of aggregate and then the coarser fractions.

This method permits the full wetting of the fines whereas if much of resin is absorbed by wetting out the coarse material first, it is likely that dry, unwetted pockets of fine aggregate will remain in the mix.

Mastics, pastes and liquids can be mechanically mixed prior to incorporating in a mortar, by using a suitable paddle chucked in a low-speed, half horse-power, electric drill.

Pot-Life

As soon as the components of a kit of **epidermix** are combined, a chemical reaction is started. The length of time that this takes to complete is known as the pot-life. The pot-life figures quoted in **a.b.e.®** literature is the length of time taken for 500ml of mixed **epidermix** to remain usable when maintained at an ambient temperature of 25°C.

The reaction between the base and activator generates heat and it is obvious that the less the heat-loss is from the tin, the quicker the reaction will proceed. Therefore 5 litres will have a shorter pot-life than one litre.

A given volume will cure more rapidly on a summer's day at 40°C than on a July day with temperatures at 5°C to 10°C.

An **epidermix** compound must be used within the time of its practical pot-life.

Application

An **epidermix** compound can be applied in a variety of ways. Specific methods such as brushing, spraying or trowelling will be dealt with under the various operations, to be discussed later. Application temperatures are extremely important. If the surface to be treated and ambient temperatures are below 10°C, curing of the **epidermix** will be almost totally retarded. Furthermore the viscosity of most compounds will increase markedly making them extremely difficult to apply.

Ideal working temperatures between 10°C to 30°C. Above 30°C pot-life will be reduced, again making for difficult handling and lowered viscosities may cause problems in obtaining specified film thicknesses.

At all times improved results will be obtained if base, activator and where necessary, aggregate is pre-conditioned to a good working temperature, say 20°C to 25°C.

Overcoating

The successful application of consecutive coats of **epidermix** is a simple matter, if normal precautions are observed.

Once the earlier coat has dried, the subsequent coat should be applied with of as little pressure as possible. The preferred time lapse is between 12 and 48 hours at 20°C. where solvent-based coating is being used, sufficient time should be allowed for a film to lose its solvent content before overcoating, but where solvent-free compound is being used, overcoating can follow soon as the earlier coat is firm enough to resist displacement by a subsequent application. Intercoat adhesion can be weakened by several factors:

1.The deposit of a film of dust.

2.The deposit of a film of salt if work is carried out in close proximity to the sea.

3.The deposit of an oily or greasy film.

4.The presence of bloom (A hazy dull film on the surface usually due to application under conditions of high atmospheric pressure).

In cases 1,2 and 4 the surface should be washed down with clean water and then be allowed to dry before overcoating proceeds.

In case 3, a solvent such as **a.b.e.® thinners no.3** or MEK (methyl ethyl ketone) may be used to remove the oil or grease or a detergent may be used. If a detergent is used, great care must be exercised to see that all traces of detergent are removed with clean water.

The age of the film may also upset intercoat adhesion. If overcoating has been delayed, the first coat may have cured fully. Before overcoating, the surface must be given a light abrasion to kill gloss, followed by a wash off with clean water to remove the debris of the abrasive process. The surface must dry before coating proceeds.

Curing

Once an **epidermix** compound has been applied, curing proceeds, providing that the temperature is warm enough.

Curing rates can be speeded up by the judicious application of external heat. If this is done, care must be taken to see that the material does not exceed 60°C to 65°C.

Heating can be done by infrared lamps, or by radiant heat. Flame must never be placed directly on to **epidermix**.

Out in the open air, curing can be accelerated by covering **epidermix** with a sheet of black plastic, which can absorb solar heat and act as an in situ oven. While this method is satisfactory for solvent-fee compounds, ventilation must be provided to remove solvent vapours from solvent carried compounds.

Although **epidermix** films will dry between 4 and 24 hours after application, depending on formulation in use, full cure will take seven days at normal ambient temperatures. In cases of chemical exposure it is essential that full cure be reached before chemical contact is allowed.

Clean-Up

If **epidermix** is allowed to set on working tools and mixers, it becomes almost impossible to remove. To keep equipment in good working order it should be cleaned immediately on cessation of work.

Brushes, rollers and trowels should be soaked in **abe® super brush cleaner** followed by a thorough washing with soap and water. Injection and extrusion guns should be completely stripped down to the last component and soaked in **abe® super brush cleaner**.

On major applications where work will continue for several hours at a time, equipment should be available in duplicate. As soon as there are signs that the **epidermix** is starting to set on brushes, rollers or guns, they should be sent for cleaning and the second set brought into use.

The loss of equipment is usually due to carelessness.

Release Agents

It often happens that wet **epidermix** must come in contact with surfaces to which it is specifically required not to adhere. The simplest way to prevent adhesion is to treat the surface with a release agent.

While there are specially formulated release agents based on silicones, a coating of clear floor polish such as White Cobra Floor polish, is usually sufficient to prevent adhesion. Polyvinyl alcohol in water/alcohol solution is an excellent release agent. An aerosol furniture polish containing silicone and wax is also a good release.

Where small articles with a complicated shape are involved such as moulds, a simple and useful release agent is a piece of candle dissolved in benzine. This low viscosity liquid is poured into the mould and after swilling around is poured out again.

As the solvent evaporates a film of wax is left behind.

The easiest way of getting a clean strip from a release-treated surface is to let the **epidermix** set before attempting to remove it with a scraper.

Handling Precautions

Polyamide cured films of epoxy resin are completely non-toxic and can be used for lining drinking water tanks and food containers. Amine-cure compounds and formulations containing coal tar are not recommended for use in contact with foodstuffs or portable water. Epoxy compounds in their uncured state are toxic and prolonged skin contact can give rise to dermatitis. When handling epoxy compounds, one should always make use of disposable gloves and barrier creams.

Involuntary habits such as face scratching and spectacle adjustment must be avoided. Similarly, eating and smoking whilst or after working with epoxy must be avoided until the individual has washed up.

Clean-up should be done with soap and warm water and any stubborn spots of epoxy should be removed with a cloth that has been moistened with a little **abe® super brush cleaner**. Raw solvent such as toluol, MEK or **a.b.e.® thinners no.3** should never be used as these drive the resin deeper into the skin.

If regular skin contact is made with **abe® super brush cleaner**, a lanolin based skin cream should be applied prior to contact. **abe® super brush cleaner** tends to remove the natural skin oils resulting in cracking which will increase the chance of dermatitis. Should signs of dermatitis occur, medical assistance should be sought immediately.

N.B. Adequate ventilation must always be provided. Smoking and use of naked lights are strictly forbidden when handling **epidermix** products.

Important Note

This data sheet is issued as a guide to the use of the product(s) concerned. Whilst **a.b.e.® Construction Chemicals** endeavors to ensure that any advice, recommendation, specification or information is accurate and correct, the company cannot – because **a.b.e.®** has no direct or continuous control over where and how **a.b.e.®** products are applied – accept any liability either directly or indirectly arising from the use of **a.b.e.®** products, whether or not in accordance with any advice, specification, recommendation, or information given by the company.

Further Information

Where other products are to be used in conjunction with this material, the relevant technical data sheets should be consulted to determine total requirements. **a.b.e.® Construction Chemicals** has a wealth of technical and practical experience built up over years in the company's pursuit of excellence in building and construction technology.