

TECHNICALLY SPEAKING

Dissolving Conductive Epoxy

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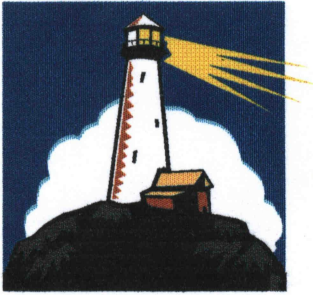
I receive a call almost every week, in Technical Support, asking how to dissolve conductive bonds made with CircuitWorks Conductive Epoxy, CW2400. The best advice I can give is to physically remove the cured material, by sanding, scraping or chipping the epoxy away. We have no product in our line that will rapidly dissolve cured epoxy resin and those solvent products on the market, which claim to dissolve cured epoxies, present a number of problems.

Removing **uncured** epoxies, like the CW2400 Conductive Epoxy, presents no special problems. Straight solvents such as acetone, methyl ethyl ketone (MEK) and methylene chloride (dichloromethane) will quickly dissolve the uncured paste, even though they are flammable or carcinogenic. Our own products, Electro-Wash[®] Two Step, Electro-Wash[®] MX, Flux-Off[®] Heavy Duty and Flux-Off[®] Aqueous, can be used to remove uncured epoxy from printing stencils and circuit boards, by either wiping or immersion in a heated dip-tank or ultrasonic bath.

Removing **cured** CW2400 Conductive Epoxy is a different matter. Epoxies are meant to be permanent bonding compounds. They are designed to hold tightly to surfaces, while exhibiting extremely good chemical resistance, heated strength, and high abrasion resistance. A cured epoxy will be very resistant to attack by solvents over a short period of time (hours), and show high resistance even over much longer periods of time (hours to days). This is why we recommend that the hardened epoxy be removed by physical means.

There are some products on the market that claim to dissolve cured epoxy resins, and a quick search of the Internet will turn up a number of companies that sell such products. All of these products rely on very strong chemicals, such as methylene chloride, n-methyl pyrrolidone (NMP) and organic acids, to name a few, which are extremely toxic (methylene chloride is a cancer causing agent), have very unpleasant odors, or are otherwise hazardous to use. In most cases, depending on the type of epoxy your dealing with, these products must be heated for them to work well. Many are combustible and present flammability problems when heating them to temperatures near their flashpoints. Even when heated these products may take hours or days to dissolve the cured epoxy. In many cases complete dissolution is not attainable, and the best that can be achieved is a softening of the epoxy, which then requires physical removal.

Simple "5 minute epoxies" can sometimes be softened by covering them with a cloth soaked in acetone, MEK or methylene chloride, then wrapping the cloth with plastic wrap or another material to retard the evaporation of the solvent. The cloth must be kept wetted with the solvent. The epoxy will usually swell and soften and can then be removed fairly easily by scraping.



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One must also take into consideration the type of materials the epoxy is bonded to, when using an “epoxy dissolver”. In the case of CW2400, the epoxy is usually applied directly to the surface of a circuit board. Circuit boards are made up of layers of phenolic resin-impregnated paper or epoxy resin impregnated glass cloth (fiberglass). Any solvent that will attack the cured conductive epoxy will also attack the resins that make up the circuit board, resulting in de-lamination or separation of the layers in the board. These strong solvents will also attack some metals, such as aluminum, which must be taken into account if trying to dissolve the epoxy bond between to metallic surfaces.

Given all the factors of exposure time, temperature, toxicity and final result (softening not dissolving) I feel that physical removal (i.e sanding, scraping, chipping) is the best and safest way to remove cured CW2400 Conductive Epoxy. If the conductive bond to be made is not intended to be permanent, it is best to use another conductive product, such as the CW2200 Conductive Pen, or the CW7100 Conductive Grease or solder the pieces together to achieve electrical contact, rather than use the CircuitWorks Conductive Epoxy.

CW2400 Conductive Epoxy can be removed, in some cases, from metal surfaces, by heating the epoxy residue with a soldering iron set to 500 –600 °F. The epoxy will soften and loose adhesion, and can then be easily scrapped off. This removal method can be used on metal, glass or any surface that will not be adversely affected by high temperatures. I would not recommend it for removing the epoxy from plastic surfaces or from printed circuited boards. The high temperatures involved will melt most plastics and can damage circuit boards by leaving an unsightly burned spot, or causing the board to de-laminate in the area of heating.

Michael Watkins
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