EPOXY TECHNOLOGY

Tech Tip #3

Handling Instructions For Epoxy Adhesives

CONTACT US

If you would like an electronic copy of this guide please send an email to

info@epotek.com

Got a question? Send us an email:

Sales/Marketing	salesinfo@epotek.com
Engineering and Technical Assistance	techserv@epotek.com

Or if you prefer, you can write us, call us, or fax us with your questions:

Epoxy Technology
14 Fortune Drive
Billerica, MA 01821
Tel: 978.667.3805
Fax: 978.663.9782

HANDLING INSTRUCTIONS FOR EPOXY ADHESIVES

A. Storage

The two-component adhesives of Epoxy Technology should be stored at room temperature between 20°C-25°C. It is also important that the containers are always secured to prevent gradual escape of any adhesive vapors and prevent the ingress of moisture. When stored in this fashion the shelf life on the data sheets will always be met.

Storing the adhesive in a freezer at –40°C can considerably extend the shelf life of a one component adhesive. However, prior to use, the adhesive must be removed from the freezer and brought back to room temperature. Do not open the container until it has reached ambient temperature. If this is not done, unnecessary amounts of moisture will condense on the surface of the adhesive, and this can lead to deterioration of the material.

B. Elimination of Crystallization

Prolonged exposure to cold storage conditions, particularly of two component adhesives, can cause crystallization of the individual components. Filled adhesives can, on occasion, form crystals that look like small lumps or agglomerates.

Both problems can be eliminated as follows:

The components A and B must be individually heated in the closed containers to 40°C - 55°C until the crystals are dissolved. Keep the cover on but loosely fitting. Stir the components with a spatula until they are homogeneous. Allow cooling to room temperature before mixing with the Part B hardener. Of course this method cannot be used for one-component adhesives because the adhesive could begin to cure.

C. Mixing of the Adhesive

Prior to use, the adhesive must be properly stirred prior to mixing with the Part B hardener. Be careful not to vigorously mix the material. The user does not want to whip or entrap air into the adhesive as this will lead to voids in the adhesive bond line.

D. Surface Preparation

Surface preparation is a very important step to ensure proper bond strength and performance. To achieve this, a clean surface must be achieved. Grease, oil, dirt, rust, etc. must be removed from the surfaces to be bonded. Most contaminants can be removed with organic solvents such as acetone, methanol, or MEK (methyl ethyl ketone). Roughing the surface will considerably improve the adhesion of the material. This can be achieved by scrubbing or sanding the surface with a brush, fine sand paper or scouring pad.

Normally, epoxy-adhesives bond very well to metals (with the exception to chrome), glass, ceramic and many plastics. Difficult to bond to surfaces or surfaces with low surface energy, such as plastics, may require plasma cleaning, vapor degreasing, ultrasonic vapor degreasing, or chemical etching to change the chemistry of the bonding surface to make it compatible with the adhesive.

E. Vacuum Degassing

If an adhesive contains entrapped air, it should be removed in order to apply it consistently. The EPO-TEK adhesives can contain special additives, which normally eliminate the need for degassing.

For some applications degassing of the adhesive is necessary. Vacuum degassing and centrifuge are common methods to remove entrapped air. Vacuum degassing requires an ordinary vacuum pump and vacuum chamber. An efficient pump should be capable of pulling a vacuum of 29 inches Hg at a quick rate of speed. Vacuum should be held for minimum amount of time to remove the entrapped air. Try to minimize the amount of time the vacuum is applied and do not create a "rolling boil" effect. Care should be taken that only a small amount of adhesive is filled into a large container (typically 5-10 times the adhesive volume). During the vacuum process, the adhesive swells up considerably and can spill out of the container. Applied vacuum along with agitation/vibration will effectively remove any entrapped air.

Centrifuging can also be used to remove air from unfilled adhesives. By centrifuging the material at 1,000-3,000 rpm for 1-2 minutes will remove any entrapped air in the adhesive.

F. Curing

For curing the recommendations in the data sheet should be followed. As a rule, the curing time should be generously extended in order to achieve satisfactory physical properties.

Note: The curing time can never be too long; however, when it is too short poor cross-linking can result, which leads to loss of durability and adhesive strength and an overall suppression of optimum properties.

G. Separating and Repair of Adhered Joints

Epoxy adhesives are thermosetting compounds and have excellent adhesive strength to most surfaces. They are very difficult to remove once they are fully cured.

There are several methods for the separation of cured joints:

-Application of heat
-Mechanical force
-Epoxy solvents

The best method for repairing epoxy joints is by applying heat directly to the joint. The warmer the applied heat, preferably above its Tg, the easier it is to remove the component. By heating the material to extreme temperatures (near the decomposition temperature) the adhesive will simply burn away. A combination of heat and force will usually be enough to remove the most difficult components.

A chemical soak in a variety of solvents, such as methylene chloride or n-methyl pyrollidone) can also be effective to remove components. Please call our Technical Service department for information on to the best approach.

H. Safety

Uncured epoxy resins are typically considered irritants. It is important to understand the potential hazards due to exposure before using any chemicals. The safety instructions in the material safety data sheet (MSDS) should be followed. Skin contact with the adhesive must be minimized and avoided. The proper use of gloves, goggles, and protective clothing must be worn at all times to prevent contact

with the adhesive. Proper ventilation of the adhesive workstation is mandatory. Take proper precautions and use general common laboratory practices when using these compounds.

Caution: Adhesive on the skin must never be removed with an organic solvent. When an adhesive on the skin makes contact with an organic solvent the risk of skin irritation is considerably increased. Skin should only be cleaned with water and ordinary soap or hand cleaner.