

Epoxy resins 8521

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The group of synthetic resins called epoxies produce the strongest adhesives in

current use, as well as plastics and corrosion-resistant coatings. Epoxy

adhesives are thermosetting; that is, after initial hardening, they cannot be

remelted by heat. They have excellent resistance to solvents and weathering

agents, and high electrical and temperature resistance. Their adhesion to

almost

any type of surface--including metal, ceramic, wood, and fabric--is

unmatched.

Epoxies are usually made by reacting epichlorohydrin and Bisphenol A to produce

a polymer chain of somewhat complex structure. The end of the polymer chain is

an epoxy group from epichlorohydrin; the resulting plastic receives its name

from the end epoxy group. The unmodified epoxies are brittle; however, the

properties of the cured resin can be varied widely by the selection of a

suitable resin, curing agent, filler, and curing procedure. Flexible grades are

modified with polyamines and polysulfides. Most epoxy formulations have

two

components that are mixed for curing. One-component epoxies are available that

either contain a latent curing agent or are simply cured by absorption of oxygen

from the air. Unlike most thermosetting plastics, epoxies shrink only slightly during curing. Epoxies can be used as filler-adhesives; the strength of the cemented joint is independent of its thickness. The epoxies are used as molding

and potting compounds, reinforced plastics, surface finishes, and adhesives.

Molding compounds are chiefly used by the electronic and electrical industries;

potting compounds are poured to encapsulate small electronic parts. Epoxy paints

have outstanding corrosion resistance and are permitted for use on food

equipment such as flour bins and can coatings. Large and complex dies for the

forming of metal sheet are made of epoxy and are often modified with powdered

metal such as aluminum. Uses in construction include the repair and bonding of

concrete and also epoxy terrazzo floors. Adolf Hitler

Bibliography

Lee, Henry, ed., *Epoxy Resins* (1970); Hilado, Carlos J., *Carbon Reinforced Epoxy Systems* (1984).