

SECTION VI - OUR EPOXY SYSTEMS

What follows is a brief description of the various epoxy product systems we offer along with suggested areas of use. Consult the individual Technical Data Sheets for each product for specific information. These are available online at www.systemthree.com, from your System Three dealer, or by calling us.

SilverTip Series

This product family consists of SilverTip marine laminating resin with Fast and Slow hardener, SilverTip GelMagic wood adhesive, EZ-Fillet wood flour putty, SilverTip QuikFair microballoon fairing putty, and SilverTip MetlWeld for bonding metals and other difficult materials. These products are especially formulated ready to use directly from the container, and do not require the user to make any addition of fillers or other materials.

General Purpose Resin

This was our first formulated epoxy resin product. It is a general-purpose epoxy system that is widely used in wooden boat construction and repair, fiberglass boat repair including gel coat blister repair for fiberglass boats. While our general-purpose epoxy is specially formulated for wooden boat building, it has also been used to repair fiberglass boats both above and below the waterline. It is highly rated in the repair of gel coat blisters on fiberglass boat hulls. It has been used in some exotic non-boatbuilding areas such as the repair of cracked concrete oil well linings in the permafrost zone in Alaska, for lobster tank linings, piano repair, guitar making, sail, surf and snowboards, wind turbine blades, along with numerous other uses. Today this epoxy is successfully being used around the world in every conceivable climatic condition from above the polar circles to right smack on the equator and everywhere in between.

Our general-purpose epoxy has an excellent balance of properties for use with wood, fiberglass and other materials where the substrate carries the major portion of the load and the service temperature is not extreme - the situation with almost all wooden boats, balsa strip boats and similar structures.

Various fillers must be added to our general-purpose resin to make adhesives, filleting and fairing compounds. This resin will blush under conditions of high humidity and temperatures too low for the hardener being used.

Phase Two Laminating Epoxy

Phase Two is an ultrahigh modulus laminating epoxy resin system ideally suited for composite cored (foam, honeycomb and end grain balsa) boat hulls. Many sailboard builders use it to build polystyrene foam cored boards. It has been used to build radar domes and other solid (non-cored) structures like carbon fiber masts, booms and spinnaker poles. With the exception of some balsa strip boats intended to be painted a darker color, Phase Two is not used for wood boat building or fiberglass boat repair.

Most high modulus epoxy systems tend toward brittleness. Phase Two epoxy overcomes this problem by using two-phase morphology to achieve an excellent balance of mechanical and toughness

properties. When Phase Two epoxy cures, a material soluble in the uncured resin precipitates from solution to form discrete particles of matter with vastly different mechanical properties than the high modulus homogeneous first phase. It is the interaction between the first phase and second phase that gives Phase Two epoxy its excellent toughness properties. The overall mechanical properties derive from the first phase. Toughness properties involve fracture behavior and it is Phase Two epoxy's extreme resistance to fracture that gives it great impact and fatigue resistance. Second phase formation causes Phase Two to cure with a milky color. In thick sections it is opaque.

Like all high modulus epoxy systems Phase Two must be heated to finish the cure. This requirement along with its mechanical properties limit its use in wooden boat building to balsa strip boats that will be painted a darker color (more heat). Separate brochures on Phase Two epoxy are available either online or by telephoning.

Clear Coat Epoxy

Clear Coat epoxy is a very low viscosity (thin) almost colorless epoxy system that has a long pot life and cures without amine blush. Unlike some of the so-called penetrating epoxies, Clear Coat contains no solvent. Furthermore, it is a very strong system when cured whereas the penetrating epoxies have little, if any, strength or resistance to moisture. Clear Coat epoxy will cure at temperatures as low as 50°F.

Clear Coat epoxy wets out fiberglass cloth almost instantly and is sometimes used to build furniture grade strip planked canoes and kayaks. Clear Coat epoxy is often used as the base coat in fiberglass gel coat blister repair particularly when the gel coat has been removed exposing damaged and loose glass fibers. It is also used as a base for varnish for front entry doors and outdoor wood furniture. A separate application brochure on using Clear Coat with our spar urethane varnish or WR-LPU Topcoat on outdoor wood projects is available.

SB-112

SB-112 was developed for use in building surf and sailboards. It has practically no color and contains ultraviolet light stabilizers making it a good choice for this application. The UV stabilizers in SB-112 protect it from intermittent sunlight exposure that surf or sailboards might see. They do not protect it from permanent exposure to the sun that is likely to be seen on the bright work of a boat hull. See the Painting Section for more information on UV protection. Polyester finishes may be applied directly to SB-112.

MirrorCoat

MirrorCoat is specially formulated to create glossy, high build resin surfaces on bars, counters and tabletops. MirrorCoat forms a high build durable, smooth, glossy finish on many surfaces such as wood, ceramics, plaster and masonry. MirrorCoat cures to a glossy, smooth bubble free finish that is scratch and stain resistant as well as alcohol and waterproof. A separate application brochure on MirrorCoat is available.

RotFix

RotFix is a very thin 2:1 liquid epoxy system used in the repair of dry rot. It is used in conjunction with SculpWood. The general method is to remove the punky rotted wood. Allow the area to dry if wet. Liberally apply RotFix to the inside of the cavity allowing it to soak into the end grain. Anytime after this and preferably while the RotFix is still at least slightly tacky over fill the cavity with SculpWood. Once cured sand flush with the surrounding area. For the absolute best in rot repair see the section below on EndRot.

SculpWood

SculpWood is a 1:1 kneadable epoxy putty used to replace rotted wood. It is often used in conjunction with RotFix as described above. SculpWood can be sanded, drilled, screwed and nailed when cured. It has about the same density as wood.

EndRot Kit

In addition to RotFix and Sculpwood, the EndRot Kit contains EPA approved sodium borates for killing dry rot fungus. We highly recommend the use of these borates when doing a repair in a home or other structure exposed to the weather. Simply replacing the rotted wood as described above will not stop the dry rot from re-occurring when conditions favor it.

T-88 Structural Adhesive

T-88 has been used for years in the building of experimental wooden aircraft and for woodworkers who desire a clear glue line. More recently T-88 has been approved by the FAA for the repair of certified wooden aircraft on a case-by-case rather than blanket basis. Check with us for the current status prior to use on certified aircraft. T-88 meets the requirements of MIL-A-81236(OS) and CID-A-A-3053.

Mixed T-88 has a viscosity of about 12,000cps and does not require the addition of thixotropes to fill small gaps. Larger gaps can be filled using T-88 gel. Both the liquid and gelled versions are available in dual cartridges that accept static mixers. T-88 is considered an "overnight" cure product and is waterproof.

Quick Cure

Quick Cure is available in 5, 15, and 30-minute gel time versions appropriately called Quick Cure 5, 15 & 30. Quick Cure hardener is mercaptan based. Because of this it should be considered water resistant rather than waterproof. We do not recommend the use of Quick Cure for continuous immersion. Mercaptan cured epoxy resin (so called 5-minute epoxy) typically is a bit more rubbery than polyamide cured products like T-88 and softens more quickly with elevated temperature. Despite these drawbacks their rapid development of strength makes these products extremely useful for the right applications. It is possible, for example, to coat a board with T-88 leaving a few small areas uncoated. The uncoated areas are then coated with Quick Cure 5 and the board is then put in place on an overhead or vertical surface. It is held there for a few minutes while the Quick Cure hardens. Once this happens the board will stay put while the T-88 cures.

Epoxy Paste Pigments

We offer several pigments dispersed in epoxy resin in highly concentrated form. These are basic pigments that the user can blend with each other to make many shades. Since they are dispersed in epoxy resin they are added to the resin portion of the system and then the pigmented resin is used at the correct ratio with the appropriate hardener. Our dispersed pigments include white, black, brown, red iron oxide, toluidine red, phthalocyanine green, phthalocyanine blue and organic yellow. Do not use these pigments to tint our water reduceable urethane coatings (WR-LPU). The pigments can be mixed with WR-155 Activator to tint the primer to a pastel shade.

PG-101

PG-101 is a moisture-cured MDI based urethane. The attractiveness of these kinds of wood adhesives is that they are "one-part" and ready to use right out of the bottle. The disadvantages include considerably lower cured strength than epoxy adhesives, inability to bond dry non-porous surfaces, poor moisture resistance and limited shelf life. Because of their limitations we recommend PG-101 and other moisture-cured urethanes only for lightly loaded dry applications such as furniture building, cabinet making, etc. We strongly recommend against their use in marine applications.

Infusion Resins

For years, System Three has made resin systems for both pressure (RTM – Resin Transfer Molding) and vacuum infusion of dry fiberglass, carbon fiber and the like. These resins are characterized by their low viscosity and long pot lives. Typically infusion systems must be postcured to reach full strength. The infusion process has become popular in the marine area primarily because it offers a low cost way to reduce styrene emissions when polyester and vinyl ester resins are used. Some builders use epoxy with the infusion process. The chief advantage is a slightly higher glass to resin ratio. Since there is a steep learning curve associated with infusion we recommend it only to boat builders who understand that a better glass to resin ratio more than justifies the "costs" associated with the infusion process. We invite those who have studied this process to contact us regarding System Three's Infusion Resin offerings.

Electrical Potting Resins

Over the years System Three has been a large supplier of electrical and electronics potting and encapsulating resins. Many of these products have been based upon our General Purpose and Clear Coat systems with added pigments. Others are more complex and contain fillers and thixotropes. In most cases our electrical potting resins are custom formulated to mesh as perfectly as possible with the user's production process. Our standard product, EP-2010, is available "off-the-shelf". Those with interest in this area are encouraged to contact us to learn more.