



TRADITIONAL EPOXY SYSTEM

- Optimized viscosity for wetting out fiberglass and other reinforcement fabrics
- Exceptional thin-film characteristics provide smooth flow-out and self-leveling ideal for coating and laminating
- Available in three different hardener speeds, or Crystal Clear hardener for applications that require the best cosmetic finish
- Combine with fillers or thickening agents for customized bonding, filleting, gluing, and fairing applications
- Compatible with wood, metals, fiberglass, carbon fiber, and more
- Can be used above or below the waterline

The TotalBoat Traditional Epoxy system is designed around a variety of applications, ranging from boat building, composite construction, and epoxy repair projects. Compatible substrates include wood, fiberglass, reinforcement fabrics, etched aluminum, bare steel, lead, and more. Fast, Slow, and Tropical (extra slow) hardener cater to laminating, fairing or bonding applications, while the Crystal Clear hardener option cures with a super-clear, glossy finish.

CLEANER/SURFACE PREPARATION: Acetone, denatured alcohol, TotalBoat Eco Solvent

CLEANUP: Denatured alcohol or acetone. Once cured, it must be removed mechanically.

THINNER/REDUCER: Do not thin Traditional Epoxy.

MOLD RELEASE AGENTS: Mold release paste wax, aerosol mold release agents

PRIMER: No primers are necessary; etching with TotalBoat Aluminum Boat Etch Wash is highly recommended on bare aluminum substrates, and TotalBoat Rust Primer is recommended on ferrous steel applications.

APPLICATIONS: Lamination, clear coating, hand layups, vacuum bagging, bonding, structural epoxy adhesive, filleting & small gap filling

ACCEPTABLE SUBSTRATES: Fiberglass, epoxy, wood (pressure treated wood is not recommended), properly prepared metals, masonry, concrete, glass, stone, some plastics

the TotalBoat Traditional Epoxy system. Please take this very seriously, as epoxy sensitization is a very serious matter.

EXOTHERMIC REACTION!

The cure of the TotalBoat Traditional Epoxy system is an exothermic reaction and will generate heat. It is not uncommon for a larger mass of mixed epoxy to reach 300°F or higher during the cure cycle.

SURFACE PREPARATION:

Any surfaces that are to be bonded, coated, glued, or laminated with TotalBoat Traditional Epoxy need to be free of any forms of contamination. Surface contamination will reduce or completely compromise the epoxy's bond strength to any material. If any surfaces are to be abraded before applying Traditional Epoxy, always remove all surface contaminants prior to grinding or sanding the surface. Contaminants can include dust, dirt, grease, moisture/water, oil, or wax.

IMPORTANT! Only use clean cotton rags for surface preparation. Synthetic rags can leave a film of contamination if they come in contact with some solvents.

FIBERGLASS:

- Fiberglass substrates (commonly composed of polyester resin-saturated fiberglass) may have wax or amine blush on the surface, depending on the resin system with which they're constructed, and application methods.
- Any amine blush needs to be removed with fresh, warm water and a mild soap.
- Dry the surface completely. Any waxes need to be completely removed with a dewaxing product.
- After the surface has been cleaned of all potential surface contamination, grind the surface, or abrade it with 80-grit (or coarser) sandpaper, remove all sanding residue, then wipe with a clean cotton rag dampened with one of the specified surface preparation solvents.
- This will provide a rough surface for TotalBoat Traditional Epoxy to achieve the best mechanical bond.
- Allow the surface to dry completely before applying TotalBoat Traditional Epoxy.

EPOXY:

- The cure of the TotalBoat Traditional Epoxy system with the Slow, Fast, or Tropical hardener creates an amine blush on the surface of the cured material as a by-product of the reaction. This amine blush can look like a waxy substance, and it is considered a potential surface contaminant. As a

SAFETY AND PERSONAL PROTECTIVE EQUIPMENT: Always use proper safety equipment, clothing, and PPE in accordance with the Safety Data Sheets for



TRADITIONAL EPOXY SYSTEM

best practice, even if another epoxy is being used that is considered 'non-blushing', it is strongly recommended to assume that a blush may be present and needs to be removed before any attempts are made to bond to it.

- Remove any potential amine blush by washing the surface with fresh, warm water and a mild soap. Dry the surface completely.
- Wipe the surface with a clean, dry cotton rag dampened with one of the specified surface preparation solvents.
- After the surface has been cleaned of all potential surface contamination, grind the surface, or abrade it with 80-grit (or coarser) sandpaper, remove all sanding residue, then wipe with a clean cotton rag dampened with one of the specified surface preparation solvents.
- This will provide a rough surface for Traditional Epoxy to achieve the best mechanical bond.
- Allow the surface to dry completely before applying TotalBoat Traditional Epoxy.

WOOD:

- Remove all surface contamination by wiping the surface with a rag dampened with one of the surface preparation solvents.
- Oily hardwoods and white oak should be wiped with acetone, if possible, during the surface preparation steps.
- Allow any solvents to evaporate completely.
- Abrade the area of the wood that is to be bonded with 80-grit (or coarser) sandpaper.
- Remove all sanding residue and wipe the surface clean using one of the specified solvent wipes.
- Allow the surface to dry completely before applying TotalBoat Traditional Epoxy.

METALS:

Steel/Iron:

- Remove all surface contamination by wiping the surface with a clean cotton rag dampened with one of the recommended surface preparation solvents.
- Grind or sand the surface with 80-grit (or coarser) sandpaper, leaving it shiny and rough. Remove all sanding residue and wipe the surface again with a clean cotton rag dampened with the surface preparation solvent.
- Applying TotalBoat Rust Primer, as directed, is recommended, but not required. It will help to prevent further development of rust and optimize the bond.
- Allow the surface to dry completely before applying TotalBoat Traditional Epoxy.

Stainless Steel:

- Remove all surface contamination by wiping the surface with a clean cotton rag dampened with one of the

surface preparation solvents. Allow the surface to dry completely.

- Sanding (with 80-grit or coarser sandpaper) or grinding the surface that will be bonded with TotalBoat Traditional Epoxy can help maximize the bond strength. If the surface is abraded, remove all sanding residue and wipe the surface with a clean cotton rag dampened with the surface preparation solvent.
- Allow the surface to dry completely before applying TotalBoat Traditional Epoxy.

Aluminum:

- Remove all surface contamination by wiping the surface with a clean cotton rag dampened with one of the surface preparation solvents. Allow the surface to dry completely.
- The aluminum surface should be abraded with either 80-grit sandpaper or a grinder immediately before bonding, or it should be etched with TotalBoat Aluminum Boat Etch Wash, as directed.
- If the surface is abraded, remove all sanding residue and wipe the surface clean with one of the specified solvent wipes, then allow to dry before bonding.
- If the surface is to be etched, ensure that the surface has dried completely before applying TotalBoat Traditional Epoxy.
- Apply TotalBoat Traditional Epoxy within 1 hour of the surface preparation.

Lead: SAFETY ALERT! Always take extreme care and use the required Personal Protective Equipment when working with lead.

- Remove all surface contamination by wiping the surface with a clean rag dampened with one of the recommended surface preparation solvents.
- Grind or sand the surface with 80-grit (or coarser) sandpaper, leaving it shiny and rough.
- Work quickly, and only in a small area at a time; lead oxidizes very quickly and will turn dull in just minutes, leaving a poor surface for bonding. Remove any sanding residue and wipe the surface clean again with the recommended surface prep solvent.
- Allow the solvent to evaporate, then apply TotalBoat Traditional Epoxy immediately. If epoxy is not applied within a few minutes of the surface preparation, repeat the surface preparation before applying Traditional Epoxy.

Other Metals:

- Remove all surface contamination by wiping the surface with a clean rag dampened with one of the recommended surface preparation solvents.



TRADITIONAL EPOXY SYSTEM

- Grind or sand the surface with 80-grit (or coarser) sandpaper, leaving it shiny and rough. Remove all sanding residue and wipe the surface again with a clean cotton rag dampened with the surface preparation solvent.
- Allow the surface to dry completely.
- Within 1 hour, apply TotalBoat Traditional Epoxy to the prepared surface.

STONE:

- Stone materials should always be dry and free of any dirt, dust, or other residue.
- If possible, do not attempt to bond stone that has recently been submerged in water for a long duration.
- Clean the stone by wiping with one of the appropriate surface prep solvents.
- Allow the stone to dry completely before applying TotalBoat Traditional Epoxy.

MASONRY:

- Masonry is a compatible substrate for Traditional Epoxy, but for best adhesion, it is extremely important to ensure that the masonry has been left to dry for an extended period of time before applying the epoxy.
- Masonry can trap a lot of moisture, which can impact the bond strength of TotalBoat Traditional Epoxy during periods of dramatic pressure change, or enduring freezing-to-hot temperatures.
- Clean the surface of any dust, debris, or loose material.
- Sand or abrade the surface where the masonry is to be bonded. Remove any sanding residue and wipe with one of the recommended surface preparation solvents.
- Allow the solvent to evaporate completely and apply TotalBoat Traditional Epoxy.

CONCRETE:

- Remove any loose chunks, dust, debris or other surface contamination from the surface that is to be bonded.
- Do not attempt to bond new concrete, or concrete that is sweating or emitting a lot of moisture.
- Sandblasting or otherwise abrading the surface where it is to be bonded will help provide a great base for a mechanical bond.
- Etching the concrete, as directed, with a concrete etch material will also prepare the surface to accept the epoxy, helping to generate a very strong bond.
- If the surface was etched, ensure that the surface is completely dry before applying TotalBoat Traditional Epoxy.

GLASS:

- Remove all surface contamination by wiping the surface with a clean rag dampened with one of the surface preparation solvents — denatured alcohol is preferred for glass surfaces.

- Allow the surface to dry completely before applying TotalBoat Traditional Epoxy.

PLASTICS:

VERY IMPORTANT WHEN APPLYING TOTALBOAT TRADITIONAL EPOXY TO ANY PLASTICS: TotalBoat Traditional Epoxy can form a good bond to a limited variety of plastic materials.

- TotalBoat Traditional Epoxy does not bond to all plastics, and the bond strength will vary across plastics.
- The bond strength to plastics will be limited when compared with the substrates listed previously, and will still vary with each application.
- The specific surface preparation methods are listed below, and it is always very important to perform a small test sample to ensure that it achieves the desired bond.
- Unless specified, do not use acetone for surface preparation on any plastic materials.
- Do not attempt to bond any plastics that are not listed below.

PVC, Nylon, ABS: Clean the surface completely. There are three surface preparation methods (choose one):

- Use acetone as a quick surface wipe that will change the surface of the plastic; do not allow acetone to sit on the surface.
- Quickly flame/heat treat the surface — do not singe, burn, or melt the plastic.
- Sand the surface heavily with 80-grit (or coarser) sandpaper, then remove all sanding residue.
- Apply TotalBoat Traditional Epoxy immediately.

Acrylic, Plexiglass, Lexan, Polycarbonate, Polystyrene (NOT in the expanded form (foam) such as Styrofoam):

- Clean the surface completely, removing any surface contamination. DO NOT use acetone, it may permanently haze or degrade the plastic.
- To promote the best mechanical bond, where the epoxy will be applied, sand or grind the surface with 80-grit sandpaper.
- Remove any sanding residue and apply TotalBoat Traditional Epoxy.

Vinyl:

- Clean the surface, removing any surface contamination.
- Apply TotalBoat Traditional Epoxy to the vinyl when the surface is completely dry.

Polyester:

- Follow the directions for FIBERGLASS (page 1).



TRADITIONAL EPOXY SYSTEM

APPLICATIONS:

Laminating and Using with Reinforcement Fabrics:

- TotalBoat Traditional Epoxy provides an excellent adhesive when wetting out layers of reinforcement fabrics for repairs or the construction of new pieces.
- The viscosity of mixed TotalBoat Traditional Epoxy requires little effort to effectively saturate fiberglass, carbon fiber, Kevlar®, basalt, Spectra®, or Dyneema® cloth.
- Select the appropriate cloth and cloth weight based on the application stresses/loads, curves and corners, and overall stiffness of the final part.
- Wet out the desired cloth material with mixed epoxy to saturate the cloth evenly. Only apply enough epoxy to just saturate the cloth; do not apply extra epoxy, or allow it to pool.
- Tools such as resin rollers, chip brushes, plastic spreaders, or other tools can be very helpful to distribute the epoxy evenly across fabrics.
- When wetting out thicker fabrics such as biaxial and triaxial cloths, it may be necessary to apply mixed epoxy to one side of the cloth, then flip it over and add more epoxy and work it into the cloth, if needed.
- Once the cloth has been sufficiently saturated, work to remove any extra epoxy from the cloth material. Extra epoxy is wasteful, heavy, and can even detract from the overall strength of the finished part.
- A disposable chip brush, resin roller, or squeegee can help to evenly distribute the mixed epoxy resin, or remove any extra epoxy.
- Laminates should only be made with enough mixed epoxy to saturate the cloth, and any extra liquid epoxy should be removed with a spreader, squeegee or brush before it is allowed to cure.
- Extra epoxy on laminates creates brittle areas in the laminate, and adds weight and unnecessary thickness, which could potentially lead to an excessive exotherm during the cure process.
- The process of vacuum bagging a laminated part after the fabric has been saturated with epoxy can be very helpful to remove voids and ensure even epoxy saturation throughout the part. This process can also remove excess epoxy from the part, preventing oversaturation.
- The TotalBoat Traditional Epoxy system does not have the super-low viscosity that is desired for infusion applications.

Adding Fillers and Thickeners:

- Fillers and thickeners can be added to TotalBoat Traditional Epoxy, as needed, for any application. Some applications may not require much thickener or filler, while others may need the epoxy to be thick like peanut butter, or thicker.

- Only add thickening agents or filler materials once the resin and hardener components have been blended thoroughly.
- Thickeners or fillers can be added to achieve a sense of sag resistance, to resist being absorbed into a porous substrate, to increase structural bond properties, or to promote easier sanding after it has cured.
- **Silica** (Includes colloidal silica, fumed silica): Acts as an adhesive thickener, adds sag resistance, is white in color and will impart a milky color. Silica is also commonly used to prevent porous substrates from absorbing epoxy.
- **Milled Glass Fiber**: For structural applications, these chopped fiberglass strands add strength, but do not add any sag resistance.
- **Microballoons**: These can be phenolic or glass in composition, and help to thicken and improve the sanding qualities of the cured epoxy. Microballoons will add body, bulk, and sag resistance, but will not prevent dripping or sagging.
- **Wood Flour**: Wood flour can be used when sag resistance and imparting a wood-tone color are desired; it can also be used for structural adhesive applications.
- **Other additives**: Non-skid media, graphite, and barrier coat additives are just a few examples of other acceptable additives. Always test a small sample to ensure the desired results when working with these materials.

Bonding:

- The TotalBoat Traditional Epoxy system can be used as an excellent adhesive for bonding applications. Thickeners and fillers can be added or blended to mixed Traditional Epoxy to achieve a desired working property or cured material property.
- Only add thickening agents or filler materials once the resin and hardener components have been blended thoroughly.
- Thickeners or fillers can be added to achieve a sense of sag resistance, to resist being absorbed into a porous substrate, to increase structural bond properties, or to promote easier sanding after it has cured.
- When bonding, do not over-clamp items, as this can squeeze all of the epoxy out of the glue joint. Adhere to the posted clamp times for each hardener to allow for sufficient cure time.

Filleting: (Applying a concave, convex, or flat bead of thickened epoxy in a joint where two surfaces meet, which can be joined perpendicularly or at an angle).

- This bead usually requires epoxy thickened to the consistency of peanut butter, with good sag resistance.
- Apply appropriately thickened epoxy between the two items that are to be bonded. Then, when they are set in position, run an additional continuous bead, roughly 1/8"-1/4" thick in the corner of the joint.



TRADITIONAL EPOXY SYSTEM

- A rounded tool, such as a wooden tongue depressor, can be run along this bead to spread the bead of epoxy evenly, with the rounded profile, and make it uniform and aesthetically clean looking. This fillet adds extra rigidity and stability by increasing the surface area of the bond.

Fairing:

- The TotalBoat Traditional Epoxy system can be thickened to create an ideal fairing compound that's smooth to apply and easy to sand, once cured.
- This blend should only be used for fine fairing, and fairing applications of less than 1/8".
- Microballoons are the main thickener for fairing compounds; it may also be desirable to add silica to increase body and sag resistance.

Clear Coating:

- The TotalBoat Traditional Epoxy with the Crystal Clear hardener can be used as a clear coat material on a wide variety of substrates.
- The maximum application film thickness for this type of application is 1/8", however, when used to saturate reinforcement fabrics, only apply the epoxy in a thin film.
- It is not advised to use any of the other hardeners in the Traditional Epoxy system for clear coating applications, as they impart a slight amber color, and are not designed with optimal clarity and transparency in mind.

Adding tints, colorants, dyes, pigments:

- TotalBoat Traditional Epoxy can be tinted, colored, or given other special effects using a variety of products. It is imperative that any colorants, dyes, pigments, or tints that are added are compatible with TotalBoat Traditional Epoxy.
- Incompatible substances, or excessive concentrations of substances such as colorants/tints/dyes/pigments that are added to TotalBoat Traditional Epoxy, may compromise the physical properties or cured properties.
- Some compatible tints and colorants include TotalBoat Pigment Dispersions, TotalBoat Mixol® Universal Tints (in the TotalTint Kit), mica powders, and alcohol inks.
- Always dispense the resin and hardener components at the specified ratio and mix them thoroughly prior to adding any colorants or tints.
- Pigments such as mica powders may settle due to gravity and their density; it may be desirable to add them just as the epoxy is starting to gel slightly, allowing them to appear suspended.
- Always test a small sample when using new tints or colorants. This will help establish a desired concentration of the tint/colorant, as well as help to ensure that it achieves the desired results, and cures properly.
- Adding tints or colorants may have an effect on the structural or physical performance of cured Traditional

Epoxy. When adding pigments, colorants, and dyes, always use as little as possible.

DISPENSING & MIXING:

2-Part Epoxy System:

- TotalBoat Traditional Epoxy is a 2-part epoxy system, which requires blending both the resin and hardener components together at the specified ratio to create a usable epoxy material.
- The TotalBoat Traditional Epoxy system has four different hardeners (Fast, Slow, Tropical/Extra Slow, and Crystal Clear), each with different working times and cure rates. It is very important to ensure that the selected hardener is mixed with the resin at the proper ratio.
- Thorough mixing at the exact ratios of the two components is imperative for the chemical reaction that occurs, allowing the material to achieve the maximum cured physical properties.
- Adding more resin or hardener is NOT beneficial. It will not speed up the cure, and it will only have negative consequences on the cured physical properties.

Application Conditions:

- TotalBoat Traditional Epoxy should only be dispensed when the ambient temperature, the temperature of the epoxy itself, and the temperature of the substrate are above the minimum posted temperature for use with each hardener in the APPLICATION DATA chart (page 8).
- The relative humidity should not exceed 90% for the first 24 hours of the cure process.
- For clear coating applications, when using the Crystal Clear Hardener, or when the cosmetic appearance of the finished material is of greater importance, the maximum relative humidity should be less than 60%.
- Curing TotalBoat Traditional Epoxy outside of the specified application conditions may slow the rate of cure, or compromise some physical properties of the cured epoxy.

Warming or Cooling the Epoxy, Dissipating Heat, Influencing Working Times and Cure Rates:

- The curing of mixed epoxy is an exothermic reaction — it generates heat.
- Epoxy in a larger, deeper mass will react and generate heat and begin to cure significantly faster than if it is spread thin, or in a smaller mass.
- Promoting the best heat dissipation possible with mixed epoxy will promote the longest working time by slowing the cure process.
- In cooler ambient conditions below 65°F, it may be desirable to warm the epoxy to 70-80°F to maintain the desirably low viscosity, or to control the working time and cure rates.



TRADITIONAL EPOXY SYSTEM

- Conversely, in warmer conditions over 80°F, it may be desirable to cool the epoxy components before they are mixed to ensure sufficient working time and cure rates.

Mix Ratio:

- The TotalBoat Traditional Epoxy system mix ratio can be measured by volume, by weight, or by calibrated pumps. Due to different densities of the resin and hardeners, the mix ratio by weight is not the same as the mix ratio by volume. Mixing by weight can provide the most accurate mix ratio, regardless of how much is dispensed, while the calibrated pumps are the most convenient and fastest way to dispense Traditional Epoxy components.
- The mix ratio of the TotalBoat Traditional Epoxy system when the Fast or Slow hardeners are used is 5A:1B (resin:hardener), by volume. The mix ratio by weight for each hardener is posted in the APPLICATION DATA chart (page 8).
- The mix ratio of the TotalBoat Traditional Epoxy system when the Crystal Clear or Tropical/Extra Slow hardeners are used is 3A:1B (resin:hardener), by volume. The mix ratio by weight for each hardener is posted in the APPLICATION DATA chart (page 8).
- Do not deviate from the mix ratios specified for each individual hardener. Epoxy requires a precise mix ratio of resin to hardener in order to ensure the desired cured physical properties.

Pumps:

- TotalBoat Traditional Epoxy can be dispensed with calibrated pumps from TotalBoat. Follow the included instruction sheet for installing the pumps onto the respective bottles.
- The hardener pumps have a sticker on the top, indicating the mix ratio which it dispenses by volume. Ensure that the Slow and Fast hardeners are only dispensed from a pump with a '5:1' sticker on the top, and the Crystal Clear and Tropical/Extra Slow pump has a '3:1' sticker on the top.
- Ensure that the correct hardener pump is being used.
- Ensure that the pumps are primed before using any of the dispensed epoxy.
- **1 pump of resin, 1 pump of hardener:** When dispensing with TotalBoat calibrated pumps, the pumps are pre-calibrated, so the user only needs 1 pump of resin to 1 pump of hardener.
- SLOW/FAST PUMPS (marked 5:1): The resin pump dispenses 20mL of resin, while the hardener pump dispenses 4 mL of hardener, ensuring a proper mix ratio.
- CRYSTAL CLEAR/TROPICAL PUMPS (marked 3:1): The resin pump dispenses 20mL of resin, while the hardener pump dispenses 6 mL of hardener, ensuring a proper mix ratio.

- The mix ratio of 20:6 by volume is within an acceptable tolerance range for this epoxy system.
- The pumps should remain installed in the bottles unless they will not be used for more than two weeks, in which case the pumps should be removed and cleaned out with denatured alcohol and stored. Be sure the original caps are tightly secured on the resin and hardener bottles.

CURING:

- The cure of the epoxy system is the process it goes through, changing from a liquid epoxy, to a hard, plastic material. Cure rates are dictated by the hardener that is selected, the ambient temperature, the temperature of the substrate, and the mass of epoxy that was dispensed.
- The working time and cure rate for each hardener are posted in the APPLICATION DATA chart (page 8). In general, warmer conditions will shorten these times, while cooler conditions will extend them.
- Larger masses of mixed epoxy than noted will also shorten the posted times, while smaller masses of mixed epoxy will extend the posted times.

Clamping:

- The recommended clamp time for bonding applications is also indicated by the hardener selected, and is posted below in the APPLICATION DATA chart (page 8).
- The natural tendency is to clamp with a lot of pressure, but this method squeezes all of the epoxy out of the glue joint, making the joint weak.
- Take extra care not to over-clamp items, and ensure that there is a thin film of epoxy between all items being bonded.
- For porous substrates such as wood, it is recommended to thicken the epoxy to prevent it from being completely absorbed into the wood grain.

PRODUCT STORAGE:

- Before and after use, seal all TotalBoat Traditional Epoxy system components tightly and store in a dry place between 60-90°F.
- Do not store the epoxy bottles on the floor or near windows/doors that may expose the product to cooler conditions.
- Storing TotalBoat Traditional Epoxy components at cooler conditions, or otherwise exposing the liquid epoxy components to dust and humidity, can increase the risk of crystallization.
- If the respective pumps are being used with the TotalBoat Traditional Epoxy system, it is strongly recommended that they are removed from the bottles and cleaned out with denatured alcohol and stored if they will not be used for a



TRADITIONAL EPOXY SYSTEM

minimum of two weeks. Tightly seal the bottles for storage using the original caps.

CRYSTALLIZED EPOXY:

- Crystallization can occur in the liquid resin or hardener components of epoxy, and can present itself as a gritty texture, cloudiness, or as being much thicker in consistency than it should be.
- Epoxy that has crystallized should not be used until the crystallization has been resolved.
- Warming the liquid epoxy to 125-150°F will rectify the crystallization in the epoxy, turning it back to the consistency it is supposed to have, making it ready to use again.
- The most common way to sufficiently warm any TotalBoat Traditional Epoxy components is to insert the closed bottle into a tub or basin of warm water (do not submerge up to the cap, and do not use boiling water, 130-160°F is sufficient). Agitate or stir the contents in the bottle to ensure that all of the material in the bottle reaches the necessary temperature.
- Change out the water, as needed. It may take 30-90 minutes until all contents of the bottle are at least 125°F.
- Following proper storage conditions is the best way to prevent crystallization.

SHELF LIFE:

- The shelf life of the TotalBoat Traditional Epoxy system components is a minimum of one year if it has been stored properly according to the directions.
- Under most circumstances, the components may last multiple years under proper storage conditions.

Priming, Painting, or Applying More Epoxy, or Other Coatings on top of the TotalBoat Traditional Epoxy System:

The TotalBoat Traditional Epoxy system can be coated by a variety of paints, primers, or other epoxy materials.

• MORE TOTALBOAT TRADITIONAL EPOXY:

- The TotalBoat Traditional Epoxy system can be reapplied once the previous coat has cured completely by washing the surface with warm water and a mild soap, allowing it to dry completely, then sanding with 80-220 grit sandpaper, and remove all sanding residue before applying. It is imperative to wash and dry the surface before sanding, to remove the amine blush.
- For some applications, it can be desirable to 'hot coat' more epoxy onto a previous layer. To do so, wait for the previous coat to become somewhat firm, but it must still be tacky. The next coat of epoxy can be applied without washing away and amine blush or sanding the surface at

this point, however, if the epoxy surface becomes tack-free and the epoxy becomes very firm or hard, the surface must be washed and sanded.

• APPLYING OTHER EPOXY PRODUCTS OR EPOXY-BASED PRIMERS:

- Allow the Traditional Epoxy substrate to cure completely for at least 48 hours. Wash then sand the surface with 80-grit sandpaper, or follow the specific directions on the product being applied.
- Remove any sanding residue and apply the product, as directed.

• APPLYING OTHER PAINTS, PRIMERS, VARNISHES, CLEAR COATS, URETHANES, OR OTHER COATINGS:

- Allow the TotalBoat Traditional Epoxy to cure for at least 5-7 days, under normal curing conditions.
- Wash the epoxy surface with warm water and a mild soap, then rinse well and dry the surface completely.
- Sand the surface with the sandpaper grit specified on the paint or primer's instructions. If no grit is specified, 180-grit or 220-grit sandpaper are commonly used for this purpose.
- Remove all sanding residue, and apply the desired paint or primer as directed on the product's instructions.

• APPLYING GELCOAT:

- Gelcoat cannot be applied directly to TotalBoat Traditional Epoxy, cured or uncured. An approved epoxy-based primer is required when applying gelcoat over cured TotalBoat Traditional Epoxy. All products must be applied as directed, with no substitutions or deviation, or the gelcoat may not adhere or cure as it should.
- TotalBoat TotalProtect epoxy barrier coat primer and TotalBoat 2-Part Epoxy Primer are the approved epoxy primer products for gelcoat.
- Allow the Traditional Epoxy to cure for at least 48 hours, under normal curing conditions.
- Wash the cured epoxy surface with warm water and a mild soap, and rinse thoroughly. Do not sand it until the surface has been washed thoroughly.
- Sand the epoxy thoroughly with 80-grit sandpaper, and apply TotalBoat TotalProtect or TotalBoat 2-Part Epoxy Primer.
- Allow the epoxy primer to cure for 5-7 days, under normal curing conditions.
- Wash the epoxy primer with warm water and a mild soap, then rinse thoroughly and dry the surface completely.
- Sand the surface with 80-grit sandpaper, and remove all sanding residue.
- Wipe the surface clean with a clean cotton rag dampened with acetone — DO NOT use any synthetic rags for this application.
- Apply the gelcoat, as directed.



TRADITIONAL EPOXY SYSTEM

APPLICATION DATA:

HARDENER SELECTED:	SLOW	FAST	CRYSTAL CLEAR	TROPICAL/EXTRA SLOW
Application Temperature/ Relative Humidity:	Minimum of 60°F, 0-90% RH	Minimum of 40°F, 0-90% RH	Minimum of 55°F, 0-90% RH	Minimum of 55°F, 0-90% RH
Application Film Thickness:	Thin film only	Thin film only	Thin film to 1/8" @ 75°F	Thin film only
Resin Density (@ 75°F) (ASTM D1475):	1.14 g/cm ³	1.14 g/cm ³	1.14 g/cm ³	1.14 g/cm ³
Hardener Density (@ 75°F) (ASTM D1475):	1.01 g/cm ³	1.06 g/cm ³	1.01 g/cm ³	1.03 g/cm ³
Resin Viscosity (@ 75°F) (ASTM D2196):	1000-1400cP	1000-1400cP	1000-1400cP	1000-1400cP
Hardener Viscosity (@ 75°F) (ASTM D2196):	100-160cP	200-500cP	200-500cP	N/A
Initial Mixed Viscosity (at 75°F) (ASTM 2196):	700cP	1000cP	530cP	650cP
Mix Ratio (By Weight):	100A:18B	100A:18B	100A:27B	100A:28B
Mix Ratio (By Volume):	5A:1B	5A:1B	3A:1B	3A:1B
Working Time (Varies by Mass of Mixed Epoxy):	20-45 minutes @ 75°F	10-25 minutes @ 75°F	10-30 minutes @ 75°F	5-15 minutes @ 75°F
Working Life (Applied Immediately at Thin Film):	90 minutes	60 minutes @ 75°F	3-4 hours @ 75°F	3-4 hours @ 75°F
Pot Life (150g mass @ 75°F) (ASTM 2471):	20 minutes	12 minutes	20 minutes	46 minutes
Set Time (Thin Film @ 75°F):	10 hours	6 hours	10-15 hours	20-24 hours
Minimum Cure for Light Use (@ 75°F):	1-4 days	1-4 days	1-4 days	2-4 days
Clamp Time (Minimum, @ 75°F):	24 hours	24 hours	24 hours	36 hours
Full Cure Time (For High Loads/Stresses @ 75°F):	3-5 days @ 75°F	3-5 days @ 75°F	3-5 days @ 75°F	5-7 days @ 75°F
Shelf Life:	At least 1 year (under proper storage conditions)	At least 1 year (under proper storage conditions)	At least 1 year (under proper storage conditions)	At least 1 year (under proper storage conditions)

PHYSICAL DATA:

HARDENER SELECTED:	SLOW	FAST	CRYSTAL CLEAR	TROPICAL/EXTRA SLOW
Cured Color/Finish:	Clear/Amber	Clear/Amber	Clear	Clear/Amber
Components:	2 (Resin and Hardener)	2 (Resin and Hardener)	2 (Resin and Hardener)	2 (Resin and Hardener)
UV Stable:	No	No	Yes (limited)	No
Tensile Strength (ASTM D638):	7,500 psi	8,000 psi	9,500 psi	6,800 psi
Tensile Modulus (ASTM D638):	460,000 psi	410,000 psi	450,000 psi	390,000 psi
Tensile Elongation (ASTM D638):	4.5%	3.5%	7.8%	7.8%
HDT (Room Temperature Cure) (ASTM D648):	125°F	120°F	125°F	126°F
HDT (Post Cure) (ASTM D648):	N/A	N/A	145°F	N/A
Compressive Strength (ASTM D695):	11,500 psi	11,500 psi	12,000 psi	11,900 psi
Flexural Strength (ASTM D792):	12,000 psi	14,400 psi	14,800 psi	13,800 psi
Flexural Modulus (ASTM D790):	450,000 psi	460,000 psi	425,000 psi	390,000 psi
Volumetric Shrinkage (ASTM D792/D1475):	4.4%	4.4%	4.9%	4.0%
Cured Density:	1.18 g/cm ³	1.18 g/cm ³	1.15 g/cm ³	1.15 g/cm ³
Volumetric Yield (in ³ /lb) (ASTM D792):	23.5	23.5	24	24.1
Hardness (ASTM D2240):	83 Shore D	84 Shore D	88 Shore D	85 Shore D



TRADITIONAL EPOXY SYSTEM

Troubleshooting Guide

SYMPTOMS	POSSIBLE ISSUES	SOLUTION
<ul style="list-style-type: none"> • The epoxy did not cure. • The epoxy is still sticky after a long duration. • There are isolated areas of uncured epoxy. • There are striations in the cured epoxy. 	<ul style="list-style-type: none"> • Both components were not mixed together thoroughly. • Improper mix ratio of the resin and hardener • A substance was mixed with the epoxy before the resin and hardener were mixed together thoroughly. • Need to wait longer for epoxy to cure. • Cooler conditions lead to longer than desired cure time. • Contamination • An overabundance of any substance (which is not the resin or hardener component) mixed in with the epoxy, that may have diluted the epoxy too much, or reacted with it chemically. 	<ul style="list-style-type: none"> • Allow the epoxy to cure under normal curing conditions for another 24 hours. • If it does not cure to the desired hardness/tack-free state, mechanically remove the uncured epoxy and start over, taking extra care to follow all surface preparation, mixing, and application procedures with better care. • Take extra care to mix TotalBoat Traditional Epoxy at the specified mix ratio, as specified in the APPLICATION DATA chart (on page 8). • Only apply TotalBoat Traditional Epoxy when the environmental conditions are within the specified range to ensure a proper cure, within the desired timeframe. • Only use approved fillers, thickeners, pigments, colorants, or other additives. Do not add solvents to thin the epoxy. • Always mix the resin and hardener components prior to adding any fillers, thickeners, colorants, tints, or other substances. • Do not subject the curing epoxy to high humidity, dew, rain, or water spray until it has become tack-free. For cosmetic applications, wait a minimum of 24 hours after it has become tack-free before subjecting the epoxy to high humidity or any other contact with water. • Only use the specified solvents when working with TotalBoat Traditional Epoxy. • If calibrated pumps are being used, ensure that the proper pumps are being used for the specific resin and hardener.
<p>TotalBoat Traditional Epoxy cured properly but did not adhere to the substrate.</p>	<ul style="list-style-type: none"> • Incompatible substrate • Contamination • Improper surface preparation 	<ul style="list-style-type: none"> • Only apply TotalBoat Traditional Epoxy to acceptable substrates. Substrates that are not listed as 'acceptable' may not allow for a sufficient bond. • Mechanically remove Traditional Epoxy from any areas that show poor adhesion or delamination. • Start all surface preparation over from the beginning, taking extra care and attention to detail. Do not cut corners or make substitutions.
<p>Epoxy cured white, or with white spots.</p>	<ul style="list-style-type: none"> • Moisture is the most common source of white spots that are present when epoxy finishes curing. 	<ul style="list-style-type: none"> • Take extra care to prevent moisture or water from coming in contact with the epoxy until it has finished curing. • When applying epoxy to wood or other potentially porous/damp substrates, verify that the moisture content is within the acceptable range. • Sufficient moisture can lead to premature delamination. If delamination is a concern, mechanically remove the epoxy and start over, taking extra care to ensure that moisture is not a factor.
<p>Bubbles in the cured epoxy</p>	<ul style="list-style-type: none"> • TotalBoat Traditional Epoxy was applied to a porous substrate. • Bubbles were whipped into the epoxy while mixing, and they did not rise to the surface and pop prior to the cure of the epoxy. • Contaminant/substance that reacted with the epoxy is not compatible. 	<ul style="list-style-type: none"> • Always mix epoxy products very thoroughly, ensuring that there are no resin-rich or hardener-rich areas, however, whipping the epoxy excessively can induce air bubbles that have to try and float to the surface. • For cosmetic or thicker applications, take extra care not to whip air bubbles into the epoxy while mixing. • Quickly and briefly wave a heat gun or torch over clear coat applications that have bubbles. This will help bubbles rise to the surface. Keep the heat source moving and do not scorch the surface.



TRADITIONAL EPOXY SYSTEM

<p>Traditional Epoxy with the Crystal Clear hardener turned yellow and/or has cracks that showed up during the cure process.</p>	<ul style="list-style-type: none"> • Excessive heat was generated during the cure — this can also make the epoxy hard and brittle. • Direct exposure to high levels of UV radiation while curing • Other Traditional Epoxy hardeners may impart an amber or yellow color naturally. 	<ul style="list-style-type: none"> • For any applications where maximum clarity is desired, only use the Crystal Clear hardener. • Avoid dispensing and curing in extreme levels of UV exposure. • Dispense and cure smaller masses of epoxy to avoid creating an excessive exothermic reaction. • Only apply TotalBoat Traditional Epoxy under the specified environmental conditions. Curing under hotter conditions may lead to signs of excessive heat from the exothermic reaction. • Follow the maximum pour depth based upon the selected hardener shown in the APPLICATION DATA chart (Page 8). • Mechanically remove any undesirable-looking yellowed epoxy, perform all surface preparation over again, and reapply the epoxy, taking more care to avoid generating excessive heat, or exposing it to excessive UV light (sunlight).
<p>Epoxy turned yellow over time — not from the curing reaction.</p>	<ul style="list-style-type: none"> • Exposure to excessive temperature • Excessive exposure to moisture • UV exposure — Crystal Clear is the only hardener in the Traditional Epoxy system with UV stability (which is still limited). • The Slow, Fast, and Tropical/Extra Slow hardeners may impart a yellow color naturally. 	<ul style="list-style-type: none"> • Epoxy inherently has limited UV stability, even when using the Crystal Clear hardener. A UV-stable coating is highly recommended for any Traditional Epoxy applications that require good UV stability, to ensure maximum clarity retention. • For cosmetic applications, avoid storing cured epoxy under conditions that may affect its finish. • Select the Crystal Clear hardener for applications that require the clearest finish.
<p>One epoxy component or the other seems very thick, lumpy, or has small crystals.</p>	<ul style="list-style-type: none"> • Ambient temperature is below the recommended application temperature, increasing the viscosity of the liquid epoxy component. • Crystallization has occurred in the liquid epoxy component. 	<ul style="list-style-type: none"> • Always store epoxy components as directed on the product or on the Technical Data Sheet. • Dispensing and applying TotalBoat Traditional Epoxy at lower temperatures than recommended may lead to the epoxy components having a higher viscosity than desired. • Follow the crystallization remediation process outlined on page 6 of the Technical Data Sheet if the viscosity and consistency do not resolve by bringing the liquid epoxy components back to the specified storage conditions.
<p>Did not cure with a smooth, shiny surface</p>	<ul style="list-style-type: none"> • The only TotalBoat Traditional Epoxy hardener that will promote a smooth, shiny finish is the Crystal Clear hardener. • Excessive exothermic reaction • Higher moisture content was present during the cure • An amine blush has formed on the surface. • Improper mix ratio, or poor mixing of the resin and hardener components 	<ul style="list-style-type: none"> • Ensure that the Crystal Clear hardener is used for any projects that require a smooth, shiny finish. • If the epoxy has not cured completely, wait another 24 hours. Mechanically remove any epoxy that is uncured at that point and start over. • For all other scenarios: Wash the surface with warm water and a mild soap, then rinse thoroughly and dry the surface completely. Sand the surface until any undesirable epoxy has been removed. Remove all sanding residue and reapply TotalBoat Traditional Epoxy as desired, taking extra care when mixing and applying, as well as following all specified environmental conditions, to ensure the best results.
<p>Colorants/dyes/tints did not achieve the desired finish, or settled.</p>	<ul style="list-style-type: none"> • Test sample was not performed to observe the final product. • Tints, dyes, or pigments that do not go into solution with the liquid epoxy may float or sink depending on their density relative to that of the epoxy they are mixed into. • Traditional Epoxy with the Slow, Fast, or Tropical/Extra slow may impart a yellow color, or even some haziness, which can affect added colors. 	<ul style="list-style-type: none"> • Always perform a test sample of TotalBoat Traditional Epoxy with any tints or colorants prior to using them on the final project, to see if the desired results are achieved. • Pigments and special effects that do not mix into the epoxy in a liquid form, such as mica powders, may settle or float to the surface of the epoxy if they are added too soon. These types of pigments or additives can be added as soon as the epoxy begins to warm from the reaction, but is still a flowing liquid. • Mechanically remove any epoxy that did not achieve the desired effect.



TRADITIONAL EPOXY SYSTEM

<p>Paint, primer, or other form of topcoat did not adhere to TotalBoat Traditional Epoxy.</p>	<ul style="list-style-type: none"> • Improper surface preparation • Incompatible material was applied to TotalBoat Traditional Epoxy. • Traditional Epoxy was not sufficiently cured. • Amine blush from the cure of the Traditional Epoxy was not removed via soap and water as the FIRST step of surface preparation. • Gelcoat should not be applied directly to TotalBoat Traditional Epoxy without using one of the specified TotalBoat epoxy primer products first. 	<ul style="list-style-type: none"> • Ensure product compatibility before applying any coatings or topcoats to TotalBoat Traditional Epoxy. • Ensure that Traditional Epoxy has cured for a sufficient amount of time before beginning any surface preparation. • Follow the surface preparation based upon the specific topcoat, as outlined in the Technical Data Sheet, and the product being applied. • Do not cut any corners when performing the surface preparation. • After the epoxy has cured, amine blush from Traditional Epoxy must be removed with fresh water and a mild soap before doing any sanding or other surface preparation. Solvents and sanding do not remove amine blush, they just move it around on the surface. • Remove any coatings that didn't adhere properly and start over. • Take extra care with the surface prep & application instructions.
<p>Cracks appeared in the area of a fiberglass (or other reinforcement fabric) repair spot.</p>	<ul style="list-style-type: none"> • Excessive epoxy was applied, and insufficient reinforcement fabric was used. • Verify that the correct reinforcement fabric was used for the application. 	<ul style="list-style-type: none"> • Do not use 'extra' epoxy when performing repairs. Only use enough to sufficiently wet out the fabric. The fabric is the strength of any repair. • Ensure that the proper laminate schedule was used for the repair. For serious or specific structural repairs, an engineer or specialist may need to be consulted. • Use sufficient reinforcement fabric for a repair. • Select the appropriate reinforcement fabric for a given application based upon its strength properties.
<p>Delamination of a fiberglass (or other reinforcement fabric) repair spot</p>	<ul style="list-style-type: none"> • Poor surface preparation • Amine blush or wax was not removed from the substrate prior to performing the repair. • Repaired area was stressed prior to being sufficiently cured. • Incompatible substrate • The laminate was 'dry', or had insufficient epoxy saturation. 	<ul style="list-style-type: none"> • Completely remove any partly delaminated repairs. • Ensure that the substrate is a compatible material for TotalBoat Traditional Epoxy. • Perform all surface preparation over again ensuring that extra care is taken. • Ensure that any amine blush or wax on the substrate has been removed prior to sanding and performing the repair. • Perform the laminate repair again, and ensure sufficient epoxy saturation and sufficient time for the repair to cure prior to use or stressing the repair.