



# THIXO FLEX

- Two-part thixotropic epoxy adhesive
- Extra tolerant to dynamic stresses from contraction, expansion, vibration, and shock
- Bonds fiberglass, metals, wood, ceramics, and some plastics
- Each cartridge comes with two static mixing tips
- Can be used above or below the waterline
- Comes in a 250ml cartridge that fits most standard caulk guns

TotalBoat TotalBoat Thixo Flex flexible epoxy adhesive forms permanent, flexible, waterproof bonds that withstand movement caused by changes in humidity, temperature, and load stresses. An essential part of any boat building or repair toolkit, this high-strength, sag-resistant epoxy adhesive bonds many different materials, including damp wood, fiberglass, metal, and most plastics.

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**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 Thixo Flex.

**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:** Bonding, structural epoxy adhesive, filleting, small gap filling, bonds where dynamic stresses are present, adhesive for substrates that are generally tough to bond

**ACCEPTABLE SUBSTRATES:** Fiberglass, wood, properly prepared metals, block, brick, concrete, glass, slate, tile, stone

**CAULK GUN (REQUIRED FOR USE):** 250ml cartridges fit most standard caulk guns that allow for an offset nozzle. Guns that only have a small, centered hole for the nozzle will not work. An 8:1 mechanical advantage, or higher, is strongly recommended.

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**SAFETY AND PERSONAL PROTECTIVE EQUIPMENT:**

Always use proper safety equipment, clothing, and PPE in accordance with the Safety Data Sheet for Thixo Flex.

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**EXOTHERMIC REACTION!**

The cure of TotalBoat Thixo Flex is an exothermic reaction and will generate heat. Though Thixo Flex is generally applied in thin films or smaller applications, it is not uncommon for a larger mass of mixed Thixo Flex to reach 200°F or higher during the cure cycle.

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**SURFACE PREPARATION:**

All surfaces need to be free of any potential contaminants. Surface contamination will reduce or compromise Thixo Flex's bond strength to any substrate. If any surfaces are to be sanded before applying Thixo Flex, always remove all surface contaminants prior to sanding or abrading the surface. Contaminants can include dust, dirt, grease, moisture/ water, oil, or wax. Though Thixo Flex will bond under high humidity conditions, and to damp materials, the strongest bonds occur when the humidity level is low and all substrates are dry, with low moisture content.

- **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 used, 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 and 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 Thixo Flex to achieve the best mechanical bond.

**EPOXY:**

- The cure of epoxy materials can create an amine blush on the surface of the cured material, even if the epoxy being used is considered 'non-blushing'.
- 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 and remove all sanding residue. Then wipe with a clean cotton rag dampened with one of the



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specified surface preparation solvents. This will provide a rough surface for Thixo Flex to achieve the best mechanical bond.

## WOOD:

- Remove all surface contamination by wiping the surface with a clean 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.

## METALS:

### Steel/Iron:

- Remove all surface contamination by wiping the surface with a clean rag dampened with one of the 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 Thixo Flex.

### 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.
- Grinding or sanding (with 80-grit or coarser sandpaper) the surface that will be bonded with Thixo Flex 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 Thixo Flex.

### 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 either be abraded with 80-grit sandpaper or a grinder immediately before bonding, or 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 Thixo Flex.
- Apply Thixo Flex 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 surface preparation solvents.
- Grind or sand the surface with 80-grit or coarser sandpaper, leaving it shiny and rough.
- Work quickly, and only do a small area at a time, because 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 surface prep solvent.
- Allow the solvent to evaporate and apply Thixo Flex immediately. If Thixo Flex is not applied within a few minutes, repeat the surface preparation.

### Other Metals:

- Remove all surface contamination by wiping the surface with a rag dampened with one of the 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.
- Allow the surface to dry completely.
- Within 1 hour, apply Thixo Flex to the prepared surface.

### STONE:

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

### MASONRY:

- Masonry can be bonded with Thixo Flex, but, for best results, it is extremely important to ensure that the masonry has been left to dry for an extended period of time before applying Thixo Flex.
- Masonry can trap a lot of moisture, which can impact the bond strength of Thixo Flex during periods of dramatic pressure change, or enduring freezing-to-hot temperatures.
- Clean the surface of any dust, debris, or loose material.



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- 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 solvents to evaporate completely, then apply Thixo Flex.

## CONCRETE:

- Remove any loose dust or debris from the surface that is to be bonded, as well as any other surface contamination.
- 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 with a concrete etch material (as directed) 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 Thixo Flex.

## 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 Thixo Flex.

## PLASTIC:

- **PVC, Nylon, Polystyrene (not Styrofoam):** Clean the surface of any dust, debris, grease, oils, waxes, moisture, or other contaminants. Heat treat or heavily abrade the surface by grinding or sanding with a coarse grit sandpaper. Heat treating generally entails quickly heating the surface with a torch for about ½ a second to 3 seconds. Do not singe or burn the surface. Heat treating changes the surface energy of the plastic, allowing it to bond. Wiping the surface with acetone can also help to change the surface energy, but use moderation, as too much contact with acetone will permanently damage the plastic. Apply Thixo Flex immediately after treating the surface.
- **ABS, Lexan, Acrylic, Polycarbonate, Plexiglass:** Clean the surface of any dust, debris, grease, oils, waxes, moisture, or other contaminants. Abrade the surface that is to be bonded with 80-grit sandpaper and remove any sanding residue. DO NOT wipe the surface with acetone or heat treat the surface. Apply Thixo Flex to the prepared surface.
- **LDPE, HDPE, Polyethylene, Polypropylene:** Thixo Flex will not bond to these materials. Do not use Thixo Flex on these materials. Vinyl surfaces may not allow Thixo Flex to achieve a good bond.

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## APPLICATIONS:

**Bonding:** Thixo Flex's strength, flexibility, and thixotropic properties makes it an extremely dynamic adhesive for a wide variety of bonding applications and substrates. Thixo Flex is safe to use below the waterline, or for structural applications, when the cured physical properties of Thixo Flex are adequate.

**Filleting:** When bonding two items that are perpendicular, or at an angle, with Thixo Flex, apply the epoxy between the two items that are to be bonded. Then when they are set in position, run an additional continuous bead of Thixo Flex, roughly 1/8"-1/4" thick, in the corner of the joint. A rounded tool, such as a wooden tongue depressor can be run along this bead to evenly spread the Thixo Flex with the rounded profile, make it uniform and aesthetically clean looking. This fillet adds extra rigidity and stability by increasing the surface area of the bond.

**Gap Filling:** Thixo Flex can be used as an epoxy gap-filling material for gaps up to ½" in thickness. For any gaps wider than ½", apply Thixo Flex in layers, allowing the epoxy to become firm but slightly tacky with each coat, before applying the next one, or allow it to cure completely, sand the surface, and apply the next coat.

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## DISPENSING & MIXING:

**Application Conditions:** Thixo Flex should only be dispensed when the ambient temperature, temperature of the epoxy itself, and the temperature of the substrate being bonded are above 40°F. For optimal bond strength, the relative humidity should not exceed 90% for the first 24 hours of the cure process. Curing Thixo Flex outside of these conditions may slow the rate of cure, or compromise some physical properties of the cured epoxy.

**Warming the Cartridge:** In cooler ambient conditions below 65°F, it is recommended to warm the cartridge to 75-90°F before use, as the liquid components in the cartridge can become very thick and difficult to dispense easily. Caulk guns with 8:1 or 10:1 mechanical advantage may not provide enough force to easily dispense Thixo Flex under cool conditions without warming the cartridge first.

### Caulk Gun:

Use an appropriate caulk gun to dispense Thixo Flex. For ease of application, ensure that the caulk gun meets the minimum recommended mechanical advantage. The caulk gun must allow for the tip to be offset of the center of the cartridge.

### Mix Ratio:

The mix ratio of Thixo Flex is 1:1 (resin:hardener). Thixo Flex cartridges are constructed with the internal mechanics to automatically dispense at the rate of 1 part resin for every 1 part of hardener.

### Static Mixing Tips:



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- Thixo Flex can be dispensed with or without the static mixing tip threaded on the cartridge. The static mixing tips blend the two components as they come out of the cartridge, ensuring that the bead of epoxy that is dispensed from the tip is completely mixed and ready for use.
- The tip of the static mixing tip can be trimmed to the desired diameter.
- Unscrew the threaded cap and remove the plug from the Thixo Flex cartridge, and thread on a new static mixing tip.
- Dispense 3-4" of bead as WASTE MATERIAL. DO NOT use the first few inches, as it may be resin or hardener rich.
- After use, do not attempt to clean or reuse static mixing tips.
- Allow the epoxy to cure in the tip, on the cartridge. Simply replace the static mixing tip when the cartridge is used the next time.

### Dispensing Without a Static Mixing Tip:

- Remove the threaded cap.
- It is strongly advised to use a marker or some other method to indicate the orientation of the plug if it is to be put back on the cartridge later.
- Ensure that the epoxy is mixed thoroughly, until it has an even color and texture.

### CURING:

Cure rates are dictated by the ambient temperature, the temperature of the substrate, and the mass of epoxy that was applied. The gel time of Thixo Flex in a thin bead or film is roughly 50 minutes at 77°F; it can be sanded, or used for light-duty applications in roughly 24 hours. Full cure is roughly 5-7 days. Warmer conditions will shorten these cure times, while cooler conditions will extend them.

**Clamping:** The recommended clamp time for Thixo Flex is at least 3-4 hours @ 72°F (or warmer). 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 Thixo Flex between all items being bonded.

### PRODUCT STORAGE:

- Store Thixo Flex between 60-90°F, sealed tightly, in a dry place, before and after use.
- Do not store Thixo Flex on the floor or near windows/doors that may expose the Thixo Flex cartridge to cooler conditions.
- Storing Thixo Flex at cooler conditions, or exposing the epoxy in the cartridge to dust and humidity, can increase the risk of crystallization.
- If the original plug for the cartridge is to be put back on the cartridge after use, take extreme care not to put the resin

plug on the hardener side, or vice versa. Marking the plug before removing it the first time can help prevent this.

- For applications where a static mixing tip is used, leave the static mixing tip on the cartridge after use, and allow the epoxy to cure in the tip. The epoxy will not adhere the mixing tip to the cartridge. The cured epoxy in the mixing tip will form a seal, protecting the epoxy inside the cartridge. It is not viable to try and clean out static mixing tips after use. When the product is used next, simply unscrew the static mixing tip that was on the cartridge, and install a new, unused one.

### 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 warm a Thixo Flex cartridge is to place the cartridge into a sealable plastic bag, and insert it into a bowl or basin of warm water (not boiling). Change out the water, as needed. This may take 30-90 minutes, until all contents of the cartridge are at least 125°F.
- Following proper storage conditions is the best way to prevent crystallization.

### APPLICATION DATA:

<b>Application / Epoxy Type:</b>	Adhesive, bonding, sealing, filling
<b>Application Film Thickness:</b>	Thin film up to 1/2"
<b>Application Temperature/RH:</b>	Minimum of 40°F, 0-90% Relative Humidity
<b>Working Time</b>	75 minutes @ 77°F (thin film/bead)
<b>Gel Time:</b>	40 minutes @ 77°F (100g mass) (ASTM 2471)
<b>Clamp Time:</b>	3-4 hours (minimum) @ 72°F
<b>Minimum Cure For Use (@ 77°F):</b>	7-10 hours (low loads), 24 hours (high loads)
<b>Full Cure Time:</b>	5-7 days
<b>Resin Density:</b>	10.0 lbs./gallon @ 77°F
<b>Hardener Density:</b>	8.3 lbs./gallon @ 77°F
<b>Mix Ratio (by Weight):</b>	1.2A:1B (Calculated)
<b>Mix Ratio (by Volume):</b>	1A:1B (Calculated)
<b>Mixed Viscosity:</b>	Thixotropic (ASTM 2196)
<b>Shelf Life:</b>	At least 1 year (under proper storage conditions)



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## PHYSICAL DATA:

<b>Cured Color/Finish:</b>	Buff/caramel
<b>Components:</b>	Two – Resin (Part A), Hardener (Part B)
<b>Units:</b>	250ml cartridges
<b>UV Stable:</b>	No
<b>Tensile Strength:</b>	5,330 psi (ASTM D638)
<b>Tensile Modulus:</b>	187,000 psi (ASTM D638)
<b>Tensile Elongation:</b>	23.8% (ASTM D638)
<b>HDT (Room Temperature Cure):</b>	134°F (ASTM D648)
<b>HDT (Post Cure):</b>	189°F (ASTM D648)
<b>Compressive Strength:</b>	7,200 psi (ASTM D695)
<b>Flexural Strength:</b>	8,800 psi (ASTM D792)
<b>Flexural Modulus:</b>	203,000 psi (ASTM D790)
<b>Volumetric Yield/Coverage:</b>	Roughly 81' of bead @ 1/8", or 244 sq. in. spread @ 1/16" thickness (not accounting for waste)
<b>Volumetric Shrinkage:</b>	3.50% (ASTM D792/D1475)
<b>Cured Density:</b>	1.14 g/cm <sup>3</sup>
<b>HDT (Room temperature Cure):</b>	134°F (ASTM 648)
<b>HDT (Post Cure):</b>	189°F (ASTM 648)
<b>Onset of Tg:</b>	195°F (by DSC) (ASTM 3418)
<b>Ultimate Tg:</b>	213°F (by DSC) (ASTM 3418)
<b>Hardness:</b>	77 Shore D (ASTM D2240)