

# Water Clear

## 72D Casting Urethane

**Product Description:**

Alumilite Water Clear casting system produces crystal clear castings used to make clear or tinted casting of all kinds. Water Clear is great for short-run production of clear pieces such as lenses, medical display and training models, clear prototypes, artistic pieces, architectural items, and much more. When used at room temperature castings 1/8" thick or larger can be readily cast. Castings that are less than 1/8" thick generally require post-curing. It is highly recommended to always preheat your molds to 125-150 degrees F before pouring. Recommended for industrial use only.

**Physical Properties:**

Color	Clear/Colorless
Mixed Viscosity (cps)	400
Hardness, (ASTM D-2240) Shore D	72
Specific Gravity	1.05
Shrinkage (in/in)	.005
Tensile Strength (ASTM D-638) (psi)	3,120
Elongation (in/in)	30-40%
Heat Deflection (ASTM D-648) (Degrees F)	140

**General Properties:**

Color	"A" Side	Clear/Colorless
	"B" Side	Clear/Colorless
Mix Ratio		1:1 by wt.
Shelf Life		3 months
Work Time at 75 Degrees F (100g mass)		14.5 minutes
Demold Time at 75 Degrees F (100g mass)		1 hour
Full Cure Schedule		5-7 days at room temperature, or 16 hours at 150-180 degrees F.

<b>Packaging:</b>	1 lb	8 oz A/8 oz B
	2 lb	1 lb A/1 lb B
	16 lbs	8 lbs A/8 lbs B
	80 lbs	40 lbs A/40 lbs B
	Drum Kit	400 lbs A/400 lbs B

**RECOMMENDED FOR INDUSTRIAL PURPOSES ONLY.**

**Safety: Read complete labels, SDS, and technical data sheet including instructions before using.**

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## Instructions

**Keep Alumilite out of the reach of children, do not take internally, and do not use in any way other than it's intended use. Recommended for Industrial Purposes Only.**

### **Before Starting**

Make sure your work area is appropriate for measuring, mixing, and pouring casting resins that can and will stain any porous materials such as carpet and clothing. Also, make sure to use and store materials in an area where children cannot reach or access.

### **Mold Type**

It is best to use platinum base silicone rubber molds when pouring Alumilite Clear and Water Clear. New tin base silicone rubber molds should be conditioned to clean and crosslink any uncured tin that is on the surface of the mold that may contaminate the clear casting.

**Important Note:** Your mold must have a high gloss surface to produce a see-through/glossy appearance in your casting. If the surface of your mold has a matte finish, your clear casting will also have that same appearance which will make a frosty appearance on your cast piece. So be sure your master is highly polished without any blemishes prior to molding. Then your mold will reproduce the quality of the original and your finish piece will look just like your original.

### **1. Mold Preparation**

Before mixing and pouring the resin into your mold to achieve a cast resin piece there are a few things you can do to prepare your mold that will greatly enhance the physical properties and curing of your cast resin piece.

The first thing you can do is to preheat your mold. Warm the mold in a conventional oven at 120-150 degrees F for 15 minutes or warm your mold in a microwave for 1 minute/lb of rubber on high. This will only warm your mold and will not affect the microwave or your mold adversely. It will, however, help the thin sections of your casting cure more evenly with larger sections and reduce your demold time. It will also help the resin set up uniformly to give you a consistent fully cured cast piece. (It is highly recommended to warm your molds when using the Slow Set, Water Clear, Clear, Flex, Amazing Clear Cast, or parts under a 1/2" in thickness to ensure proper curing.)

**Note: Do not microwave when there is resin in the mold, if you have painted your mold, or if you have already coated the mold with the Metallic Powders.**

### **2. Vacuuming and/or Pressure**

Vacuuming the material prior to pouring or pressure casting once it has been poured is required for making perfectly clear cast pieces. It is possible to get relatively clear pieces with minimal air bubbles by measuring, mixing, and pouring extremely slow but bubbles should still be expected.

**Vacuum** – With the use of a vacuum chamber and vacuum pump, it is possible to remove the air out of the Clear and Water Clear prior to casting your part. Vacuum puts negative air pressure on the material and expands the air bubbles to a large size which gives them the buoyancy to float to the top and pop. It is NOT recommended to vacuum cast (degas after pouring the resin into the mold as the excessive vacuum will pull any air and much of the resin back out of the mold). The best way to vacuum the Water Clear or Clear is to degas A & B separately prior to mixing until no air bubbles are seen. Then mix A and B by equal parts by Weight and mix thoroughly. Once mixed thoroughly, degas a second time. The air bubbles will come up and then go back down. Once the bubbles go back down under full vacuum and begin to clear up, you may remove the mix container from the vacuum chamber and begin to slowly fill your mold. When filling the mold try to pour so that you will not create any new air bubbles in the process. Then allow to cure.

**Pressure** – Pressure casting does the opposite of vacuum. It puts positive air pressure onto the resin which crushes the bubbles so small, the human eye cannot see them, then holds them in that crushed state until the resin has cured in which the bubble is unable to expand and will not be seen. In order to pressure cast your piece, you must make sure your mold does not have any air bubbles in it as the mold walls may also crush during pressure casting leaving a positive blemish on the mold surface as the resin fills the void left by the mold collapsing. So make sure you have either vacuumed your mold or pressure cast it prior to pressure casting the Clear or Water Clear into it. The minimum amount of pressure that is needed is 35 psi.

### **3. Mixing**

Before mixing make sure you know the proper mix ratio of the material you are using. The mix ratio of the Water Clear and Clear are 1:1 by Weight. It's important to note and understand the mix ratio is by weight (with a scale). If the mix ratio is not followed precisely, hazy white or soft pieces may result. Varying the mix ratio of Alumilite resins will alter the cure and change the physical properties in a negative way and is NOT recommended. Alumilite resins have been formulated to crosslink completely and altering the mix ratio may leave uncured components in your cast piece that could come out at a later time. One troubleshooting technique worth mentioning is if you use too much A side, the cast piece will result in a cloudy, semi-transparent, or even opaque white colored casting. Be sure to mix the Alumilite Clear and Water Clear very accurately by Weight.

After the materials have been poured together, mix thoroughly (keeping the stir stick in contact with the bottom of the cup - reduces air from being introduced into your resin) for approximately 30-45 seconds. Make sure to scrape the sides and the bottom of the mixing cup and continue to mix until no swirls are seen.

If you are pressure casting, simply pour into your mold with a reservoir in the pour hole big enough to displace the air that will be crushed within the mold as the liquid volume will shrink into your mold cavity. If you do not have a big enough pour spout/reservoir, the result will be a short pour as the bubbles inside that are being crushed need to be displaced by resin from the pour hole. If there is not enough resin to displace the volume lost, the part will not be filled, and you will result in a part that did not have enough resin to fill the entire cavity. You **MUST** have the resin in the pressure pot and apply the pressure prior to the open time expiring in order to crush the bubbles and hold them in the crushed state until the resin hardens. Do not remove the mold/casting from the pressure pot until the demold time has been reached.

If you are vacuuming, after mixing place the mix container into your vacuum chamber and degas until the resin has foamed up and then collapsed and has either cleared up or is nearly clear before removing. If the resin is still bubbling and you are close to the end of your open time, you must remove it from the vacuum chamber and pour it before it sets up in your mix cup.

The ideal process is the degas A & B separately, measure accurately, mix thoroughly, degas, pour, then pressure cast.

#### **4. Pouring**

Once the material is thoroughly mixed, pour the resin slowly down the side of your mold cavity. Tilting your mold will prevent the resin from splashing in the bottom of your mold and creating unwanted air bubbles that would then need to find their way to the top of the mold. Similar to tilting your glass as you pour a beverage rather than letting it splash/cavitate off the bottom creating air bubbles.

Squeezing the brim of the cup to form a point allows you to pour a smaller/slower stream of resin into your mold controlling the flow and reducing the chance of unwanted air bubble entrapment against the surface of the part.

If your mold has undercuts, pour enough resin into the mold to fill it halfway. Then, tilt and rotate the mold in the opposite direction of the undercut to allow the air to escape up the side of the mold. Squeezing or burping the mold at the same time will also help relieve the air trapped in the undercut and allow the bubbles to release from the mold surface. Once you see air bubbles come to the surface of the resin and you can be confident you have removed the air from the undercut, simply top off the mold by pouring the remaining resin into the mold.

#### **5. Work Time**

Water Clear has a Work Time of 14.5 minutes based on 100-gram sample at 70°F. Larger amounts of mixed resin will shorten your work time as will warmer ambient temperatures. Mixing large volumes similar to 1-gallon volumes, you can expect the open time to be cut in half. To increase the open time by 1-2 minutes, simply chill the "A" & "B" sides of the Clear and Water Clear. When cooling your resin, we highly recommend preheating your mold to ensure a proper cure.

**NOTES:** When used at room temperature, castings 1/8" thick or larger can be readily cast but extremely large masses over 4 inches thick can produce excessive exotherms that can cause cracks in the part. Castings that are less than 1/8" thick generally require mild post-cure. Always warm your molds to approx. 125 degrees F before pouring.

#### **6. Post Cure**

After pouring thin or small parts and the resin has started to cure, it is recommended to post-cure the part at 120F-140F for 1-2 hours. This will assist the resin in fully curing. Allow the part to cool down before demolding.

Parts that remain soft or flexible may need a similar post-cure.

#### **7. Color – Dyes & Painting**

Alumilite Clear and Water Clear resins can be dyed or pigmented using non-water base dyes. Alumilite offers a line of translucent dyes in standard colors that react/crosslink chemically with the resin to achieve beautifully translucent cast pieces with no worry of leaching or color ever coming out of the cured piece. Alumilite's Fluorescent, White, and Black are not completely transparent as they contain some filler. Used in small quantities, they do not affect the transparency of the piece. However, if used in higher percentages, they can add opacity to the cast piece. Use very small amounts of dye to achieve bright translucent colored castings. If you wish to preload the dye into the Clear or Water Clear to achieve consistent colors in every cast, add the dye to the A side and mix thoroughly. If you are looking to use a dye, pigment, or filler that you have not used before, we highly recommend making a small test sample to ensure compatibility before using or preloading into the resin.

Painting can be achieved but is best if painted immediately after demolding while the resin is still curing. Once the resin has completely cured and hardened up, paint adhesion is not as strong. Most paints will still bond but may scratch off easier if not applied while the resin is still curing. Another option is to paint your silicone rubber mold, allow the paint to dry, and then cast your resin into the mold. Alumilite resins will chemically bond to the dry paint, and once the resin cures you will demold a perfectly painted piece.

### **8. Color Stability**

Alumilite Clear and Water Clear do NOT contain any MERCURY and are cured using a much safer tin catalyst. Mercury cure systems typically have better UV stability than tin systems which are not known for long term color stability. The health and safety benefits of not using Mercury outweigh the expectation of some yellowing over time. Although clear castings do not typically change drastically, you should expect some change in color. If a color is added, typically no color change is ever noticed.

### **9. Mold Release**

Mold releases may leave witness marks on the surface of your finished clear casting as every tiny detail will show or affect the surface of your casting and we caution you to test using mold release to see if it will witness the surface prior to casting production-grade parts.

If you need to use mold release to either ensure the release of non-silicone molds (aluminum, urethane elastomers, latex, etc) or to maximize the number of releases out of your silicone rubber molds, we recommend using Alumilite's Stoner Urethane Mold Release. This offers maximum release and puts an effective layer of release on non-porous surfaces to release Alumilite Casting Resins. When using the Stoner Mold Release, some release will transfer to the cast resin part after demolding and may interfere with the ability to paint or bond the cast resin piece. A mild solvent wash and perhaps even some mild abrasion may be required to remove the Stoner from the casting.

### **10. Shelf Life**

The shelf life of Alumilite Clear and Water Clear is 3 months in an unopened container and we highly recommend using it within its shelf life to maintain optimum clarity and stability.

### **11. Moisture Contamination**

Relative humidity or moisture will react with the B sides of the Alumilite Clear and Water Clear and can thicken, crystallize, or gel. You may notice crust, crystals, or chunks around the tip/cap or at the bottom of the bottle. If the "B" side thickens to a gel-like state, warm the material to bring back to its original consistency. Warm the material by filling a bucket with hot tap water and place the entire sealed container into the bucket of water. DO NOT open the caps and do not pour the resin into the water. Simply warm the container using hot tap water on the side of the bottle or soak in a container until the viscosity returns to normal. Shake occasionally until the "B" side returns to its original thin viscosity. Rotate hot water as needed and continue to warm until the material thins back down to its original viscosity. DO NOT microwave the material. DO NOT place the plastic container into an oven in an attempt to restore. A hot plate can be used but should be set at a very low setting between 120-140 degrees F. The material should also be shaken frequently to mix restore the warming "B" side and prevent the bottom from getting too hot. Once the material has been restored, it will stay in its liquid state until being exposed to below 65-degree temperatures for more than a few days at which time it will once again begin to thicken. Short periods of cold temperature exposure will not affect the "B" side viscosity however prolonged periods of time may cause the "B" side to thicken and eventually gel.

If the A side has been contaminated by moisture, it will not show any signs of contamination until you cast your piece in which you will notice an excessive amount of bubbles or perhaps even a froth or foam on the top side of your casting. Once the polyol side (A sides) has been contaminated with moisture it is extremely difficult to restore. Vacuuming the resin for a long period of time may vaporize and pull the moisture out. A molecular sieve is not recommended as it will add color or opacity to the resin.

The absolute best solution is to place caps and lids back onto the containers as soon as you are done measuring the material you need to pour and storing in an environmentally controlled space that contains low humidity.

### **12. Work Area & Clean Up**

Mixed Alumilite resins will absorb into porous materials and will stain! Avoid clothing, carpet, upholstery, and any other porous materials which will stain and will not come out. Resin casting is best done in a designated work area such as a basement, garage, or hobby room with adequate air movement or ventilation. Cover any surfaces including floors with plastic sheeting, cardboard, or plywood to prevent damage from spilled resin. To clean up unmixed or still liquid material, use rubbing alcohol on a rag or paper towel to quickly clean and remove. Once cured, the resin is extremely durable and chemical resistant and nearly impossible to remove. There are a couple of solutions out in the market that claim to dissolve cured urethanes. If you are in need of such material, please call us and we can refer you to some possible solutions.

### **13. Warranty**

**NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED, IS MADE CONCERNING THE INFORMATION HEREIN PROVIDED OR ANY RELATED PRODUCT.** The user is responsible for determining whether the Alumilite product is fit for the user's particular purpose and suitable for user's use or application. Given the variety of factors that can affect the use and application of an Alumilite product, the user must determine the suitability of the product for its intended application, and the user assumes all risk and liability for safe use of the product. Alumilite's liability is limited to product replacement only after review/testing of the product alleged to be defective that is returned to Alumilite in accordance with Alumilite's Shipping and Returns Policy. In no event shall Alumilite be liable for punitive, consequential or indirect damages or damages in excess of the purchase price of the product.