Technical Data Sheet

Crystal Clear® Series Clear Urethane Casting Resins

#24200

Product Overview

Crystal Clear® 200, 202, 204 and 206 are water white clear and made specifically for applications that require clarity. These rigid urethane casting resins differ only in working and demold times. Low viscosity ensures easy mixing and pouring. Crystal Clear® resins cure at room temperature* with negligible shrinkage. Cured castings are UV Resistant and are not brittle. Vibrant colors and color effects are achieved by adding pigment dispersions. Applications include encapsulation, making prototype models, lenses, sculpture reproductions, decorative cast pieces, jewelry, prototype models, special effects and props.

CAUTION: Not for Home Use. this Product is for Industrial Use Only.

Proper ventilation, A NIOSH Approved Respirator and Protective Clothing (gloves and long sleeves) are required to minimize the risk of inhalation and dermal sensitization. If breathing is affected or a dermal rash develops, immediately cease using this product and seek medical attention. Read MSDS before using.

Technical Overview

	Crystal Clear® 200	Crystal Clear® 204	Crystal Clear® 206
Pot Life @ 73°F / 23°C **(**ASTM D-2471)	20 Min.	2 Hours	7 Hours
Cure Time ** @ 73°F / 23°C	16 Hours	48 Hours	5 Days
Tensile Strength (ASTM D-638)	2,500 psi	3,500 psi	2,500 psi
Tensile Modulus (ASTM D-638)	73,200 psi	86,240 psi	73,200 psi
Elongation at Break % (ASTM D-638)	10%	10%	10%
Flexural Strength (ASTM D-790)	10,650 psi*	5,390 psi	10,650 psi*
Flexural Modulus (ASTM D-790)	200,000 psi	183,200 psi	200,000 psi
Compressive Strength (ASTM D-695)	6,385 psi*	4,200 psi	6,385 psi*

Compressive Modulus (ASTM D-695)	40,000 psi	44,000 psi	40,000 psi
Shrinkage in./in. **(**ASTM D-2566)	0.001	0.002	0.002

Mix Ratio;	100A:90B by weight
Mixed Viscosity, cps;	600 (ASTM D-2393)
Specific Gravity, g/cc;	1.036 (ASTM D-1475)
Specific Volume, cu. in./lb.;	26.7 (ASTM D-1475)
Color;	Clear
Shore D Hardness;	80 (ASTM D-2240)
Heat Deflection Temp;	120°F/50°C (ASTM D-648)

Refractive Indexes	
Crystal Clear 200:	1.49962 @ 20°C
	1.49894@ 25°C
Crystal Clear 204:	1.49888 @ 20°C
	149830 @ 25°C
Crystal Clear 206:	1.49962 @ 20°C
	1.49894 @ 25°C

Electrical Properties	
Dielectic Strength;	260 Volts/MIL (ASTM D-149)
Dielectric Constant;	3.36@77°/25°C at 100 Hz (ASTM D-150)
Dielectric Constant;	3.34@77°/25°C at 1 kHz (ASTM D-150)
Dissipation Factor;	0.00@77°/25°C at 100 Hz (ASTM D-150)
Dissipation Factor;	0.01@77°/25°C at 1 kHz (ASTM D-150)
Volume Resistivity;	1.4x1015@77°/25°C ohm-cm (ASTM D-257)

Processing Recommendations

Preparation...

Safety - Store and use at room temperature (73°F/23°C). These products have a limited shelf life and should be used as soon as possible. Environmental humidity should be as low as possible. Good room size ventilation is essential. Wear safety glasses, long sleeves and rubber gloves to minimize contamination risk. Wearing a NIOSH approved respirator will minimize inhalation of residual fumes.

Selecting A Mold Rubber - Pour into a metal mold, a urethane rubber mold (following application of a release agent) or a silicone mold made with Smooth-On Mold Max® Silicone. Do not use other silicone products. If you are unsure about surface compatibility, a trial casting should be made. To prevent cure inhibition, post-cure newly made Mold Max® silicones for 8 hours at 60°C / 150°F and let cool prior to casting resin.

For Best Results: Pre-heat the rubber mold at 212°F / 100°C for 4 hours before mixing & pouring Crystal Clear®. This will minimize the chances that cured castings will exhibit casting phenomenon such as fish-eyeing, suck back, corner rounding, large bubbles, etc.

Measuring & Mixing...

Liquid urethanes are **moisture sensitive** and will absorb atmospheric moisture. Mixing tools and containers should be clean and made of metal or plastic. Materials should be stored and used in a warm environment (73°F/23°C).

Measuring - Materials should be stored and used at room temperature (73°F / 23°C). The proper mixing ratio is 100A: 90B by weight. You must use an accurate scale (gram scale or triple beam balance scale) to weigh these components properly Dispense the required amount of Part A into a mixing container. Weigh out the appropriate amount of Part B and combine with Part A.

Mixing - Mix SLOWLY, but thoroughly, for at least 90 seconds making sure that you scrape the sides and bottom of your container several times. If coloring or filling Crystal Clear® product, add filler or pigment dispersion to Part B and mix thoroughly before adding Part A.

Bubbles in the finished casting will be greatly reduced by vacuum degassing prior to pouring. Subject mixture to 29 h.i.g. mercury in a suitable vacuum chamber for until mixture rises, breaks and falls. Allow for 3 to 4 times volume expansion in mixing container.

Pouring, Curing & Performance...

Pouring - If casting Crystal Clear® into a rubber mold, pour mixture in a single spot at the lowest point of the mold. If encapsulating an object, do not pour the mixture directly over the object. Let the mixture seek its level. A uniform flow will help minimize entrapped air.

For Best Results: Bubble elimination is best achieved by pressure casting. After pouring the mixed compound, the entire casting assembly (mold, dam structure, etc.) is placed in a pressure chamber and subjected to 60 PSI (4.2 kg/cm2) air pressure for at two hours prior to heat curing.

Post Curing - Castings will achieve maximum physical properties, better heat and UV resistance if Crystal Clear® is post cured. Post curing is recommended if castings are thin or of low mass concentration. Castings should be post cured in a mold or support structure. Post Cure Schedule: Allow the material to cure for 6–8 hours at room temperature followed by 6 hours at 150°F–160°F (65°C–72°C). Allow casting or part to cool to room temperature before demolding.

Materials should be stored and used in a warm environment (73°F / 23°C). Castings will reach ultimate physical properties at room temperature in 5–7 days. Castings removed from mold before recommended cure may exhibit a tacky surface that can be eliminated by exposing casting to 150°F / 65°C for 6 hours.

Casting Thickness & Cure Time - The cure time and ultimate shrinkage of all Crystal Clear® products will vary depending on mass concentration, thickness of the casting, mold configuration, etc. For example, a 200 gram mass of CC 200 will cure faster if left to cure in a conical vessel (cup) versus a casting dispersed as a thin sheet measuring 3 centimeters square by 1 mm thick. This is due to the heat generated by the concentration of material in the cup versus heat that is dissipated from the sheet casting. Castings will resist yellowing when exposed to UV, but may darken over time.

- **Crystal Clear® 200** is intended for a casting thickness ranging from ½" to 3" at a casting weight maximum of 16 lbs. (7.25 kgs.) Castings greater than 3" should be layer cast.
- **Crystal Clear® 204** can be cast in thicknesses up to 6" at a casting weight maximum of 35 lbs. (15.88 kgs.).
- **Crystal Clear® 206** is for castings greater than 6".

Because no two applications are quite the same, a small test application to determine suitability for your project is recommended if performance of this material is in question.

The Material Safety Data Sheet (MSDS) for this should be read prior to use and is available upon request. These products are safe to use if directions are read and followed carefully.

Be careful.

Part A is a modified aliphatic diisocyanate. Vapors, which can be significant if heated or sprayed, cause lung damage and sensitization.Use only with adequate ventilation. Contact with skin and eyes may cause severe irritation. Flush eyes with water for 15 minutes and seek immediate medical attention. Remove from skin with waterless hand cleaner followed by soap and water. Refer to MSDS.

Part B is irritating to the eyes and skin. Avoid prolonged or repeated skin contact. Remove from skin with soap and water. If contaminated, flush eyes with water for 15 minutes and seek immediate medical attention. Use only with adequate ventilation.

Important: The information contained in this bulletin is considered accurate. However, no warranty is expressed or implied regarding the accuracy of the data, the results to be obtained from the use thereof, or

that any such use will not infringe upon a patent. User shall determine the suitability of the product for the intended application and assume all risk and liability whatsoever in connection therewith.