

**DESCRIPTION:** Poly-Optic® 17-Series Urethane Resins are two-component, mercury-free, room temperature curing (RTV) systems that are formulated specifically for applications where optical clarity is a must. These polyurethane systems produce water-clear castings, but can be used in conjunction with PolyColor Dyes and dry fillers (e.g., fine metal powders) to create a myriad of effects.

Poly-Optic resins are the plastics of choice for mimicking glass and ice-like features and are widely used to create stunning prototypes (lenses, bottles, containers), as well as unique art, medical models, sculpture and display items. Vacuum and/or pressure casting techniques are recommended for bubble-free parts.

**MOLD PREPARATION:** Poly-Optic products reproduce minute detail from a mold or pattern, but may stick or foam when poured on improperly prepared surfaces; ensure that the surface is moisture-free. Perform a trial casting on a surface similar to the final mold to avoid damaging a valuable mold. Polyethylene and silicone rubber (i.e., PlatSil® 71- and 73-Series) molds, do not require a release agent. [CAUTION: Condensation-cure silicones (i.e., TinSil® 70-Series) are not recommended for casting Poly-Optic since residual alcohol can inhibit cure or produce hazy castings.] Latex, polyurethane or metal molds must be dry and require a coat of a suitable release agent (i.e., Pol-Ease® 2300 Release Agent). For optically clear castings, use highly polished masters to create molds with excellent surface quality.

**MIXING:** Before mixing resins, be sure that both Parts A and B are at room temperature and that all tools and molds are ready to go. Use metal or plastic mixing vessels (i.e., polyethylene pail) and spatulas to avoid introducing moisture. Carefully weigh or measure proper ratios of

## PRODUCT LINE FEATURES

- Non-Mercury Formulas
- Water clear
- Reproduces fine detail
- Can be machined, drilled and sanded
- Low shrinkage upon cure
- Low Viscosity
- Easily accepts PolyColor Dyes and dry fillers

A and B into a mixing container. Mix immediately, thoroughly scraping sides and bottom. Vacuum degas, mix and pour into the mold as quickly as possible. Using pre-heated molds (i.e., 150°F) reduces shrinkage and improves the surface quality of Poly-Optic parts. Pressure casting helps produce clear castings. A light spray of Pol-Ease 2300 Release Agent over the back of the casting helps to break bubbles on the back of the pour. To produce bubble-free castings, vacuum degassing and pressure casting is necessary.

Once Part A and B containers are opened, use the product completely or reseal tightly since atmospheric moisture may cause foaming of the plastic. To lengthen shelf life, spray PolyPurge, a heavier-than-air dry gas, into the open containers before resealing. If containers collapse slightly over time, reopen containers and spray more Poly Purge to keep containers from further collapse.

## PHYSICAL PROPERTIES

| Poly-Optic® Product                   | 1730X       | 1730        | 1740        |
|---------------------------------------|-------------|-------------|-------------|
| Mix Ratio by Weight or Volume         | 1A:1B       | 1A:1B       | 1A:1B       |
| Shore Hardness*                       | D80         | D80         | D70         |
| Pot Life (min)(1 lb mix)              | 8           | 15          | 14          |
| Demold Time at 73°F (hr) †            | 1           | 1           | 1           |
| Cured Color                           | Water Clear | Water Clear | Water Clear |
| Mixed Viscosity (cP)                  | 450         | 400         | 400         |
| Specific Volume (in <sup>3</sup> /lb) | 28.8        | 28.8        | 28.5        |
| Specific Gravity                      | 1.04        | 1.04        | 1.03        |
| Linear Shrinkage (in/in)^*            | 0.0015      | 0.0015      | 0.0015      |
| Elongation (%)                        | 6.7         | 7.4         | 12          |
| Max Exotherm (°F)                     | 235         | 235         | 210         |
| Heat Deflection Temp. (°F)*           | 137         | 137         | 137         |
| Tensile Strength (psi)*               | 5,670       | 5,480       | 3,180       |
| Elastic Modulus (psi)                 | 104,000     | 112,000     | 80,100      |
| Flexural Modulus (psi)                | 213,000     | 201,000     | 91,000      |
| Flexural Strength 5% Strain (psi)     | 7,920       | 7,350       | 3,560       |

\*All values measured after 7 days at 73°F/23°C. †Demold time varies with thickness of casting and the amount of accelerator used. ^Shrinkage is primarily caused by gelling while hot then cooling.

**CURING:** Allow castings to remain in the mold until thoroughly cured. Parts demolded too soon may be subject to deformation. Use pre-warmed molds to hasten curing, reduce shrinkage and improve overall quality of the casting. Low temperatures slow the cure and extend demold time.

To expedite the cure of thin castings (e.g., <math><1/2\text{''}</math>), add Poly-Optic® 14 Part X Accelerator or heat cure (8 hr at 140-150°F). See “Accelerating Cure Speed” section below for additional instruction. If used, wash mold release from surfaces prior to painting or bonding.

**ACCELERATING CURE SPEED:** Poly-Optic® 14 Part X Accelerator can be mixed into Part B prior to adding Part A to accelerate cure times. For castings less than 1/2-in thick, Part X is recommended. Each addition of 1% Part X to the total mix weight will reduce the pot life by approximately 1 to 2 minutes. Exotherm (heat of reaction) and thus shrinkage on cooling is also increased. Experiment to determine the best amount of Part X to use, but do not use more than 5% Part X because final physical properties may be affected.

**COLORS:** Add PolyColor Dyes to 17-Series Part B before mixing with Part A to create clear plastics of any color. Add up to 0.5% PolyColor Dye of the total mixed weight when using PolyColor Black, Brown, Blue, Green, Red and Yellow. Add up to 2% PolyColor Dye of the total mixed weight when using PolyColor White and Fleshtone.

**EXTERIOR USES:** Although Poly-Optic products are non-yellowing formulas, they are not recommended for long-term exterior use. To improve durability for exterior applications, add 1% Poly UV Additive to the total mix weight of Poly-Optic to reduce the onset of chalking and pitting of the outside surface for ~2 years. Add 3% Poly UV Additive to achieve good exterior stability beyond 5 years.

**CLEAN UP:** Tools should be wiped clean before the plastic is hard. Denatured ethanol is a good cleaning solvent, but it must be handled with extreme caution owing to its flammability and health hazards. Work surfaces can be waxed or coated with Pol-Ease 2300 Release Agent so cured rubber can be removed.

**SAFETY:** Before use, read product labels and Safety Data Sheets. Follow safety precautions and directions. Contact with uncured products may cause eye, skin and respiratory irritation and dermal and/or respiratory sensitization. Avoid contact with skin and eyes. If skin contact occurs, remove with waterless hand cleaner or alcohol then soap and water. In case of eye contact, flush with water for 15 minutes and call physician. Use only with adequate ventilation. Poly-Optic plastics are not to be used where food or body contact may occur. Poly-Optic plastics burn readily when ignited. Care should be taken with sanding dust and other easily ignitable forms of these products.

**STORAGE LIFE:** For best results, store products in unopened containers at room temperature (60-90°F/15-32°C) and use products within six months from date of shipment.

Poly-Optic Part As may crystallize slightly or become viscous during storage. If crystallization occurs warm the container to 100-120°F until crystals dissipate. Cool to room temperature before use.

**DISCLAIMER:** The information in this bulletin and otherwise provided by Polytek® Development Corp. is considered accurate. However, no warranty is expressed or implied regarding the accuracy of the data, the results to be obtained by the use thereof, or that any such use will not infringe any patent. Before using, the user shall determine the suitability of the product for the intended use and user assumes all risk and liability whatsoever in connection therewith.

## ACCESSORIES

**Accelerator:**

Poly-Optic® 14 Part X Accelerator

**Retarder:**

Poly-Optic® 14 Part R Retarder

**Sealers & Release Agents:**

Pol-Ease® 2300 Release Agent

Pol-Ease® 2500 Release Agent

**Product Life Extender:**

PolyPurge Aerosol Dry Gas

**Colors:**

PolyColor Dyes

Black - Brown - Blue - Green - Red - Yellow - White - Fleshtone

**Fillers:**

Bronze Powder

**UV Stabilizers:**

UV Additive