

EJ-290 Plastic Scintillator Casting Resin

Instructions for Use

A standard kit contains three parts:

- Part A Resin – The partially polymerized plastic scintillator
- Part B Solvent – Vinyltoluene (VT) monomer for dissolving the catalyst
- Part C Catalyst – Lauroyl peroxide, a white powder

The following procedure is offered as a guideline for casting ingots at relatively low temperature in order to avoid the thermal shrinkage or mold degradation problems associated with high temperature curing. The quantities in the example may be scaled up or down as needed.

Suitable casting molds may be fabricated from glass, galvanized steel, tin, Teflon® and similar fluorinated plastics, nylon, stainless steel, and aluminum. Copper and brass should be avoided for best results.

Instructions for preparing a 100 g casting

1. Measure out about 150 mL of the Resin (allows for 15-20% shrinkage).
2. Weigh out 0.75 g of the catalyst (0.5% of the resin volume).
3. Dissolve the catalyst in the VT making a 10% solution (7.5 mL in this example). The resulting solution should be clear.
4. Thoroughly blend this solution with the Resin. Mix until full homogeneity is achieved. Allow the bubbles to rise out. Vacuum techniques may be used.
5. Pour the clear mix into the mold and remove air bubbles as needed.
6. Place the mold in a water bath at 47°C (116°F) and leave for fourteen days or until the plastic is sufficiently hard to where it is not dented by a knife or pencil pressed into it.
7. Best results are obtained when the resin is polymerized in an inert gas atmosphere. This is best achieved by running a small bleed of nitrogen gas over the top of the casting while in the bath.
8. Post-cure for about 8 hours at 80°C (176°F). For molds that cannot endure this temperature, a longer post-cure period may be employed. When cured at 70°C (158°F), the time should be about 24 hours. Note: If the plastic is not sufficiently hard before being post-cured, there is a good chance of bubbles forming during the post cure treatment.
9. If you intend to remove the mold at the end of the curing step, it is often helpful to do so while the casting is still at a moderately elevated temperature such as 45°C (113°F). Glass molds may be water-cooled and broken off, while metal molds may be cut and peeled away from the casting. Cylindrical molds having a mild taper are often advantageous.

Leftover materials should be tightly sealed and stored in a cool place, preferably in a refrigerator. The resin shelf life will vary with storage conditions, but is typically 4-5 weeks at standard room temperatures.

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ELJEN TECHNOLOGY

1300 W. Broadway, Sweetwater, TX 79556

www.eljentechnology.com • eljen@eljentechnology.com

Toll Free (USA & Canada): (888)-800-8771 • Tel: (325)-235-4276 • Fax: (325) 235-0701

