

Development Corp.

Polygel®

U.S. Patent #5,128,433

Liquid Rubbers & Plastics for Brush-On or Sprayed Molds and Mold Shells

USES: Polygel® Mold Rubbers are without equal for brushed or sprayed blanket molds. Polygel Plastics produce strong, light-weight mold shells. Polygel products are ideal for molds and shells built up with a brush or spatula on vertical or overhead surfaces. Evaluate Polygel Mold Rubbers for casting plaster, cement and waxes, as well as for limited casting with polyester, epoxy and polyurethane resins. Use Polygel Plastics for building mold shells over brushed or sprayed rubber molds. Sprayable Polygel products are ideal for large surface area applications where brushing may be impractical. Polygel products bond well to many surfaces and should be evaluated as adhesives and sealants.

DESCRIPTION: Polygel products consist of liquid Parts A and B, that after mixing 1A:1B by weight or volume (2A:1B for Polygel 80), immediately thicken to a brushable or trowellable consistency. As the liquid components of Polygel Mold Rubbers are mixed together, the product changes color and thickens to a buttery, non-sag paste with a working time of 1 to 20 minutes (depending on the specific Polygel product used). A mold can be built up in 2 to 3 coats, applied about 1 hour apart. Polygel Spray 35, Spray 50 and Quick Spray 50 can be sprayed continuously until the desired mold thickness is achieved. Polygel products cure overnight at room temperature to flexible, tough rubbers or hard, strong plastics. Polygel Spray 35 and Quick Spray 50 cure in 4-6 hours. Polygel Plastics cure within 2-4 hours.

POLYGEL PRODUCT OPTIONS

Polygel® 35 - Softest, most elastic, brushable Polygel rubber. Cures to Shore A35 hardness in 4-6 hours.

Polygel® Spray 35 - Sprayable version of Polygel 35 designed for use with meter-mix spray equipment.

Polygel® 40 - The most liquid mix for best air bubble release and easiest brushing. Cures to a Shore A40 hardness.

Polygel® 50 - A thicker mix and cures to a tough Shore A50 hardness. Polygel 50 is a great adhesive for repairing polyurethane molds and bonding molds to backing material such as plywood.

Polygel® Spray 50 - Designed for spray mold applications using meter-mix spray equipment.

Polygel® Quick Spray 50 - A fast, sprayable mold rubber with a 1-minute working time and a 4 to 6-hour cure.

Polygel® 80 - Mix 2A:1B, for a trowellable consistency that cures to a firm (A80) rubber.

Polygel® Plastic-75 - Thickens to a paste with a 3-minute working time and cures to a hard plastic within 2-4 hours.

Polygel® Shell - A sprayable plastic for creating mold shells, sprayed-up castings or surface hardcoats.

FEATURES

- Easy -- 1:1 mix by weight or volume
- Fast -- one-day molds
- Tough and strong
- Color-coded mix indication
- Long life for molds and shells
- Good flow into fine detail
- Good dimensional stability

MODEL PREPARATION: Porous models (i.e., wood or plaster) must be sealed to prevent Polygel from penetrating the pores of the material. Wax, lacquer, petroleum jelly, paint and most other coatings are suitable sealers. If shellac is used as the sealer, it must be thoroughly coated with release agent as Polygel bonds tenaciously to shellac. Fresh, moist plaster must be sealed particularly well to insure a proper cure on the surface of the Polygel mold. This can be accomplished with multiple coats of shellac, shellac coated with a Krylon® spray, or potter's soap. The sealed or non-porous model and other materials that will contact the Polygel should then be sprayed or coated with Pol-Ease® 2300 Release Agent, which should be brushed out for thorough coverage. If there is any question about the compatibility between the Polygel and the prepared model surface, perform a test cure on an identical surface to verify curing and good release. Porous models must be vented from beneath to prevent trapped air from causing bubbles in the mold rubber. Polygel Plastics develop significant heat upon curing and should not be used directly over materials that melt (i.e., petroleum jelly). Paste wax followed by Pol-Ease 2300 is the best release combination for Polygel Plastics.

MIXING & CURING: Before use, be sure that Parts A and B are at room temperature and tools and molds or models are ready to go. Surfaces and air temperature should be above 60°F during application and for the entire curing period. Cool temperatures slow the cure, while warm temperatures speed the cure.

Weigh Parts A and B into a suitable, clean container. Volume measurement can be used, but is never as accurate as weighing. Mix thoroughly, scraping the sides and bottom until a uniform mix is obtained. Carefully apply the mixed Polygel over the dry, properly prepared model. When brushing Polygel mold rubber, allow the first coat to cure enough so that the second coat will not disturb it (usually about 1 hour), then apply a second coat being careful to cover any thin spots in the first coat. Do not allow prior layers to cure completely before applying subsequent coats. Ideally a blanket mold should be at least 1/8-inch thick but not

more than 3/8-inch, since too thick a layer of rubber causes difficulty turning a mold back on itself during demolding. Allow to cure at room temperature prior to demolding or building the mold shell. Strength continues to develop for several days.

Rubber molds can be reinforced with Tietex® Fabric, which is strong and wets out better than other fabrics. Tietex can be laminated at the top of a seam or strips can be laid around the perimeter of a mold to prevent tearing. The fabric may be embedded in the second or third coat of rubber while tacky and covered with a subsequent coat, which should be as fluid as possible for best penetration of the cloth. The fabric should not be too close to the model surface or the weave pattern may show through to the face of the mold.

For Polygel Plastic-75, mix Parts A and B completely within ten seconds or so before gelling begins and while the mix is still liquid to minimize air entrapment. Mix only enough that can be applied during the working time. Polygel Plastic-75 generates heat when mixed, so use rubberized cotton gloves to ease handling of the hot container. Once mixed, dumping the thickened mix on the surface to be coated and quickly spreading into a thin layer will cool the mass and extend working time by a minute or two. Do not try to demold Polygel Plastic-75 until adequate cure time has elapsed as it may be somewhat brittle.

Polygel Shell Plastic is a rapid-setting liquid plastic designed for spray applications. Hand mixing this product is not recommended. When meter-mixed and sprayed 1:1 by volume, Polygel Shell gels several seconds after contacting the surface being covered, then remains in a workable grease-like state for 1 minute. Shells or castings can be demolded in 2 hours depending upon thickness and ambient temperature. Thicknesses <1/4-inch may require longer cure time. Thin, tough coatings can be applied to many surfaces such as carved foam. Mold shells should be approximately 1/4-inch thick. When spraying a mold shell, thicknesses >3/8-inch are not recommended as shrinkage can occur upon curing and cooling. For additional strength, place fiberglass strand or mat between layers of Polygel Shell. For very large shell sections, supporting structures such as boards or metal rods can be attached to prevent warping or damage during use.

NOTE ON LAYERING DIFFERENT POLYGEL RUBBERS:

Typically, brush-on molds should be completed with one rubber. For example, if the face coat is brushed with Polygel 40, then all subsequent coats should be with Polygel 40. In some cases, the initial coat can be brushed with lower viscosity Polygel 35 or 40 for better detail and the second (usually final) coat with thicker Polygel 50 to speed the mold making process. This technique is acceptable for molds that do not require long-term storage or use. When layering different products, oils can transfer from one rubber to another causing warping or curling of the mold. In extreme cases, a mold can distort enough that it will not fit in its shell.

THICKER MIXES FOR FILLING UNDERCUTS: Polygel Mold Rubbers can be made even thicker by stirring Cab-O-Sil® into the mixed Parts A and B.

USING THE MOLD: No release agent is necessary for casting plaster, cement and waxes in Polygel rubber molds. But release

agent or a barrier coat is recommended when casting epoxy, polyurethane or polyester resins. Polygel molds can be stored for years in a cool, dark, dry place in a non-porous mother mold to maintain shape. Cured Polygel rubber should not be exposed to sunlight or used in contact with skin or foods.

If a Polygel rubber mold is to be turned inside out like a sock, lubricate the outside surface with soapy water or petroleum jelly so that it slides over itself easily. The shell or mother mold can be made of Polygel Plastics, plaster, polyester resin and fiberglass, or Poly 15-6 or 1512X resin filled with Poly Fiber II or fiberglass (see Polytek Mold Making & Casting Manual & Catalog). If the shell is built with Polygel Plastics or other resin, the rubber must be thoroughly coated with paste wax then Pol-Ease 2300 Release Agent to prevent the plastic from sticking to the rubber. A plaster shell must be sealed with potter's soap, shellac, lacquer or wax to prevent mold distortion during storage or use.

SAFETY: Before use, read product labels and Material Safety Data Sheets. Follow safety precautions and directions. Spray application of Polygel products should be conducted with suitable ventilation and personal protective equipment (i.e., respirators, gloves, coveralls). 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. Polygel products are not to be used where food or body contact may occur. Polygel products burn readily when ignited. Use care with sanding dust and other easily ignitable forms of these products.

STORAGE LIFE: At least six months in unopened containers stored at room temperature (60-90°F).

DISCLAIMER: The information in this bulletin and otherwise provided by Polytek 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.

Polygel® Packaging	
Product	Unit Weight
Polygel 35, Polygel 40 & Polygel 50 Rubbers	4 lb 16 lb 80 lb
Polygel Plastic-75	900 lb
Polygel Spray 35, Polygel Spray 50, Polygel Quick Spray 50 Rubbers	80 lb
Polygel Shell Plastic	
Polygel 80 Rubber	24 lb