Polytek Development Corp.

MOLD MAKING & CASTING
Manual & Catalog

Discover the Flexibility of LIQUID MOLD RUBBERS & CASTING PLASTICS

Materials & Methods

Polyurethane Mold Rubbers

Silicone Mold Rubbers

Casting Plastics, Foams & Rubbers

Specialty Materials

11th EDITION

Polytek Development Corp.

Welcome to Polytek® Development Corp.'s Updated Manual & Catalog!

If you are a returning customer, thank you for your business. We hope you enjoy reviewing our updated Catalog and look forward to providing you with products and technical support for your latest molding and casting challenges. Loyal customers, like you, have fueled our growth and success and inspired us to develop innovative products over the years.

For those of you who are new to Polytek, we eagerly invite you to learn about our liquid rubbers and plastics and the seemingly infinite ways they can be used. Please read, study, and, most importantly, ask questions. This Catalog, coupled with our website, online videos and hands-on seminars/workshops, make for a flexible learning experience suitable regardless of your level of expertise. We look forward to getting to know you and to developing a long-lasting relationship.

Mold making and casting projects range in complexity from simple and quick to challenging and time consuming. As with most disciplines, expertise is developed over time and with practice. Expand your knowledge by trying new products and experimenting with various techniques: you'll hone your skills, improve your confidence, and, hopefully, inspire your creativity.

We encourage you to take advantage of the greatest resource we offer – our Technical Support Experts. These individuals have decades of mold making and casting experience and they know Polytek's products inside and out. They will happily and patiently direct you to the best solution for your application and will likely save you valuable time and expense.

Whether you are an infrequent mold maker, hobbyist or craftsman working on a small project, or a full-time, professional mold maker, looking for a new material or twist to solve a problem, we will gladly help. Please take Polytek products, add your imagination, and enjoy the results!

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Polytek offers discounted, Trial Kits with Free Shipping! Experiment with Trial Kits of liquid mold rubbers and casting plastics to determine which products work best for your application. Call Polytek to learn about special Trial Kit pricing on your first order of any Polytek product. Polytek will cover shipping on accessories ordered with the Trial Kit (up to the value of the Trail Kit). Free shipping applies to orders shipped within the contiguous U.S.

Materials & Methods 2
Materials Selection
Types of Flexible Molds & Castings
Mold Making & Casting - General Procedures
Making Block Molds
Making Blanket Molds
Applications

Polyurethane Mold Rubbers 22
Poly 74-, & Poly 75-Series Rubbers
Polygel® Brushable/Sprayable Rubbers
Poly 81-Series Rubbers
Poly-Fast 72-40 & Poly GlassRub Rubbers

Silicone Mold Rubbers 34
TinSil® 70-Series Silicone Rubbers
TinSil® 80-Series Silicone Rubbers
PlatSil® 71-Series Silicone Rubbers
PlatSil® 73-Series Silicone Rubbers
PlatSil® Gel Silicone Rubbers

Casting Plastics, Foam & Rubbers 46
EasyFlo & Poly 15-Series Plastics
Poly PT Flex-Series
Poly-Optic® 14-Series Clear Casting Resins
PolyFoams
PolyPoxy Resins & PolyCures
Poly LiteCast & Poly Plasti-Flex

Specialty Materials 60
Latex Rubber Products
Poly Wax 15
Poly Skin-Wax
Hydrogel® N Mold Compound

Accessories 64
Pol-Ease® Release Agents & Sealers
Fillers, Thickeners & Colors
Mold Making Equipment & Tools
Safety Equipment

Appendix 68

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Before you start . . .

To have a successful mold making experience, PLEASE . . .

- **Study.** Read as much "how-to" literature as possible. Watch instructional videos on the PolytekDevelopment YouTube channel or www.polytek.com.
- **Start Small.** Make a small, simple mold and casting before attempting an important piece. Get a feel for the materials without costly mistakes. Experiment with small Trial Kits.
- **Ask Questions.** It's difficult to tell you how to make molds and castings over the phone, but we'll try! Please call Polytek Customer Service with questions.

In order to succeed, you must consider many factors before you start a project. Here are a few things to think about:

- What is the model made of?
- Does the shape or location of the model present mold making or demolding challenges?
- What material will the castings be made of?
- How many castings do you envision making?
- How much money do you plan to spend?
- How much time do you have to complete the project?

Think ahead.

You need to plan your project from start to finish before you begin. Read this "Materials & Methods" section entirely so that you understand all of the factors that need to be considered during the planning stage of your project.

Materials Selection

Polytek® produces many types of flexible mold making materials and a variety of casting systems. Before you begin your project, learn about the various products. Mold making and casting materials must be selected so that they work well together. This is because some casting resins work well only in certain mold materials (and vice versa). Often, Polytek customers have a specific casting material in mind, and the mold material selection is limited by the desired casting material.

In this section, you will learn about considerations that impact mold making and casting materials selection including model composition, shape, location and size; mold type; cost; and timing. But, in order to select your mold making material, you will also have to determine what type of mold will work best for your application. So, you'll also need to read the next section, Types of Flexible Molds & Castings in order to select the best materials for your application.

The illustration below provides general guidelines regarding suitability of casting materials depending on mold composition.

MOLD MATERIAL		CASTING MATERIAL
Wax	→	Low-exotherm materials -- polyurethane and silicone rubbers and select resins
Alginate (Hydrogel®)	→	Materials that are not moisture sensitive -- wax, plaster, silicones and select resins and rubbers
Latex	→	Concrete, plaster and select resins
Polyurethane	→	Most casting materials, except molten metals
Silicone	→	All casting materials

Materials & Methods

Flexible mold materials range from simple, one-part compounds to high performance, two-part polyurethane and silicone rubbers. One-part compounds include latex (the natural product of the rubber tree), Hydrogel® (alginate, a powder to which water is added), and Skin-Wax (which is melted for use). Polytek's two-part systems consist of two liquids that after mixing together react to form rubber. These systems cure at room temperature and, therefore, are referred to as room temperature vulcanizing (RTV) systems.

The tables below list advantages, disadvantages, uses and methods of application for various one- and two-part mold materials.

ONE-PART MOLD MATERIALS

Type	Advantages	Disadvantages	Uses	Methods
Alginate Hydrogel®	Safe for body contact	Very limited life; dries out Gets model wet	Body molds Single-use molds	Pour Layup
Wax Poly Skin-Wax	Safe for body contact Low cost Fast set Reusable	Low strength Limited use Must melt prior to use Hot!	Body molds Single-use molds	Brush Dip
Latex Poly Latex 60 Poly Latex False Face	High strength	Dimensionally unstable Takes days or weeks to make a mold Oils can soften and destroy molds Makes only blanket molds, which require mold shells	Concrete casting Plaster statuary Limited resin casting	Brush Spray Dip

TWO-PART RTV MOLD RUBBERS

Type	Advantages	Disadvantages	Uses	Methods
Polyurethanes Poly 74- and 75-Series Poly 81-Series Poly-Fast 72-40 Polygel® Poly GlassRub	High strength Low to moderate cost Many versatile formulas	Requires careful application of release agent Moisture sensitive (in liquid form)	Casting most materials. Acceptable for some resins. Not acceptable for molten metals.	Pour Brush Spray
Tin-Cured Silicones TinSil® 70-Series TinSil® 80-Series	No release agent needed High strength Excellent chemical resistance	Higher cost Shrinks on cure (~1%) Cured rubber has limited storage life	Casting all materials, especially resins, foams and and some low-melt metals.	Pour Brush Spray
Platinum-Cured Silicones PlatSil® 71-Series PlatSil® 73-Series PlatSil® Gels	No release agent needed No shrink on cure Cured rubber has long storage life High strength Excellent chemical resistance	Higher cost Cure inhibited by some surfaces	Casting all materials, especially resins, foams and and some low-melt metals.	Pour Brush Spray

$ Cost per cubic inch is your real cost -- price per pound can be misleading.

When using mold making or casting materials you are usually filling a given space. The lower the cost per cubic inch of material, the lower the cost of filling the space. "Specific Volume," expressed in cubic inches per pound (in^3/lb), is the key to calculating the real cost of a mold making or casting material.

Some rubbers and plastics that have a low price per pound contain dense fillers such as powdered marble or silica. These fillers typically reduce the price per pound, but raise the price per cubic inch. Simple calculations reveal the real cost of your material in terms of dollars per cubic inch.

Poly 74-Series Liquid Rubbers are low density and contain no heavy fillers. They yield 27.5 in^3/lb. Poly-Fast 72-40, a dense rubber, contains fillers and yields 20 in^3/lb -- nearly 1/3 less rubber volume per pound. For example:

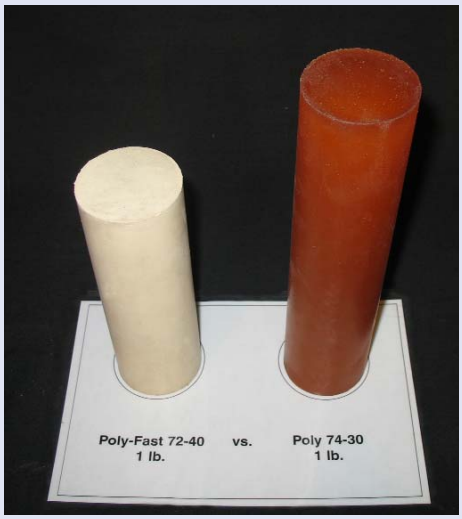
- An 80-lb trial unit of Poly 74-30 costs $395 or $4.94/lb ($395/80 lb). Dividing $4.94/lb by 27.5 in^3/lb yields a cost of $0.18 per in^3.

  Poly 74-30 = $0.18 per in^3

- A 49.5-lb trial unit of Poly-Fast 72-40 costs $230 or $4.65/lb ($230/49.5 lb). Dividing $4.65/lb by 20 in^3/lb yields a cost of $0.23 per in^3.

  Poly-Fast 72-40 = $0.23 per in^3

At first glance it appears that Poly 74-30 is the more expensive product; however, to fill a given space, using Poly 74-30 actually costs nearly 25% less than higher density Poly-Fast 72-40 rubber. The photo below shows the difference in volume for 1 lb of each of these cured rubbers.



Model Composition Considerations

A model's composition or surface coating may restrict your choice of mold making materials. Certain mold materials do not cure properly over some model materials (i.e., platinum-cured silicones do not cure on sulfur-containing clay models). Sometimes, if the model's composition presents a problem, it can be overcome by carefully sealing the model. Thoroughly review product technical bulletins to be sure that there are no compatibility issues between your model and the mold material you've selected. If your model is delicate or valuable, it is best to try the selected mold material on a small hidden area before you jump into mold making. Fragile models can be damaged in the mold making process. The resulting mold, however, can be used to make a reproduction out of a more durable material. [Note: If the model is a human body, there are obvious safety issues. Consider Hydrogel Mold Compound, Poly Skin-Wax or PlatSil® Gels.]

Model Shape and Size Considerations

Take into account the characteristics of your model and the mold making challenges it presents. The size, shape, and even location of your model may limit you to certain mold making materials and types of molds (i.e., a simple block mold may not work for a model with deep undercuts). If you're restricted to a certain type of mold, then your choice of materials may be further limited.

Cost Considerations

Both the volume of material needed and the price per unit volume must be considered in calculating project cost. The quantity of mold making material needed is dictated largely by the type of mold you choose to make -- a large model may mandate a blanket mold since a block mold would require too much material. The quantity of material needed can be calculated by estimating the volume of mold making material needed (in cubic inches) and dividing by the specific volume (cubic inches per pound) of the material (see box to the left). To properly determine project cost, you need to consider the time it takes to make the mold, as well as, the projected life of the mold.

Time Considerations

Timing plays an important role in the selection of a mold making material. With some materials a mold can be completed in an afternoon (i.e., accelerated silicone or polyurethane mold rubbers), while with others, it can take weeks (i.e., latex). To learn more about demold times, read the technical bulletins for individual products. Remember, the fastest material or method may not be the least expensive.

Consider how long you intend to use and keep the mold. Some materials are suitable for making one casting (i.e., Hydrogel®), while others will hold up for hundreds of castings (most silicones and polyurethanes). Also, consider "library life:" how long the mold will remain useful once placed in storage. Most properly cured rubber molds are usable for many years, but some degrade within two to four years (i.e., Poly-Fast 72-40 and some TinSil® rubbers). If molds must have long library life, use polyurethane (except Poly-Fast 72-40) or PlatSil® silicone rubbers.

Casting Materials

To select the best casting material for your project, you must consider several factors: mold composition and construction, required characteristics of the casting (i.e., weight, durability), cost, and timing.

First, it is a good idea to familiarize yourself with common casting materials and understand the general advantages and disadvantages of each. The most common and least expensive casting materials are gypsum plasters and concretes, both of which are available in many formulas for various end uses. Waxes are castable, of course, but uses are limited by low hardness and high shrinkage. Low melting metals can be cast in heat resistant silicone molds. Polyurethane and epoxy systems are versatile and durable casting materials. Polyester resin is low in cost, especially if low cost fillers, like sand, limestone or wood flour, are added.

Depending on the mold's composition, you might be restricted to certain casting materials. In a few cases, casting materials may rapidly degrade or even destroy the mold (i.e., exothermic epoxy resins will melt a wax mold). Carefully review product

Technical Bulletins to be sure that there are no compatibility issues between your mold and the casting material.

Molds made from Polytek products are non-porous and casting materials used in the molds should "cure" or set chemically. In most cases, air drying materials are not suitable, since the rubber prevents them from drying except from the back. Water clay, paper-mache, and latex are often not suitable casting materials.

The table below presents common casting materials suitable for use in molds made from Polytek mold making products.

CASTING MATERIAL	ADVANTAGES	DISADVANTAGES	END USES	MOLD MATERIAL(S)
Wax	Easy demold	Fragile High shrinkage	Foundries Candles Resculpting	All (except Skin-Wax)
Gypsum Plaster	Fast Yields good quality	Indoor-use only Brittle	Most indoor objects Molding/Trim	Usually polyurethane
Concrete/ Specialty Concrete	Acceptable for outdoor use	Heavy Rough surface Slow set	Statuary (indoor & outdoor) Architectural ornaments	Polyurethane or silicone
Acrylic Resin	Clear	Expensive Difficult to use Strong odor	Many diverse uses and methods of application	Silicone or polyurethane
Polyester Resin	Inexpensive	Flammable Strong odor	Many diverse uses and methods of application	Silicone or polyurethane
Epoxy Resin	Moderate price	Health hazards Fire hazard for large castings May yellow upon UV exposure	Many diverse uses and methods of application	Silicone or polyurethane
Polyurethane Rubber, Resin or Foam	Moderate price Easy to use Versatile	Moisture sensitive (in liquid form) May yellow upon UV exposure	Many diverse uses and methods of application	Silicone or polyurethane

Weight of the Casting

Casting materials have different densities that affect the weight and feel of the final casting. Typically, plaster and concrete are heavy, while resins and foams are lighter. The weight of a casting can often be controlled by adding fillers to the casting material. Also, you can create a lighter, hollow casting, by using a "plug" to prevent casting material from filling the entire mold, or by laying up into or rotating a mold so casting material cures in a thin shell on the mold surface. These techniques are presented on p. 9.

Exterior Durability of the Casting

Many casting materials need to be painted or sealed for outdoor use, since exterior castings are subject to elements such as UV light from the sun, rain, and freezing and thawing. Concrete and polyester resin castings are fine for interior and exterior uses. Polyurethanes, however, must be painted or sealed prior to being placed outdoors in order to prevent yellowing and chalking of the bare plastic, which occurs over time. Fillers, pigments and Poly UV Additive can be added to improve exterior performance (see Accessories Section).

Cost Considerations

Both the quantity of material needed and the price per cubic inch must be considered in calculating casting cost. The quantity (lb) of casting material needed is dictated by the volume of material needed (cubic inches) divided by the specific volume (cubic inches/lb) of the casting material.

Here is a general idea about the relative costs of casting materials.

High	Unfilled polyurethanes and epoxies
Medium	Filled resins, speciality concretes
Low	Concrete, plaster, wax, filled polyester

Obviously, to determine true project cost, one needs also to consider the time it takes to make the casting.

Time Considerations

Timing plays an important role in the selection of casting material. With some materials, a finished casting can be made in minutes (i.e., EasyFlo 60 Plastic); while with others, it can take a day or more. The fastest casting material or method often is not the least expensive.

Here is a general idea about the relative cure times of typical casting materials.

Slow	Concrete
Medium	Plaster, wax, thin resins
Fast	Polyurethane and polyester resins

"Exotherm" of Casting Material

Exotherm is the heat of reaction produced as a resin or rubber cures. Polyurethane rubbers generally have very little measurable exotherm. Poly 74-55 in a large mass may rise just a few degrees above the temperature of the Parts A and B before mixing. Epoxies, on the other hand, are much more exothermic and, if poured in too large a mass for the heat to dissipate, may get so hot that they boil and burst into flames. Therefore, *casting epoxies in large masses is dangerous and must be avoided.*

Consider exothermic heat when selecting casting resins. If the casting is so thin that exothermic heat is easily dissipated into the mold, the resin will be slow to cure, but there will be no thermal shrinkage caused by gelling while hot then cooling. Slow curing in these cases can be overcome by using warm molds or using a faster curing system. Massive castings tend to build heat in the center of thicker sections and sometimes thinner sections of the same casting remain cooler. If the temperature difference is too great, distorted parts or shrink marks may be evident. Often, warm molds can help overcome this problem as can addition of fillers or use of slower curing systems. High curing temperatures shorten rubber mold life, so proper selection of casting systems results in best economy and longest mold life.

Add FILLERS to reduce cost and cast larger masses.

Many fillers can be added to liquid plastics to reduce costs and help dissipate exotherm, which can cause shrinkage and limit the size of the mass that can be cast at once. Heavy fillers absorb more exothermic heat, but result in heavy castings. Lightweight fillers can make the casting lighter than wood so it will float and carve easily. Some fillers such as wood powder and nut shell flours, might contain moisture and cause foaming of the plastic or other problems. Dry fillers that stir easily into the mixed resin are best. The cost per cubic inch of resin displaced is the real cost of these fillers. Typical costs per cubic inch follow:

Filler	$/lb	Density (g/cc)	$/in^3
Dry Sand	0.05	2.7	0.01
Bronze Powder	15.00	8.8	4.79
Ground Limestone	0.15	2.7	0.01
Extendospheres CG	0.50	0.7	0.01
Q-Cel 6014 or 3M K1	6.00	0.1	0.02

Adding an equal volume of low cost filler to a Polytek liquid plastic can cut the cost of the casting nearly in half. High filler loading can adversely affect flow characteristics; so testing is recommended.

Types of Flexible Molds & Castings

There are two basic types of flexible rubber molds: block molds and blanket molds. Within these two basic mold types, there are numerous variations differing in both construction and complexity. Similarly, there are varying types of castings and casting methods. It is necessary to determine the types of molds and castings you envision from the start, since these both must be considered when selecting appropriate mold making and casting materials for your project.

Block Molds

Block molds are typically made by placing the model into a containment area (i.e., mold box) and pouring liquid rubber over the model. After curing, the rubber is removed from the model and the result is a single-piece, poured block mold. This is the simplest type of mold. Since a block mold is often made in box shape, it is sometimes called a box mold. However, this type of mold can be made in any appropriate containment area (i.e., a cylinder such as a piece of PVC pipe). Also, block molds are sometimes referred to as poured molds since this is the method used to make them.

Single-piece, poured block molds are best for models with a relatively flat base or back and no sharp undercuts that prevent the rubber from demolding from the model. This type of mold would be used for reproduction of a wall plaque.

For a model with undercuts (i.e., the chin of a cherub's face), a block mold might work, however, a softer rubber would be needed to allow for removal of the model and castings. Sometimes, it is necessary to cut the mold to remove the model: this is referred to as a cut or split block mold.

In some cases, when the model has significant undercuts or has details on all sides (i.e., does not have a flat base or back), the block mold may need to be cut into or poured in several pieces to allow for removal of the model and then carefully reassembled prior to casting: this is referred to as a multi-piece block mold.

For diagrams depicting the procedures to make a single-piece poured block mold, a split single-piece poured block mold, and a multi-piece poured block mold, see p. 15.

Most Polytek pourable liquid polyurethane or silicone mold rubbers work well for making block molds. To select the best rubber, carefully consider the hardness of the cured rubber and its compatibility with the model and subsequent casting material.

Blanket Molds

As the name implies, blanket molds resemble a thin blanket carefully placed around the model. Blanket molds are usually made by brushing or spraying the flexible mold material onto the model, or pouring the mold material into a pre-constructed shell around the model. Blanket molds are generally ¼- to ½-inch thick. To hold a blanket mold in its proper shape after the cured rubber is removed from the model and during the casting process, a rigid or firm mold shell ("mother mold") is required. Typically, blanket molds consume less mold rubber, but often take more time to make.

In certain situations, blanket molds are mandated by the size and/or location of the model. Since blanket molds consume less rubber than a conventional block mold, they are preferred for large or irregularly shaped models. Often, blanket molds are the only choice for large, immovable models (i.e., large gargoyle high on a building facade).

Polytek produces several types of mold rubbers that are excellent for making blanket molds. In the past, latex was the rubber of choice for making blanket molds. But, since each layer of latex must dry before the next layer can be applied, building up an adequate thickness of latex for a usable mold can take weeks. Polytek's Liquid Polyurethane or Silicone RTV Rubbers are routinely used for making blanket molds. These liquid formulations

Mold Complexity

Complexity ↑

- **Multi-Piece Poured Blanket Mold**
- **Poured Blanket Mold**
- **Sprayed Blanket Mold**
- **Brushed Blanket Mold**
- **Multi-Piece Block Mold**
- **Single-Piece Block Mold**

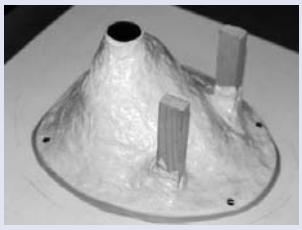
Contributing Factors:

Size • Location • Shape • Time • Materials

can easily be thickened to a brush-on consistency with the addition of Poly Fiber II, Fumed Silica or chemical thickening agents. Also, Polytek produces polyurethane and silicone products that have been specially formulated for spray application.

Polygel® and TinSil® Brush/Spray 25 Liquid Rubbers are ideal for making blanket molds, because once Parts A and B are mixed, they immediately react to form a gel with a consistency perfect for brush-on applications. In addition, certain Polygel products have been specially formulated for spray application. For detailed information on Polygel products, see pp. 28-29; for TinSil Brush/Spray 25, see pp. 36-37.

Whether using liquid rubber thickened with Poly Fiber II or Fumed Silica, or Polygel products, a most important characteristic of the mixed mold material for brush-on or spray application is "thixotropy" (see Appendix). To make a brush-on or spray-on blanket mold, the rubber must be thick enough not to sag after application on the model, but also must be more fluid when it is mixed or moved around the model surface with a brush. Polygel products are thixotropic: they are thick enough to resist sagging when applied to a vertical surface, but are fluid when mixed and moved around the model surface. Basically, the more energy you put into a thixotropic material, the lower the viscosity -- the faster you stir it the more fluid it seems. A good liquid rubber for brush-on molds must become thixotropic shortly after Parts A and B are mixed together -- that's Polygel.



These three photos illustrate the construction of a poured blanket mold. First, the model, a gargoyle face, is covered with clay. Next, a rigid, plastic mold shell (i.e., Poly 1512X, see pp. 50-51) is constructed over the clay blanket. After the plastic cures, it is removed and the clay is removed from the model. Then the plastic shell is repositioned over the model and liquid rubber (i.e., PlatSil® 71-11, see pp. 40-41) is poured through an opening in the shell and covers the model. Once the rubber cures, the model is removed and the mold is ready to use. Cast away!

For diagrams depicting procedures to make a single-piece blanket mold, or a split single-piece blanket mold, see pp. 16-18.

For more information regarding thickening of liquid mold rubbers, refer to the product descriptions for Polyurethane and Silicone RTV Liquid Rubbers or call Polytek Customer Service.

Mold Shells (aka "Mother Molds")

A mold shell, also known as a "mother mold," is not a production mold, but, rather, a shell that is needed to hold the flexible rubber mold in its proper shape. The mold in its shell is used on the production line. Mother molds are sometimes used with block molds and are nearly always used with flexible blanket molds. Mother molds can be made of plaster, plaster and hemp, polyester resin and fiberglass, urethane foam, or one of Polytek's firm liquid rubbers or rigid liquid plastics. Poly 15-Series Liquid Plastics make tough, durable, lightweight mold shells in a matter of minutes. For more information on 15-Series Liquid Plastics, see pp. 50-51.

The mother mold is usually made over and is removable from the rubber production mold. Care must be taken so that a rigid shell does not lock onto undercuts in the blanket mold. All such undercuts must be eliminated, or the shell must be made in multiple pieces to work around them. In certain situations, a firm but flexible mother mold can offer a good solution to undercuts. A flexible mother mold, such as one made of Poly 74-30 Liquid Rubber, can be pulled off simple undercuts. You may use a little more rubber, but you can save on labor.

A mother mold can last indefinitely and prolongs the life of a mold, since a rubber mold stored in its shell maintains its exact dimensions. The mold in its shell will last many years if it is stored in a cool, dry area out of sunlight. In the case of brushed or sprayed blanket molds, the shell is of no use after the mold fails. However, for poured blanket molds, the shell can be repositioned over the model and a new blanket mold can be poured and ready for use the next day. In a production setting, not having to remake a mother mold saves valuable time and money!

Types of Castings

While considering what mold making and casting materials you might use, and what type of mold you plan to make, you also have to think about what type of castings you plan to make (e.g., solid or hollow), and how you will make your castings. A mold must be designed to accommodate your intended casting method. See the table below to learn about various casting methods.

METHOD DEFINED	ADVANTAGES	DISADVANTAGES	END USES
Solid Pour Material is poured into the mold resulting in a solid casting.	Fast Strong	Heavy Potential high cost	Small objects Industrial tools
Gel Coat and Layup A thin surface coat is applied and then subsequent layers of reinforcing materials (i.e., fiberglass mat and resin) are built up to a thin, strong laminate.	Lightweight Uses less material High quality surface	Time consuming	Rigid molds Mold shells Large objects Props and displays Bonded bronzes
Slush Cast Casting material is manually rotated in the mold, creating a thin layer, which results in a hollow, lightweight casting.	Lightweight Uses less material	Time consuming	Props and displays Art objects Bonded bronzes
Rotational Cast A closed mold is rotated by a machine as a small amount of casting material coats the surface and sets, which results in a hollow, lightweight casting.	Fast Easy Lightweight Six-sided parts	Requires a rotational casting machine	Large statues Props and displays Hollow parts
Injection Liquid is forced into the mold under pressure.	High quality parts	Requires setup time Requires a machine or pressure pot	Thin-walled parts
Solid Pour with Vacuum/Pressure Material is poured into the mold and then vacuum or pressure is applied, which eliminates bubbles in the resulting casting.	High quality parts	Requires setup time Requires a vacuum pump or pressure pot and chamber	Prototypes Figurines Clear castings
Direct Layup/Spray (No Mold) Material is sprayed over a screen armature or foam substrate. Surface detail is sculpted into the wet casting material or cured plastic hard coat	Lightweight Uses less material	Time consuming Often requires equipment Produce single part	Amusement/theme parks Sculpted rocks Props and displays

Mold Making & Casting General Procedures

This section guides you from model preparation through finishing your casting. The directions provided here are general in order to be helpful regardless of what mold making and casting materials you choose and what type of mold or casting you're making. For detailed directions always read the Technical Bulletin for the product you intend to use. Also, to watch helpful video demonstrations, go to www.polytek.com or the PolytekDevelopment channel on YouTube.

Safety First!

Before you open containers of mold making or casting materials, understand the hazards of the materials.

Read Safety Data Sheets (SDSs) and product labels. SDSs are sent with every Polytek product and contain important safety information. If you do not receive SDSs with your shipment, call Polytek to request a copy, or download a file from www.polytek.com. Also, hazard warnings and precautionary statements are printed on every product label.

Understand the hazards of your materials and follow precautionary measures. Some Polytek products, in their uncured state, can cause skin, eye and respiratory irritation. Also, polyurethane and epoxy products can cause dermal and respiratory sensitization (i.e., allergic reactions) in sensitive individuals. Some mold release agents are flammable.

Use personal protective equipment (PPE) and engineering controls. Wear rubber gloves, safety glasses or goggles, aprons, dust masks, and, in some cases (i.e., spray applications), air-purifying respirators with organic vapor cartridges. Use products in well ventilated areas.

Read Directions

Before starting your project, read product Technical Bulletins and label directions thoroughly. If you have any questions, call Polytek Customer Service, (800)858-5990. Too often, projects are spoiled because, in their enthusiasm, customers start projects without first understanding important directions.

Model Preparation

Before applying liquid rubber to any model, prepare the model so that the cured rubber does not bond to it. When using polyurethane mold rubber, the model must be sealed and coated with a release agent, such as Pol-Ease® 2300 Release Agent, before contacting liquid rubber. When using silicone mold rubber, coating the model with a release agent, such as Pol-Ease® 2500 Release Agent, before contacting liquid rubber is optional.

Apply release agent by spraying it evenly evenly over the model surface and then gently brush it with a dry brush to pick up any excess and spread the release over spots missed by the spray. Wipe the brush with a paper towel periodically to prevent leaving too heavy a coating of release agent on the surface. Too much release can cause pinhole defects in the surface of the liquid material poured against it. In the case of non-aerosol (bulk) releases, the carrier solvent must be completely dry before applying liquid rubber. This can take 15 minutes or longer depending on the carrier solvent and ambient temperature.

Porous models, such as wood, plaster, stone, pottery or masonry, must be sealed before applying a release agent. Sealing porous models prevents liquid rubber from penetrating pores in the model surface. Several coats of paste wax, melted paraffin, petroleum jelly, lacquer, shellac, paint, or PVA (polyvinyl alcohol) solution work well for many surfaces. Some rubbers (i.e., Poly-Fast 72-40) contain materials that dissolve or soften lacquer and paints. For them, wax or shellac can be used as sealers. Polyurethanes bond tenaciously to shellac, however, so, if shellac is used as the sealer, release agent must be carefully applied over the shellac.

To seal bare plaster, be sure that the surface is damp and lather potter's soap or Murphy's Oil Soap onto the surface with a soft brush. Rinse and repeat this process several times, and then polish the surface with a soft cloth. Soap is only suitable for sealing plaster. Do not use soap to seal other materials.

Moist water clay, another special case, can be sealed and released with Pol-Ease 2350 Release Agent. Apply the 2350 using the Sure Shot Atomizer (see p. 64) or a plant spray bottle, then brush out and allow to dry. This prepares the water clay for contact with most mold rubbers. If the water clay is completely dry, then it should be sealed and coated with release agent as you would any other porous model.

When using polyurethane liquid rubbers, consider PolyCoat: a semi-permanent sealer and release agent (see p. 64).

If you have any question about the compatibility between the rubber and the prepared model surface, perform a test cure on an identical surface to determine that complete curing and good release are obtained. Some materials, such as sulfur-containing modeling clays and wood knots, inhibit cure of some rubbers and plastics.

Mixing the Mold Rubber

Have all materials at room temperature before mixing. It can take 24 hours for a 5-gal pail of material to warm up to room temperature (75°F) in the winter.

Have mixing containers and tools clean and ready. Time is critical to success. You do not want to go searching for tools after you have mixed Parts A and B.

If there is a "Stir Before Use" sticker on the Part A or Part B, be sure to do so.

Weigh and measure accurately. Mix ratios vary from one product to another, so carefully check the mix ratio for the specific product you are using. For liquid rubbers, most mix ratios are expressed by weight. Carefully weigh Parts A and B in proper ratio. Weighing components on an accurate scale is a must. Polytek does not recommend measuring by volume except for materials with a mix ratio of 1:1 by volume.

Close containers tightly after use. Most materials are usable at least six months to a year after shipment if unopened. Uncured polyurethanes, epoxies and some silicones react with atmospheric moisture and, therefore, should be used up as soon as possible after opening. Before resealing, spray Poly Purge Dry Gas Blanket (see p. 65) into open containers to displace moist air and extend storage life.

Time your actions with a clock. Start timing when you start mixing. Try to have material poured and in place before half of the working time has elapsed, so that there is plenty of time for bubbles to rise away from the model surface.

Mix well, but avoid whipping air into the mix. Scrape the sides and bottom of the mixing container thoroughly several times while mixing. A Poly Paddle is invaluable for good mixing. Sometimes, to insure that no unmixed material is clinging to the sides or bottom, the mix can be poured into a clean container and mixed again for 1-2 minutes before pouring. For large mixes (i.e., >30 lb), a Jiffy or Turbo Mixer (see p. 66) on a variable speed drill can be helpful, but care must be taken not to whip air into the mix or scrape the mixer blades against sides and bottom of the container. Using a Poly Paddle to finish the mixing can minimize unmixed material remaining on the sides and bottom of the mixing container.

Carefully Adhere to Mix Ratios!

The chemistry of polyurethanes, silicones, and epoxies must add up. Unlike polyester resins, the recommended mix ratio of polyurethanes, silicones, and epoxies cannot be varied without causing changes in the physical properties of the cured material. This is because to cure 100 reactive groups of Part A, 100 reactive groups of Part B are needed. If 100 reactive groups of A weigh two pounds and 100 of B weigh one pound, then the mix ratio must be two A to one B (2A:1B), by weight.

If you don't follow directions, there is a lot that can go wrong . . .

Improper Mix Ratio - Slow, non-curing or soft material can result if two-part materials are not weighed or measured accurately. Always use an accurate scale (see Accessories Section). Double check the mix ratio listed on labels and product literature, and make calculations carefully.

Low Temperatures or Demolding Too Soon - Deformed parts can result. Fluctuating temperatures during curing can cause bubbles and dimensional changes.

Leaking Mold, Boxes or Shells - Your pour can spill, wasting material and time. Use mechanical fasteners and hold downs and be sure that seams are tight and sealed.

Release Agent or Sealer - Missing, incorrectly applied, or using the wrong sealer or release agent can result in sticking or damage to the mold/casting. If you're not sure that you've properly sealed/released a model, make a test cure. Too much release agent can cause pinhole surface defects or bubbles in the mold or casting.

Material Hardens Before It's In Place - Avoid delays once material is mixed. Watch a clock!

Material Not Stirred Before Use - Some components (Part A or B) must be stirred before use. If the component is not carefully stirred before mixing with its counterpart, soft cures or bubbles can result.

Unmixed Material - Streaks of uncured or soft areas and/or gas bubbles can develop upon curing if Parts A and B are not thoroughly mixed. Do not scrape the sides or bottom of the mixing container while pouring, since poorly mixed material is often in these areas.

Incorrect Material Selected - Choosing the wrong material can result in sticking or damage such as staining or softening a model, mold or casting.

Contaminated Material - Moisture or other foreign contaminants can spoil the cure. Use product from newly opened containers when possible and always use clean mixing containers and tools.

Applying The Mold Rubber

Liquid mold rubber can be poured over a model, or brushed or sprayed onto a model's surface. How you apply the mold rubber depends largely on what type of mold you plan to make. Block molds are typically made by pouring rubber over a model's surface. Blanket molds can be made by pouring, brushing, or spraying mold rubber onto a model's surface. For detailed procedures for making block molds, see pp. 14-15. For detailed procedures for making blanket molds, see pp. 16-18.

No matter how you choose to apply the liquid rubber, one key to success is to avoid air entrapment. Poured mold materials generally pick up detail with fewer entrapped air bubbles than materials applied by brush or spray. When pouring mold rubber, pour the liquid rubber in a steady stream into one corner of the mold box, allowing the liquid to flow over the model surface pushing air out ahead of it. Take precautions to avoid trapping bubbles under ledges in the model (i.e., under the chin of figure). Tilting the mold box while pouring is a useful technique for preventing air entrapment. In cases where there is exceptionally fine detail, some mold makers feel that brushing a small amount of mixed rubber onto the surface or blowing it into the detail with low pressure air before pouring the bulk of the mix is poured helps to ensure that the liquid pushes all of the air out of the crevices. But, this must be done gently to avoid breaking through the layer of release agent applied to the model.

To apply rubber by brush, add a filler (i.e., Poly Fiber II) or chemical thickener to the liquid rubber to make it the appropriate consistency, or select a Polygel® product. To learn about using thickeners, read the product Technical Bulletin carefully. For spray application, select specially designed products such as Polygel Spray 35 or Spray 50, or TinSil® Brush/Spray 25.

After the rubber is applied to the model, lightly spraying Pol-Ease® 2300 Release Agent on the surface of the liquid rubber just before it gels, will break most of the surface bubbles and ensure a smooth mold back.

Curing The Mold

Cure the mold rubber at the same warm temperature that it was when mixed. Temperatures below 65°F lengthen the time required for curing and may prevent the cure of some materials. Placing the poured mold or casting in a warmer area than the materials were when they were poured, can cause bubbles or distortion in the cured rubber.

Check the product Technical Bulletin for proper cure time. Demold carefully as materials are tender shortly after curing. Bending or forcing a material when it is not fully cured can cause permanent distortion.

Using The Mold

Molds must be clean and properly prepared prior to casting. Depending upon the mold composition and intended casting material, a release agent may need to be carefully applied to the mold before casting. Avoid exposing rubber molds to strong solvents, oils or cleaners, or sunlight. Proper mold design, careful handling and storage, and routine cleaning prolong mold life. More rubber molds fail due to poor maintenance and handling than from normal use.

Storing The Mold

Proper storage of molds cannot be overemphasized and is the key to extended "library life" -- the time that a mold remains useful after storage. Some rubber molds, if stored properly, can have a library life of ten years or more.

Molds should be stored in a cool, dry area and out of the sunlight, which can degrade the surface.

Store molds in their original, undistorted shape. Molds should be left in the mother mold, mold box or on a surface that causes the least distortion possible. If rubber is left in a distorted shape for any length of time, it may never recover to its original shape.

If a blanket mold is stored in a mother mold/shell made of porous material, such as bare plaster, the shell surface that contacts the mold must be sealed (e.g., with shellac). Sealing the shell prevents it from absorbing oils from the mold rubber which, in turn, can cause mold distortion.

Do not allow molds made of one type of rubber to remain in contact with molds of other rubbers as migration of oils or plasticizers from one to another can cause swelling, shrinkage, or distortion.

If long library life is required, use polyurethane (except Poly-Fast 72-40) or platinum-cured silicone rubbers. Avoid using Poly-Fast 72-40 or tin-cured silicones, since these rubbers may only last two to four years depending on conditions.

Three Ways to Apply Liquid Rubber:

- **Pour**
- **Brush**
- **Spray**

Colors for Polytek Products

PolyColors, reactive liquid dyes available in red, green, yellow, blue, brown, white and black, can be used in most Polytek polyurethane products. Polyurethane rubbers and plastics can be lightly tinted or made vibrant and dark in color by adding up to 3% by weight of PolyColor dye to the total liquid mix. Since PolyColors are dyes, not pigments, they mix in easily and do not settle in the liquid rubber or plastic when properly mixed. Use PolyColors individually or in combination to make any color imaginable. PolyColor Brown is excellent for creating a base color when making cold cast bronze parts. PolyColor Black can be used to make even white plastics true black.

SiliColor pigments are excellent for coloring silicone rubbers. Fleshtone pigment is popular for tinting PlatSil® Gels when making theatrical prosthetic appliances and animatronic skins.

For more information, see the Accessories Section.

Casting & Finishing

For simple solid casts, the flexible mold in its shell (if required) are positioned so the opening is level and release agent, barrier coat or rinse is applied, if necessary. The casting material is poured right to the top edge, vibrated if necessary to release bubbles, and allowed to cure. Most casts should be removed as soon as they are adequately set, since longer residence times can damage some mold materials.

Use of vacuum or pressure (see box below), brushing, spraying or heated molds are all helpful techniques to eliminate bubbles and achieve perfect casts of highly detailed parts, but simple pours are often adequate.

Trim and touch up, is easiest just after demolding while the casting is warm. Remove release agent prior to painting by detergent washing. If a primer coat is desired on the cast part, a barrier coat can be sprayed on the mold before casting. Paint enhances and protects plastic castings and improves exterior durability.

Cleanup

Tools should be wiped clean with paper towels before the rubber or plastic cures. Casting plastics are extremely difficult to remove from tools once cured. Be sure to clean tools as soon as possible. Denatured ethanol is a good cleaning solvent, but it must be handled with extreme caution owing to its flammability and health hazards. Before work begins, work surfaces can be waxed or coated with Pol-Ease® 2300 Release Agent so that cured rubber and plastic can be removed.

Vacuum & Pressure Casting

Although many bubble-free molds and castings are made with Polytek rubbers and resins every day, trapped air bubbles create the most common defects. Use of vacuum or pressure eliminates bubbles from some castings and molds and might be easier and less expensive than you think. The following applies only to non-porous molds and models -- porous materials such as wood and plaster do not lend themselves to use of vacuum and pressure.

Vacuum

To use a vacuum to pull air bubbles out of mixed liquid rubber or resin, place the container of mixed liquid in a vacuum chamber and draw about 28 inches mercury so that the largest air bubbles rise to the surface. Perform degassing while the mix is still liquid! Do not attempt to "vacuum degas" Polytek rubbers or resins with short working times, since this can create more bubbles in the cured piece. Some liquids rise 2 to 3 times their original volume during degassing, so use a container with adequate head space. Once degassed, pour the liquid carefully, so that air is not reintroduced into the mix.

Simple vacuum chambers can be constructed from pressure pots or commercial cooking pots. Use a clear cover so that you can watch the liquid rise. Buy a vacuum pump that is large enough to achieve maximum vacuum quickly in order to degas and pour before your material thickens. A Welch Model 1397 pulls 17.7 CFM, works well with a 40-quart pot, and is ~$5,000 new (www.welchvacuum.com).

An alternative to a traditional vacuum pump is a venturi vacuum pump from Vaccon Vacuum Products (www.vaccon.com). In a venturi system, compressed air runs through an initial chamber and then through a smaller portal, creating a negative pressure area, which in turn evacuates the chamber. For some applications, a venturi pump is less expensive and effective.

Pressure

Using pressure to eliminate bubbles can be very effective, because when pressure is applied to a liquid, small bubbles are forced into solution and disappear. To accomplish pressure casting, pour the resin or rubber and place the whole mold in a pressure pot before the material begins to set. Fasten the lid and pressurize to ~60 psi with compressed air or nitrogen. Allow the cure to take place under pressure. You might be amazed with the results. For the best results, make the mold under pressure too.

Inexpensive pressure pots, typically used by spray painters, are available from paint supply stores.

Caution: Vacuum and pressure systems can be dangerous. If you have questions about your vacuum or pressure system, consult a qualified engineer. Never use glass parts unless they are designed for the purpose.

Making Block Molds

Block molds are the simplest type of molds. They are made by pouring liquid rubber into a containment area built around the model. After the rubber cures, it is simply pulled off the model and the mold is complete. Block molds are fast and easy to make, and can be appropriate even for oddly shaped models. Block molds, however, require more liquid rubber than blanket molds. But, by carefully choosing your mold containment area (e.g., box or cylinder), you can reduce the amount of mold rubber needed.

To make a poured block mold, the model must be securely fastened (e.g., screwed or glued) to a base board. Kitchen countertop sink cut outs make excellent base boards. If the model is porous, a vent hole should be drilled through the baseboard to the model to allow air to escape. The sides of the mold containment area must be sealed to the base board (e.g., with plasticene or hot melt glue), so that liquid rubber cannot leak out. If the mold will be used without being placed in its box for support, then be sure to position the sides far enough from the model such that the rubber mold will be thick enough that it will not deform when it is full of casting material (at least ½-inch thick). Sometimes a strap is placed around the finished mold box and base to ensure that it all holds together. Once the model and the base and sides of the box are properly sealed and released, slowly pour liquid rubber directing the flow to the bottom of the box and being careful not to trap air bubbles as the liquid rises. The rubber should be at least ½ inch above the highest point on the model (mark the mold box before you start pouring liquid rubber).

Typically, block molds are free standing if the rubber is thick enough to maintain its shape. But, sometimes, a box or rigid shell is used with the mold so that it maintains its shape. Generally, the box or shell is a separate piece from the rubber mold in order to allow the mold to flex for removal of the model or casting.

Estimating How Much Rubber You Need

1. Calculate the volume of the mold box/cylinder in cubic inches.
   For a box: **V = l x w x h**
   For a cylinder: **V = π x r² x h**
   Where: l = Length, w = Width, h = Height, π = 3.14, r = Radius
2. Estimate the volume of the model.
3. Subtract the estimated volume of the model from the volume of the mold box/cylinder.
4. Divide the result (volume of mold area) by specific volume of the mold rubber to determine lb of mold rubber needed.

For example:

The volume of a rectangular mold box:
10 in x 5 in x 5 in = 250 in^3

The volume of the model
8 in x 3 in x 3 in = 72 in^3

Subtract the volume of the model from the volume of the mold box.
250 in^3 - 72 in^3 = 178 in^3

Divide by the specific volume of Poly 74-30 Liquid Rubber (27.5 in^3/lb):
178 in^3 ÷ 27.5 in^3/lb = **6.5 lb Rubber**

Cut Block Mold

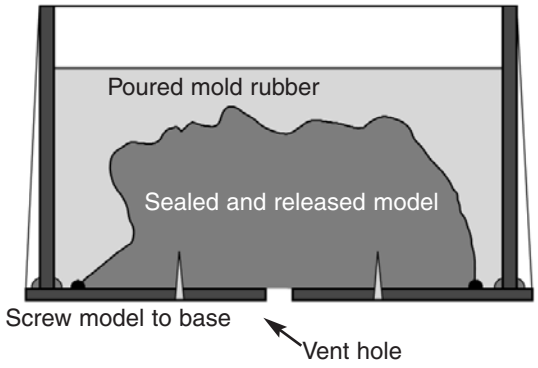
Depending on the complexity of the model, it may be necessary to cut the block mold to remove the model, and, subsequently, the castings. The cut can be a simple slit on one side of the block mold. In some cases, the block mold has to be cut into several pieces to create a complex multi-piece mold. In either case, after the model is removed, the mold is reassembled by carefully lining up the seams and usually returned to its box to hold it together before casting material is poured into the mold. Making quality, multi-piece block molds requires considerable practice and expertise.

For a successful cut block mold, the key is in the cutting. First, select a rubber with an appropriate hardness for cutting (i.e., soft Shore A30; Poly 74-30). Next, carefully evaluate where the cut(s) will be made (i.e., for a figurine, possibly up the back of the head; not on the face), and how many cuts are required. Decide on the cutting locations *before* the mold rubber is poured, and mark the locations on the mold box and then transfer the marks to the cured rubber mold. To cut the mold, use a mold key knife (see p. 66), which has a sharp blade with a groove that creates a tongue and groove effect in the cut rubber, which makes reassembling the mold with the seams properly aligned possible. To avoid damaging the model, the first cut should not go completely through to the model, but rather the final cut is made with a scalpel or X-acto knife. If needed, vents and pour holes can be cut or drilled into the cured rubber, or can be formed with rods or plasticene prior to pouring the rubber. When casting, cut block molds are reassembled and typically placed back into the containment area with the pour hole at the top for filling with casting material.

Block Mold Poured in Two Pieces

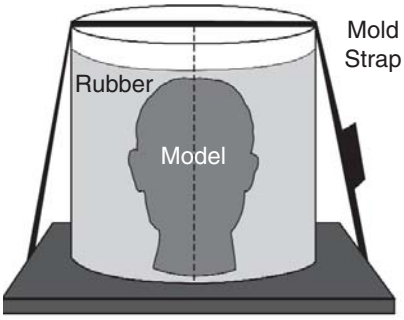
A block mold can be made by pouring two pieces of the mold separately. First, one portion of the model is embedded in clay up to the desired parting line. Then liquid rubber is poured over the properly prepared, exposed portion of the model (1). After the rubber cures, the clay is removed and release agent is applied to the other side of the model and the cured rubber surrounding it. Rubber is then poured over the second half of the model (2). Once cured, a pour hole is cut through the rubber mold and, if necessary, vent holes are drilled through high spots in the mold to eliminate the possibility of trapped air bubbles. The mold is repositioned in its box and is ready for casting (3).

Simple One-Piece Block Mold



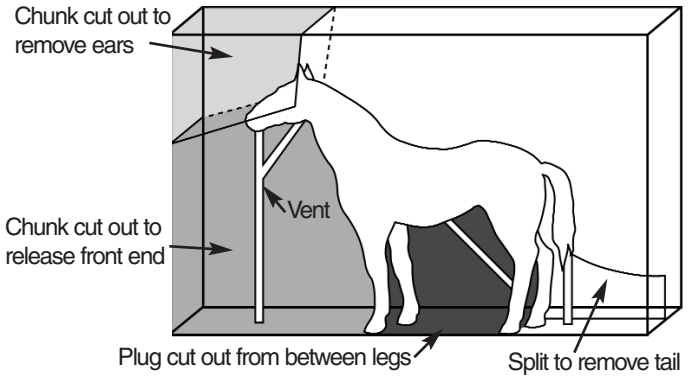
The model must be securely mounted to the base board. If the model is porous, then vent holes must be drilled under the model. After the model is sealed and release agent is applied, the mold box is built around the model, secured to the base, and then the insides of the box are sealed and released. The box is leveled and properly mixed rubber is poured into a corner of the mold box. As the rubber flows over the model, it pushes air away from the model surface. After the rubber is cured, box sides are removed and the cured rubber mold is peeled off the model.

Simple Cut Block Mold



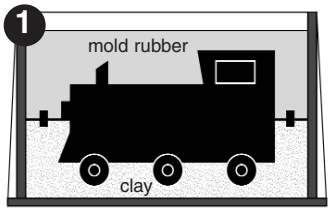
To use less liquid rubber to make the mold of this cylindrical model, the containment area can be a piece of PVC pipe sealed to a base. After the rubber cures, remove the pipe from the base and cut it with a saw to remove the mold. Then, cut the rubber with a mold key knife in a predetermined location to allow for removal of the model. To cast in the mold, carefully realigned the seam, strap the mold together, and invert the mold in order to pour casting material into the opening.

Multi-Piece Cut Block Mold

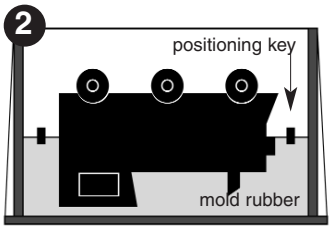


This horse mold is cut from a single block of mold rubber. After pouring, curing and cutting the mold, it is reassembled and placed back into the mold box upside down for casting. Casting material is poured through the feet. As an alternative, the mold of the horse model could be made as a blanket mold poured into a pre-constructed shell -- this would mean easier cutting of the thinner blanket mold and using less mold rubber.

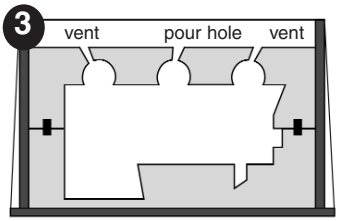
Block Mold Poured in Two Pieces



Embed half of the model in clay and place in a mold box. Coat model and clay surface with sealer and/or release agent. Pour liquid rubber starting in a corner and let it flow over the model.



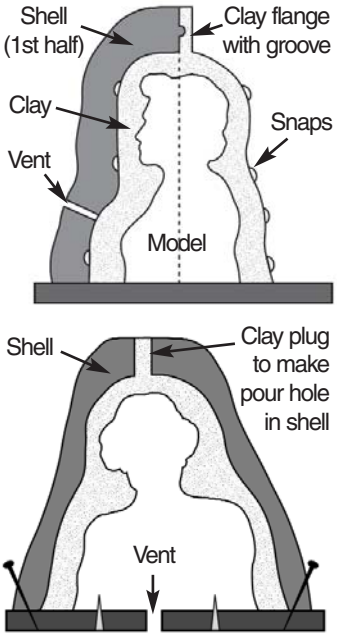
After the first pour cures, invert model, remove clay and properly prepare other half of model and cured rubber surface. Pour liquid rubber over second half.



After second pour cures, remove model, prepare mold surface, and drill pour and vent holes, as needed. Mix and pour casting material.

One-Piece Blanket Mold with Two-Piece Shell

Cover the model with clay, then build the mold shell.



The prepared model is covered with plastic wrap and then a clay blanket (~½-inch thick) is built over it. The clay blanket should have a protruding flange in the location where the shell will part. To make the shell, liquid plastic is brushed over half of the clay-covered model up to the flange. Once the first half of the plastic shell cures, the clay flange is removed, release agent is applied to the exposed plastic and the second half of the shell is built up to the first half.

Estimate how much mold rubber you will need.

The volume of clay removed from the model equals the volume of liquid rubber needed. Calculate the volume of clay by multiplying its weight by its specific volume. Divide the clay volume by the specific volume of the liquid rubber to get the weight of rubber needed.

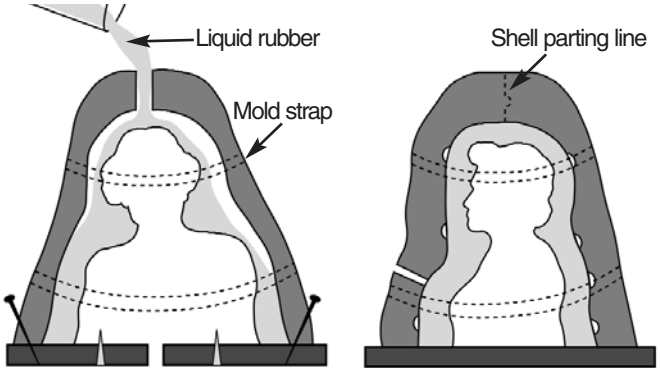
e.g., If 2 lb of clay was removed from the model:

2 lb x 18.4in^3/lb = 36.8 in^3 clay

36.8 in^3 ÷ 27.5 in^3/lb* = **1.3 lb Liquid Rubber**

* Specific volume of Poly 74-30 Liquid Rubber

Then pour the liquid rubber into the shell.



After the clay is removed from the model, and the shell is repositioned, liquid rubber is poured through the pour hole into the void. When making a one-piece or cut mold, all of the clay is removed and the entire space is filled with rubber. If necessary, the cured rubber is cut to remove the model.

Making Blanket Molds

Blanket molds differ from block molds in that they require a mold shell, or "mother mold." Blanket molds are always thin, as the name implies. With some models, blanket molds can be made in one piece and lifted or peeled off the model and subsequent castings like a sock; this is sometimes called a "sock mold" or "glove mold." Often blanket molds are one-piece, with a slit up one-side; and, sometimes, blanket molds are made in two or more pieces. Blanket molds can be made by pouring liquid rubber over the model after a mother mold is constructed; or by brushing or spraying liquid rubber directly onto the model and then constructing a mother mold. With the development of self-thickening and "thixotropic" (see Appendix) mold materials, making brush-on and sprayed blanket molds has become routine. Not only do brush-on and spray blanket molds use less rubber, but they are often faster to make than poured blanket molds and offer the mold maker better control of rubber placement.

Poured Blanket Molds

In the case of a poured blanket mold, the mother mold is made first, then the rubber mold is made. The model is covered with clay and the mold shell is built over the clay-covered model. Then, after the mother mold is cured, the clay is removed, the mother mold is repositioned over the model, and the liquid mold rubber is poured into the void left by the clay between the mother mold and model to make the blanket mold.

First, the model must be properly prepared (e.g., sealed and released) and mounted. Then the model is covered with plastic wrap and a clay blanket is formed around the model. The clay blanket must fill-in any undercuts so that the mold shell cannot lock onto the rubber mold. Since the shell is often made in two (or more) pieces, the clay is formed with protruding flanges, which act as parting lines for the shell. In fact, since the rubber replicates the clay blanket exactly, parting or cut lines should be delineated in the clay for transfer to the rubber. Sometimes "snaps" are placed along the clay blanket so that the rubber mold will "snap" into position in the mold shell. The shell is made overtop of the clay, usually, by brushing on a liquid plastic such as Poly 15-Series Liquid Plastic thickened with Poly Fiber II. The first section of the mold shell is built up against the clay flange. When the first section of shell is hard, the clay flange is removed, wax and then release agent is applied to the edge of the first shell section, and the second section is built against the first section for a perfect, keyed fit of the shell sections.

To make the rubber mold, the clay and plastic wrap is removed from the model, the shell is repositioned over the model, and then rubber is poured into the shell filling the void left by the clay. The rubber mold can be poured in one piece and cut with a mold key knife after curing. Or, for a two-piece mold, half of the clay is removed and rubber is poured in the void along half of the model. After the rubber cures, clay on the other half is removed, release is applied to the model and cured rubber edge, and liquid rubber is poured into the void along the second half of the model.

Brush-On Blanket Mold

Obviously, attempting to brush-on a pourable liquid rubber can be frustrating, since the liquid flows off vertical surfaces. So, liquid rubbers should be thickened to a consistency that can be applied by brush (e.g. Poly 74-30 Liquid Rubber mixed with Poly Fiber II). Or, choose a self-thickening Polygel® product, which can be applied by brush or spray (see pp. 28-29), or TinSil® Brush/Spray 25 (see pp. 36-37).

In the case of brush-on blanket molds, the mold is made first, then the shell is made over the cured mold. Some one-piece blanket molds are simply peeled off a low-relief or pyramid-shaped model. But, often it is necessary to create a seam or cut a split in the mold to allow for removal of the model and castings. For a split or cut blanket mold, in order to reduce the chance of tearing the mold, the rubber at the end of the anticipated split, where a tear would be likely to develop in the mold, should be reinforced (i.e., with fabric embedded in the rubber). For a blanket mold with the seam built into the mold, thin shims (e.g, aluminum flashing or stiff plastic sheet) are securely fastened to the model to create a parting line in the mold. The shims can have keys or indentations that will enable the adjacent mold sections to lock together and maintain their relative positions. In lieu of shims, rubber can be brushed thick enough in areas so that the cured rubber can be cut to permit demolding. This technique is helpful for models with "through holes" that can lock the rubber mold to the model. Also, this technique alleviates the need to trim flashing on the casting, which forms where the shims were present in the mold making process.

If needed, to prevent trapping air bubbles during casting, vents are created in the mold by neatly fastening thin straws or rods to the model. Remember, neater fastening means less cleanup of the casting. After the model, shims and vents are coated with release, liquid rubber is brushed on.

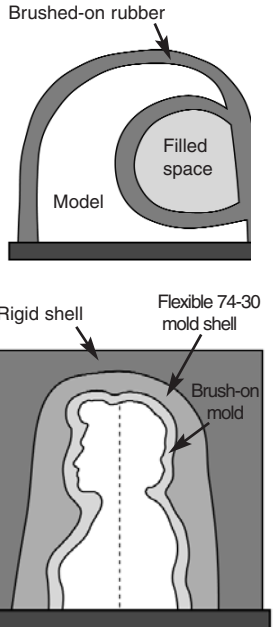
Sometimes with large models, it's a good idea to create "snaps" or keys on the rubber mold to hold the mold in place in its shell. [Tip: Buttons of rubber, cast in advance in plastic pill holders, can be bonded onto the mold rubber so that the shell is formed around them holding the mold in position in the shell.]

If there are undercuts in the rubber mold, they can lock the shell onto the mold when there is a casting/model inside the mold. To prevent this, the shell must be more than one piece in order to allow for its removal from the rubber blanket mold.

The parting line for the rigid shell is defined with a clay flange applied over the mold. A groove or depressions should be made in the clay where it contacts the shell material to create good locking and positioning of the shell halves. The mold shell is built one section at a time against the waxed and release-coated rubber mold and clay flange. When one section of the shell is complete, the clay is removed, petroleum jelly or butcher's wax is applied to the exposed shell edge followed by a release agent, and the next shell section is built against the first. The two halves of the shell compress the rubber along the mold opening together making a good seal so that liquid casting material cannot leak out.

Dealing with Undercuts in Blanket Molds

When making a brush-on blanket mold, all undercuts in the model must be eliminated before the mold shell is made. Typically, undercuts are filled with mold rubber or another filler material -- even air. Sometimes the filler must be compressible, so that the mold can be removed from the model. A hollow bladder can be formed by bridging the undercut area with a piece of plastic wrap pressed into the previous layer of rubber. Then another coat of rubber can be brushed overtop of the plastic wrap. If more support is needed, the undercut can be filled with a material such as soft foam then covered with liquid rubber.



In lieu of filling undercuts, a flexible mold shell can be built instead of the standard rigid mold shell. A flexible mold shell (e.g., made of Poly 74-30 Liquid Rubber) can be removed from simple undercuts in the blanket mold, and can sometimes alleviate the need for a multi-piece shell. The soft, polyurethane rubber can be poured over the release-coated blanket mold enclosed in a simple box or rigid mold. Although this option may be more expensive since it uses more rubber, it can save on labor.

Glove Mold

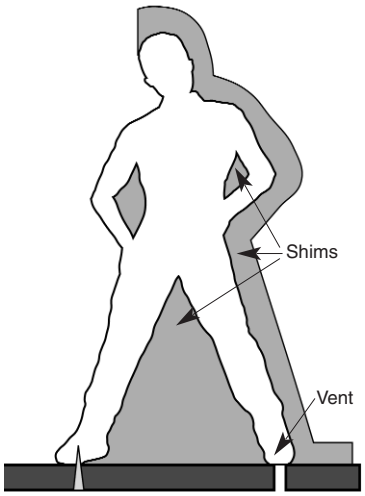
A bas relief or a figure with a pyramid shape (the bottom wider than the top) lend themselves to one-piece molds. Molds that are to be turned back on themselves and peeled off must be kept thin, usually less than 1/8-inch thick, to minimize stress and possible tearing of the rubber. As the mold is peeled off, it may need to be lubricated with silicone release or soapy water on the outside surface to allow it to slide easily against itself.

A glove mold is a thin blanket mold that is peeled off the model like a glove (or sock).

Materials & Methods

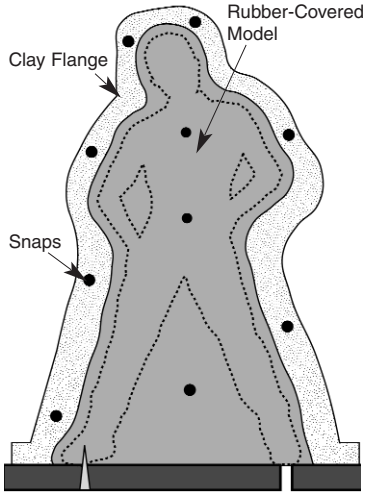
One-Piece Blanket Mold with Two-Piece Shell

First, the model is prepared for making the blanket mold. Then thixotropic mold rubber is brushed on.



The model is prepared (i.e., sealed and released) and securely mounted to a base. A vent is drilled through the base to release air trapped in the model. Thin shims are placed along the model and in spaces formed under the legs and arms. The shims form a parting line in the brush-on rubber blanket mold. Once the shims are secure, the rubber is brushed on in several coats to ¼- to ½-inch thick. In the final coat, rubber bumps (aka snaps) can be placed on the outside of the rubber mold so that the mold positions properly in the mold shell.

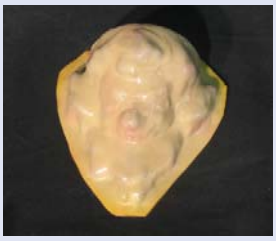
After the rubber cures, the rubber-coated model is prepared for construction of the mold shell.



A clay flange is formed on the rubber-covered model to define the parting line of the rigid mold shell. Depressions are made in the clay that will form "snaps" in the mold shell to help properly lock the mold shell halves together. Apply wax and release to the outside of the rubber mold and the flange. The first half of the rigid mold shell is built up to the clay flange. After the shell material cures, the clay flange is removed, wax and release agent is applied to the exposed edge of the shell, and the second half of the shell is constructed. When complete, the two halves of the shell compress the rubber along the mold opening to make for a good seal along the mold opening.

Making A Brushed Blanket Mold With A Two-Piece Shell

1. Mount the model to a board and apply sealer and/or release agent.



2. Brush-on rubber (Polygel® 35 is shown). First coat should be thin to capture detail and minimize bubbles. Apply coats to 1/4"-3/8" thickness. Cure.

3. Create a parting line for shell separation. Apply release agent to rubber and shims. Brush thickened liquid plastic (1512X with Poly Fiber II) onto first half to make shell.

4. After first half of shell cures, remove shims. Apply wax and release to plastic parting surface, then brush-on second half of shell. (Wooden legs were added for leveling.)

5. Remove completed shell. Notice keys in shell for proper alignment of halves. Trim shell as needed.

6. To cast a part, properly position mold in its shell and apply release agent to mold face. Then pour liquid plastic into mold cavity. Cure.

Applications

Polytek®'s Liquid Rubbers and Plastics are used in many mold making and casting applications.

Architectural Reproduction & Restoration

Architectural reproduction and restoration specialists use liquid polyurethane rubbers (e.g., Poly 74-Series Liquid Rubbers) to make molds of architectural elements and, subsequently, reproductions out of materials such as concrete, GFRC (Glass Fiber Reinforced Concrete), plaster, or fiberglass. Often, molds are made of aging or damaged elements, then the first reproduction is resculpted to look like new, a production rubber mold is made from the like-new model, and, finally, restored elements are cast and mounted. In some locations, the architectural element cannot be removed from the building, and, therefore, a mold must be made on site. Often, in these situations, Polygel® Liquid Rubber is brushed or sprayed directly onto the building surface to make a blanket mold. Then, a reproduction can be made, and repaired as needed, back in the controlled environment of the mold shop.

Sculpture & Figurines

Liquid mold rubbers and casting plastics are used extensively in the reproduction of figurative sculpture. After the original is sculpted or carved (i.e., from clay, wax or wood), a liquid rubber can be poured, brushed or sprayed onto the original to make a mold that captures all of the detail and allows for easy demolding from undercuts and negative drafts. Polyurethanes, such as Poly 74-Series Liquid Rubbers, can be poured as supplied or thickened with Poly Fiber II for brush-on applications. Although TinSil® or PlatSil® Silicone Liquid Rubbers are more expensive, they might be the better choice for a large number of resin castings. For blanket molds, mold shells can be quickly and easily constructed using Poly 15-Series Liquid Plastics thickened with Poly Fiber II.

Concrete Casting

Polyurethane rubbers are used extensively in the concrete industry for casting, forming or texturing concrete. Liquid rubbers are used to make molds for flexible form liners, concrete countertops, manufactured stones and stone veneer, and ornamental precast and statuary. In addition, liquid rubbers are used to make various concrete-related tools such as stamps for texturing concrete. Both conventional concrete and GFRC (Glass Fiber Reinforced Concrete) are routinely cast in polyurethane rubber molds and, to a lesser extent, in silicone molds.

Polyurethane Foam, Flexible Millwork & Ornamentation

Polyurethane foams and flexible polyurethane resins are used to cast decorative millwork and architectural decor elements, which can be used in both interior and exterior environments. PolyFoam rigid polyurethane, self-skinning foams can be used to cast parts of varying densities. Casting is usually performed in PlatSil® silicone molds sprayed with a fast-curing, spray paint primer or PF Barrier Coat. Flexible millwork can be made by casting Poly Plasti-Flex into either TinSil® or PlatSil® silicone rubber molds.

Materials & Methods

Art & Decor Objects

Artistic and decorative objects span a range too vast to describe. A rubber mold can be made from any three-dimensional master, whether sculpted, carved, or CNC-machined. Then, reproductions can be cast out of plaster, concrete, resin, foam or rubber. Choose polyurethane liquid rubber if you intend to make concrete or plaster castings. Choose silicone liquid rubber if you intend to cast a large number of resin, rubber or foam parts.

Educational Institutions

Colleges, universities and other educational institutions use flexible mold materials and casting plastics for numerous and diverse disciplines including sculpture, architecture, rapid prototyping, model making, and the sciences. We are always ready to help instructors and students choose the best mold making and casting materials and methods for any application.

Model Making

Polyurethane liquid plastics, such as the EasyFlo-Series products, are used to reproduce models of many different items. They are low viscosity, easy-to-mix and fast curing, so many parts can be made in a relatively short period of time. Plastic parts can be colored by mixing PolyColor dyes into the liquid plastics or plastic parts can be painted after they are cured. Silicone rubbers, such as the PlatSil®- and TinSil®-Series are often used for casting plastic models due to their excellent chemical resistance to liquid plastics and their easy-release properties.

Hobby & Crafts

Polyurethane and silicone liquid rubbers are used extensively to make molds for numerous hobby and craft applications. Any decorative object (model train, custom tile, light switch plate, small figurine, etc.) can be reproduced using liquid rubber and a casting material such as plaster, concrete, resin, foam or wax. These materials are easy-to-use, economical and fun.

Rapid Prototyping

As the name implies, rapid prototyping is a method to create models or functional parts quickly from design to completion. Once a CAD drawing is made, and a model created by stereolithography or some other 3-D mastering process, the master can be replicated by making a mold using TinSil® or PlatSil® Silicone Rubbers and parts can be cast using Poly 15-Series, EasyFlo, or Poly-Optic® Liquid Plastics.

Plaster Ornamentation, Millwork & Figurines

Plaster is an age-old casting media used today for casting statuary, home decor items (i.e. lamps, wall plaques), as well as ornamental moldings and decorative millwork. Polyurethane and silicone rubber molds can be used without release agent for casting plaster over and over again.

Props & Displays

Props and displays, for movies, retail outlets, residences, theme parks, hotels and more, are routinely molded and cast using liquid mold rubbers and casting plastics. In some cases, foam carvings are hard-coated with a fire-rated plastic shell (e.g., EasyFlo Spray FR) to provide a durable, paintable exterior.

Life Casting

Life casting involves making a mold of the human body and reproducing it in a variety of media including cold cast bronze. Hydrogel® is routinely used for life casting since it is an easy-to-use powder which is mixed with water and can be safely be applied to the body. Hydrogel molds are single-use since they are fragile and dry out quickly. PlatSil® Gels, body-contact safe silicone rubbers, can be used to make body molds that can be stored and reused. Poly Skin-Wax is a simple, one-part, flexibilized wax for making molds of hands and feet quickly and inexpensively.

Candles & Soaps

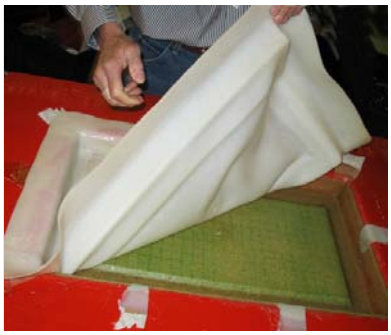
Candles and soaps are routinely cast in both rigid and rubber molds. Rubber molds are employed if the original is delicate or has decorative undercuts that cannot be accommodated using rigid molds. Rubber molds also permit easy, cost-effective removal of waxes and soaps. Polyurethane as well as silicone molds are used depending upon specific circumstances.

Special Effects: TV, Movies, Theater & Prosthetics

The area of special effects is immensely diverse. Customers often use PolyFoams, rotocastable EasyFlo Liquid Plastics, and clear, glass- or ice-like Poly-Optic® Liquid Plastics for special effect applications. PlatSil® Gels are often used to make prosthetic appliances for making creatures; or transforming actors into aged, injured, or deformed characters. PlatSil® Gels are versatile since they can be mixed with a "Deadener" to reduce the snappy silicone-feel and create gels that can simulate any type of tissue. With Deadener and other additives, makeup artists can use PlatSil® Gels for nearly all prosthetic applications.

Taxidermy

Taxidermists use polyurethane and silicone mold rubbers and polyurethane casting plastics to replicate antlers, horns, hooves, claws, feet and eyes, as well as wood, stone, water features and more. Using Polytek mold making and casting materials, taxidermists can create ultra-realistic animals and themed environments.



Composite Casting & Vacuum Bagging

Silicone mold rubbers are used to cast a wide array of composite and filler-reinforced resin parts. In "vacuum bagging," a silicone "bag" or contoured blanket is positioned over a rigid tool into which reinforcement (fiberglass/carbon fiber) is laid. Resin is drawn under the silicone bag under vacuum to form high-strength to weight ratio parts free of voids and excess resin.

Polyurethane RTV Liquid Mold Rubbers

Product Overview

Polytek manufactures several polyurethane RTV liquid mold rubbers each formulated to meet various customer applications. Polytek's polyurethane mold rubbers consist of a Part A and a Part B that, after mixing, cure at room temperature to flexible, high-strength rubbers. Polyurethane rubbers make durable, easy releasing molds for casting plasters and waxes without release agents, but, when used with proper release agents, are also excellent for casting concrete, epoxy, polyester, polyurethane and acrylic.

The last two digits in the Polytek mold rubber product name indicate the approximate Shore A hardness of the cured rubber. Polytek polyurethane mold rubbers range in hardness from a soft A20 to a firm D45. (Refer to the Appendix for more information on the Shore A hardness scale.)

MODEL PREPARATION: Porous models, such as wood, plaster, stone, pottery or masonry, must be sealed, then coated with a release agent. Multiple coats of paste wax dried and buffed will seal most surfaces. Potters soap or Murphy's Oil Soap can be used as a sealer for plaster. Lacquer, paint, PVA, PolyCoat and Pol-Ease® 2350 also work well as sealers for many surfaces. PolyCoat may be effective as both a sealer and a semi-permanent release agent. Porous models must be vented from beneath to prevent trapped air from forming bubbles in the rubber.

Non-porous models (i.e., metals, plasticene, wax, glazed ceramics, fiberglass, and polyurethanes) and sealed porous models should be coated with a release agent such as Pol-Ease 2300 Release Agent or PolyCoat.

Models made of sulfur-containing modeling clay (i.e., Roma Plastilina) should be sealed with shellac. *[CAUTION: Shellac-coated models must be thoroughly coated with release agent because polyurethane rubbers bond tenaciously to shellac. In fact, uncoated shellac may be used to bond polyurethanes to certain surfaces (i.e., plaster).]*

Polyurethane Mold Rubbers:

Poly 74 Series - Polytek's easiest-to-use and most versatile mold rubbers. These soft (A20) to mid-range hardness (A55) mold rubbers are popular with plaster casters, concrete precasters and art foundries. Can be poured as supplied or made brushable with additives.

Poly 75 Series - Firmer (from A60 to A90), high-strength, mold rubbers. Primarily used for high production concrete casting, forming and texturing.

Polygels® - These rubbers self-thicken upon mixing, and are best for making brush-on or sprayed blanket molds.

Poly 81-Series - Firm rubber for making stamps, forms or industrial parts.

Poly-Fast 72-40 - Flexible rubber for casting wax. Pour as supplied or thicken to a creamy, brushable consistency with a liquid additive.

Poly GlassRub 50 - Clear, flexible rubber for making see-through molds or casting clear or colored art/decor objects.

If there is any question about the compatibility between the liquid mold rubber and the prepared model surface, perform a test cure on an identical surface to determine that complete curing and good release are obtained.

MIXING AND CURING: Before mixing rubber, be sure that both Parts A and B are at room temperature and that all tools and models are ready to go! Check product labels or technical bulletins to determine working time for the product -- some products set fast -- meaning that you must work quickly.

Many Polyurethane Part Bs require stirring before use. If there is a "Stir Before Use" label on the container -- be sure to do so.

Mix Ratios Vary! Check the mix ratios for the specific product you are using. For polyurethane rubbers, most mix ratios are expressed by weight. ***Carefully weigh Parts A and B in proper ratio.*** [Note: Polygel® products can be mixed 1:1 by weight or volume.]

Weigh Part B (usually the lower viscosity component) into a clean metal or plastic mixing container. Then weigh the appropriate amount of Part A into the same container. Mix thoroughly. Hand mixing with a Poly Paddle is best to avoid mixing air into the rubber. While mixing, scrape the sides and bottom several times to insure thorough mixing. Pour the rubber as soon after mixing as possible for best flow and air bubble release.

Vacuum degassing or pressure curing helps to provide bubble free molds, but is usually not necessary.

Allow the rubber to cure at room temperature, 77°F (25°C). Heat accelerates the cure - low temperatures slow the cure. Avoid curing in areas where the temperature is below 60°F (15°C).

Check product labels or technical bulletins to determine appropriate cure times. For most polyurethane products, final cure properties are obtained in about seven days, but most molds may be used with care after curing for 24 to 48 hours.

USING THE MOLD: Usually no release agent is necessary when casting plaster or molten wax in polyurethane molds. When casting with plaster, sponge, dip, or spray the mold with Pol-Ease Mold Rinse and then pour plaster on the wet mold to reduce air bubbles in the plaster and aid release. When casting resin, spray the mold with Pol-Ease 2300 Release Agent or PolyCoat. For casting concrete, use an appropriate form release such as Pol-Ease 2650 or 2601 Release Agent if needed. To reduce the likelihood of mold distortion due to shrinkage or swelling, minimize exposure to solvent-containing form releases.

After repeated casting with certain resins, plaster and concrete, molds may shrink or swell since these materials can either extract oils from the mold or force chemicals into the rubber matrix. The proper selection of release agent and/or barrier coat can minimize this effect. If shrinkage becomes evident, a light application of Pol-Ease Mold Dressing can help to restore the mold to its original dimensions. For more information on the use of Pol-Ease Mold Dressing, call Polytek Customer Service.

CLEAN UP: Tools should be wiped clean before the rubber cures. 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 or PolyCoat 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/or 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 a physician. Use only with adequate ventilation. Do not use polyurethane products where food or body contact may occur. Polyurethanes burn readily when ignited unless they are formulated to be fire-retardant.

STORAGE: For best results, store products in unopened containers at room temperature (60-90°F/15-32°C). Use products within six months. Parts A and B react with atmospheric moisture and, therefore, should be used up as soon as possible after opening. If product remains, spray Poly Purge Dry Gas Blanket into containers to displace moist air and extend storage life, then tightly reseal containers.

Polyurethane rubber molds can last many years if stored in their proper shape in a cool, dry location out of direct sunlight.

ADDITIVES & ACCESSORIES

Polytek offers various additives that can be used to vary the properties of the cured and uncured polyurethanes. See Accessories Section and product Technical Bulletins for details.

Accelerator

Poly 74/75 Part X Accelerator

Sealers, Barrier Coats & Release Agents

Barrier PF
Pol-Ease® 2300 Release Agent
Pol-Ease® 2350 Sealer/Release Agent
Pol-Ease® 2450 Release Agent
Pol-Ease® 2500 Release Agent
Pol-Ease® 2601 Release Agent
Pol-Ease® 2650 Release Agent
Pol-Ease® Mold Rinse or Mold Dressing
Poly PVA Solution (Green or Clear)
PolyCoat Semi-Permanent Sealer/Release Agent

PolyColors

Black, Blue, Brown, Green, Red, Yellow, White

Softener

Poly 74/75 Part C Softener

Product Life Extender

Poly Purge Aerosol Dry Gas

Thickeners

Fumed Silica
Poly Fiber II

UV Stabilizer

Poly UV Additive

Reinforcement Materials for Blanket Molds

Fiberglass Mat (3 yd^2)
Tietex® Fabric (10-ft sheet, or 324-ft roll x 40-in wide)

Poly 74-Series

Soft, Flexible, High-Strength Rubbers

DESCRIPTION: Poly 74-Series Liquid Rubbers consist of two parts (A and B), which, after mixing, cure at room temperature to flexible, high-strength mold rubbers. Poly 74-Series Rubbers make durable, easy releasing molds for casting plasters and waxes without release agents. When coated with a proper release agent, Poly 74-Series molds are excellent for casting concrete and various resins, such as epoxy, polyester, urethane and acrylic.

MODEL PREPARATION: Porous models (i.e., wood, plaster, stone) must be sealed with wax, soap (plaster only), petroleum jelly, paint, PVA or shellac. Sealed or non-porous models must be coated with Pol-Ease® 2300 Release Agent or wax and allowed to dry. Alternatively, PolyCoat, a sealer and semi-permanent release agent, can be used on porous or non-porous models. Shellac-sealed models must be coated thoroughly with release agent since Poly 74-Series rubbers bond tenaciously to shellac. If there is any question about the compatibility between the rubber and the prepared model surface, perform a test cure on an identical surface to determine that complete curing and good release is obtained.

Porous models must be vented from beneath to prevent trapped air from forming bubbles in the rubber.

MIXING AND CURING: Several Poly 74-Series Part Bs require stirring before use (i.e., Poly 74-20, 74-29, 74-30 and 74-40). Weigh Part B into a clean metal or plastic mixing container. Weigh the appropriate amount of Part A into the same container. Mix thoroughly. Hand mixing with a Poly Paddle is best to avoid mixing air into the rubber. While mixing, scrape the sides and bottom several times to ensure thorough mixing. Pour the rubber as soon after mixing as possible for best flow and air bubble release.

Vacuum degassing helps to provide bubble-free molds, but is usually not necessary.

Why Choose Poly 74-Series Rubbers?

- Make durable, long-lasting molds owing to strength and elongation properties of cured rubber
- Pourable liquid rubbers that cure to soft to mid-range hardnesses
- Easily thickened for brush-on applications
- No release agents needed when casting many plasters, waxes and concretes
- User-friendly, forgiving formulations
- Low-viscosity liquid rubbers capture detail from intricate masters
- All products share the same high-performance Poly 74-Series Part A

Allow to cure at room temperature, 77°F (25°C). Ultimate properties are reached in about seven days, but molds may be used with care after curing for 24 to 48 hours. Heat accelerates the cure - low temperatures slow the cure. Avoid curing in areas where the temperature is below 60°F (15°C).

Both Parts A and B react with atmospheric moisture and, therefore, should be used up as soon as possible after opening. Before resealing, Poly Purge, a heavier-than-air, dry gas, can be sprayed into open containers to displace moist air and extend storage life. For 55-gallon drums of Parts A and B, affix Drierite cartridges on the small bung during dispensing to protect product from moist air entering the drum.

SOFTENING THE RUBBER: Add Poly 74/75 Part C Softener to 74-Series products for a lower viscosity mix and a softer rubber. When Part C is used, cure time is longer and there is some loss of strength in the rubber and increased tendency to shrink after repeated castings. To soften Poly 74-30 to Shore A15, mix 1A:1B:1C, by weight. The quantity of Part C required to soften other products varies and should be determined through experimentation.

ACCELERATING THE CURE: Add Poly 74/75 Part X to Poly 74-Series rubbers to accelerate the cure. Part X is most useful when making brush-on molds to decrease the time needed between coats. By adding 3% Part X (by weight of the total mix) to 74-30 or 74-29, the working time is reduced to approximately eight minutes -- in the time it takes to mix the next batch, the previous layer gels enough to apply the next coat. Demolding is possible in as little as four hours after the final layer is applied. Rapid curing with Part X allows a shell or mother mold to be made in the same day. Exercise caution when using Part X for poured molds since the rapid onset of gelling may trap air bubbles on or near the surface of the master.

Polyurethane RTV Liquid Mold Rubbers

THICKENING FOR BRUSH-ON: Add Poly Fiber II or Fumed Silica to mixed Parts A and B to thicken the liquid mix to a gel for application by brush or trowel.

USING THE MOLD: Usually no release agent is necessary when casting plaster or molten wax in Poly 74-Series molds. Sponging, dipping or spraying the mold with Pol-Ease Mold Rinse before pouring plaster in the mold reduces air bubbles in the plaster and aids release. Pol-Ease 2300 Release Agent is excellent for casting most resins. Water-based form releases, such as Pol-Ease 2601, are preferred for concrete casting. Exposure to solvent-containing form releases should be kept to a minimum to reduce the likelihood of mold distortion due to shrinkage or swelling. Shrinkage may become apparent after repeated casting with resins having strong solvating power or porous casting materials such as plaster or concrete, which can extract oils from the mold. The proper choice of release agent and/or barrier coat can minimize this effect.

Poly 74-Series molds will last many years if stored undistorted on a flat, non-porous surface in a cool, dry location out of direct sunlight.

CLEAN UP: Wipe tools clean before the rubber cures. Denatured ethanol is a good cleaning solvent, but is highly flammable and must be handled with caution. Coat work surfaces with wax, Pol-Ease 2300 Release Agent or PolyCoat 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 74-Series products are not to be used where food or body contact may occur. Poly 74-Series rubbers burn readily when ignited.

Poly 74-20 is a popular rubber for veneer stone applications.

PACKAGING

Product (Mix Ratio)	Kit Size (lb)	Part A (lb)	Part B (lb)
Poly 74-20 Mix Ratio: 1A:2B	6 24 120 1,350	2.0 8.0 40.0 450	4.0 16.0 80.0 900
Poly 74-24, 74-29, 74-29 White, 74-30, 74-30 Clear, 74-30 HT, 74-41, 74-45 Mix Ratio: 1A:1B	4 16 80 900	2.0 8.0 40.0 450	2.0 8.0 40.0 450
Poly 74-40, 74-44, 74-50 Mix Ratio: 2A:1B	6 24 120 675 1,350	4.0 16.0 80.0 450 900	2.0 8.0 40.0 225 450
Poly 74-55 Mix Ratio: 4A:1B	5 20 40 100 562.5	4.0 16.0 32.0 80.0 450	1.0 4.0 8.0 20.0 112.5

PHYSICAL PROPERTIES

	74-20	74-24	74-29 (White)	74-30 (Clear & HT)	74-40	74-41	74-44	74-45	74-50	74-55
Mix Ratio, By Weight	1A:2B	1A:1B	1A:1B	1A:1B	2A:1B	1A:1B	2A:1B	1A:1B	2A:1B	4A:1B
Hardness, Shore A	20	25	30	30	40	40	45	45	50	55
Pour Time (min)	30	20	30	25-30	20	20	20	30	15	15
Color*	Yellow	Amber	Black	Varies	Varies	Varies	Gray	Yellow	Amber	Amber
Mixed Viscosity (cP)	800	2,000	2,800	2,000	3,400	2,000	3,500	2,500	2,000	4,000
Specific Vol. (in^3/lb)	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5

* Part Bs may darken with age, but cured rubber properties are not affected.

Poly 75-Series

Firm, Flexible Rubbers

DESCRIPTION: Poly 75-Series Liquid Rubbers consist of two parts (A and B), which, after mixing, cure at room temperature to flexible rubber. Molds made with Poly 75-Series products are excellent for casting concrete, plaster and wax. In addition, when coated with a proper release agent, Poly 75-Series molds can be used to cast various resins and foams. Poly 75-Series Liquid Rubbers are formulated for good economy with high performance and durability.

MODEL PREPARATION: Porous models, such as wood, plaster, stone, pottery or masonry, must be sealed, then coated with a release agent. Multiple coats of paste wax dried and buffed will seal most surfaces. Potters soap can be used as a sealer for plaster. Lacquer, paint, PVA, and Pol-Ease® 2350 Release Agent also work well as sealers for many surfaces. Alternatively, PolyCoat, a sealer and semi-permanent release agent, can be used on porous or non-porous models. Porous models must be vented from beneath to prevent trapped air from forming bubbles in the rubber.

Models made of sulfur-containing modeling clay (i.e., Roma Plastilina) should be sealed with shellac. [CAUTION: When shellac is used as the sealer, it must be thoroughly coated with release agent because polyurethane rubbers bond tenaciously to shellac. In fact, uncoated shellac may be used to bond polyurethanes to certain surfaces.]

Non-porous models (i.e., metals, plasticene, wax, glazed ceramics, fiberglass, and polyurethanes) and sealed, porous models should be coated with Pol-Ease 2300 Release Agent or PolyCoat.

If there is any question about the compatibility between the liquid mold rubber and the prepared model surface, perform a test cure on an identical surface to determine that complete curing and good release is obtained.

Why Choose Poly 75-Series Rubbers?

- Firm yet flexible mold rubbers
- Ideal for demanding, high-production casting and forming of concrete
- Dimensionally stable -- molds can last for years
- Abrasion resistant for long mold life
- Easy-to-use, forgiving formulations
- All products share the same high-performance Poly 75-Series Part A

MIXING AND CURING: Before mixing, be sure that both Parts A and B are at room temperature and that all tools and models are ready to go! Some products set fast -- meaning that you must work quickly. Check mix ratio. Weigh Part B into a clean metal or plastic mixing container and then weigh the appropriate amount of Part A into the same container. Mix thoroughly. Hand mixing with a Poly Paddle is best to avoid mixing air into the rubber. While mixing, scrape the sides and bottom several times to ensure thorough mixing. Pour the rubber as soon after mixing as possible for best flow and air bubble release.

Vacuum degassing helps to provide bubble-free molds, but is usually not necessary.

Allow to cure at room temperature, 77°F (25°C). Final cure properties are obtained in about seven days, but molds may be used with care after curing for 24-48 hours. Heat accelerates the cure -- low temperatures slow the cure. Avoid curing in areas where the temperature is below 60°F (15°C).

Both Parts A and B react with atmospheric moisture and, therefore, should be resealed or used up as soon as possible after opening. Before resealing, Poly Purge, a heavier-than-air, dry gas, can be sprayed into open containers to displace moist air and extend storage life. For 55-gallon drums of Parts A and B, affix Drierite cartridges on the small bung during dispensing to protect product from moist air entering the drum.

SOFTENING THE RUBBER: Add Poly 74/75 Part C Softener to 75-Series products for a lower viscosity mix and a softer cured rubber. When using Part C, cure time is longer and there is some loss of strength in the rubber and increased tendency to shrink after repeated castings. Determine the quantity of Part C required through experimentation.

ACCELERATING THE CURE: Add Poly 74/75 Part X to Poly 75-Series rubbers to accelerate the cure. By adding 1% Part X (by weight of total mix) to Poly 75-80, the working time is reduced to approximately 10 minutes and demolding is possible in as little as 6 hours. Exercise caution when using Part X since the rapid onset of gelling may trap air bubbles on or near the surface of the model. Curing the mold in a heated area accelerates the cure as well.

Polyurethane RTV Liquid Mold Rubbers

USING THE MOLD: Usually no release agent is necessary when casting plaster or wax in Poly 75-Series molds. For casting plaster, sponge, dip or spray the mold with Pol-Ease Mold Rinse and then pour plaster on the wet mold to reduce air bubbles in the plaster and aid release. For casting resin, first spray the mold with Pol-Ease 2300 Release Agent or PolyCoat. For casting concrete, use a form release, such as Pol-Ease 2650 or 2601. Avoid solvent-containing releases since they can cause mold distortion (i.e., shrinkage or swelling).

After repeated casting with certain resins, plaster and concrete, molds may shrink slightly since these materials extract oils from the mold. The proper selection of release agent and/or barrier coat can minimize this effect. If shrinkage becomes evident, a light application of Pol-Ease Mold Dressing can help to restore the mold to its original dimensions.

Poly 75-Series molds can last many years if stored undistorted on a flat, non-porous surface in a cool, dry location out of direct sunlight. If occasional outdoor use is required, Poly 75-59, 75-65 and 75-80 perform best and UV resistance can be improved by adding Poly UV Additive. Add 0.5% UV Additive to the total mix weight to reduce the characteristic surface degradation caused by sunlight. Never store Poly 75-Series molds outside as UV exposure will eventually degrade the rubber.

CLEAN UP: Wipe tools clean before the rubber cures. Denatured ethanol is a good cleaning solvent, but is highly flammable and must be handled with caution. Coat work surfaces with wax, Pol-Ease 2300 Release Agent or PolyCoat 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 then soap and water. In case of eye contact, flush with water for 15 minutes and call physician. Use only with adequate ventilation. Poly 75-Series products are not to be used where food or body contact may occur. Poly 75-Series rubbers burn readily when ignited.

Poly 75-80 is a popular rubber for concrete stamp applications.

Poly 75-Series is popular for decorative form liners.

PACKAGING

Product (Mix Ratio)	Kit Size (lb)	Part A (lb)	Part B (lb)
Poly 75-59, 75-60, 75-65 & 75-70 Mix Ratio: 1A:1B	4 16 80 900	2.0 8.0 40.0 450	2.0 8.0 40.0 450
Poly 75-75, 75-79, 75-80, 75-81 & 75-90 Mix Ratio: 2A:1B	6 24 120 675 1,350	4.0 16.0 80.0 450 900	2.0 8.0 40.0 225 450

PHYSICAL PROPERTIES

	75-59	75-60	75-65	75-70	75-75	75-79	75-80	75-81	75-90
Mix Ratio, By Weight	1A:1B	1A:1B	1A:1B	1A:1B	2A:1B	2A:1B	2A:1B	2A:1B	2A:1B
Hardness, Shore A	60	60	65	70	75	80	80	80	90
Pour Time (min)	10	10	35	40	20	20	45	3	10-15
Cured Color	Amber	Amber	Amber	Gray	Amber	Yellow	Yellow	Amber	Opaque Amber
Mixed Viscosity (cP)	2,500	1,200	3,000	3,000	4,000	2,000	5,000	2,400	6,000
Specific Vol. (in^3/lb)	27	27	27	27	26	26	26	27	26

Polyurethane RTV Liquid Mold Rubbers

Polygel®

For Making Brush-On or Sprayed Molds

DESCRIPTION: Polygel® Liquid Rubbers are without equal for making brush-on or sprayed blanket molds. Polygel products consist of two liquid components, Parts A and B, which after mixing 1A:1B by weight or volume, immediately thicken to a brushable or trowellable consistency. These products are non-sag, and therefore, especially useful for application to vertical or overhead surfaces. For brush-on application, use Polygel 35, 40 or 50. In circumstances where spray application is best (e.g., large surface areas where brushing may be impractical), use Polygel Spray 35 or Spray 50. Polygel rubber molds are suitable for casting plaster, concrete and waxes, as well as limited casting with polyester, epoxy and polyurethane resins. Since Polygel products bond well to many surfaces, they can also be used as adhesives and sealants.

As with other Polytek® elastomers, the last two digits in the product name indicate the approximate Shore A hardness of the cured rubber. Choose the best Polygel rubber for your application.

- **Polygel® 35 -** Brushable mix that cures to the softest, most elastic, Polygel rubber. Has an 8- to 10-minute working time and cures in 8 to 12 hours.
- **Polygel® Spray 35** - Sprayable version of Polygel 35. Use with meter-mix spray equipment.
- **Polygel® 40 -** The most liquid mix for best air bubble release and easiest brushing. Has a 15- to 20-minute working time and cures in 16 hours.
- **Polygel® 50** - A thicker mix with a 8- to 10-minute working time and a 16-hour cure time. 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 application using meter-mix spray equipment. Has a 5- to 7-minute working time and a 16-hour cure time.

Why Choose Polygel® Rubbers?

- Use to make brush-on or sprayed molds quickly and easily without the need for a thickener
- Easy -- 1:1 mix by weight or volume
- Color-coded mix indication
- Good flow into fine detail
- Good dimensional stability

MODEL PREPARATION: Porous models (i.e., wood or plaster) must be sealed to prevent Polygel Liquid Rubber 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 a release agent as Polygel rubber bonds tenaciously to shellac. Fresh plaster must be sealed particularly well to ensure 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, potters soap, or Murphy's Oil Soap. The sealed or non-porous model, and other materials that will contact the Polygel, should then be sprayed with Pol-Ease® 2300 Release Agent (which should be brushed out for thorough coverage) or brushed with PolyCoat. 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.

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 the mix is uniform in color and consistency. Carefully apply the mixed Polygel over a dry, properly prepared model. When brushing Polygel, allow the first coat to gel enough so that the second coat will not disturb it (usually about one hour), and then apply the second coat being careful to cover any thin spots in the first coat. To ensure uniform coverage by each coat, a small amount of PolyColor dye can be mixed into Polygel so that layers can be colored differently and coverage can be checked visually. Do not allow prior layers to cure completely before applying subsequent coats. For spray application, Polygel Spray 35 and Spray 50 can be sprayed continuously until the desired mold thickness is achieved. Ideally, blanket molds should be at least 1/8-inch thick, since thinner molds can be easily torn, but not more than 3/8-inch, since too thick a layer of rubber causes difficulty when 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.

Polyurethane RTV Liquid Mold Rubbers

Rubber molds can be reinforced with Tietex® Fabric, which is strong and wets out better than other fabrics. To reduce tearing, Tietex can be laminated at the top of a mold seam or strips can be laid around the perimeter of a mold. Embed the fabric in the second or third coat of rubber while it is still tacky and then cover with a subsequent coat of rubber, which should be as fluid as possible for best penetration of the fabric. Ensure that the Tietex is not too close to the model surface, so that the weave pattern does not show through to the face of the mold.

NOTE ON LAYERING POLYGEL RUBBERS: Typically, brush-on molds should be completed with one product. 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: If needed, Polygel Liquid Rubbers can be made even thicker by stirring Fumed Silica or Poly Fiber II into the mixed Parts A and B.

USING THE MOLD: No release agent is necessary for casting plaster, certain concrete mixes, and waxes in Polygel rubber molds. But a release agent or barrier coat is needed when casting epoxies, polyurethanes, polyester resins, and some concrete mixes. If a Polygel mold is to be turned inside out like a sock, lubricate its outside surface with soapy water or petroleum jelly, so that it slides over itself easily. A shell or mother mold can be made of plaster, polyester resin and fiberglass, or Poly 15-Series Liquid Plastic filled with Poly Fiber II or fiberglass. If the shell is built with Polytek Plastics or other resin, the rubber must be thoroughly coated with paste wax and allowed to dry, and then Pol-Ease® 2300 Release Agent, to prevent the plastic from sticking to the rubber. A plaster shell must be sealed with potters soap, shellac, lacquer or wax to prevent mold distortion during storage or use.

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.

SAFETY: Before use, read product labels and 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 then seek medical attention. Use with adequate ventilation. Do not use Polygel products where food or body contact may occur. Polygel products burn readily when ignited.

PACKAGING
(Mix Ratio 1A:1B By Weight or Volume)

Product	Kit Size
Polygel 35 Liquid Rubber Polygel 40 Liquid Rubber Polygel 50 Liquid Rubber	4 lb 16 lb 80 lb 900 lb
Polygel Spray 35 Liquid Rubber Polygel Spray 50 Liquid Rubber	80 lb

PHYSICAL PROPERTIES

	Polygel® 35	Polygel® Spray 35	Polygel® 40	Polygel® 50	Polygel® Spray 50
Mix Ratio (by Weight or Volume)	1A:1B	1A:1B	1A:1B	1A:1B	1A:1B
Hardness, Shore A	35	35	40	50	50
Working Time (min)	8-10	8-10	15-20	8-10	5-7
Cure Time (hr) @ 77°F	8-12	16	16	16	16
Color, Cured	Light Blue (varies)	Light Blue (varies)	Tan (varies)	Tan (varies)	Green
Initial Mixed Consistency	Medium Thixotropic	Medium Thixotropic	Thinnest Thixotropic	Thickest Thixotropic	Medium Thixotropic
Specific Volume, in^3/lb	27.5	27.5	27.5	27.5	27.5

Poly 81-Series

Tough, Durable, Polyurethane Rubbers

DESCRIPTION: Use Poly 81-Series rubbers to make firm molds, mold facings, stamping tools, industrial parts, rollers, gaskets, mold shells, bumpers or pads. Poly 81-Series rubbers consist of liquid Part A and Part B, which, after mixing, cure at room temperature to tough, durable rubbers. They offer low sensitivity to moisture, and low viscosity for easy mixing and pouring.

MODEL PREPARATION: Porous models, such as wood or plaster, must be sealed with wax, soap (for plaster only), petroleum jelly, paint, PVA or shellac. Sealed or non-porous models must be coated with Pol-Ease® 2300 Release Agent, PolyCoat or wax and allowed to dry. If a model is sealed with shellac, it must be thoroughly coated with release agent, since Poly 81-Series rubbers bond tenaciously to shellac. PolyCoat can be used as both sealer and semi-permanent release agent. An application of PolyCoat may eliminate the need for additional release agent application prior to subsequent pours of polyurethane liquid rubber. If there is any question about the compatibility between the rubber and the prepared model surface, perform a test cure on an identical surface to determine that complete curing and good release is obtained.

Porous models must be vented from beneath to prevent trapped air from forming bubbles in the rubber.

MIXING AND CURING: Parts A and B are clear liquids. The color of Part B may vary, but it has no effect on cured rubber properties. Weigh Part B into a clean metal or plastic mixing container. Then weigh the proper amount of Part A into the same container. Mix thoroughly. Hand mixing with a Poly Paddle is best to avoid mixing air into the rubber. While mixing, scrape the sides and bottom several times to ensure thorough mixing. Vacuum degassing helps to provide bubble-free molds, but is usually not necessary. Pour the rubber as soon as it is thoroughly mixed to obtain best flow and air bubble release.

Allow to cure at room temperature, 77°F (25°C). Heat accelerates the cure -- low temperatures slow the cure. Avoid curing in areas where the temperature is below 60°F (15°C). Ultimate properties are reached in about seven days, but molds may be used with care after curing for 24 to 48 hours.

Both Parts A and B react with atmospheric moisture and, therefore, should be used up as soon as possible after opening. After opening, but before resealing, spray Poly Purge Dry Gas into containers to displace moist air and extend storage life of the products. For 55-gallon drums of Parts A and B, affix Drierite cartridges on the small bung during dispensing to protect product from moist air entering the drum.

Why Choose Poly 81-Series Rubbers?

- Firm rubbers with Shore A90 or D45
- Hard, yet flexible
- Easy-to-use formulations
- Reproduce finest details
- Make tough, long-lasting molds, tools, parts, jigs, fixtures & more

PHYSICAL PROPERTIES

	81-90	81-D45
Mix Ratio, By Weight	100A:40B	100A:20B
Hardness (Shore A/D)	A90	D45
Pour Time (min)	23	19
Demold Time (hr)	16	16
Color	Yellow	Varies
Mixed Viscosity (cP)	2,000	1,600
Specific Volume (in^3/lb)	26.6	26.4

PACKAGING

Product (Mix Ratio)	Kit Size (lb)	Components (lb)	
		Part A	Part B
Poly 81-90 (100A:40B)	11.2 56.0 280 630	8.0 40.0 200 450	3.2 16.0 80.0 180
Poly 81-D45 (100A:20B)	9.6 48.0 192 540	8.0 40.0 160 450	1.6 8.0 32.0 90.0

USING THE MOLD: Usually, no release agent is necessary when casting plaster or molten wax in Poly 81-Series molds. Sponging, dipping or spraying the mold with Pol-Ease® Mold Rinse before pouring plaster in the mold reduces air bubbles in the plaster and aids release. When casting resins, lightly spray the mold with Pol-Ease 2300 Release Agent. When casting concrete, Pol-Ease 2650 or 2601 Release Agents can be used.

Poly 81-Series molds will last many years if stored undistorted on a flat surface in a cool, dry location out of direct sunlight.

CLEAN UP & SAFETY: See p. 25.

Poly-Fast 72-40

Flexible, Polyurethane Mold Rubber

DESCRIPTION: Poly-Fast 72-40 RTV Liquid Rubber consists of liquid Part A and Part B that, after mixing in correct ratio, cure at room temperature to a versatile mold rubber. This liquid rubber may be poured, or thickened and applied by trowel or brush, to make tough, flexible molds. These molds are useful for casting wax or plaster.

MODEL PREPARATION: Most models must be sealed and coated with a release agent such as Pol-Ease® 2300 Release Agent. Some plastics and coatings are softened by Poly-Fast 72-40 and, therefore, must be must be coated with a barrier such as Poly PVA Solution before contacting the liquid rubber. Poly-Fast 72-40 may be subject to cure inhibition by certain contaminants and may stick to some surfaces. Read the Technical Bulletin for details.

If there is any question about the compatibility between the rubber and the prepared surface, a test cure should be made on an identical surface to verify that satisfactory results are obtained.

MIXING AND CURING: All materials should be at room temperature. Shake or stir Part B before use. The proper mix ratio is 1A to 10B, by weight, and must be carefully followed. See Technical Bulletin for details.

Allow Poly-Fast 72-40 to cure eight hours at room temperature, 77°F (25°C), before demolding. Ultimate properties are reached in three days. Curing in a warm location, up to 150°F (65°C), accelerates the cure, while a cool location slows the cure. Avoid curing in areas where the temperature is below 60°F (15°C).

FLOW CONTROL: Add Poly Fiber II or Fumed Silica to mixed, uncured Poly-Fast 72-40 to produce varying viscosities. Consistencies can range from that of a thin latex paint to a grease-like putty that can be spread onto a vertical surface. A liquid thickener, Part D, is also available for use with Poly-Fast 72-40. See Technical Bulletin for details.

MOLD RELEASE: When casting wax or gypsum in Poly-Fast 72-40 molds, release agents are usually not necessary. When casting epoxy, urethane and polyester resins, a release agent must be used, and, with some resins, a barrier coat, like Poly PVA Solution (top coated with a release agent), may also be necessary. Portland cement castings erode the rubber slightly with each casting, sometimes leaving a white haze on the casting. Some mold releases or barrier coats may reduce mold erosion and whitening of castings. For highest performance for concrete casting, consider Poly 74- or 75-Series Liquid Rubbers. Repeated contact of the rubber with solvents and oils should be kept to a minimum as these materials can cause mold swelling or shrinkage. Spray application of release agents is best as it lessens mold contact with solvents.

SOFTER MOLDS: Add Poly-Fast 72-40 Part C to create rubber as soft as Shore A-6. See Technical Bulletin for details.

Why Choose Poly-Fast 72-40?

- For sculptural applications and investment casting with wax
- Pour or brush-on with the addition of a liquid thickener
- Vary hardness with the addition of softener
- Good flow and bubble release resulting in reproduction of the finest details
- For long library life from cured molds, consider Poly 74-Series

PHYSICAL PROPERTIES	
Mix Ratio, By Weight	1A:10B
Hardness, Shore A	40
Pour Time (min)	30
Cured Color	Ivory
Mixed Viscosity (cP)	4,000
Specific Volume (in^3/lb)	20
Shrinkage Upon Cure	Nil

POLY-FAST 72-40 PACKAGING
Mix Ratio 1A:10B (By Weight)

Kit Size	Weight		Volume	
	A (lb)	B (lb)	A	B
9.9 lb	0.9	9.0	1 pt	1 gal
49.5 lb	4.5	45.0	½ gal	5 gal
495 lb	45.0	450	5 gal	55 gal

CLEAN UP & SAFETY: See Technical Bulletin for details.

STORAGE: Poly-Fast 72-40 Liquid Rubber remains usable for at least six months from the date of shipment in unopened containers, stored in a cool, dry location. Cured molds slowly soften with age. Thorough mixing of components in the proper mix ratio contributes to longer mold life as will storage of molds in a dark, cool, dry area. With proper care, 72-40 molds should not soften appreciably for two to four years. Molds should be discarded before they become too soft to handle. Do not store molds outdoors, as exposure to sunlight and standing water or moisture will cause rapid deterioration of the rubber.

DISPOSAL: Dispose of Poly-Fast 72-40 Liquid Rubber and cured rubber in accordance with local and federal environmental regulations. Upon disposal, liquid Part B and cured Poly-Fast 72-40 rubber are, most likely, hazardous waste owing to mercury content.

Poly GlassRub 50

Clear Polyurethane Rubber for Transparent Molds or Parts

Poly GlassRub 50 RTV Liquid Rubber consists of two parts (A and B) that, after mixing, cure at room temperature to a flexible, clear rubber. The transparency of Poly GlassRub 50, allows the mold maker to see if air bubbles are trapped against the master or forming in the casting. Additionally, clear rubber castings or objects encapsulated in the clear rubber make interesting displays or original art. Cured GlassRub may yellow slightly over time or following UV exposure. PolyColors can be added to the liquid rubber to make a tinted or colored, yet still clear, rubber. The smallest addition of a PolyColor virtually eliminates post-cure yellowing.

MODEL PREPARATION: Most models must be sealed and coated with a release agent such as Pol-Ease® 2300 Release Agent. Some plastics and coatings are softened by GlassRub and, therefore, must be must be coated with a barrier such as Poly PVA Solution before contacting the liquid rubber. Read the Technical Bulletin for details.

If there is any question about the compatibility between the liquid rubber and the prepared model surface or mold, perform a test cure on an identical surface to determine that complete curing and good release is obtained.

MIXING & CURING: Before mixing, be sure that both Parts A and B are at room temperature and that all tools and models are ready to go! The mix ratio is 1A:1B by weight or volume. Measure or weigh Part B into a clean mixing container.

Allow to cure at room temperature, 77°F (25°C). Final cure properties are obtained in about seven days, but molds or castings may be used with care after curing for 24 hours.

Refer to GlassRub Technical Bulletin for details.

USING A GLASSRUB MOLD: Refer to Technical Bulletin.

CASTING WITH GLASSRUB: GlassRub 50 can be successfully cast into polyurethane rubber molds made of GlassRub 50 or Poly 74-Series products. Pol-Ease 2300 Release Agent or PolyCoat must be properly applied to polyurethane molds before GlassRub is poured. Molds made of PlatSil® products also work well and do not require release agent. Do not pour GlassRub into tin silicone molds as slight surface inhibition can produce a tacky, partially cured surface on the GlassRub part.

FILLERS: Various fillers can be added to GlassRub 50 to create many different looks (e.g., marble powder). All fillers must be completely dry before use. Residual moisture in a filler can create small, undesirable air bubbles in the cured rubber.

ENCAPSULATING OBJECTS: When encapsulating an object in GlassRub, it is important that the object be free of air pockets, which may outgas after the rubber is poured. Porous objects should be sealed with a coat of clear Krylon spray to prevent pinhole bubbles from forming on the surface of the object being encapsulated. Objects that sink can be suspended using ultra-fine fishing line. Objects that float can be submerged using thin wire, which can be removed when the rubber begins to gel.

COLORS: Add PolyColors to mixed GlassRub 50 or to Part B before mixing with Part A to create clear rubber objects of any color. Refer to GlassRub Technical Bulletin for details.

EXTERIOR USE: GlassRub 50 is not recommended for exterior use. Poly UV Additive can be evaluated at 0.5 to 1% total weight to reduce the onset of yellowing upon UV exposure.

SOFTENING: Refer to GlassRub Technical Bulletin.

CLEAN UP & SAFETY: Before use, read product labels, Safety Data Sheets and Technical Bulletin.

Why Choose Poly GlassRub 50?

- Glass-like appearance (pale blue clear)
- Reproduces fine detail
- Easy-to-use formulation -- 1A to 1B mix ratio
- Low viscosity mix with excellent bubble-release
- Long working time

PHYSICAL PROPERTIES	
Mix Ratio, By Weight or Volume	1A:1B
Hardness, Shore A	45-50
Pour Time, 1-lb. mix (min)	45
Demold Time (hr)	16
Specific Gravity	1.0
Color, Cured	Glass Like/Blue-Clear*
Viscosity, 2.5 min after mix (cP)	1000
Specific Volume (in^3/lb)	27.5

* Upon exposure to UV light (i.e., fluorescent light or sunlight), cured rubber may yellow with age.

PACKAGING

Kit Size	Weight		Volume	
	A (lb)	B (lb)	A	B
4 lb	2	2	1 qt	1 qt
16 lb	8	8	1 gal	1 gal
80 lb	40	40	5 gal	5 gal
900 lb	450	450	55 gal	55 gal

Polyurethane Liquid Mold Rubbers In Use

Poly 75-65 form liner for precast concrete

Poly 74-45 mold for precast concrete

Poly 74-20 two-piece block mold and cold-cast bronze frog made with EasyFlo 60

Poly 74-45 mold of countertop edge molding

Poly 75-70 patio stone molds

Polygel® 35 blanket mold - ready to make a two-part, Poly 1512X plastic mold shell

Poly 75-65 sink plug for concrete countertop

EasyFlo 60 master with Poly 74-20 corner mold for veneer stone

Product Overview

Polytek Silicone RTV Liquid Mold Rubbers consist of two parts, Part A and Part B, which, after mixing, cure at room temperature to flexible, high-strength rubbers with varying hardnesses. Silicone molds are easy releasing and are excellent for casting plaster, wax, concrete, low melting metals and many resins such as epoxies, polyesters, polyurethanes and acrylics. Silicones are sometimes preferred over polyurethanes for their release qualities and superior chemical resistance. Normally, products cast in silicone molds do not require release agents, so cleaning the cast parts to accept paint is easier.

Polytek offers both tin- and platinum-cured silicones. Tin systems, TinSil® Silicone Rubbers, are typically less expensive and are more forgiving if mixed off ratio. Mix ratios for tin-cured systems are generally 1A:10B by weight and, therefore, a scale is needed. TinSil 70-60 molds are heat-resistant, suitable for casting low-melting-point metals (up to 600°F). Disadvantages of tin-cured systems are that they shrink slightly during the curing process and cured molds have shorter library life (two to five years) than molds made of platinum-cured silicone.

Platinum-cured silicones, PlatSil® Silicone Rubbers, offer the advantages of no shrinkage during curing and long library life for cured molds. In addition, several PlatSil systems offer 1A:1B mix ratios, by weight or volume, and are low in viscosity making them easy to mix and pour, with no need for degassing. Some materials, such as sulfur-based clay, polyester resin, tin-cured silicones and certain paints, cause cure inhibition in platinum-cured silicones; therefore, a test cure is always advised when working with PlatSil products.

As with other Polytek elastomers, the last two digits in the product name usually indicate the approximate Shore A hardness of the cured rubber. Polytek's silicone rubbers range in hardness from a very soft OO30 to a firm A60.

MODEL PREPARATION: Porous models such as wood or plaster should be sealed to prevent penetration of the rubber into the pores of the material. Wax, petroleum jelly, lacquer, paint and most other coatings are suitable sealers. Materials that will contact the rubber can be sprayed or coated with a light coat of Pol-Ease® 2350, which functions as a sealer and release agent. Allow the Pol-Ease 2350 to dry before applying liquid rubber. Pol-Ease 2500 is an excellent release agent for use with TinSil and PlatSil rubbers. Do not use silicone-based release agents (i.e., Pol-Ease 2300) on surfaces that contact liquid silicone rubbers since inhibition and/or adhesion may occur. In addition, modeling clays containing sulfur may inhibit curing. In every case where there is any question about the compatibility between the rubber and the prepared model surface, a test cure should be made on an identical surface to determine that complete curing and good release are obtained.

Liquid silicone rubbers may bond to cured silicone rubbers unless a parting agent, such as Pol-Ease 2500 Release Agent, is used.

Porous models must be vented from beneath to prevent trapped air from forming bubbles in the rubber.

MIXING AND CURING: Before mixing rubber, be sure that both Parts A and B are at room temperature and that all tools and models are ready to go. Check product labels or technical bulletins to determine working time for the product -- some products set fast -- meaning that you must work quickly.

Some products require stirring before use. If there is a "Stir Before Use" label on the container -- be sure to do so.

Mix Ratios Vary! Check the mix ratios for the specific product you are using. Most mix ratios are expressed by weight.

Silicone Mold Rubbers At A Glance

TinSil® 70 Series - Tin-catalyzed silicone systems that cure to tough, high-performance rubbers with easy release properties and resistance to high temperatures. Great for casting polyester resin.

TinSil® 80 Series - Tin-catalyzed silicone systems that are designed for use in applications demanding minimal shrinkage upon cure and extended library life from cured molds.

PlatSil® 71 Series - High-tear strength, platinum-cured silicone systems with hardness up to A40. Excellent for casting polyurethane resins and dimensionally accurate prototype parts.

PlatSil® 73 Series - High-tear strength, tough, platinum-cured silicone systems with hardness up to A60. Excellent for casting polyurethane foams and dimensionally accurate prototype parts.

PlatSil® Gels - Soft, translucent rubbers for delicate casting projects, prosthetics, and special effects applications.

Molds made from silicone rubbers are best for casting harsh resins. This gargoyle blanket mold made of soft PlatSil® 71-11 easily pulls off the cast resin part. The smooth, release-free demold of silicone is especially welcome on highly detailed parts.

Carefully weigh Parts A and B in proper ratio. Accurate weighing is essential to obtain optimum physical properties from the cured rubber. Weigh Part B into a clean metal or plastic mixing container. Then weigh the appropriate amount of Part A into the same container. Mix thoroughly, scraping sides and bottom of the container. Hand mixing with a Poly Paddle (see p. 66) is best to avoid mixing air into the rubber. To ensure a bubble-free mold, place the liquid rubber in a vacuum chamber at 28-29 inches mercury. Allow the mass of rubber to rise and then collapse, and continue to deaerate for an additional two minutes. When vacuuming, use a mixing container three to four times larger than the volume of rubber to allow for the product to rise without overflowing the container. Pour the rubber as soon after mixing as possible for best flow and air bubble release.

If reinforcement of the rubber is needed (i.e., in thin blanket molds), place stretchy, mesh cloth into the uncured rubber. Be sure that the fabric is not too close to the mold surface or the weave of the cloth may show through to the face of the mold.

Check product labels or technical bulletins to determine cure times. To reach full hardness in the specified demold time, temperature should be above 77°F (25°C). At lower temperatures, more time may be needed to reach full hardness. Curing below 65°F (18°C) is not recommended. For most silicone rubbers, final cure properties are obtained in about seven days, but most molds can be used with care after curing for 24 to 48 hours.

USING THE MOLD: No release agent is necessary for casting most materials in silicone rubber molds. For longer mold life, however, a barrier coat or release agent (i.e., Pol-Ease 2300) is recommended when casting epoxy, polyurethane or polyester resins. PolyCoat can be applied to worn molds to extend their life span. Most molds can be stored for years, but tin-catalyzed silicone molds might eventually deteriorate and lose their elasticity.

CLEAN UP: Tools should be wiped clean before the rubber cures. Denatured ethanol is a good cleaning solvent, but it must be handled with extreme caution owing to its flammability and health hazards.

SAFETY: Before use, read product labels and Safety Data Sheets. Follow safety precautions and directions. Contact with uncured products may cause eye, skin and/or respiratory irritation. 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 a physician. Use only with adequate ventilation.

STORAGE: For best results, store products in unopened containers at room temperature (60-90°F). Use products within six months. Tightly reseal containers after use.

ADDITIVES & ACCESSORIES

Polytek offers additives that can be used to vary the properties of the cured and uncured silicones. Accessories help make the products easier to use. See Accessories Section and product Technical Bulletins for details.

Accelerators & Retarders
- PlatSil® 71/73X Accelerator
- PlatSil® 71/73R Retarder
- TinSil® FastCat

Barrier Coats, Sealers & Release Agents
- Barrier PF
- Pol-Ease® 2300 Release Agent
- Pol-Ease® 2350 Release Agent
- Pol-Ease® 2500 Release Agent
- Poly PVA Solution (Green or Clear)
- PolyCoat (Mold Life Extender)

Colors
- SiliColor Silicone Pigments
- Black, Blue, Fleshtone, Green, Red, White, Yellow

Deadeners
- Smith's Theatrical Prosthetic Deadener
- TinSil® Deadener

Thickeners
- Fumed Silica
- PlatThix
- TinThix

Thinner
- Silicone Fluid 50 cSt

Silicone rubber blanket molds reproduce the fine details of models and are soft and tough enough to easily pull off complex castings. Usually, the more intricate the model/casting, the softer the mold rubber selected. This ornate column capital was easily cast in TinSil® 70-11. The gargoyle mold is PlatSil® 71-20.

TinSil® 70-Series

High-Performance, Silicone Rubbers

DESCRIPTION: TinSil® 70-Series RTV Silicone Rubbers are condensation-cure, tin-catalyzed, flexible mold rubbers. TinSil products consist of a liquid Part B base and Part A accelerator, which, after mixing at the proper ratio by weight, cure at room temperature to rubber with a tough, knotty tear property. TinSil molds have easy release properties and are resistant to high temperatures. TinSil molds are excellent for casting polyesters, epoxy and polyurethane resins, waxes and many other materials.

As with other Polytek® elastomers, the last two digits in the product name indicate the approximate Shore A hardness of the cured rubber. Choose the appropriate hardness of rubber for your application.

- **TinSil 70-11, 70-20 and Gel-10** are soft and, therefore, best for delicate castings. TinSil Gel-10 is translucent and especially useful for animatronics and special effects.
- **TinSil 70-25 and 70-30** are popular and versatile, mid-range hardness, silicone rubbers.
- **TinSil Brush/Spray-25** is brushable or sprayable and can be applied by hand or sprayed with a low-cost Plas-Pak spray gun or more sophisticated 1:10 ratio spray equipment. This product is great for making large blanket molds!
- **TinSil 70-60** is stable at higher temperatures making it suitable for casting low melting metals. TinSil 70-60 has limited tear strength because of its hardness.

MODEL PREPARATION: Porous models such as wood or plaster must be sealed to prevent penetration of the liquid rubber into the pores of the material. Wax, petroleum jelly, lacquer, paint and most other coatings are suitable sealers. Pol-Ease® 2350 Release Agent can be sprayed or brushed onto an unsealed model to act as both a sealer and release agent. A couple of coats of Pol-Ease 2350 may be required depending on the porosity of the model. Allow to dry before pouring rubber. Do not use Pol-Ease 2300 Release Agent on surfaces that contact liquid TinSil, since inhibition and/or adhesion can occur. Pol-Ease 2500 Release Agent can be used on sealed models or on cured silicone rubber to prevent additional liquid silicone from adhering. TinSil rubbers bond to cured silicone rubbers unless a parting agent is used. Modeling clays containing sulfur may inhibit curing. In every case where there is any question about the compatibility between the rubber and the prepared model surface, a test cure should be made on an identical surface to determine that complete curing and good release are obtained.

Porous models should be vented from beneath to prevent trapped air from causing bubbles in the rubber.

Why Choose TinSil® 70-Series Rubbers?

- Easy mix ratios; most 1:10
- Easy release properties -- save on release agents
- High tear strength -- fewer prematurely torn molds
- Heat-resistant -- suitable for casting low-melting-point metals
- Range of hardness from A10 to A60

MIXING & CURING: Weigh proper amounts of Part B and then Part A into a clean mixing container. *Accurate weighing is essential to obtain optimum physical properties from the cured rubber*. Mix thoroughly, scraping sides and bottom of the container. If the liquid rubber is mixed carefully, so as not to whip air into the mix, 70-Series products can be poured without vacuum degassing. To ensure a bubble-free mold, however, place the liquid rubber in a vacuum chamber at 28-29 inches mercury until the mass of rubber rises and then collapses. Deaerate for additional two minutes. When vacuuming, use a mixing container three to four times larger than the volume of rubber.

To reach full hardness in the specified demold time, temperature should be above 77°F (25°C). At lower temperatures, more time may be needed to reach full hardness. Curing below 65°F (18°C) is not recommended.

TinSil products release alcohol while curing. Before casting polyurethanes in a TinSil mold, be sure that all alcohol has evaporated since alcohol inhibits surface cure of some polyurethanes. Exposure for 24 hours to a warm location in open air is often adequate, but the mold can be baked for four hours at 212°F (100°C) to speed alcohol evaporation.

USING THE MOLD: No release agent is necessary for casting most materials in TinSil molds. For longer mold life, however, apply a barrier coat, or Pol-Ease 2300 or 2500 Release Agent to molds before casting epoxy, polyurethane or polyester resins. TinSil molds can be stored for a year or more, but as with most tin-catalyzed silicones, molds may eventually deteriorate and lose their elasticity. Molds made with excess catalyst may degrade from aging faster than silicone rubbers cured with less catalyst.

FASTER CURES FOR RAPID DEMOLDING: Use TinSil FastCat **in place of** any TinSil Part A to accelerate cure and shorten demold time. When using FastCat, the working time is shorter as well, so avoid over-catalyzing. FastCat can be used in a range of two to six parts per 100 parts B. At two parts FastCat to 100 parts B, the working time and demold time will be similar to that observed when using 10 parts of the appropriate TinSil Part A. At three parts FastCat per 100 parts TinSil B, the working time will be reduced to ~20-30 minutes, with less than an eight-hour demold. Experiment with a small mix first to determine the best amount of FastCat to use. Use of FastCat can shorten the library life of cured TinSil rubber.

BRUSH ON BLANKET MOLDS: TinSil 70-Series rubbers can be thickened with TinThix liquid thickener or Fumed Silica for brushing on blanket molds. TinThix is a liquid additive that can be added to the mixed A and B to achieve varying levels of thixotropy. TinSil Brush/Spray 25 is brushable or sprayable as supplied. SiliColor Silicone Pigments can be used to vary the color of brushed layers to help insure uniform coverage.

Blanket molds can be reinforced by placing stretchy, mesh nylon or dacron cloth into the uncured rubber. The fabric should not be too close to the mold surface or the weave of the cloth may show through to the face of the mold.

THINNING AND SOFTENING WITH SILICONE FLUID: The very low viscosity 50 cSt Silicone Fluid can be added sparingly to the mixed rubber to thin the mix with some loss of strength, hardness and cure speed. More than 10% fluid addition may exude from the cured rubber. A 10% addition to TinSil 70-20 will reduce hardness to approximately Shore A10-15.

BARRIER COAT: A barrier coat is a fast drying, lacquer-like primer that is sprayed into a silicone mold and allowed to dry prior to pouring liquid plastic or foam. Upon removing the cured plastic casting from the mold, the barrier coat comes out on the casting resulting in a primed part. Also, using a barrier coat can extend mold life.

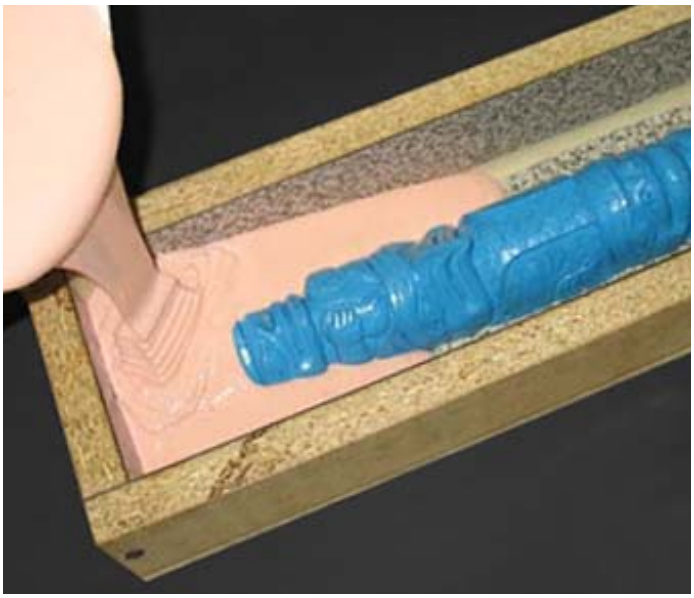
SAFETY: Before use, read product labels and Safety Data Sheets. Follow safety precautions and directions. Contact with uncured products may cause severe eye and skin irritation. Avoid contact. If skin contact occurs, remove by wiping with paper towels, then wash with soap and water. In case of eye contact, flush with water for 15 minutes and call a physician. Use with adequate ventilation. If solvents must be used for cleanup, denatured ethyl alcohol is best, but should be handled with respect for health and flammability hazards. Do not use TinSil products where food or body contact may occur.

PACKAGING

Product	Kit Size (lb)	Part A (lb)	Part B (lb)
TinSil® Gel-10, 70-11, 70-20, & 70-25 Mix Ratio 1A:10B (By Weight)	1.0 9.0 44 495	0.1 0.9 4.0 45	0.9 8.1 40 450
TinSil® 70-30 Mix Ratio 2A:100B (By Weight)	1.02 8.3 40.8 448.8	0.02 0.2 0.8 8.8	1.0 8.1 40 440
TinSil® 70-60 Mix Ratio 5A:100B (By Weight)	1.05 8.4 42	0.05 0.4 2.0	1.0 8.0 40
TinSil® Brush/Spray 25 Mix Ratio 1A:10B (By Weight)	2.0 (Cartridge) 9.0 44 495	0.2 0.9 4.0 45	1.8 8.1 40 450

PHYSICAL PROPERTIES

	TinSil Gel-10 & 70-11	70-20	70-25	Brush/Spray 25	70-30	70-60
Mix Ratio (By Weight)	1A:10B	1A:10B	1A:10B	1A:10B	2A:100B	5A:100B
Hardness, Shore A	10	20	25	25	30	60
Pour Time (min)	45	60	60	30	60	30
Demold Time (hr) @ 77°F	16	16	16	16-24	24	24
Specific Gravity	1.1	1.1	1.1	1.1	1.1	1.5
Color, Cured	Translucent (Gel-10) Blue (70-11)	Blue	Blue	Translucent	Beige	Red
Initial Mixed Viscosity (cP)	10,000	10,000	14,000	Thixotropic	26,000	17,000
Specific Volume, in^3/lb	25.3	25.3	25.3	25.3	25.3	18
Shrinkage Upon Cure (%)	~0.3	~0.3	~0.3	~0.3	~0.3	~0.8



Why Choose TinSil® 80-Series Rubbers?

- High tear and excellent chemical resistance leads to long mold life
- Lower viscosity than similar hardness silicone systems
- Less shrinkage upon cure than other tin-catalyzed systems
- Longer library life than other tin-catalyzed systems

TinSil® 80-Series

Low Shrinkage Silicone Rubbers with Long Library Life

DESCRIPTION: TinSil® 80-Series RTV Silicone Rubbers are condensation-cure, tin-catalyzed, flexible mold rubbers. TinSil 80-Series products were designed for applications where high tear, excellent chemical resistance, low shrinkage upon cure, and longer library life for the cured molds are required.

TinSil products consist of a liquid Part B base and Part A accelerator, which, after mixing at the proper ratio by weight, cure at room temperature to rubber with a tough, knotty tear property. TinSil molds have easy release properties and are resistant to high temperatures. TinSil molds are excellent for casting polyesters, epoxy and polyurethane resins, waxes and many other materials.

As with other Polytek® elastomers, the last two digits in the product name indicate the approximate Shore A hardness of the cured rubber.

MODEL PREPARATION: Porous models such as wood or plaster must be sealed to prevent penetration of the liquid rubber into the pores of the material. Wax, petroleum jelly, lacquer, paint and most other coatings are suitable sealers. Pol-Ease® 2350 Release Agent can be sprayed or brushed onto an unsealed model to act as both a sealer and release agent. A couple of coats of Pol-Ease 2350 may be required depending on the porosity of the model. Allow to dry before pouring rubber. Do not use Pol-Ease 2300 Release Agent on surfaces that contact liquid TinSil, since inhibition and/or adhesion can occur. Pol-Ease 2500 Release Agent can be used on sealed models or on cured silicone rubber to prevent additional liquid silicone from adhering. TinSil rubbers bond to cured silicone rubbers unless a parting agent is used. Modeling clays containing sulfur may inhibit curing. In every case where there is any question about the compatibility between the rubber and the prepared model surface, a test cure should be made on an identical surface to determine that complete curing and good release are obtained.

Porous models should be vented from beneath to prevent trapped air from causing bubbles in the rubber.

MIXING & CURING: Weigh proper amounts of Part B and then Part A into a clean mixing container. *Accurate weighing is essential to obtain optimum physical properties from the cured rubber*. Mix thoroughly, scraping sides and bottom of the container. If the liquid rubber is mixed carefully, so as not to whip air into the mix, it can be poured without vacuum degassing. To ensure a bubble-free mold, however, deaerate the liquid rubber under vacuum at 28-29 inches mercury until the mass of rubber rises and then collapses. Deaerate for additional two minutes. When vacuuming, use a mixing container three to four times larger than the volume of rubber.

To reach full hardness in the specified demold time, temperature should be above 77°F (25°C). At lower temperatures, more time may be needed to reach full hardness. Curing below 65°F (18°C) is not recommended.

TinSil products release alcohol while curing. Before casting polyurethanes in a TinSil mold, be sure that all alcohol has evaporated since alcohol inhibits surface cure of some polyurethanes. Exposure for 24 hours to a warm location in open air is often adequate, but the mold can be baked for four hours at 212°F (100°C) to speed alcohol evaporation.

USING THE MOLD: No release agent is necessary for casting most materials in TinSil molds. For longer mold life, however, apply a barrier coat, or Pol-Ease 2300 or 2500 Release Agent to molds before casting epoxy, polyurethane or polyester resins. TinSil molds can be stored, but as with most tin-catalyzed silicones, molds may eventually deteriorate and lose their elasticity. Molds made with excess catalyst may degrade from aging faster than silicone rubbers cured with less catalyst.

FASTER CURES FOR RAPID DEMOLDING: Use TinSil FastCat **in place of** any TinSil Part A to accelerate cure and shorten demold time. When using FastCat, the working time is shorter as well, so avoid over-catalyzing. FastCat can be used in a range of two to six parts per 100 parts B. At two parts FastCat to 100 parts B, the working time and demold time will be similar to that observed when using 10 parts of the appropriate TinSil Part A. At three parts FastCat per 100 parts TinSil B, the working time will be reduced to ~20-30 minutes, with less than an eight-hour demold. Experiment with a small mix first to determine the best amount of FastCat to use. Use of FastCat can shorten the library life of cured TinSil rubber.

BRUSH ON BLANKET MOLDS: TinSil 80-Series rubbers can be thickened with TinThix liquid thickener or with Fumed Silica for brushing on a blanket mold. SiliColor Silicone Pigments can be used to vary the color of brushed layers to help insure uniform coverage.

Blanket molds can be reinforced by placing stretchy, mesh nylon or dacron cloth into the uncured rubber. The fabric should not be too close to the mold surface or the weave of the cloth may show through to the face of the mold.

THINNING AND SOFTENING WITH SILICONE FLUID: The very low viscosity 50 cSt Silicone Fluid can be added sparingly to the mixed rubber to thin the mix with some loss of strength, hardness and cure speed. More than 10% fluid addition may exude from the cured rubber. A 10% addition to TinSil 80-30 will reduce hardness to approximately Shore A25.

BARRIER COAT: A barrier coat is a fast drying, lacquer-like primer that is sprayed into a silicone mold and allowed to dry prior to pouring liquid plastic or foam. Upon removing the cured plastic casting from the mold, the barrier coat comes out on the casting resulting in a primed part. Also, using a barrier coat can extend mold life.

SAFETY: Before use, read product labels and Safety Data Sheets. Follow safety precautions and directions. Contact with uncured products may cause severe eye and skin irritation. Avoid contact. If skin contact occurs, remove by wiping with paper towels, then wash with soap and water. In case of eye contact, flush with water for 15 minutes and call a physician. Use with adequate ventilation. If solvents must be used for cleanup, denatured ethyl alcohol is best, but should be handled with respect for health and flammability hazards. Do not use TinSil products where food or body contact may occur.

TinSil® 80-30 is brushed over the helmet to make a blanket mold. Then a mold shell is made over the cured rubber mold with Poly 1512X plastic. The blanket mold and shell are pictured with the cast helmet.

PACKAGING			
	Kit Size (lb)	Part A (lb)	Part B (lb)
TinSil® 80-15, 80-25, & 80-30 Mix Ratio 1A:10B	1.0 9.0 44.0 495	0.1 0.9 4.0 45.0	0.9 8.1 40.0 450

PHYSICAL PROPERTIES			
	80-15	**80-25**	**80-30**
Mix Ratio (By Weight)	1A:10B	1A:10B	1A:10B
Hardness, Shore A	15	25	30
Pour Time (min)	30	45	45
Demold Time (hr) @ 77°F	24	24	24
Specific Gravity	1.10	1.10	1.17
Color, Cured	Peach	Peach	Peach
Initial Mixed Viscosity (cP)	12,000	15,000	17,000
Specific Volume, in^3/lb	25.3	25.3	23.7
Shrinkage Upon Cure (%)	~0.2	~0.2	~0.2

PlatSil® 71-Series

High-Performance, Silicone Rubbers

DESCRIPTION: PlatSil® 71-Series RTV Silicone Rubbers are two-component, addition-cure, platinum-catalyzed, flexible, mold compounds. The 71-Series products exhibit a tough, knotty tear, making them especially valuable to the mold making industry. They are excellent mold materials for casting polyester, epoxy and polyurethane resins, as well as for waxes and many other materials. PlatSil 71-Series products offer advantages over tin-catalyzed systems in certain applications because on curing they don't shrink and don't produce alcohol (like tin-catalyzed silicones), which can inhibit urethane castings.

MODEL PREPARATION: Seal porous models (i.e., wood or plaster) with wax, petroleum jelly, lacquer or paint to prevent penetration of the rubber into the pores of the material. The model and other surfaces that contact the liquid rubber should be coated lightly with Pol-Ease® 2350 Release Agent or sprayed with Pol-Ease 2500 Release Agent. Pol-Ease 2350 is both a sealer and release agent and must be allowed to dry before applying liquid rubber. Pol-Ease 2500 is an aerosol spray and does not need to dry before applying liquid rubber. *Do not use silicone-based release agents (i.e., Pol-Ease 2300) on surfaces that contact liquid PlatSil rubbers since inhibition and/or adhesion may occur.* In every case where there is any question about the compatibility between the rubber and the prepared model surface, perform a test cure on an identical surface to determine that complete curing and good release are obtained.

PlatSil 71-Series rubbers may bond to cured silicone rubbers unless a parting agent is used.

Porous models must be vented from beneath to prevent trapped air from causing bubbles in the rubber.

Why Choose PlatSil® 71-Series Rubbers?

- Easy mix ratios; some 1:1 mixes available
- Easy release properties -- save on release agents
- High tear strength -- fewer prematurely torn molds
- Good chemical resistance for longer mold life
- Low/zero shrinkage for dimensional reproduction
- Range of hardnesses from A10 to A40

MIXING & CURING: Carefully weigh Part B then Part A in proper ratio into a clean mixing container. *Accurate weighing is essential to obtain the optimum physical properties from the cured rubber*. Mix thoroughly, scraping sides and bottom of the container. To assure a bubble-free mold, deaerate the liquid rubber under vacuum at 28-29 inches mercury, until the mass of rubber rises and then collapses. Deaerate for additional two minutes. When vacuuming, use a mixing container three to four times larger than the volume of rubber. Do not attempt to vacuum fast setting 71-10. (Note: PlatSil 71-10 Part B and 71-20 Parts A and B require stirring before use.)

If reinforcement of the rubber is needed (i.e., thin blanket molds), place stretchy, mesh nylon or dacron cloth into the uncured rubber. Be sure that the fabric is not too close to the mold surface or the weave of the cloth may show through to the face of the mold.

PlatSil 71-Series rubbers cure faster at higher temperatures. To reach full hardness in the specified demold time, temperature should be above 77°F. At lower temperatures, more time may be needed to reach full hardness. Curing below 65°F is not recommended.

Note on SiliGlass: Demold Siliglass within one-half to one hour after mixing to prevent crumbling upon demolding. As curing progresses, Siliglass becomes harder and more brittle and the likelihood of breaking increases.

CURE INHIBITION: *CAUTION! Contamination from amines, sulfur, tin compounds, cured polyester resins, or some RTV silicone rubbers may inhibit surface cure*. If in doubt, test compatibility by pouring a small quantity of catalyzed material on the surface to be reproduced, allow to cure and observe for proper cure and release.

USING THE MOLD: No release agent is necessary for casting most materials in PlatSil 71-Series molds, but for longer mold life with epoxy, polyurethane or polyester resins, a barrier coat or release agent (i.e., Pol-Ease 2300) is recommended. Properly cured PlatSil 71-Series molds last for years without deterioration.

ACCELERATING CURE SPEED: Accelerate the cure with heat or the addition of PlatSil 71/73X. Mix 71/73X with Part B prior to adding Part A. Weigh and add Part A to the accelerated Part B mixture and mix thoroughly. Pour over a properly prepared model as soon after mixing as possible. The addition of one part 71/73X per 100 parts of Part B decreases the gel time to ~1/3 the normal gel time. The addition of two parts decreases the normal gel time to ~1/4. The addition of three parts decreases the normal gel time to ~1/6. Experiment on a small scale before making a larger mix. Remember, heat accelerates the cure; low temperatures slow the cure.

RETARDING CURE SPEED: PlatSil 71R added to PlatSil Part A prior to mixing with Part B slows the cure yielding longer working time and longer demold time. Adding ~1% of 71R to the total mixed weight of PlatSil A+B roughly doubles the working time. Adding ~2% of 71R triples working time. Do not use more than 4% as the system may not cure at all.

THICKENING FOR BRUSH ON: For brushing on a blanket mold, thicken PlatSil 71-Series rubbers with PlatThix liquid thickener or with Fumed Silica. When brushing PlatSil 71-11 or 71-20, apply subsequent coats to the previous layer within one hour to obtain best adhesion. SiliColor Silicone Pigments can be used to vary the color of brushed layers to help insure uniform coverage.

THINNING AND SOFTENING WITH SILICONE FLUID: The very low viscosity 50 cSt Silicone Fluid can be added sparingly to the mixed rubber to thin the mix with some loss of strength, hardness and cure speed. More than 10% fluid addition may exude from the cured rubber. A 5% addition to PlatSil 71-30 will reduce hardness to approximately Shore A25.

BARRIER COAT: A barrier coat is a fast drying, lacquer-like primer that is sprayed into a silicone mold and allowed to dry prior to pouring liquid plastic or foam. Upon removing the cured plastic casting from the mold, the barrier coat comes out on the casting resulting in a primed part. Also, using a barrier coat can extend mold life.

SAFETY: Before use, read product labels and Safety Data Sheets. Follow safety precautions and directions. Avoid contact with mucous membranes and eyes. Best method of clean up is by wiping with paper towels, then washing with soap and water. If solvents must be used, denatured ethanol is good, but handle with extreme caution owing to its flammability and health hazards.

PACKAGING

Product	Kit Size (lb)	Part A (lb)	Part B (lb)
PlatSil® 71-11, 71-20, & SiliGlass	2.0	1.0	1.0
Mix Ratio 1A:1B	16.0	8.0	8.0
(By Weight)	80	40	40
PlatSil® 71-10, 71-30, & 71-35	1.0	0.1	0.9
Mix Ratio 1A:10B	9.0	0.9	8.1
(By Weight)	44	4.0	40
	495	45	450
PlatSil® 71-40	9.8	1.7	8.1
Mix Ratio 1A:5B	48	8.0	40
(By Weight)	528	88	440

PHYSICAL PROPERTIES

	71-10	71-11	71-20	71-30	71-35	71-40	SiliGlass
Mix Ratio, By Weight	1A:10B	1A:1B	1A:1B	1A:10B	1A:10B	1A:5B	1A:1B
Hardness, Shore A	10	10	20	30	35	40	40
Pour Time (min)	5	20	25	60	60	60	5
Demold Time (hr) @ 77°F	0.5	4	4	24	24	24	0.5-1
Color	Pink	Blue Green	Lt. Purple	Lt. Green	Blue	Translucent	Clear
Mixed Viscosity (cP)	3,500	6,000	12,000	25,000	25,000	25,000	200
Specific Volume (in^3/lb)	26	24.7	24.7	24.7	24.7	25	28
Specific Gravity	1.06	1.12	1.12	1.12	1.12	1.10	0.97

PlatSil® 73-Series

High-Performance, Silicone Rubbers

DESCRIPTION: PlatSil® 73-Series RTV Silicone Rubbers are two-component, high-strength, flexible, mold compounds. Molds made with 73-Series Silicones are excellent for casting many materials including polyester, epoxy and polyurethane resins and foams. The 73-Series Silicones are addition-cure, platinum-catalyzed systems, and offer advantages over tin-catalyzed systems in certain applications, because on curing they don't shrink, they don't produce alcohol (which can inhibit urethane castings), and their cure can be heat accelerated.

MODEL PREPARATION: Seal porous models (i.e., wood or plaster) with wax, petroleum jelly, PVA, lacquer or paint to prevent penetration of the rubber into the pores of the material. The model and other surfaces that contact the liquid rubber should be coated lightly with Pol-Ease® 2350 Release Agent or sprayed with Pol-Ease 2500 Release Agent. Pol-Ease 2350 is both a sealer and release agent and must be allowed to dry before applying liquid rubber. Pol-Ease 2500 is an aerosol spray and does not need to dry before applying liquid rubber. *Do not use silicone-based release agents (i.e., Pol-Ease 2300) on surfaces that contact liquid PlatSil rubbers since inhibition and/or adhesion may occur. In addition, modeling clays containing sulfur may inhibit curing*. PlatSil rubbers usually bond to cured silicone rubbers unless a parting agent is used. If there is any question about the compatibility between the rubber and the prepared model surface, a test cure should be made on an identical surface to determine that complete curing and good release are obtained.

Porous models must be vented from beneath to prevent trapped air from forming bubbles in the rubber.

Why Choose PlatSil® 73-Series Rubbers?

- Low viscosity for excellent reproduction of details and easy degassing
- Easy mix ratios -- can use with dispensing machines
- Cure at room temperature or accelerate with heat
- Easy release properties -- save on release agents
- High tear strength -- fewer prematurely torn molds
- Good chemical resistance for longer mold life
- Low/zero shrinkage for better dimensional reproduction
- Range of hardness from A15 to A60

MIXING & CURING: Weigh Part B and Part A in proper ratio into a clean mixing container. *Accurate weighing is essential to obtain optimum physical properties from the cured rubber.* Mix thoroughly, scraping sides and bottom of the container.

To ensure a bubble-free mold, it may be necessary to deaerate the liquid rubber under vacuum at 28-29 inches mercury. PlatSil 73-45 and 73-60 work best with vacuum. Other 73-Series rubbers (especially 73-15, 73-20 and 73-25) do not necessarily need vacuuming since they are low viscosity. Evaluate the need for vacuum on a case-by-case basis. If vacuum is used, use a mixing container three to four times larger than the volume of rubber and deaerate until the mass of rubber rises and then collapses and continue for an additional two minutes. Pour the rubber as soon as possible after mixing/vacuuming for best flow and air bubble release.

If reinforcement of the rubber is needed (i.e., in thin blanket molds), place stretchy, mesh nylon or dacron cloth into the uncured rubber. Be sure that the fabric is not too close to the mold surface or the weave of the cloth may show through to the face of the mold.

PlatSil 73-Series rubbers cure faster at higher temperatures. To reach full hardness in the specified demold time, temperature should be above 77°F (25°C). At lower temperatures, more time may be needed to reach full hardness. Curing below 65°F (18°C) is not recommended.

CURE INHIBITION: *CAUTION! Contamination from amines, sulfur, tin compounds, polyester resins or some RTV silicone rubbers may inhibit surface cure*. If in doubt, test compatibility by pouring a small quantity of catalyzed material on the surface to be reproduced, allow to cure and observe for proper cure and release.

USING THE MOLD: No release agent is necessary for casting most materials in 73-Series molds; but, for longer mold life with epoxy, polyurethane or polyester resins, a barrier coat or

release agent (i.e., Pol-Ease 2300 or 2500) is recommended. Properly cured 73-Series molds last for years without deterioration. PlatSil 73-Series molds are recommended for casting polyurethane foam, such as Polytek's PolyFoam systems. Refer to the PolyFoam Technical Bulletin for more information.

ACCELERATING CURE SPEED: PlatSil 71/73X can be used to accelerate gel and cure times. Weigh and add 71/73X to Part B and mix. Then weigh and add Part A to the Part B and 71/73X mixture and mix thoroughly. Pour over a prepared model as soon after mixing as possible. Demold when tack free. Experiment to determine the proper amount of 71/73X for the application. For 73-29, the addition of one part 71/73X per 100 parts of Part B decreases the gel time from 45 min to ~35 min. The addition of two parts decreases the gel time to ~30 min. The addition of three parts decreases the gel time to ~25 min. Adding 71/73X softens the cured rubber slightly.

Remember, heat accelerates the cure; low temperatures slow the cure.

THICKENING FOR BRUSH ON: PlatSil 73-Series rubbers can be thickened with PlatThix liquid thickener or with Fumed Silica for brushing on a blanket mold. SiliColor Silicone Pigments can be used to vary the color of brushed layers to help insure uniform coverage.

THINNING AND SOFTENING WITH SILICONE FLUID: The very low viscosity 50 cSt Silicone Fluid can be added sparingly to the mixed rubber to thin the mix with some loss of strength, hardness and cure speed. If more than 10% fluid is added to the mix, then fluid might exude from the cured rubber.

BARRIER COAT: A barrier coat is a fast drying, lacquer-like primer that can be sprayed into a silicone mold and allowed to dry prior to pouring liquid plastic or foam. Upon removing the cured plastic casting from the mold, the barrier coat comes out on the plastic casting resulting in a primed part. Using a barrier coat can extend mold life.

PlatSil® 73-25 is an easy 1:1 mix ratio silicone rubber. Parts A and B are different colors, so it's easy to determine complete mixing.

SAFETY: Before use, read product labels and Safety Data Sheets. Follow safety precautions and directions. Avoid contact with mucous membranes and eyes. Best method of cleanup is by wiping with paper towels and washing with waterless hand cleaner, then soap and water. If solvents must be used, denatured ethyl alcohol is best, but should be handled with respect for health and flammability hazards.

PACKAGING

Product	Kit Size (lb)	Part A (lb)	Part B (lb)
PlatSil® 73-15, 73-20, & 73-25	2.0	1.0	1.0
	16.0	8.0	8.0
Mix Ratio 1A:1B (By Weight)	80	40	40
PlatSil® 73-29, 73-40, 73-45, & 73-60	1.0	0.1	0.9
	9.0	0.9	8.1
	44	4.0	40
Mix Ratio 1A:10B (By Weight)	495 lb*	45*	450*
* Applies to 73-29 & 73-40	550	50	500

PHYSICAL PROPERTIES

	73-15	73-20	73-25	73-29	73-40	73-45	73-60
Mix Ratio, By Weight	1A:1B	1A:1B	1A:1B	1A:10B	1A:10B	1A:10B	1A:10B
Hardness, Shore A	15	22	25	30	40	45	60
Pour Time (min)	20	5	15	45	45	60	45
Demold Time (hr) @ 77°F	4-5	1	4-5	16	16	16	16
Color	White Translucent	Gray Translucent	Green	White	Yellow	Green	Blue
Mixed Viscosity (cP)	2,500	2,000	6,000	15,000	25,000	35,000	40,000
Specific Volume (in^3/lb)	25.0	25.0	24.3	25.0	22.0	21.3	21.3
Specific Gravity	1.10	1.10	1.14	1.10	1.26	1.30	1.30

Why Choose PlatSil® Gels?

- Soft, translucent, silicone rubbers
- Add “Deadener” to create ultra-realistic prosthetic appliances with varying skin effects and levels of adhesion
- Fast 30-minute demold with 6-minute working time
- PlatSil 71R Retarder slows the cure
- PlatSil 71/73X Accelerator speeds the cure
- PlatThix thickens to a brushable mix
- Bonds to Poly Plastics

PlatSil® Gels

Soft, Translucent Rubbers for Theatrical Prosthetics, Life casting & Mold Making Applications

DESCRIPTION: PlatSil® Gel-OO and Gel-10 are 1A:1B (by weight or volume) platinum-cured silicone systems with six-minute working and 30-minute demold times. PlatSil Gel-OO cures to a Shore OO hardness of 30; while Gel-10 cures to a Shore A10 hardness. Use PlatSil Gels as mold rubbers, to create prosthetic appliances, or for Life casting. Polytek offers an array of accessory products that can be used independently or in concert to increase working time; accelerate cure time; thicken the mix for brushing/layering; thin the mix for easier pouring, or for softening or “deadening” the rubber to soften and eliminate the snappy, synthetic look and feel of ordinary silicone rubbers. Deadened PlatSil Gels can be made to look, feel and move like all types of living tissue. Unlike silicone fluid, Smith’s Theatrical Prosthetic Deadener does not leach from the cured rubber/appliance, so bonding and use are far easier.

MIXING AND CURING: Carefully weigh equal amounts of Parts A and B into a clean container. Mix thoroughly, scraping sides and bottom of the container. Normal mixes gel in approximately six minutes at room temperature; faster if warm, slower if cold. The mix should be quickly placed over the model or in the mold. Normally, there is not adequate time for vacuum (unless retarder is used), but pressure casting can be used to eliminate bubbles.

MOLD MAKING: Seal porous models (i.e., wood or plaster) with wax, petroleum jelly, lacquer or paint to prevent penetration of the rubber into the pores of the material. The model and other surfaces that contact the liquid rubber should be coated lightly with Pol-Ease® 2350 Release Agent or sprayed with Pol-Ease 2500 Release Agent. Pol-Ease 2350 is both a sealer and release agent and must be allowed to dry before applying liquid rubber. Pol-Ease 2500 is an aerosol spray and does not need to dry before applying liquid rubber. *Do not use silicone-based release agents (i.e., Pol-Ease 2300) on surfaces that contact liquid PlatSil rubbers since inhibition and/or adhesion may occur. In addition, modeling clays containing sulfur may inhibit curing*. Contamination with soaps, amines, sulfur, tin compounds, polyester resins and some silicone rubbers can inhibit surface cure. PlatSil rubber usually bonds to cured silicone rubbers unless a parting agent (i.e., Pol-Ease 2350 or 2500 Release Agent) is used. If in doubt, perform a test cure on a similar surface.

Porous models should be vented from beneath to prevent trapped air from causing bubbles in the rubber.

For best results, the PlatSil Gel mold should be allowed to cure for at least one hour before it is put into use. No release agent is necessary for casting most materials in properly cured PlatSil Gels. For longer mold life when casting epoxy, polyurethane or polyester resins, a barrier coat or release agent is recommended.

MAKING THEATRICAL PROSTHETIC APPLIANCES: For the purpose of prosthetic and simulated tissue/skin applications, use Gel-OO, Gel-10, or mix the two products for varied hardness. If even softer rubber is required, add Smith's Theatrical Prosthetic Deadener. Adding 30% by weight of Deadener typically results in a non-paintable, sticky cured gel. The stickiness can be eliminated with powder (once powdered, the stickiness cannot be brought back), or by painting a thin barrier coat of straight PlatSil Gel over the sticky surface. PlatSil Gel applied as a barrier mimics the surface tension of skin. Up to 250% by weight Deadener can be added to the mixed weight of Gel-10 to create a super-gel. Less Deadener is required when using Gel-OO.

PlatSil Gels can be painted or pigmented with a variety of silicone-based pigments such as SiliColors. Flocking can also be used to achieve tissue-like appearances.

PlatSil Gels can be stippled lightly onto a prepared mold surface (i.e., released with Pol-Ease 2350 allowed to dry, or Pol-Ease 2500), and then layered with deadened PlatSil Gel. The deadened mix can also be injected by syringe into a mold cavity. Using injection, one can create ultra-thin edges that are easily feathered away when applied to the subject.

The sticky back surface of the prosthetic appliance permits direct, adhesive-free application to the subject. The appliance can be carefully removed, covered with clear, clean plastic wrap or wax paper and reused. These prosthetics can also be adhered to the skin using uncured PlatSil Gel as a glue (e.g., apply directly to the skin or back of the prosthetic).

LIFE CASTING: PlatSil Gels can be used to make molds of hands, feet, faces and other body parts. Avoid PlatSil Gel contact with eyes, nose, mouth or mucous membranes. Perform small-scale patch testing on the subject prior to starting the project to determine that the subject is not unusually sensitive or allergic to any of the components. PlatSil Gels can be mixed with PlatThix and 71/73X Accelerator to achieve a brushable mix with a suitable demold time. Addition of 4-5% by weight 71/73X results in a demold time of ~10 minutes.

ACCELERATING CURE SPEED: Mix PlatSil 71/73X into Part B before adding Part A to accelerate gel and cure times. Adding 4 to 5% 71/73X to the total mix weight reduces working time to three minutes with a ~10-minute demold. Experiment to determine the best level of 71/73X for the application.

RETARDING CURE SPEED: Add PlatSil 71R to Part A prior to mixing with Part B to slow the cure yielding longer working time and longer demold time. Add 71R at 1% of the weight of the total mix (A+B) to roughly double the working time. Add 2% to triple the working time. Add 5% to yield a 60-minute working time with a fast, 120-minute demold time. Never use more than 5%, since the system may not cure at all.

THICKENING FOR BRUSH ON: Thicken PlatSil Gel by adding PlatThix liquid thickener to the mixed Parts A and B. Add 1% PlatThix to the total mix (by weight) for a light-bodied, non-sag gel. Add up to 5% PlatThix for a thicker mix. Very small quantities of TinThix can be added for thickening, but be careful not to over thicken with TinThix.

THINNING AND SOFTENING: Add 50 cSt Silicone Fluid to the mixed rubber to thin the mix. Use the fluid sparingly since it leads to some loss of strength, hardness and cure speed. More than 10% fluid addition may exude from the cured rubber. To soften without oil leaching, use Smith's Prosthetic Deadener (see above).

COLORING: SiliColor Silicone Pigments can be added separately or in combination to achieve any desired color. SiliColors are available in Fleshtone, Black, Blue, Green, Red, White and Yellow.

BONDING TO PLASTICS: PlatSil Gels bond to clean, cured Poly 15-Series Plastics that are less than 24-hours old. Poly 15-Series Plastics bond to PlatSil Gels if poured into the PlatSil Gel while it is still tacky (less than 30-minutes old). Each bonding procedure should be tested to the user's satisfaction prior to actual use in production scale. Remember, release agents on any surface may interfere with good bond development.

PHYSICAL PROPERTIES		
	Gel-OO	**Gel-10**
Mix Ratio, By Weight or Volume	1A:1B	1A:1B
Hardness (Shore)	OO30	A10
Pour Time (minimum)	6 min	6 min
Demold time @ 25°C (77°F)	30 min	30 min
Color	Milky White	Milky White
Mixed Viscosity (cP)	15,000 cP	15,000 cP
Specific Volume (in^3/lb)	25	25
Specific Gravity @ 25°C (77°F)	1.1	1.1
Shrinkage Upon Cure	Nil	Nil

PACKAGING			
Product	Kit Size (lb)	Part A (lb)	Part B (lb)
PlatSil® Gel-OO & Gel-10	2.0	1.0	1.0
Mix Ratio 1A:1B	16.0	8.0	8.0
(By Weight)	80.0	40.0	40.0

PlatSil® Gels can be used to create simulated skin, scary effects, medical models, and so much more.

SAFETY: Before use, read product labels and Safety Data Sheets. Follow safety precautions and directions. Avoid contact with mucous membranes and eyes. Best method of clean up is by wiping with disposable paper towels and washing with waterless hand cleaner, then soap and water. If solvents must be used, denatured ethyl alcohol is best, but should be handled with respect for health and flammability hazards. PlatSil Gels conform to ASTM D4236.

Product Overview

Polytek® produces liquid casting systems that cure to plastics, foams and rubbers.

Liquid plastics and foams are used to cast decorative objects, parts, tools, and patterns, as well as, to create lightweight mold shells and mold boxes to support blanket molds. These products vary in density and appearance: they can mimic thermoplastics, glass, wood, stone, metals and more. Casting plastics can be poured, brushed or sprayed to accommodate any size casting or object. Varying viscosities, pot-lives, cure times and physical properties allow customers to choose a casting material tailored to their particular needs.

For prototyping applications, fast-curing casting rubbers (i.e., PT Flex Series) are popular. These rubbers are designed as casting rubbers to make prototype parts fast, but can be used for making quick molds too.

MOLD PREPARATION: Before pouring liquid casting resins, be sure that the mold surface is properly prepared in order to prevent sticking or foaming. Polyethylene and silicone molds, such as TinSil® and PlatSil® rubbers, do not require a release agent, but a barrier coat may be helpful. Latex, polyurethane rubber or metal molds must be dry and require a coat of release agent. A trial casting or application should be made to avoid damaging a valuable mold and/or wasting liquid plastic.

MOLD SHELLS: To create fast, lightweight mold shells, use a liquid plastic, such as Poly 15 Series, thickened with Poly Fiber II. Mix the Poly Fiber II into the resin to create a thixotropic consistency, which can be applied to the mold surface like frosting a cake. Be sure to apply wax and then release agent to the exterior of the mold before applying shell material. See pp. 16-18 for more information on making plastic mold shells. PolyFoams can be used to make mold boxes instead of shells.

AT A GLANCE

EasyFlo Series - Low viscosity, 1:1 mix by volume, fast-setting plastics that can be poured, rotocast or sprayed. Fire-retardant versions are available. *Polytek's easiest-to-use and best selling plastics!*

Poly 15 Series - Strong plastics with varying densities: some are like thermoplastics, others like stone.

Poly PT Flex Series - Strong, fast-curing rubbers for prototyping and model making. Special fire-retardant formulations are available.

Poly-Optic® 14 Series - Water clear, non-yellowing casting resins for specialty applications demanding clear castings. Vacuum or pressure casting is recommended for bubble-free castings.

PolyFoam Series - Low viscosity, 1:1 mix ratio, fast-setting, self-skinning, rigid and flexible foams.

Poly LiteCast - Easy, 1:1 mix ratio plastic with a wood-like density.

Poly Plasti-Flex - Innovative flexible plastic for architectural moldings that bend, props and more.

PolyPoxy® Resins & PolyCures - Epoxy systems for creating various castings including decorative bonded bronzes and tools that can withstand high heat.

MIXING: Before mixing resins, be sure that Parts A and B are at room temperature and that tools and molds are ready to go! Use metal or plastic mixing vessels (i.e., polyethylene pail) and spatulas to avoid introducing moisture. Check product labels or technical bulletins to determine working time for the product -- some products set fast -- meaning that you must work quickly. Some components require stirring before use: if there is a "Stir Before Use" label on the container, be sure to do so.

Check the mix ratios for the specific product you are using. Carefully weigh/measure Parts A and B in proper ratio. Accurate weighing/measuring is essential to obtain optimum physical properties from the cured product. Weigh or measure Part B into a clean metal or plastic mixing container. Then weigh or measure the appropriate amount of Part A into the same container. Mix thoroughly, scraping sides and bottom of the container. Hand mixing with a Poly Paddle is best to avoid mixing air into the resin. Pour mix into the mold cavity or apply to surface as soon after mixing as possible.

Once the containers of Parts A and B are opened, they should be used completely or resealed tightly, since atmospheric moisture can react with the Part A or may cause foaming of the plastic. Poly Purge, a dry gas product, can be sprayed into opened containers to lengthen shelf life once opened.

CURING: Castings should be allowed to remain in the mold until thoroughly cured. Parts demolded too soon may be subject

to deformation. Use of pre-warmed molds will hasten curing and minimize shrinkage. Mold shells should not be demolded until fully cured to prevent distortion or warping. Check product labels or technical bulletins to determine demold times. To reach full hardness in the specified demold time, temperature should be above 77°F (25°C). At lower temperatures, more time may be needed to reach full hardness. Curing below 65°F (18°C) is not recommended. Final cure properties are attained in seven days.

ADDITIVES & ACCESSORIES: Polytek offers various additives and accessories:

- **Accelerators/Retarders** - Specially formulated chemical accelerators or retarders can be used to vary cure times.
- **Fillers** - Dry fillers or metal powders can be added to vary the density and appearance of cured pieces, as well as reduce shrinkage and lower cost. Also, fillers can be added to make the liquid resins thicker (i.e., for brush-on or trowel application).
- **Foamer** - A chemical foamer can be added to some liquid plastics to turn them into open-cell foams.
- **Colors** - PolyColors can be added to create integral colors in the finished pieces.
- **Barrier Coat** - A barrier coat (i.e., Barrier PF) is a fast drying, lacquer-like primer that is sprayed into a silicone mold and allowed to dry prior to pouring plastic or foam. The resin cures against the barrier coat and comes out on the casting resulting in a primed part. Using a barrier coat often extends mold life.

To learn more about additives, refer to product-specific technical bulletins or the Accessories Section of this Catalog, or call Polytek Customer Service.

FINISHING: Many cured plastics yellow slightly and chalk when exposed to sunlight and, therefore, should be painted or sealed for exterior use. Check adhesion of the coating carefully over a period of time to determine that it is satisfactory for the intended use. If all mold release is removed by detergent washing, most auto body primers and oil paints work well. Plastic and foam castings can be drilled, sanded and machined.

CLEAN UP: Wipe tools clean before the resin hardens. Denatured ethanol is a good cleaning solvent, but it must be handled with extreme caution owing to its flammability and health hazards. Coat work surfaces with wax or Pol-Ease® 2300 Release Agent so cured plastic 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/or respiratory irritation. 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 a physician. Use only with adequate ventilation. Do not use Polytek plastics where food or body contact may occur. Plastics burn readily when ignited unless designed for fire-rated applications. Care should be taken with sanding dust and other easily ignitable forms of these products.

ADDITIVES & ACCESSORIES

Polytek® offers various additives that can be used to vary the properties of the cured and uncured polyurethanes. See Accessories Section and product Technical Bulletins for details.

Accelerators & Retarders
Poly-Optic® 14X Catalyst
Poly-Optic® 14R Retarder
Poly 15X Catalyst

Sealers, Barrier Coats & Release Agents
Barrier PF
Pol-Ease® 2300 Release Agent
Pol-Ease® 2500 Release Agent
Poly PVA Solution (Green or Clear)
PolyCoat Semi-Permanent Release Agent

Product Life Extender for Liquids
Poly Purge Aerosol Dry Gas

Fillers & Thickeners
Bronze Powder
Poly Fiber II
PolyFil ND

UV Stabilizer
UV Additive

PolyColors
Black, Blue, Brown, Green, Red, White & Yellow

Add PolyColors to liquid rubbers and plastics to create any color imaginable.

STORAGE: Polytek liquid polyurethane components can be stored for at least six months in unopened containers stored at room temperature (60-90°F). Cured plastics, foams and rubbers will last indefinitely, but may discolor as noted above.

In order to maintain dimensions, plastic mold shells must be stored in temperatures <100°F. Also, the shells must not be deformed (i.e., under weight) while stored.

EasyFlo Series

Low Viscosity, Fast, Liquid Polyurethane Plastics

DESCRIPTION: EasyFlo Liquid Plastics are excellent for casting decorative objects, production parts, tools, models, duplicate masters and more. EasyFlo systems consist of two parts (A and B) that, after mixing, quickly cure to tough polyurethane plastics. Since Parts A and B are low viscosity liquids, they are easy to mix, provide excellent detail penetration, and make bubble-free castings without vacuum degassing or pressure casting techniques. Rapid demold times make EasyFlo ideal for high-volume, fast-cast applications. All EasyFlo products can be easily color-cast, painted or machined. Most EasyFlo products can be filled for various cold-cast techniques such as cold-cast bronze, marble, etc. Thin-walled castings made from EasyFlo have surprising strength and lack the brittleness typical of other low viscosity, fast polyurethane resins.

Choose the EasyFlo product that's best for your application:

- **EasyFlo 60** pours like water, so making bubble-free parts is easy and fast (2-min working time, 10-min demold).
- **EasyFlo 95** is useful when longer working time (5 min) is needed to complete a pour. For thin parts, demold time is longer and molds may need to be preheated (100-120°F) to speed demold and reduce surface bubbles and shrinkage.
- **EasyFlo 120** is best for rotocasting or slush casting to create hollow parts. This is a tough plastic - hollow parts are nearly unbreakable, especially when backfilled with PolyFoams.
- **EasyFlo Clear** cures to a pale amber color and is often used with PolyColors to make transparent, colored castings. Also, it's excellent in applications using fillers (e.g., bronze) intended for visual appeal.
- **EasyFlo 100FR & Spray FR** are pourable/sprayable, UL-94 (V-0) fire-retardant plastics. Use the portable Plas-Pak sprayer or higher volume spray-equipment to apply hardcoat over foam or for sprayed-up hollow castings.

Why Choose EasyFlo Liquid Plastics?

- Easy 1:1 mix, by volume
- Rapid demold
- Reproduces finest detail
- Tough, non-brittle formulas
- Excellent bubble release
- Reduced need for pressure or vacuum

- **EasyFlo Spray Foam FR** is a sprayable, self-skinning, UL-94 (V-0) fire-retardant rigid foam. Use spray equipment to apply directly into a mold or as a foam backup/reinforcement on panels, signs, or props.

MOLD PREPARATION: EasyFlo Liquid Plastics reproduce minute detail from molds and patterns, but may stick or foam when poured on improperly prepared surfaces. Perform a trial casting on a surface finish similar to the final mold in order to avoid damaging a valuable mold. Polyethylene and silicone rubber molds (e.g., Polytek's TinSil® and PlatSil® Silicone Rubbers) do not require a release agent, but a barrier coat may be helpful. Latex, polyurethane rubber (i.e., Poly 74-Series) or metal molds must be dry and require a coat of a suitable release agent (e.g., Pol-Ease® 2300 Release Agent or PolyCoat).

MIXING: 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. Use metal or plastic mixing vessels and spatulas to avoid introducing moisture (i.e., with paper or wood tools). Measure equal volumes of A and B into a mixing container such as a polyethylene pail. Mix immediately, thoroughly scraping sides and bottom for one minute. Pour mix into mold cavity as quickly as possible. Once the containers of Parts A and B are opened, they should be used or resealed tightly as atmospheric moisture contamination may cause foaming of the plastic. Poly Purge, a dry gas, can be sprayed into opened containers of EasyFlo to prolong shelf life.

SPRAYING: Consult the "Plas-Pak Spray Systems" Technical Bulletin before spraying EasyFlo products.

CURING: Castings should be allowed to remain in the mold until thoroughly cured. Parts demolded too soon may be subject to deformation. Use of pre-warmed molds hastens curing. Low temperatures slow the curing and extend demold time.

ADDITIVES: Poly 15X is a powerful catalyst that increases the speed of curing. Stir 15X into the Part B before adding Part A: a few drops in a one-pound mix speeds the cure significantly. Exotherm (heat of reaction) and thus shrinkage on cooling may be increased. Experiment to determine the right amount of 15X to use, but never use more than 1% Part 15X of the total weight of the mix or the final physical properties may be affected.

Fillers can be added to EasyFlo products to vary appearance, density and cost. Usually, fillers are added after A and B are mixed. Fillers must be thoroughly dried before mixing with the resin. Microballoons can be added to create a wood-like, lower density material. Bronze powder, calcium carbonate, fly ash, sand, marble dust or other stone-like fillers can be added as desired. PolyFil ND can be used to reduce the cost of EasyFlo castings and to help reduce shrinkage in larger castings without affecting density.

COLORS: Add PolyColors to Part B before mixing with Part A to create plastics of any color.

FINISHING: Cured EasyFlo products yellow slightly and chalk when exposed to excessive sunlight and should be painted or sealed for exterior use. Adhesion of the coating should be checked carefully over a period of time to determine that it is satisfactory for the intended use. If release agent is thoroughly removed by detergent washing, most oil paints work well. An auto body primer sprayed onto the clean casting and allowed to cure overnight can help paint adhere better. Castings can be drilled, sanded and machined.

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 a physician. Use only with adequate ventilation. Do not use Polytek® Plastics where food or body contact may occur. Most plastics burn readily when ignited. Care should be taken with sanding dust and other easily ignitable forms of these products.

Use EasyFlo 60 and Bronze Powder to create beautiful cold cast bronze figurines. Patinas can be added for a variety of finished looks.

PACKAGING

Product(s)	Kit Size	Part A (lb)	Part B (lb)
EasyFlo 60, 95, 120 & Clear	3.8 lb 15.2 lb 76.0 lb 855 lb	1 qt (2.0) 1 gal (8.0) 5 gal (40) 55 gal (450)	1 qt (1.8) 1 gal (7.2) 5 gal (36) 55 gal (405)
EasyFlo 100FR	4.5 lb 18.0 lb 90.0 lb	1 qt (2.25) 1 gal (9.0) 5 gal (45)	1 qt (2.25) 1 gal (9.0) 5 gal (45)
EasyFlo Spray FR & Spray Foam FR	19.0 lb 95.0 lb	1 gal (10.0) 5 gal (50)	1 gal (9.0) 5 gal (45)

PHYSICAL PROPERTIES

EasyFlo Product	**60**	**95**	**120**	**Clear**	**100FR**	**Spray FR**	**Spray Foam FR**
Mix Ratio, By Volume	1A:1B	1A:1B	1A:1B	1A:1B	1A:1B	1A:1B	1A:1B
Mix Ratio, By Weight	100A:90B	100A:90B	100A:90B	100A:90B	1A:1B	100A:90B	100A:90B
Hardness, Shore D	65	65	65	72	65	75	NA
Pour Time (min; 1-lb mix)	2-2.5	5	2-2.5	2-2.5	2-2.5	NA (spray)	NA (spray)
Demold Time (min)	15-30	20-60	15-30	15-30	15-30	5-10	5-10
Specific Gravity	1.03	1.03	1.03	1.03	1.10	1.16	1.16
Cured Color	White	Off White	White	Amber	Off White/Tan	Off-White	Off-White
Initial Mixed Viscosity (cP)	60	95	120	110	120	250	250
Specific Volume (in^3/lb)	26.9	26.9	26.9	26.9	25.2	23.9	216
Maximum Exotherm (°F) (For a 1-lb mass)	230	206	200	208	199	199	199

Why Choose 15-Series Liquid Plastics?

- Easy 1:1 mix formulations
- Reproduces fine detail
- Can be machined, drilled and sanded
- Tough and hard, but not brittle
- Lightweight for mold shells
- Low shrinkage upon cure
- Air bubbles rise and break
- Long working time or instant set with 15X
- Low odor formula
- Castable in large masses

Poly 15-Series

Pourable Polyurethane Casting Plastics

DESCRIPTION: Poly 15-Series Liquid Plastics are excellent for casting decorative objects, production parts, tools, models, patterns, fixtures, duplicate masters, mold shells and more. Poly 15-6, 1511, 1512 and 1512X Plastics have the feel and density of hard wood or thermoplastics. Poly 15-3 and 15-3X Plastics resemble stone. Poly 15-8 is an aluminum-filled system that is ideal for applications demanding heat resistance and thermal conductivity (i.e., vacuum forming). When mixed with Poly Fiber II, both 1511 and 1512X are excellent for making tough, lightweight mold shells. For applications requiring water-clear, non-yellowing plastics, consider Poly-Optic® products. For applications requiring spray application, consider EasyFlo products.

MOLD PREPARATION: These products reproduce minute detail from a mold or pattern but may stick or foam when poured on improperly prepared surfaces. A trial casting on a surface finish similar to the final mold should be made to avoid damaging a valuable mold. Polyethylene and silicone rubber molds, such as PlatSil® 71- and 73-Series, do not require release agent, but a barrier coat might be helpful. Latex, polyurethane rubber (i.e., Poly 74-Series Rubbers) or metal molds must be dry and require a coat of a suitable release agent (i.e., Pol-Ease® 2300 Release Agent or PolyCoat).

MIXING: Prior to mixing Parts A and B, have molds and equipment ready. Parts A and B should be above 60°F and, if needed, stirred thoroughly prior to use. Over time, sediment accumulates on the container bottoms of some 15-Series products. Normally, gentle mixing is all that is required to disperse the sediment. Use metal or plastic mixing vessels and spatulas to avoid introducing moisture (i.e., with paper or wood tools). Measure or weigh Parts A and B into a mixing container, such as a polyethylene pail. Mix immediately, thoroughly scraping sides and bottom for one minute. Pour mix into mold cavity as quickly as possible.

Once the containers of Parts A and B are opened, they should be used or resealed tightly since atmospheric moisture contamination may cause foaming of the plastic. To extend shelf life, Poly Purge, a dry gas product, can be sprayed into containers to displace moist air before resealing.

CURING: Castings should be allowed to remain in the mold until thoroughly cured. Parts demolded too soon may be subject to deformation. Use of pre-warmed molds hastens curing and can reduce shrinkage of cast parts. Low temperatures slow the curing and extend demold time.

ADDITIVES: Part 15X Catalyst can be added to accelerate cure times. A few drops added to a one-pound mix speeds the cure significantly. Stir Part 15X into the Part B before adding Part A. When using 15X, exotherm (heat of reaction), and thus shrinkage, is increased. Experiment to determine the best amount of Part 15X to use, but never use more than 1% of the total weight of the mix or the final physical properties may be affected.

Part 15F Foamer can be added to Poly 15-6 to create a rigid, open-cell foam with densities as low as 6 lb/ft^3. Stir Part 15F into the Part B before adding Part A. Experiment to determine the best amount of Part 15F for the application at hand, but never use more than 3% Part 15F of the total weight of the mix or the final physical properties may be affected. For self-skinning foams, consider PolyFoam products.

Fillers can be added to alter the properties of the uncured or cured resin. Fillers must be thoroughly dried before mixing with resin. Fillers should be added to mixed A and B. Add Poly Fiber II to thicken the uncured mix to make a paste-like consistency. Microballoons can be added to create a wood-like, lower density material. Bronze powder, calcium carbonate or other dry fillers can be added for varying effects. PolyFil ND, a filler

with the same density as 15-6, 1511, 1512 and 1512X, can be added to reduce the cost of castings and lower the exotherm, thereby reducing shrinkage. Experiment by adding fillers at varying levels up to ~50% by weight of the mixed resin.

COLORS: Add PolyColors to Part B before mixing with Part A to create plastics of any color.

FINISHING: Poly 15-Series Plastics yellow and chalk when exposed to sunlight and should be painted or sealed for exterior use. But adhesion of the coating should be checked carefully over a period of time to determine that it is satisfactory for the intended use. If all mold release is removed by detergent washing, most oil paints work well. An auto body primer sprayed onto the clean casting and allowed to cure overnight can help paint adhere better. Poly 15-Series Plastics can be easily drilled, sanded and machined.

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 a physician. Use only with adequate ventilation. Do not use Polytek® plastics where food or body contact may occur. Plastics burn readily when ignited. Care should be taken with sanding dust and other easily ignitable forms of these products.

To make the mold shell, Poly 1512X thickened with PolyFiber II was brushed over the clay-blanketed model. Once the shell was complete, the clay was removed and Poly 74-20 liquid rubber was poured into the void left by the clay to make the blanket mold.

PACKAGING			
Product(s)	Kit Size	Part A (lb)	Part B (lb)
Poly 15-3, 15-3X Mix Ratio 1A:1B	5.0 lb 20.0 lb 100 lb	1 qt (2.5) 1 gal (10) 5 gal (50)	1 qt (2.5) 1 gal (10) 5 gal (50)
Poly 15-6, 1511, 1512, 1512X Mix Ratio 1A:1B	4.0 lb 16.0 lb 80.0 lb 900 lb	1 qt (2.0) 1 gal (8.0) 5 gal (40) 55 gal (450)	1 qt (2.0) 1 gal (8.0) 5 gal (40) 11 x 5 gal (450)
Poly 15-8 Mix Ratio 26A:100B	3.2 lb 12.1 lb 48.5 lb	1 pt (0.7) 1 qt (2.5) 1 gal (10.0)	1 qt (2.5) 1 gal (9.6) 5 gal (38.5)

PHYSICAL PROPERTIES					
	15-3/15-3X	**15-6**	**15-8**	**1511**	**1512/1512X**
Mix Ratio (By Weight)	1A:1B	1A:1B	26A:100B	1A:1B	1A:1B
Hardness, Shore D	80	72	80	71	71
Pour Time, 1-lb mix (min)	15 (15-3) 5 (15-3X)	5	30	10	22 (1512) 5 (1512X)
Maximum Exotherm, 1-lb mass	122°F (50°C)	203°F (95°C)	131°F (55°C)	251°F (122°C)	251°F (122°C)
Demold Time (hr) (varies with 15X)	12 (15-3) 1 (15-3X)	1-3	1-16	0.5-1	1-16 (1512) 0.5 (1512X)
Specific Gravity	1.53	1.08	1.57	1.10	1.10
Color, Cured	Tan	Tan	Gray	White	White
Viscosity, 2-min after mix (cP)	2,000	800	6,000	400	400
Specific Volume (in^3/lb)	18	26	17.6	25.1	25.1
Shrinkage Upon Cure (in/in)	0.0002* (15-3) 0.008* (15-3X)	0.003*	0.0002	Very low*	Very low*
*Shrinkage is primarily caused by gelling while hot then cooling. Parts that cure with minimal temperature rise exhibit minimal shrinkage.					

Poly PT Flex Series

Fast-Curing, Pourable Polyurethane Casting Rubbers

DESCRIPTION: Poly PT Flex Liquid Rubbers are flexible, fast-curing rubbers, which have been developed specifically for prototyping and model making applications. They are excellent for casting decorative objects, production parts, tools, models, patterns, duplicate masters and more. With the addition of PolyColors, PT Flex products can be used to cast parts of almost any color.

MOLD PREPARATION: Poly PT Flex products reproduce minute detail from molds or patterns, but may stick or foam when poured on improperly prepared surfaces. To avoid damaging a valuable mold, perform a trial casting on a similar surface. Polyethylene and platinum silicone rubber (i.e., PlatSil®) molds do not require release agents. Latex, polyurethane rubber or metal molds must be dry and coated with a suitable release agent, such as Pol-Ease® 2300 or 2500 Release Agents or PolyCoat.

MIXING: Prior to mixing, be sure that all molds, equipment and PT Flex liquids are ready and at room temperature (i.e., >60°F). Shake or stir Parts A and B before use if directed to do so by the product label. Over time, sediment may accumulate on the container bottom of Poly PT Flex 20 Part B. Normally, gentle mixing is all that is required to disperse the sediment. Use metal or plastic mixing vessels and spatulas to avoid introducing moisture (i.e., with paper or wood tools). Measure or weigh Parts A and B into a mixing container. Mix immediately, thoroughly scraping sides and bottom for one minute. Pour mix into cavity as quickly as possible. Once the containers of Parts A and B are opened, they should be used or resealed tightly since atmospheric moisture contamination may cause foaming. To extend shelf life, spray Poly Purge, a dry-gas product, into opened containers to displace moist air before resealing.

CURING: Castings should be allowed to remain in the mold until thoroughly cured. Parts demolded too soon may be subject to deformation. Use of pre-warmed molds hastens curing. Low temperatures slow curing and extend demold time. Full cure is achieved within seven days at room temperature or post cured at 140°F (60°C) for 16 hours.

Why Choose PT Flex Liquid Rubbers?

- Easy 1:1 mix formulations
- Low viscosity
- Reproduces fine detail
- Low shrinkage upon cure
- Rapid demold times
- Castable in large masses

ADDITIVES: Part 74/75X Accelerator can be added to increase the speed of curing, but working time may be reduced dramatically. Heat also speeds demold time. Part 74/75C Softener can be added to reduce the hardness of the cured Poly PT Flex Rubbers. Perform small-scale experiments to determine the best amount of Part 74/75X or Part 74/75C to use.

FINISHING: Poly PT Flex Rubbers yellow and chalk when exposed to sunlight and are intended for interior use only. PT Flex Rubbers can be colored by the addition of up to 1% PolyColor dyes.

CLEAN UP: Tools should be scraped clean before the rubber cures. Denatured ethanol is a good cleaning solvent, but 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 or PolyCoat 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 a physician. Use only with adequate ventilation. Do not use Poly PT Flex Rubbers where food or body contact may occur. Poly PT Flex Rubbers burn readily when ignited.

PACKAGING

Product(s)	Kit Size	Part A (lb)	Part B (lb)
Poly PT Flex 20, 50, 60, 70 & 85	4.0 lb	1 qt (2.0)	1 qt (2.0)
	16.0 lb	1 gal (8.0)	1 gal (8.0)
	80.0 lb	5 gal (40.0)	5 gal (40.0)
	900 lb	55 gal (450)	55 gal (450)

Poly PT Flex fast-curing rubbers are ideal for making hollow rubber rotocast parts on a rotocast machine like the one pictured to the left. Two of the parts shown are filled with flexible PolyFoam.

Poly PT Flex fast-curing rubbers are ideal for molds that can be used the same day to make prototype parts in one day. The mold shown in the photo to the left was poured over an SLA model and EasyFlo castings were ready a few hours later.

PHYSICAL PROPERTIES					
	PT Flex 20	**PT Flex 50**	**PT Flex 60**	**PT Flex 70**	**PT Flex 85**
Mix Ratio (By Weight)	1A:1B	1A:1B	1A:1B	1A:1B	1A:1B
Hardness, Shore	A20	A50	A60	A70	A85
Pour Time, 1-lb mix (min)	5	5	5	5	5
Demold Time (hr) at 78°F	1½	1	1	1	1
Demold Time (min) at 70°C	30	30	30	30	30
Specific Gravity	1.00	1.03	1.03	1.05	1.06
Color, Cured	Tan	Yellow/Amber	Yellow/Amber	Yellow/Amber	Yellow/Amber
Initial Mixed Viscosity (cP)	520	550	625	680	1600
Specific Volume, in^3/lb	27.5	26.9	26.9	26.4	26.2
Shrinkage Upon Cure (in/in)	0.0050*	0.0020*	0.0026*	0.0041*	0.0013*
Tensile Strength (psi)	250	250	345	730	1064
Elastic Modulus (psi)	85	160	190	915	2700
Elongation (%)	770	200	235	175	250
Tear Strength (pli)	50	50	70	130	190
*Shrinkage is primarily caused by gelling while hot then cooling. Parts that cure with minimal temperature rise exhibit minimal shrinkage.					
To obtain the physical properties reported above, cure schedule is 16 hours at 140°F (60°C).					

Why Choose Poly-Optic® 14-Series Plastics?

- Crystal clear
- Reproduces fine detail
- Can be machined, drilled and sanded
- Tough and hard, but not brittle
- Long working time
- Low shrinkage upon cure

Poly-Optic® 14-Series

Low Viscosity, Clear Casting Plastics

Poly-Optic® 14 Series Casting Resins are two-part, polyurethane systems formulated specifically for applications where optical clarity is required. Use Poly-Optic plastics for casting decorative objects, production parts, models and more. Castings are clear like water; however, PolyColor dyes can be added to create clear, colored castings. Poly-Optic systems, with low viscosities and long pot-lives, provide for easy mixing, excellent detail penetration, and easy degassing when using vacuum or pressure casting techniques for bubble-free castings.

Poly-Optic® 1410 cures to a hard, virtually unbreakable, plastic. Cure 1410 at room temperature and, for optimum physical properties, post cure at 150°F.

Poly-Optic® 1411 is an easy 1A:1B, by volume, system that cures quickly to a super-strong, hard plastic. 1411 develops hardness and can be demolded more quickly than 1410. It also has a higher heat deflection temperature, which is useful in certain prototyping applications.

Poly-Optic® 1411 ES7, a long pot-life (~7 hr) version of 1411, is used for large pours where extra working time or minimal shrinkage is required. 1411 ES7 Part B can be blended with 1411 Part B to achieve almost any pot-life desired.

Poly-Optic® 1412 is a high-strength, heat resistant, fast-curing, rapid-prototyping plastic designed for casting in heated molds.

Poly-Optic® 1420 cures to a tough, impact- and heat-resistant plastic that can be polished and machined. For strong plastic, heat cure 1420 at 150-180°F. For brittle, glass-like castings, cure at room temperature.

Poly-Optic® 14-70 is a firm rubber. Blend 1410 and 14-70 to achieve any hardness between Shore D85 and Shore A70.

MOLD PREPARATION: Poly-Optic products reproduce minute detail from a mold or pattern, but may stick or foam when poured on improperly prepared surfaces. 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. Latex, polyurethane or metal molds must be dry and require a coat of a suitable release agent (i.e., Pol-Ease® 2300 Release Agent or PolyCoat). For optically clear castings, use highly polished masters to create molds with excellent surface quality. [CAUTION: Condensation-cure silicones (i.e., TinSil® Rubbers) are not recommended for casting Poly-Optic since residual alcohol can inhibit cure or produce hazy castings.]

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. Shake or stir Part B before use, if directed to do so by product labels. Carefully weigh or measure proper ratios of 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, 150°F, reduces shrinkage and improves the surface quality of Poly-Optic parts. A light spray of Pol-Ease 2300 Release Agent or quickly passing the flame of a torch over the back of the casting helps to break bubbles on the back of the pour. To produce bubble-free castings, vacuum degassing or 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 Poly Purge, 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.

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, and reduce shrinkage and improve overall quality of the casting. Low temperatures slow the cure and extend demold time.

Poly-Optic 1410, 1411, and 1470 cure at room temperature. For plastic castings less than ¼-inch thick, 1411 is recommended because it can be demolded more quickly in thin sections. For thinner castings, or when using Poly-Optic 1410 for thin parts, add Part 14X Catalyst or heat cure (8 hr at 140-150°F). Castings greater than ½-in thick do not require heat or 14X, but both will speed up the curing process considerably.

Poly-Optic 1412 and 1420 are demoldable after 30 minutes at 175°F and, if desired, can be post cured for 16 hours at 150°F

for optimum physical properties. To produce brittle, glass-like parts and props, cure 1420 at room temperature.

Wash mold release from surfaces prior to painting or bonding.

ACCELERATING CURE SPEED: Poly-Optic 14X Catalyst can be mixed into Part B prior to adding Part A to accelerate gel and cure times. For castings less than ½-in thick, 14X is recommended. Add 0.5% 14X to the total mix weight to speed the cure significantly (e.g, 0.5g 14X in a 100g mix of 1410 halves the pour and cure time). Exotherm (heat of reaction) and thus shrinkage on cooling is also increased. Experiment to determine the best amount of 14X to use, but do not use more than 1% 14X because final physical properties may be affected.

RETARDING CURE SPEED: Poly-Optic 14R Retarder slows the cure of Poly-Optic systems. Slowing the cure also reduces exothermic heating, which can cause distortion, waviness and shrinkage especially in castings >½-inch thick. For every part of 14R added, an equal part of Part A must be added to the mix. Add 1.5% 14R to the total mix weight of 1410 to increase the pot-life from 15 to 70 minutes. Add 1% 14R to 1411 to double the working time from 9 to 18 minutes. Depending on the size and mass of the part, post curing 14-70 and 1410 parts in the mold at >140°F for 12 to 16 hours may be necessary. The extended pot-life creates a lower exotherm upon curing, allowing larger castings to be made without distortion. Never use more than 4% 14R since the system may not cure properly. For larger castings, consider Poly-Optic 1411 ES7 with a 7-hour pot-life and low exotherm.

COLORS: Add PolyColors to 14-Series Part B before mixing with Part A to create clear plastics of any color.

EXTERIOR USES: Although Poly-Optic 1410, 1411, 1411 ES7, 1412 and 1420 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 ~two years. Add 3% Poly UV Additive to achieve good exterior stability beyond five years.

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 a physician. Use only with adequate ventilation. Do not use Poly-Optic plastics 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: Poly-Optic liquids can be stored for at least six months in unopened containers stored at room temperature. 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.

PACKAGING

Product	Kit Size (lb)
Poly-Optic® 1410 Mix Ratio 3A:2B	10.0 60.0
Poly-Optic® 1411/1411 ES7 Mix Ratio 1A:1B (By Volume)	3.8 15.2 76
Poly-Optic® 1412 Mix Ratio 1A:1B	4.5 18.0 90.0
Poly-Optic® 1420 Mix Ratio 2A:1B	6.0 24.0 120.0
Poly-Optic® 14-70 Mix Ratio 4A:5B	14.4 72.0

PHYSICAL PROPERTIES

	1410	1411/1411ES7	1412	1420	14-70
Mix Ratio	3A:2B, by wt	1A:1B, by vol	1A:1B, by wt/vol	2A:1B, by wt	4A:5B, by wt
Hardness	D80	D80	D80	D85	A70
Pour time (min), 2-lb mix	15	9/400	8	15	15
Maximum exotherm, 2-lb mass	265°F (129°C)	228°F (109°C)/100°F (38°C)	235°F (113°C)	311°F (155°C)	190°F (88°C)
Demold time (hr)*	2 (1-in thick)*	0.5 (½-in thick)/ 48	0.5 @ 175°F	8 @150°F/0.5 @175°F	24-48
Specific gravity	1.07	1.07	1.07	1.05	1.06
Viscosity, mixed 2 min (cP)	700	600	750	250	340
Specific Volume, in^3/lb	27.5	27.5	27.5	27.5	27.5

* Demold time varies with thickness of casting and the amount of Part 14X Catalyst added.

PolyFoams

Self-Skinning, Rigid & Flexible, Polyurethane Casting Foams

DESCRIPTION: PolyFoams consist of liquid Parts A and B that, after mixing, form self-skinning foams. PolyFoam R-2, R-5 and R-8 are rigid foams. PolyFoam F-3 and F-5 are flexible for casting soft parts. PolyFoams can be used to cast rigid or flexible objects with densities in the range of 3 to 20 lb/ft^3. Consider PolyFoams for production of decorative objects, lightweight mold shells, production parts, models, patterns, fixtures, duplicate masters and general tooling use. PolyFoam systems are practically odorless and do not contain toluene diisocyanate, MOCA, heavy metals or HCFCs.

MOLD PREPARATION: PolyFoams reproduce minute detail from molds or patterns, but may stick when poured on improperly prepared surfaces. Perform a trial casting on a surface finish similar to the actual mold in order to avoid damaging a valuable mold. Polyethylene and silicone (i.e., PlatSil®) rubber molds do not require release agents. A barrier coat (i.e., Barrier PF), however, can help to extend mold life when using rigid foams. If Barrier PF is used, Pol-Ease® PF Release Agent should be applied to the mold prior to applying Barrier PF. Polyurethane rubber (i.e., Poly 74- or 75-Series) or metal molds must be dry and coated with a suitable release agent (i.e., paste wax, PolyCoat or PVA Solution). Rubber molds must be stiff enough so as not to distort when subjected to packing pressures.

MIXING: Before mixing, be sure that both Parts A and B are at room temperature and that all tools and molds are ready to go. PolyFoams set fast -- meaning that you must work quickly. Measure or weigh Parts A and B into separate containers (i.e, polyethylene pails). Combine Parts A and B and mix immediately with a Turbo Mixer or other high speed mixer for 15 seconds. Pour mix into cavity as quickly as possible since foaming starts immediately. If too much time elapses, the foam will rise in the mixing container and the mix may be lost.

Why Choose PolyFoams?

- Self-skinning
- Rigid and flexible systems
- Densities range from 3 to 20 lb/ft^3
- Specially formulated fire-retardant versions are available upon request

CURING: Packing PolyFoams to a minimum of 2 to 3 lb/ft^3 above their free-rise density is recommended to achieve good surface detail and mold fill. A lid with small vents to allow air to escape as foam rises should be firmly clamped in place prior to rise. Once foam begins to rise, avoid stirring or other movement that will cause cells to collapse. Castings should be allowed to remain in the mold until thoroughly cured. Parts demolded too soon may be subject to deformation. For best casting results, the mold should be warmed to 75 to 85°F prior to casting the first part. Once a mold is heated and cycled, it will maintain heat for continued production.

FINISHING: Cured PolyFoam systems yellow and chalk when exposed to sunlight and should be painted or sealed for exterior use. Adhesion of the coating should be checked carefully over a period of time to determine that it is satisfactory for the intended use. If all mold release is removed by detergent washing, most oil paints should work well. When casting rigid foams, the use of an appropriate primer/barrier coat, such as Barrier PF, sprayed in the mold and allowed to dry before casting, will result in a pre-primed cast part and will help additional paint adhere to the part. PolyFoam R-2, R-5 and R-8 can be easily drilled, sanded and machined.

CLEAN UP: Tools should be wiped clean before the rubber cures. 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 a release agent so that cured foam can be removed.

Rigid PolyFoam (R-2, R-5, or R-8) is often used to make a mold nest (aka mold box). Like a shell, a mold nest supports a blanket mold. The nest is made by building a box around the back side of a completed blanket mold and filling the box with foam.

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 a physician. Use only with adequate ventilation. Do not use PolyFoams where food or prolonged body contact may occur. PolyFoams burn readily when ignited. Care should be taken with sanding dust and other easily ignitable forms of these products.

STORAGE: PolyFoam liquids can be stored for at least six months in unopened containers stored at room temperature. Once containers of Parts A and B are opened, they should be used or resealed tightly as atmospheric moisture contamination may degrade product integrity causing excess foaming, pressure build up and poor cure properties.

PolyFoam F-5 Part A may crystallize, develop sediment and become cloudy if stored at temperatures below 60°F. To restore product, loosen lid (to avoid pressure buildup) and warm product to 120-160°F until the liquid is clear. Before use, let product cool to room temperature. Using a crystallized or cloudy Part A may result in a foam with inferior physical properties.

Note on PolyFoam Compaction Calculation:

Determine the volume of the space you want to fill with foam in cubic inches (in^3). Convert the volume to ft^3 by dividing by 1728 in^3/ft^3. Determine the desired density of the foam part in pounds per cubic foot (lb/ft^3). (Note: Foam products are typically compacted to at least 2 pounds more than their free-rise density to produce good quality parts. Therefore, to determine the quantity of foam needed, add at least 2 pounds to the free-rise density (i.e., for R-2, use at least 4 lb/ft^3; for R-5 use 7 lb/ft^3; and so on). Multiply the volume of the part (ft^3) by the desired density (lb/ft^3) to determine how many pounds of PolyFoam liquid to mix.

Example:

You intend to make a part that is 4320 in^3.

Convert to ft^3: 4320 in^3 ÷ 1728 in^3/ft^3 = 2.5 ft^3

Desired density is 5 lb/ft^3, so choose R-2 and determine volume to pour based on packing to 5 lb/ft^3.

5 lb/ft^3 x 2.5 ft^3 = 12.5 lb PolyFoam liquid mix

PolyFoam R-5 was cast in a TinSil® Brush/Spray 25 silicone mold to create simulated tree bark.

PHYSICAL PROPERTIES

	R-2	R-5/R-8	F-3	F-5
Mix Ratio (by weight or volume, unless otherwise noted)	1A:1B	1A:1B	1A:2B (by weight)	1A:1B
Mix Viscosity (cP)	500	1100	2000	1400
Cream Time (sec)	30	45	25	45
Rise Time (min)	3	2	1.5	3-5
Tack-Free Time (min)	10	3	3	25
Demold Time (min)	30	10-15	10	30-60
Free-Rise Density (lb/ft^3)	2.5	5 (R-5) 8 (R-8)	3	5
Molded Density (lb/ft^3)	4-8	8-20	5-8	8-15

PACKAGING

Product(s)	Kit Size	Part A (lb)	Part B (lb)
PolyFoam R-2, R-5, R-8 & F-5 Mix Ratio 1A:1B (By Weight or Volume)	4.0 lb 16.0 lb 80 lb 900 lb	1 qt (2.0) 1 gal (8.0) 5 gal (40) 55 gal (450)	1 qt (2.0) 1 gal (8.0) 5 gal (40) 55 gal (450)
PolyFoam F-3 Mix Ratio 1A:2B (By Weight)	6.0 lb 24.0 lb 120 lb	1 qt (2.0) 1 gal (8.0) 5 gal (40)	2 x 1 qt (4.0) 2 x 1 gal (16.0) 2 x 5 gal (80.0)

PolyPoxy® Resins & PolyCures

High-Strength, Epoxy Plastics

DESCRIPTION: PolyPoxy® Resins and PolyCure Hardeners are liquids that, after mixing in proper ratio, cure at room temperature to high-strength plastics. Resins can be cured with various curatives allowing users to select the best system for a particular use. The mix ratio for each curing agent and resin blend varies. For best results, carefully weigh the components.

PolyPoxy® 1010 is a clear resin for use with fast PolyCure 1212 for small castings such as bonded bronze or with fiberglass or fillers for lay-up and mother molds. Use with PolyCure 1220 for decoupage clear coatings, glass bonding and many other uses where a nearly colorless, clear, low viscosity resin is required.

PolyPoxy® 1030 is an aluminum- and mineral-filled resin for lay-up or small castings when cured with PolyCure 1212. For larger vacuum forming molds and other tooling uses, cure with PolyCure 1230. Parts made with PolyPoxy 1030 can be machined, drilled and burnished with steel wool to a pewter-like finish. Parts made with PolyPoxy 1030 offer good heat resistance.

SURFACE PREPARATION: Epoxy systems are adhesives and bond to many surfaces. If adhesion is not desired, surfaces must be made non-porous with a suitable sealer, such as wax, PVA, lacquer or other coatings. The surfaces must then be coated with a release agent such as Pol-Ease® 2300 Release Agent. Poly 74-Series rubber molds require only a light, thorough coating of Pol-Ease 2300 for excellent release of epoxy castings. Perform a small test cure.

MIXING: PolyPoxy and PolyCure liquids must be mixed in the ratios shown below. Mix ratios are by weight except for PolyPoxy 1010 and PolyCure 1220, which can be mixed 1:1 by volume. PolyPoxy and PolyCure must be thoroughly mixed and poured as soon as possible after mixing to ensure low viscosity and good flow. Watch a clock to avoid being caught with unused, cured material.

SAFETY: Before use, read product labels and Safety Data Sheets. Follow safety precautions and directions. PolyCures cause severe eye and skin burns. PolyPoxy resins may cause skin irritation and sensitization. Avoid contact and breathing vapors. Wear personal protective equipment. Use only with adequate ventilation. In case of eye contact, flush with water for 15 minutes and then seek medical attention. WARNING: The epoxy cure reaction is very exothermic. Do not cast large masses -- doing so can result in a fire!

Why Choose PolyPoxy® & PolyCure Systems?

- **PolyPoxy® 1010 + PolyCure 1212** for bonded bronze and small castings
- **PolyPoxy® 1010 + PolyCure 1220** for decoupage coatings and glass bonding
- **PolyPoxy® 1030 + PolyCure 1212** for small castings and tooling applications
- **PolyPoxy® 1030 + PolyCure 1230** for larger vacuum or thermoforming molds

PACKAGING	
Product	Sizes (lb)
PolyPoxy® 1010	2.0, 9.0 & 45
PolyPoxy® 1030	3.0, 12.0 & 60
PolyCure 1212	0.25 & 2.0
PolyCure 1220	0.25, 2.0, 8.0 & 40
PolyCure 1230	0.25, 2.0 & 8.0

PHYSICAL PROPERTIES				
PolyPoxy® + PolyCure	**1010 + 1212**	**1010 + 1220**	**1030 + 1212**	**1030 + 1230**
Parts Cure per 100 of PolyPoxy	15	85 (1:1 by vol.)	6	15
Mixed Viscosity(cP)	3,000	3,000	10,000	5,000
Pour Time, 150 g mix @ 77°F (min)	25	30	30	120
Demold Time @ 77°F (hr)	4 - 8	48	24	24
Maximum Casting Thickness (in)	0.5	1.5	3.0	8.0
Shore D Hardness	95	80	98	95
Specific Gravity	1.13	1.07	1.70	1.70
Specific Volume (in^3/lb)	24.5	26.0	16.3	16.3

Poly LiteCast & Poly Plasti-Flex

Rigid & Flexible Polyurethane Casting Resins That Feel Like Wood

DESCRIPTION: Poly LiteCast and Poly Plasti-Flex Liquid Plastics are used to produce decorative moldings, tools, models, patterns, fixtures, duplicate masters and more. These products reproduce minute detail from molds and can be drilled, sanded and machined. Use Poly LiteCast Liquid Plastic when a rigid plastic with a wood-like density is required. Use Plasti-Flex to produce slightly flexible parts such as decorative trim molding, props, special effects castings, and impact-resistant items.

MOLD PREPARATION: In order to ensure good release of the cast part, molds must be properly prepared before applying Poly LiteCast and Poly Plasti-Flex Liquid Plastics. Typically, polyethylene and silicone rubber (i.e., TinSil® and PlatSil®) molds do not require a release agent, but a barrier coat may extend the mold life. Rubber (i.e., polyurethane or latex) and metal molds must be clean, dry and coated with a suitable release agent (i.e., Pol-Ease® 2300 Release Agent) before applying these plastics. To avoid damaging a valuable mold, make a trial casting on a surface made of the same material as the actual mold.

MIXING AND CURING: For Poly LiteCast, stir both Parts A and B before use since over time the filler separates and rises to the top. For Plasti-Flex, only the Part B needs stirring. Normally, gentle mixing is all that is required. Use metal or plastic mixing vessels and spatulas to avoid introducing moisture with paper or wood tools. Weigh Parts A and B into a mixing container and mix immediately, thoroughly scraping sides and bottom for one minute. Pour mix into the mold as quickly as possible.

If a paste-like consistency is needed for brush-on or trowel application, add Poly Fiber II to thicken the mix.

Leave the casting in the mold until thoroughly cured. Parts demolded too soon may be subject to deformation.

ADDITIVES: To accelerate the cure, add Part 15X Catalyst. Add Part 15X to Part B, then mix with Part A. A few drops of Part 15X in a one-pound mix of liquid plastic speeds the cure significantly. When using Part 15X, exotherm (heat of reaction) increases which can result in shrinkage of the cast part. Experiment to determine the right amount of Part 15X to use, but never use more than 1% of the total weight of the mix or the final physical properties may be affected.

FINISHING: These plastics yellow and chalk when exposed to sunlight. For exterior use, castings should be painted or sealed. Or, resins can be colored by adding PolyColors to the liquid mix.

CLEAN UP & SAFETY: See product labels, Safety Data Sheets and Technical Bulletins.

Why Choose Poly LiteCast & Poly Plasti-Flex?

- Safe & easy to machine (contains no silica)
- Reproduces fine detail
- Create rigid castings with a wood-like density
- Make slightly flexible, impact-resistant parts

PHYSICAL PROPERTIES		
	LiteCast	**Plasti-Flex**
Mix Ratio, By Weight	1A:1B	35A:100B
Hardness	D55	~A90
Pour Time, 1-lb mix (min)	5	3
Demold Time	1 hr	~15 min
Specific Gravity	0.78	0.81
Color, Cured	Tan	Tan
Mixed Viscosity @ 2 min (cP)	2,480	3,000
Specific Volume(in^3/lb)	35	34
Shrinkage Upon Cure (in/in)	Very Low*	Low*

*Shrinkage is primarily caused by gelling while hot then cooling. Parts that cure with minimal temperature rise exhibit minimal shrinkage.

PACKAGING			
Product(s)	Kit Size	Part A (lb)	Part B (lb)
Poly LiteCast 1A:1B Mix Ratio	3.0 lb	1.5	1.5
	12.0 lb	6.0	6.0
	60 lb	30	30
Poly Plasti-Flex 35A:100B Mix Ratio	8.1 lb	2.1	6.0
	38.5 lb	10.0	28.5
	192.5 lb	50	142.5

Use Poly LiteCast as a lightweight casting alternative to plaster and concrete.

Product Overview

DESCRIPTION: Polytek® offers specialty mold making and casting materials, such as latex, waxes, and Hydrogel®. These products can be used for unusual mold making projects: for example, Hydrogel and Poly Skin-Wax can be used to make molds of the human body. Sometimes, these products complement Polytek's traditional mold rubbers and casting plastics and enable our customers to overcome tricky mold making challenges.

Poly Latex 60

Natural Rubber for Brush-On Molds

Poly Latex 60 is a one-part, brush-on liquid that, after multiple coats, builds up to form a tough rubber blanket mold. Poly Latex 60 molds are used for casting plaster, concrete and some resins.

Poly Latex 60 has better tear strength than most synthetic rubbers and is sometimes preferred for molds that are peeled off the casting like a sock. However, two-part, synthetic rubbers like Polygel® products can be brushed on to final thickness in an afternoon and should be considered as a latex alternative.

MODEL PREPARATION: The model should be free of oil, grease and dirt. Wood, oil-based plasticenes, stone, and glazed ceramics generally do not require any sealer. Plaster, unglazed ceramics, copper-containing metals, water clay, and concrete should be sealed with shellac. Models made of other materials should be patch tested by applying a coat or two of latex to a small area. If the latex turns dark or sticks after drying, a sealer should be applied. Models with sharp edges or points may yield a better mold if the points are dulled slightly by sanding prior to sealing. Firmly mount the model on a suitable base board. Drill a hole through the base board to allow air to escape from within the model, so that trapped air does not cause defects in the mold.

APPLYING & CURING: Brush a thin coat of latex on the model. Be careful not to puddle the latex. A gentle stream of air can help to blow latex into the finest detail and break any bubbles. Let each coat dry for 4 to 16 hours in a warm, dry, ventilated room. When dry, latex loses its milky appearance, and becomes slightly transparent and amber in color. Apply the next coat as soon as the first coat is dry. Apply 6 to 30 coats depending on the desired mold thickness: typically 1/16- to 1/8-inch thick. For large, flat models, apply latex in a checkerboard pattern, alternating squares between coats. Since there is some shrinkage on drying, the patchwork method reduces stress and warping of the latex as it dries.

Latex can be thickened with ground cork, sawdust or fumed silica in order to fill undercuts. Thickeners must be completely wet out with latex and applied to the outside surface of the mold. Thickened latex must be allowed to dry completely as wet spots trapped in the latex can cause delamination of the mold.

AT A GLANCE

Latex - Poly Latex 60 is a tough, one-part, brushable mold rubber. Poly Latex False Face can be used to cast flexible, hollow parts such as novelty masks.

Wax - Poly Wax 15 is castable and carvable. Poly Skin-Wax is skin-safe and, when used with caution, is acceptable for body molds.

Hydrogel® - A skin-safe, alginate product can be used for body molds and life castings.

Why Choose Poly Latex 60?

- Tougher than other mold rubbers
- One part -- No mixing or weighing needed
- Great mold rubber for casting plaster & concrete

If needed, reinforce latex molds by placing fabric (i.e., muslin, or burlap) into a coat of wet latex and then saturate with latex. Allow the fabric coat to dry completely before applying more latex.

For spray application with a cup gun, mix 1 part Poly Latex 60 with 1 part Poly Latex N. Call Polytek Customer Service for details.

Before removing from the model, the latex must be thoroughly dry or heat cured. Heat in a warm oven at 110-150°F for 6 to 8 hours to ensure a complete cure. If heat curing is not feasible, place the mold in a warm area for a week.

USING THE MOLD: Avoid exposing the mold to oils, grease or solvents. Molds may be washed with soap and water. Before casting plaster or concrete, wet the mold with a 1% solution of detergent in water to aid releasing air bubbles from the mold surface: no other release is usually necessary. For resin casting, however, coat the mold with a release agent such as Pol-Ease® 2300 Release Agent or Poly PVA Solution. Most resins shorten the life of a latex mold -- polyurethane or silicone molds may last longer.

SAFETY: Read product label and Safety Data Sheet. Latex products contain ammonia and cause eye and skin irritation. Inhalation of latex proteins can cause asthma-like symptoms in allergic individuals.

STORAGE: Poly Latex 60 can be stored for at least three months in unopened containers at room temperature. Exposure to temperatures <40°F and >80°F may damage latex, causing irreversible coagulation. DO NOT ALLOW TO FREEZE.

PACKAGING	
Poly Latex 60	1 qt: 2.0 lb 1 gal: 8.0 lb 5 gal: 40 lb 55-gal drum: 400 lb

Latex False Face Compound

Natural Rubber for Casting Hollow Parts

Poly Latex False Face Compound is a one-part, pourable liquid that, when poured into a dry, unsealed plaster mold, cures to a high-strength, flexible casting rubber. False Face produces flexible, hollow parts for uses such as novelty masks, flexible sculpture and animatronic applications. This product must be cast into dry, unsealed, porous plaster molds.

MIXING & CURING: Shake or stir before use. Pour into a dry, unsealed gypsum mold. Tilting or lightly vibrating the mold may help to eliminate bubbles if the mold contains complex undercuts or deep details. For a thin skin, pour the excess latex back into the container immediately. For a thicker skin, allow the product to stay in the mold longer before pouring off excess. A standing time of 15 minutes yields a 3/32-inch thickness in a No. 1 Pottery Plaster mold. Denser plasters are not as absorbent and, therefore, cause thicknesses to build more slowly. Allow Latex False Face Compound to dry in the mold for 24 hours at room temperature. Elevated temperatures accelerate drying time.

Why Choose Latex False Face Compound?

- Forms hollow castings without roto-molding
- Tougher than most liquid rubbers
- One part -- No mixing or weighing needed

USING THE CASTING: Lightly dust the inside of the casting with talc in order to prevent the dry rubber from sticking to itself. Avoid exposing the casting to oils, greases or solvents. Castings should be stored out of direct sunlight.

SAFETY & STORAGE: See Poly Latex 60 (see p. 60).

PACKAGING	
Poly Latex False Face Compound	1 qt: 2.0 lb 1 gal: 8.0 lb 5 gal: 40 lb

Poly Wax 15

Hard Wax Blend for Carving & Casting

Poly Wax 15 is a white, hard, low shrinkage, mineral-filled wax, which can be cast and carved. When cast, it replicates the mold surface in detail and finish. Tool cuts are smooth and lustrous. Dull surfaces can be hand polished with a soft cloth to a satin luster.

MELTING AND CASTING: Poly Wax 15 softens at 126°F and is quite fluid at 160°F. Viscosity decreases rapidly as temperature rises. At 200°F, components of the wax separate slightly. Mix the melted wax thoroughly before pouring. Complete mixing is quick and easy to determine visually -- mixed wax is uniformly colored with no streaks. Use a non-porous, heat resistant stirrer such as a metal spatula. Pour temperatures of 210 to 280°F are best; however, the ideal temperature depends on the mold size, shape and material. Since Poly Wax 15 holds temperature for a long time, large or multiple molds can be filled in a single pour. When slush molding, excessively high temperatures will cause remelting of layers already laid down and significantly prolong the procedure. Casting temperatures that are too low will result in surface bubbles and "knit" marks because the wax solidifies too rapidly on the mold surface. Avoid heating Poly Wax 15 above 280°F.

Poly Wax 15 can be poured in Poly 74-Series, Poly-Fast 72-40, PlatSil®, TinSil®, Polygel® or Hydrogel® molds. Latex will be softened by pours of Poly Wax 15. Most heat resistant resins and metal molds are also suitable; however, a small trial casting is recommended to be sure castings release satisfactorily and do not damage the mold material.

Why Choose Poly Wax 15?

- Ideal for prototypes
- Suitable for master models
- Smooth and lustrous surfaces
- Cast carving blanks from rubber molds of rough originals

SAFETY: Before use, read product labels and Safety Data Sheet. Follow safety precautions and directions. Hot wax can cause severe burns and ignites easily. Avoid skin contact. Do not heat with an open flame. Do not heat above 300°F since vapors can ignite.

PHYSICAL PROPERTIES		
Softening point		126°F
Use temperature		210°F - 280°F
Viscosity	@ 100°C (212°F)	116 cP
Specific Volume (in^3/lb)	@ 25°C (77°F)	19.5
	@ 100°C (212°F)	21.6

PACKAGING	
Poly Wax 15	5-lb Block

Why Choose Poly Skin-Wax?

- One-part mold making compound
- No mixing -- simply melt and use
- Fast -- make a mold in 5 to 10 minutes
- Easily repaired with a dab of warm wax
- Flexible when warm
- Self releasing from most surfaces
- Reusable

Poly Skin-Wax

One-Part Mold Making Compound -- Safe for Skin Contact

Poly Skin-Wax is a liquid at temperatures as low as 125°F and it is somewhat elastic after solidifying. Thus, it can be used as a mold making material using dip or brush-on techniques. Poly Skin-Wax has been formulated with non-toxic materials and is safe for skin contact provided that temperature is carefully controlled.

MODEL PREPARATION: When making a mold of a body part, coat skin and hair with baby oil before applying Skin-Wax. Molds can only be made of body parts that are covered with short and light hair -- do NOT attempt to make molds from hairy areas. For most other non-porous models, Poly Skin-Wax is self releasing and, therefore, no release agent is needed. Make a small test mold on a surface identical to the model to determine that release properties and hardening of Skin-Wax is suitable.

PROCEDURE: Use a therapeutic paraffin bath, available from medical supply stores, to melt Poly Skin-Wax. A crock pot can be used to melt Skin-Wax; however, extreme caution must be exercised to ensure that the wax is not overheated. To melt Poly Skin-Wax, heat to 160 to 180°F. *Skin-Wax must be cooled to 125-135°F before contact with skin!* Even this temperature may cause discomfort in some individuals. Do not use Skin-Wax on sensitive areas such as the face. The wax must be just hot enough to produce good results; a few degrees hotter can cause considerable discomfort. Test judiciously on small areas.

Stir Skin-Wax often during melting and use since temperature variations within an unstirred bath can result in solidified wax in one area of the bath while another area heats enough to cause burns. Monitor temperature in several places in the bath (i.e., near walls, bath center and at several depths). Use an accurate thermometer.

Apply Skin-Wax by dipping the model, brushing on or slowly pouring over the model surface. For rapid cooling, immerse the wax-coated model in cool water between coats. Skin-Wax can be reinforced by laying fabric such as cheese cloth onto the previous coat and then applying wax to saturate the fabric.

Although some flexibility remains in Poly Skin-Wax at room temperature, if considerable flexibility is necessary for removal of the model, it is best to remove it as soon as the wax cools into the elastic (temporarily deformable) state. For model shapes that do not allow removal with the mold intact, the mold may be carefully cut and later rejoined using a warm metal spatula or by "welding" with molten wax. Small air vents punctured in the mold using a pin or wire may help release the mold from the model; for example, in casting a hand, pinholes at the end of each finger facilitate removal of the hand. These holes can be sealed later with a dab of molten wax.

SAFETY: Before use, read product labels and Safety Data Sheet. Follow safety precautions and directions. Do not heat with open flame. Do not heat above 300°F since vapors can ignite. Use with adequate ventilation. Do not use in the presence of sparks or open flame. Exercise extreme caution when applying Poly Skin-Wax to the skin. While Poly Skin-Wax is safe for skin contact, it is not recommended that repeated molds be made over a short period as the hot wax tends to remove skin oils and can cause irritation. For skin contact applications, avoid reuse of wax that may have absorbed irritating substances from casting materials.

PHYSICAL PROPERTIES		
Softening Temperature		125°F
Use Temperature		125-180°F
Viscosity @ 180°F		190 cP
Specific Volume (in^3/lb)	@ 77°F	31
	@ 180°F	34

PACKAGING	
Poly Skin-Wax	5-lb Block

Hydrogel® Mold Compound

Non-Toxic — Safe for Body Contact

Hydrogel® is a white powder that after mixing with water cures in about five minutes to a moist, rubbery material. Use Hydrogel to make quick, single-use molds, especially when skin contact is required. Plaster, wax, and certain EasyFlo Plastics can be cast into Hydrogel molds.

MODEL PREPARATION: Hydrogel can be poured on most surfaces with minimal preparation, but a small test cure should be made prior to use to be sure that Hydrogel releases cleanly and does not damage water sensitive surfaces. To seal questionable surfaces, apply a thin coat of petroleum jelly or Pol-Ease® 2300 Release Agent.

MIXING AND CURING: Weigh or measure proper amounts of Hydrogel powder and room temperature water. The mix ratio is 3 parts water to 1 part Hydrogel, by weight, or approximately 1 water to 1¼ Hydrogel, by volume. Mix together rapidly to a creamy consistency, but avoid whipping in air. For best results, use a Turbo Mixer on a variable speed drill. Add powder or water as needed to thicken or thin the mix. Working time is about five minutes, but can be extended using Retarder Solution (see table to right). Apply the creamy mix to the model surface with a flowing motion, pushing air ahead of the mix. Demold with care two to three minutes after the mix has gelled.

To make a large blanket mold, make and apply a series of mixes within five minutes of one another. Hydrogel bonds to itself if the previous mix is not completely gelled. To help a new mix bond to already gelled Hydrogel, wipe the gelled material with a saturated solution of water and baking soda (sodium bicarbonate). Add food coloring to the bonding solution so that you know where it has been applied. Continue layering Hydrogel as needed to make a ~3/8-inch-thick blanket mold. In the final layer of wet Hydrogel, press "teased" cotton (cotton rolls, available at any pharmacy) evenly over the entire mold surface and allow to gel. Remove excess cotton by pulling gently, leaving a thin layer of exposed fibers. As soon as Hydrogel is firm, mix and apply a plaster mold shell using bandages, cheesecloth, or hemp embedded in the plaster. The exposed cotton fibers in the mold will bond to the plaster shell helping to keep the mold attached. When the plaster shell is set, remove the Hydrogel mold/plaster shell.

Why Choose Hydrogel®?

- Non-toxic -- Safe for body casts
- Easy to use -- Just add water and mix
- Good reproduction of fine detail
- Early strength for fast demold
- Variable working time
- Low cost

USING THE MOLD: In order to make a casting with the same dimensions as the original, use the mold when it is as fresh as possible since Hydrogel molds shrink as they dry. Plaster and wax (< 212°F) can be cast in Hydrogel molds. In addition, some fast-curing polyurethane plastics (e.g., EasyFlo 60) and platinum-cured silicones (e.g., PlatSil® Gels) can be successfully cast in Hydrogel molds. However, perform small test cures before using in production to determine if casting quality is acceptable for the intended use.

Molds can be kept usable in plastic bags or sealed containers for up to a few days. Molds should then be discarded.

SAFETY: Before use, read product label and Safety Data Sheet. Avoid dust generation and wear a dust mask. Avoid eye contact. Hydrogel is not for human consumption or use against mucous membranes. Keep skin contact as brief as possible. Prior to placing Hydrogel on hair, slick down hair with petroleum jelly or cholesterol hair conditioning cream.

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

OPTIONAL LIQUID RETARDER

% Retarder in Water	Approx. Working Time
0	5 min
3	7 min
6	8 min
9	10 min

PACKAGING

Product	Volume
Hydrogel®	1 qt 1 gal 5 gal
Retarder Solution	1 qt

Release Agents & Sealers

POL-EASE® 2300 RELEASE AGENT
A silicone-based, convenient aerosol spray, Pol-Ease® 2300 is an effective release agent for use with most Polytek products. Use a soft brush to distribute evenly.
12-oz can or Case of 12 cans

POL-EASE® 2350 RELEASE AGENT
Mineral spirits solution for use as a release agent for RTV liquid silicone rubbers. Also, can be used to seal porous surfaces. Can be brushed or sprayed. Use a soft brush to spread the release agent evenly to improve results.
1 qt (1.5 lb) or 5 gal (26 lb)

POL-EASE® 2450 RELEASE AGENT
A fast drying, silicone-based release agent, which can be brushed or sprayed. Flammable!
1 qt (1.5 lb) or 5 gal (30 lb)

POL-EASE® 2500 RELEASE AGENT
An aerosol spray release agent that can be easily washed off cast parts for finishing. Spray a thin mist over the mold or model surface, then brush gently to ensure uniform coverage. Excellent release agent for use with liquid silicone rubbers.
12-oz can or Case of 12 cans

POL-EASE® 2601 RELEASE AGENT A water/silicone oil emulsion for use on polyurethane rubber when casting plaster or concrete. Spray on with the Sure Shot Atomizer. After spraying, distribute evenly with a soft brush.
1 qt (2.0 lb), 5 gal (40 lb) or 55 gal (450 lb)

POL-EASE® 2650 RELEASE AGENT
A high performance, silicone-free, release agent for use in polyurethane molds when casting concrete or plaster.
1 qt (1.5 lb) or 5 gal (35 lb)

POLY PVA SOLUTION
Apply this water-soluble barrier coat to certain rubber molds (i.e, Poly-Fast 72-40) to allow resins to cure without sticky surfaces. While Poly 74-Series and Polygel® molds do not cause sticky surfaces on resin castings, PVA may be used as a barrier coat to prevent resin attack on the mold. Can be used as a removable sealer for porous surfaces alone or in conjunction with paste wax. PVA residue washes off with water. (Specify Clear or Green)
1 qt (2.0 lb) or 5 gal (35 lb)

POLYCOAT A semi-permanent sealer and release agent that can be sprayed or brushed onto a model or into a cured polyurethane or silicone mold. PolyCoat forms a cured silicone coating that can eliminate the need for additional silicone spray release agent. In most cases no additional release is needed.
1 qt (1.5 lb) or 1 gal (6 lb)

SURE SHOT ATOMIZER 16-oz capacity atomizer for use with Pol-Ease® 2601, 2350 and 2450 Release Agents. Pressurized with a bike-style inflation valve.
Sold singly

Mold Care

POL-EASE® MOLD RINSE
Liquid concentrate reduces surface air bubbles on plaster castings made in Polytek rubber molds. Dip or spray mold with 1 part Pol-Ease Mold Rinse diluted with 10 parts water. Molds should be wet when plaster is poured.
5 gal (40 lb)

POL-EASE® MOLD DRESSING
Protects and rejuvenates polyurethane rubber molds that have been exposed to solvents or petroleum-based form releases, and/or harsh casting materials such as those that are porous and absorptive (i.e., some concrete mixes).
5 gal (40 lb) or 55 gal (450 lb)

Fillers & Thickeners

POLY FIBER II Add to liquid rubbers or liquid plastics to thicken for brush-on application or to make mold shells or layup castings. Add up to 5% total weight.
1-gal pail, 5-gal pail or 15-lb bag

FUMED SILICA Add to mixed liquid rubbers to make thicker and thixotropic for brush-on application.
5-gal pail or 10-lb bag

BRONZE POWDER Add one part Bronze Powder to one part EasyFlo (by volume) for beautiful “cold-cast bronze” castings.
2-lb can, 10-lb can or 20-lb can

POLYFIL ND A "neutral density" filler designed for use with polyurethane liquid rubbers and plastics for several purposes. Use PolyFil ND to reduce the cost of a casting without changing its density. Adding PolyFil ND to EasyFlo and Poly 15-Series plastics can also dramatically reduce shrinkage. PolyFil ND mixes into polyurethanes easily and is moisture-free, so it does not cause foaming. Experimentation with filler levels is required as fillers added to rubbers may increase hardness and reduce physical properties such as elongation and tensile strength. Adding too much PolyFil ND may increase viscosity making air entrapment more likely.
5-gal pail (22 lb)

Brushes

SILIBRUSH A reusable silicone rubber brush that can be used to brush-on polyurethane liquid rubbers and plastics. After the polyurethane cures, it easily strips off and the brush is ready for reuse. Also works with PlatSil® and TinSil® products. Brush is 6.5 -in long with a 1-in wide brush.
Sold singly

CHINA BRISTLE BRUSHES Wooden handle chip brushes. 100% China Bristle available in 1- and 2-inch widths. Use to brush-on liquid rubber or plastic or release agent.
1-in Brushes, Bundle of 10
2-in Brushes, Bundle of 10

ACID BRUSHES Tin-handle, disposable ½-inch wide brushes with 100% horsehair bristles. Excellent for making small brush-on molds.
Bundle of 30 or Box (144)

Adhesives

POLYPOXY® QUICK STICK ADHESIVE Two-part epoxy adhesive with 1:1 mix ratio by weight or volume. Bonds quickly to most clean, dry surfaces. Sets in 3-5 minutes.
2-lb kit

POLYBOND Polyurethane adhesive that's great for repairing torn molds. PolyBond has a 1A:3B mix ratio (by weight), ~3 minute working time and ~15 minute cure.
2-lb kit

EPOXYBOND A low viscosity, epoxy adhesive, which deeply penetrates porous surfaces creating an excellent bond. It has an easy 1A:1B mix ratio (by volume), a long working time (120 min), and overnight cure.
2-lb kit

Pails & Opener

PAILS FOR MIXING High density polyethylene pails with handles. These are the same pails that Polytek uses for its products. They are excellent for mixing Parts A & B and often the cured residue can be stripped out, leaving a clean pail ready for reuse. Lids can be ordered separately.
1-gal Pails (Box of 10)
5-gal Pails (Box of 5)

"PAIL PAL" Pail opener opens most plastic pails with ease. Constructed of rugged cast aluminum.

Colors & UV Stabilizer

POLYCOLORS Dyes for coloring Polytek's polyurethane rubbers and plastics. Available in red, blue, green, yellow, brown and black. A white pigment is also available.
0.25-lb bottle or 1.0-lb bottle

SILICOLOR SILICONE PIGMENTS Use with TinSil® or PlatSil® silicone rubbers to create custom colors for mold making and casting applications. SiliColors are extensively used for pigmenting PlatSil® Gels when used to make theatrical prosthetic appliances. SiliColor Fleshtone is popular for skintone applications. Available in fleshtone, red, blue, green, yellow, black, and white.
4-oz containers or 1-lb container

UV ADDITIVE Thoroughly stir this liquid additive into polyurethane liquid rubber or plastic to improve exterior durability and reduce surface degradation caused by sunlight or other UV light sources. Add 0.5% of the total mix weight.
4-oz bottle or 1-pint bottle (1 lb)

Dry Gas

POLY PURGE AEROSOL DRY GAS Blast Poly Purge into open polyurethane Part A and B containers just before resealing to displace moist air and extend the product life. Poly Purge is heavier than air, non-flammable and not ozone depleting. It is packaged in an aerosol can with a nozzle extension, which is useful for directing the gas into the desired space.
10-oz can or Case of 12 cans

Clay

POLYPLASTICENE Non-hardening, sulfur-free modeling clay. Non-toxic and odorless, with a smooth, firm consistency for sculpting. Also, makes great reusable caulk for mold boxes.
1-lb block

Reinforcers

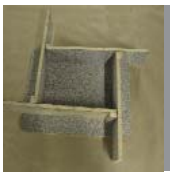
HEMP Long, natural fiber that is a traditional reinforcement for plaster mother molds.
10-lb bundle, 40-lb bale

TIETEX® FABRIC Strong, conformable reinforcing fabric that wets out well. Small pieces can be laminated in at the top of a seam in brushed or sprayed molds to prevent tearing. A sheet can be laid into the back of an open poured mold to increase durability. Use as bridging material for spanning undercuts in sprayed or brushed molds.
10-ft sheet, or 324-ft roll (40-in wide)

FIBERGLASS MAT 1.5 oz per ft^2, chopped strand mat for reinforcing Polytek resins.
3-yd^2 mat

Accessories

Mold Box



MOLD BOX Six inches high and adjustable to any size up to 24-in by 24-in. The base is smooth, plastic-faced particle board. This mold box provides a quick way to pour a rubber mold. (C-clamps not included.)

Mold-Key Knife

MOLD-KEY KNIFE Use this unique notched knife to cut tongue-and-groove seams in molds. Makes proper mold registration easy.

Scales

DIGITAL TABLETOP SCALE Battery-operated scale with a capacity of 5000 g and ±1 g readability. Requires 2 AA batteries.

DIGITAL FLOOR SCALE Battery-operated scale with a capacity of 400 lb and ±0.1 lb readability. Requires 6 AA batteries.

Bands & straps

RUBBER BANDS Top quality ¾-inch wide rubber bands made of long lasting, heavy-duty, natural rubber. Secures mold shell pieces firmly together.
1-lb Bag of 4-in Bands
1-lb Bag of 8-in Bands

NYLON MESH MOLD STRAPS One-inch wide nylon straps are adjustable to 8-feet in length. They tighten as the buckle locks to ensure a snug fit.
Sold singly or Bag of 12

Mixing Tools

POLY PADDLE The 16-inch Poly Paddle, by Rubbermaid, allows complete mixing of material by thoroughly scraping the sides and bottom of rounded or straight-sided mixing containers.

SPATULA Top quality, all purpose spatula with a comfortable, vinyl handle is unbreakable, and heat and chemical resistant. The stainless steel blade is semi-flexible for durability and easy mixing. The mirror finish wipes clean easily. Available in two sizes for most small mixing needs.
4-in Blade Spatula
6-in Blade Spatula

JIFFY MIXERS Heavy-duty, efficient mixer, designed for tough-to-mix, viscous materials. Mixes quickly and thoroughly without splashing or whipping air into the mix. The protective-ring design prevents puncture or damage to the mixing container. Made entirely of stainless steel 304 for maximum durability. Jiffy mixers fit ¼- to ¾-inch chucked power tools. Tools with 450-700 rpm give the best mixing results.
1-gal Jiffy Mixer
5-gal Jiffy Mixer

TURBO MIXERS Ingenious, patented, high efficiency mixers fit any power drill with ½-inch chuck and mix more efficiently than Jiffy Mixers. Must be kept free of built up material. It's worth the price!
½-gal Turbo Mixer
1-2 gal Turbo Mixer
3-10 gal Turbo Mixer
11-55 gal Turbo Mixer

TONGUE DEPRESSORS Made of straight-grained white birch for consistent quality. Convenient, low cost mixing tools for test cures or small quantity mixes.
6-in length, box of 500

Drum Tools

Polytek offers numerous products to make handling drums easier and safer. A few items are listed below. Call Polytek for pricing and details.
Drum Bung Wrench, Standard Bronze
Oil-Gate Valve for 2-inch Bung

DRIERITE CARTRIDGE Protect Polytek products (both Parts A & B) with Drierite Dessicant Cartridges. When dispensing product from a drum, with an adapter, screw the drying cartridge into the small bung so that air entering the drum during dispensing is dry. Cartridges have a window to view color change to determine when cartridge is spent.
Drierite Cartridge & Adapter, sold separately

Cured Samples

CURED SAMPLE STRIP BOOK Cured sample strips of most Polytek rubbers and resins in a 3-ring binder. A handy reference when selecting a material for a particular job.

Special low prices & free shipping on Trial Kits! Call for details.

Plas-Pak Spray Equipment

Certain Polytek polyurethane and silicone liquid mold rubbers and plastics (e.g., Polygel® Liquid Rubbers, TinSil® Brush/Spray 25, EasyFlo Spray FR and EasyFlo Spray Foam FR) can be inexpensively meter mixed and sprayed using sprayer assemblies and accessories from Plas-Pak Industries. Two gun assemblies are available - a 1:1 mix sprayer for polyurethane rubbers and plastics, and a 1:10 sprayer for TinSil® Brush/Spray 25. Both sprayers, with the required pressure regulator kits, are available from Polytek. You need to supply the air compressor. Empty cartridge assemblies (one tube for Part A and one for Part B) are molded into one piece for convenience and may be reused when handled carefully or disposed if clean up is impractical. Static mixers are sold separately. Static mixers are disposable and should not be reused.

With this handy spray system you can complete a mold in a one-application session.

Plas-Pak 1:1 Spray Gun/Regulator
Plas-Pak 1:10 Spray Gun/Regulator
Plas-Pak 1:1 Cartridge
Plas-Pak 1:10 Cartridge
Plas-Pak Static Mixer

Call Polytek Customer Service, at (800)858-5990, for more information on Plas-Pak Sprayers or alternatives for large-scale meter-mix and dispensing equipment

Safety Equipment

Although we don't offer a full line of safety supplies, call Polytek and we'll help you understand what you need to work safely and where to get it!

NITRILE GLOVES Disposable, powder-free, 4-mil nitrile gloves offer comfort, dexterity and protection against intermittent contact with nearly all Polytek products. Contain no natural rubber proteins.
Size L, 100 gloves per Box

SAFETY GLASSES With a sleek wrap-around polycarbonate lens, Uvex Bandido® safety glasses offer excellent eye protection, comfort and sporty styling. Meets ANSI Z87.1-1989 Standard. Made in USA.
1 pair (one size)

PROTECTIVE COVERALL Dupont Proshield™ NexGen™ coveralls are made of a micro-porous fabric that is aerosol and liquid proof. Disposable, but durable enough to be reworn. Large size and light weight allow mobility. The perfect cover-up for quick, dirty jobs. *Coverall, Size L*

SOLVENT DISPENSING CAN Plunger can for dispensing flammable liquid features brass flame arrestor screens and pump assembly. Simply press a cloth or wiper on the plunger to moisten.
Two-quart capacity.

Rotational Casting

Rotational casting involves rotating a closed mold while a liquid casting material flows over the inner surface of the mold. The liquid clings to the mold surface just enough to create a thin layer of cured material, which creates a hollow casting. Rotational casting is an efficient method of creating large, lightweight pieces such as mannequins and figurines. Fast-setting liquids are used so that pieces can be produced with short cycle times. Small machines cost ~$5,000 and can support mold loads of up to 200 lb. Table-top versions are available. Large machines can carry many molds at once and typically cost >$10,000. Polytek owns 2 machines that are available for demos and test runs in Easton, PA.

DVD

POLYTEK MOLD MAKING DVD
Watch step-by-step demonstrations showing how to make a poured block mold; brushed blanket mold with plastic shell; and a poured blanket mold with a plastic shell.

For large volume applications, Polytek products can be purchased in totes. Polytek offers accessories for handling and dispensing products from totes. Call for details.

GLOSSARY

Blanket Mold: A thin blanket-like rubber mold, usually ¼- to ½-inch thick. A rigid mold shell (mother mold) is required to hold the floppy blanket mold in its correct shape.

Chasing: Cleaning unwanted material (flashing) from a casting.

Die Lock: A condition between two objects (i.e., model and mold or mold shell) where an undercut creates a point of impossible separation when removal is attempted. Proper placement of seam lines eliminates this problem.

Durometer: A measure of the hardness of a material. The term durometer refers to both the device and the measurement. There are several durometer scales: the most common used for Polytek products are the type A and type D scales. The OO scale is used for only the softest products (e.g., PlatSil® Gel). Each scale results in a value between 0 and 100, with higher values indicating a harder material. See the diagram below.

Elasticity: The ease and ability of a solid to stretch and then return to its original shape. Sometimes reported as % Elongation.

Flashing: 1. Unwanted fin-like projections of casting materials that have flowed into mold vents and parting lines. 2. Thin material (i.e., aluminum or plastic sheet) used to divide mold sections.

Gel Time (aka Pot Life): Amount of time before a liquid begins to gel/harden. Sometimes reported as working time.

Glove Mold (aka Sock Mold): Molds that are turned back on themselves and peeled off the model. Glove molds work well for pyramid-shaped models (wider bottom than top) and must be thin, usually less than 1/8-inch thick, to minimize stress and possible tearing of the rubber. As the mold is peeled off, its outside surface may need to be lubricated with silicone release or soapy water to allow it to slide easily against itself.

Inhibition: Failure of a compound to cure against a surface within the recommended cure time. The surface in contact with the pattern remains gummy or uncured. Inhibition is most likely to occur in addition-cure (PlatSil®) silicone systems.

Keys: Tongue-and-groove, or button-like impressions to align mold or shell sections.

Library Life: The length of time a rubber mold will remain useful after being placed in storage.

Model: The original shape over which a mold is made.

Mother Mold (aka Mold Shell): The rigid shell over a flexible mold that holds the flexible mold in the desired configuration.

Parting Line: The line where sections of a mold or mold shell divide.

Release Agent (aka Parting Agent): A coating applied to prevent liquid rubbers and resins from sticking to surfaces.

Resin: A liquid that can be cured to a solid plastic.

RTV: Room temperature vulcanizing.

Shims: Thin strips of material used to form parting lines.

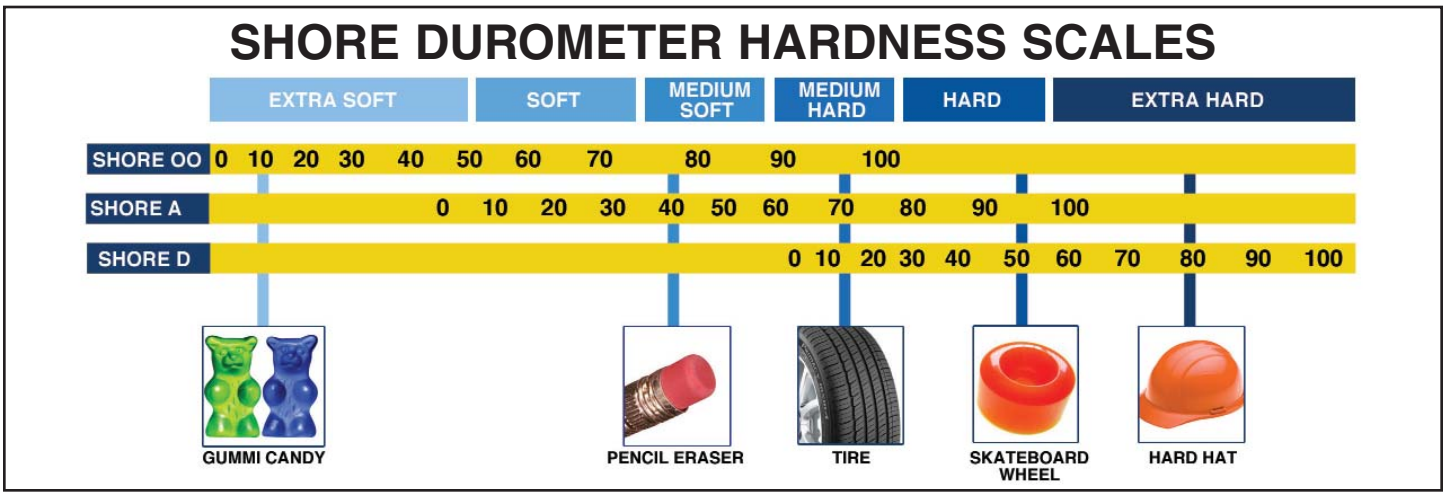
Thixotropy: The property of a gel or fluid in which it's viscosity seems lower when it is under shear (as by mixing). Thixotropic materials can be non-sag when stationary, but seem fluid when being mixed.

Undercuts: A configuration such as an overhang between two mated surfaces, such as a mold and model, that tends to prevent them from separating when pulled apart. Flexible mold materials allow molds to be made with limited undercuts because the flexible mold material bends as the part is demolded.

Viscosity: The resistance of a substance to flow. For example, water has a lower viscosity than molasses and flows more easily. For liquids, viscosity decreases with temperature. Dynamic viscosity (aka absolute viscosity) is expressed in centaPoise (cP). Kinematic viscosity is typically reported in centiStokes (cSt). Kinematic viscosity is the ratio of absolute viscosity to specific gravity. So, for liquids with a specific gravity of 1.0, dynamic and kinematic are equal. Water @ 20 °C has a dynamic viscosity of 1 cP, and a kinematic viscosity of 1 cSt

Viscosities of Common Materials

Water	1 cP
SAE 30 Motor Oil	500 cP
Honey	10,000 cP
Sour Cream	100,000 cP
Peanut Butter	250,000 cP

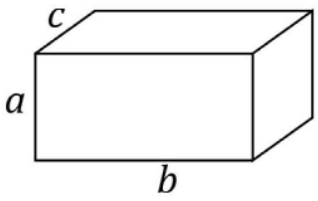


GEOMETRIC FORMULAS FOR CALCULATING VOLUME

In mold making and casting, it is important to carefully estimate the volume of a model or casting in order to determine how much liquid rubber or plastic is needed to complete a project. The following formulas are useful in making such determinations. Use the volume formula for the shape that most closely resembles your model or casting. If a volume formula is not provided, simply multiply the area of the most similar shape by the height of the model.

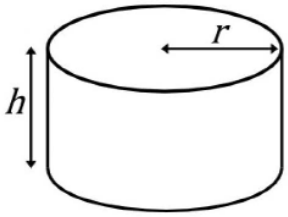
RECTANGULAR BOX

$V = abc$



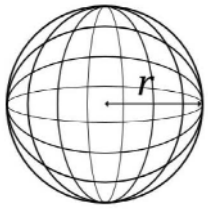
CYLINDER

$V = \pi r^2 h$



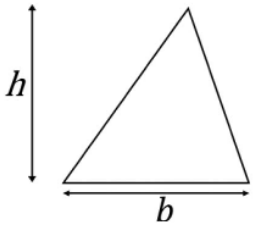
SPHERE

$V = \frac{4\pi r^3}{3}$



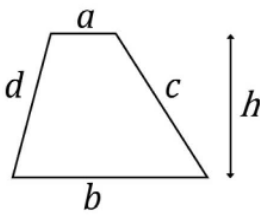
TRIANGLE

$A = \frac{1}{2}bh$



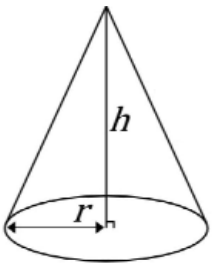
TRAPEZOID

$A = h\frac{a+b}{2}$



CONE

$V = \frac{1}{3}\pi r^2 h$



COMMON UNITS OF MEASURE & CONVERSIONS

Common Unit Equivalents	You have...	Multiply By	To Obtain
Volume			
1 liter (L)= 0.264 gal = 1.06 qt	Quart	x 0.95	= Liters
1 gal = 3.785 L	Gallons	x 3.78	= Liters
1 gal = 4 qt = 8 pt = 16 c = 128 oz	Liters	x 0.27	= Gallons
1 gal = 231 in^3 = 0.134 ft^3	Gallons	x 0.13	= Ft^3
1 ft^3 = 1,728 in^3 = 7.5 gal	Ft^3	x 7.5	= Gallons
1 in^3 = 16.4 cm^3			
Weight	Ounces	28.35	= Grams
1 oz = 28.35 g	Grams	0.0353	= Ounces
1 lb = 16 oz	Pounds	454	= Grams
1 lb = 454 g	Grams	0.0022	= Pounds
1 kg = 2.2 lb	Pounds	0.454	= Kilograms
	Kilograms	2.203	= Pounds
Length	Inches	x 0.039	= mm
1 cm = 10 mm	Millimeters	x 25.4	= Inches
1 in = 25.4 mm	Feet	x 3.28	= Meters
1 ft = 0.305 m	Meters	x .305	= Feet
1 m = 39.37 in			
Temperature			
°C = (°F -32) x 5/9			
°F = °C x 9/5 + 32			

PAYMENT POLICIES

Prices are per kit, including both A and B components. (Except one-part materials and certain epoxies.)

Terms are 1% 10 days, net 30 days for customers with approved credit.

Orders prepaid with credit card, money order or wire transfer will usually be shipped the next day if items are in stock.

Orders prepaid with check are subject to delayed shipment until the check clears.

No COD Shipments.

Prices do not include state and local taxes. Sales and use tax is required for shipments to PA and IN.

Prices are subject to change without notice.

Prices are FOB Easton, PA.

Any single pint bottle of Silicone Part A will be sold at the 1-lb kit price for that product. Any ½-gal bottle of Silicone Part A will be sold at the 9-lb kit price.

Returns must be pre-approved and a 20% restocking fee will be charged.

Return Check charge is $40.

Polytek accepts VISA MasterCard AMERICAN EXPRESS

Polytek Development Corp.

The one-stop-shop for liquid rubbers and plastics for all of your mold making and casting projects.

Polyurethane RTV Mold Rubbers

- Tough, long-lasting, flexible mold rubbers
- Hardnesses ranging from A20 to D45
- Many easy, 1:1 mix ratio systems available
- Use to cast concrete, plaster, wax and, with proper release agents, resins and foams.
- Choose Polygel® systems for brush or spray applications

For details, see pages 22-33.

Silicone RTV Mold Rubbers

- Choose between TinSil® and PlatSil® systems
- Superior chemical resistance
- No release agents required
- Hardnesses range from OO30 to A60
- Choose PlatSil® Gels for creating life-like special effects
- Spray application available for some products

For details, see pages 34-45.

Casting Plastics, Foams & Rubbers

- Low viscosity casting plastics and rubbers
- Many easy, 1:1 mix ratio systems available
- Choose super low viscosity EasyFlo for the most detailed castings
- Choose 15-Series for parts and mold shells
- Choose Poly-Optic® 14-Series for water clear castings
- Choose PT-Flex castable rubbers for fast prototypes

For details, see pages 46-59.

For **Specialty Mold Making & Casting Materials** (latex, wax, epoxy and Hydrogel®), see pages 60-63.

For **Accessories** (release agents, fillers, colors, tools and more), see pages 64-67.

For expert technical assistance, call (800)858-5990.

For up-to-date product information & prices, go to www.polytek.com.

Polytek Development Corp. FREE SHIPPING ON TRIAL KITS

Special low prices & free shipping on Trial Kits! Call for details.