

TinSil® 80-Series Silicone Rubbers Technical Bulletin

DESCRIPTION: TinSil® 80-Series Silicone Rubbers are two-component, room temperature curing mold rubbers. TinSil silicone rubbers are condensation-cure, tin-catalyzed systems that cure to soft and medium-hardness, flexible rubbers. These silicones offer reduced shrinkage upon cure and during casting, longer library life once cured and longer useable mold life than other tin-cured systems.

TinSil molds have high tear strength, good release properties and resistance to high temperatures, and excellent chemical resistance. These molds are a great choice for casting polyesters, epoxy and polyurethane resins, polyurethane foams, plaster, waxes and many other materials.

MODEL PREPARATION: Porous models must be sealed to prevent the rubber from penetrating the surface. Seal porous models (e.g., wood or plaster) with wax, petroleum jelly, PVA, lacquer or paint to prevent penetration of the rubber into the pores of the material. Do not use shellac as a sealer when working with TinSil silicone rubbers, as inhibition can occur. Some surfaces (e.g., metals and glass) 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. TinSil rubbers usually bond to cured silicone rubbers unless a release agent, like Pol-Ease 2500, is used. Do not use silicone-based release agents (e.g., Pol-Ease® 2300 Release Agent) on surfaces that contact liquid TinSil rubbers since inhibition and/or adhesion may occur.

Modeling clays containing sulfur may inhibit curing. If there is any question about the release properties of TinSil rubbers against a certain material, perform a small test cure on an identical surface.

Once sealed and positioned for mold making, vent porous models from beneath to allow trapped air to escape and to prevent air from migrating into the rubber.

MIXING AND CURING: Before use, be sure that Parts A and B are at room temperature and that all tools are ready. Surface and air temperatures should be above 60°F during application and for the entire curing period.

Read product labels to determine the correct mix ratio and if pre-mixing of Part A or Part B component is required. Carefully weigh Part B and 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 ensure a bubble-free mold, it may be necessary to deaerate the liquid rubber under vacuum at 28-29 inches mercury. If vacuum is used, mix Parts A and B in a mixing container three to four times larger than the volume of

High-Performance Silicone Rubbers

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 compared to other tin-catalyzed systems

- Longer library life compared to other tin-catalyzed systems

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 (e.g., thin blanket molds), place open mesh nylon, dacron cloth, or TieTex® Fabric 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.

At room temperature (~77°F), TinSil 80-Series rubbers cure to full hardness in the specified demold time. At higher temperatures, they cure faster. At lower temperatures, more time may be needed to reach full hardness. Curing below 60°F is not recommended.

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 TinSil® FastCat Accelerator may degrade from aging faster than silicone rubbers cured with less accelerator.

TinSil products release alcohol while curing and can inhibit the surface of some casting materials, including Polytek Poly-Optic® 14-Series clear casting resins and polyurethane rubbers. This is especially the case in **new** tin-cured molds. Before casting these materials in a TinSil mold, be sure that all alcohol has evaporated. 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. Do not cast platinum-cured silicone rubbers (e.g., PlatSil® 71- & 73-Series) in tin-cured silicone molds; they will not cure properly.

PHYSICAL PROPERTIES

	80-15	80-30	80-40
Mix Ratio By Weight	1A:10B	1A:10B	1A:10B
Shore Hardness	A15	A30	A40
Pour Time (min)	30	45	45
Demold Time (hr) @ 77°F	24	24	24
Cured Color	Peach	Peach	Peach
Mixed Viscosity (cP)	12,000	17,000	20,000
Specific Volume (in ³ /lb)	25.3	23.7	22.9
Specific Gravity	1.10	1.17	1.21
Shrinkage Upon Cure (%)	~0.2	~0.2	~0.2

ACCELERATING THE CURE: Use TinSil® FastCat Accelerator to accelerate cure and shorten demold time. When using FastCat, the working time is shorter as well, so avoid over-accelerating. FastCat can be added in a range of 1% to 4% of Part B. Add FastCat to Part B prior to mixing with Part A. When using TinSil® 80-30, for instance, adding 2% FastCat will result in a ~15-minute pour time and ~4-hour demold time. Adding 3% FastCat will result in a ~10-minute pour time and a ~3-hour demold time. Adding 4% FastCat will result in a ~5-minute pour time and ~2-hour demold time. 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 and also increase shrinkage.

THICKENING FOR BRUSH-ON: TinSil 80-Series rubbers can be thickened with TinThix liquid thickener or with Fumed Silica for brushing on a blanket mold. Blanket molds can be reinforced by placing stretchy, open 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.

When brushing on several layers of silicones, wait for the first layer to “gel” (i.e., not fully cured, but when the rubber has cured enough that application of a subsequent layer will not disturb the previous layer) before applying the next layer. Delamination can occur when too much time has passed in between layers; do not allow the layer to fully cure before applying the subsequent layer. Refer to the table below for estimated *maximum* elapsed time in between application of layers when accelerator is not used. Ambient and surface temperature can affect gel and cure times.

BRUSH-ON APPLICATION: MAXIMUM ELAPSED TIME BETWEEN APPLICATION OF LAYERS			
TinSil® Product	80-15	80-30	80-40
Maximum Time Between Layers	90 min	2 hr	2 hr

Silicone Color Pigments can be used to vary the color of brushed layers to help ensure uniform coverage.

THINNING AND SOFTENING WITH SILICONE FLUID: Low-viscosity 50 cSt Silicone Fluid can be added to the mixed liquid rubber to thin the mix, but add sparingly since fluid addition results in some loss of strength, hardness and cure speed. If more than 10% fluid is added to the mix, then fluid 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, such as spray paint, that is sprayed into a silicone mold and allowed to dry prior to pouring liquid plastic or foam into the mold. Upon removing the cured plastic or foam casting from the mold, the barrier coat comes out on the casting resulting in a primed part. Using a barrier coat can extend mold life.

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

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 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. Do not use TinSil products where food or body contact may occur.

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

Accessories:

Accelerator

TinSil® FastCat Accelerator - 0.25 lb, 1 lb, 8 lb

Sealers & Release Agents

Pol-Ease® 2500 Release Agent - 12-oz can, case of 12

Pol-Ease® 2350 Sealer & Release Agent - 1.5 lb, 26 lb

PolyCoat Sealer & Release Agent - 1.5 lb, 8 lb

Poly PVA Solution (Green or Clear) - 2 lb, 40 lb

Thinner

Silicone Fluid 50 cSt - 2 lb, 8 lb, 40 lb

Thickeners

TinThix Liquid Thickener - 0.25 lb, 1 lb

Fumed Silica - 5-gal pail, bag (~10 lb)

Colors

Silicone Color Pigments - 4 oz, 1 lb

(Black - Blue - Flesh-tone - Green - Red - White - Yellow)

Reinforcement Material for Blanket Molds

Tietex® Fabric (40-in wide) - 10-ft sheet, 324-ft roll

PACKAGING

Product(s)	Kit Size (lb)	Part A		Part B	
		Weight (lb)	Volume*	Weight (lb)	Volume*
TinSil® 80-15, TinSil® 80-30 & TinSil® 80-40 Mix Ratio: 1A:10B	1.0	0.1	2 oz	0.9	1 pt
	9.0	0.9	1 pt	8.1	1 gal
	44	4.0	0.5 gal	40	5 gal
	495	45	5 gal	450	55 gal

*Volume measurements are approximate.