

DESCRIPTION: TinSil® 70-Series Silicone Elastomers are two-component, room temperature curing mold rubbers. TinSil silicone elastomers are condensation-cure, tin-catalyzed systems that cure to flexible rubbers. TinSil molds have high tear strength, excellent chemical resistance, good release properties and resistance to high temperatures. These molds are a great choice for casting polyesters, epoxy and polyurethane resins, polyurethane foams, plaster, waxes and many other materials.

BEFORE USE: Thoroughly read Safety Data Sheets, product labels and the "SAFETY" section in this Technical Bulletin.

Select the appropriate rubber for your application:

TinSil® 70-11 & TinSil® Gel-10 are soft and, therefore, best for delicate castings. TinSil Gel-10 is translucent and especially useful for animatronics and special effects.

TinSil® 70-20 & TinSil® 70-25 are popular and versatile, mid-range hardness, silicone elastomers.

TinSil® Brush/Spray 25 is brushable or sprayable and can be applied by hand or sprayed with a low-cost PlasPak spray gun or more sophisticated 1A:10B mix 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.

PRODUCT LINE FEATURES

- Easy release properties - save on release agents
- Range of hardness from A10 to A60
- Heat-resistant (TinSil® 70-60) - suitable for casting low-melting point metals
- High tear strength - fewer prematurely torn molds

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 elastomers, 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 elastomers 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.

PHYSICAL PROPERTIES

| Product | TinSil® Gel-10 | 70-11 | 70-20 | 70-25 | Brush/Spray 25 | 70-60 |
|---------------------------------------|----------------|---------|---------|---------|----------------|---------|
| Mix Ratio By Weight | 1A:10B | 1A:10B | 1:10B | 1A:10B | 1A:10B | 5A:100B |
| Shore Hardness | A10 | A10 | A20 | A25 | A25 | A60 |
| Pour Time | 45 min. | 45 min. | 60 min. | 60 min. | 30 min. | 30 min. |
| Demold Time @ 73°F | 16 hr. | 16 hr. | 16 hr. | 16 hr. | 16 hr. | 24 hr. |
| Cured Color | Translucent | Blue | Blue | Blue | Translucent | Red |
| Mixed Viscosity (cP) | 10,000 | 10,000 | 10,000 | 14,000 | Thixotropic | 17,000 |
| Specific Volume (in ³ /lb) | 25.3 | 25.5 | 25.3 | 25.3 | 25.3 | 18 |
| Specific Gravity | 1.1 | 1.08 | 1.1 | 1.1 | 1.1 | 1.5 |
| Shrinkage Upon Cure (%) | ~0.3 | ~0.3 | ~0.3 | ~0.3 | ~0.3 | ~0.8 |
| Elongation (%) | 654 | 600 | 830 | 516 | 608 | 134 |
| Tensile Strength (psi) | 221 | 221 | 363 | 306 | 278 | 262 |
| Die B Tear Strength (pli) | 89 | 89 | 100 | 107 | 75 | 25 |
| Die T Tear Strength (pli) | 24 | 24 | 31 | 36 | 27 | ND |

ND = Not Determined

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 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 (~73°F), TinSil 70-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 elastomers 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 elastomers (e.g., PlatSil® 71- & 73-Series) in tin-cured silicone molds; they will not cure properly.

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® 70-25, 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 70-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.

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 70-25 will reduce hardness to approximately Shore A20.

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 polyurethane resin 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.

BRUSH-ON APPLICATION: MAXIMUM ELAPSED TIME BETWEEN APPLICATION OF LAYERS

| TinSil® Product | Gel-10 | 70-11 | 70-20 | 70-25 | Brush/Spray 25 | 70-60 |
|------------------------------------|--------|-------|-------|-------|----------------|---------|
| Maximum Time Between Layers | 2 hr. | 2 hr. | 3 hr. | 3 hr. | 1.5 hr. | 1.5 hr. |

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

SAFETY: Before use, thoroughly read Safety Data Sheets and product labels. Follow safety precautions and directions.

Part A: Keep out of reach of children. Keep away from flames and hot surfaces. Do not eat, drink, or smoke when using this product. Do not breathe fumes, vapors or mists. Use only outdoors or in a well-ventilated area. Use with adequate general or local exhaust ventilation to minimize exposure levels. If needed, a NIOSH-approved respirator with organic vapor cartridge may be used. If inhaled, remove victim to fresh air and keep at rest in a position comfortable for breathing. Wear impervious gloves, such as butyl rubber or nitrile rubber. Wash thoroughly with soap and water after handling. Wear eye protection, such as chemical safety glasses/goggles. If in eyes, rinse cautiously with water for several minutes, removing contact lenses if present and easy to do. If swallowed, call a Poison Control center. If spilled, collect spillage and avoid release to the environment.

Part B: Keep out of reach of children. Use with adequate general or local exhaust ventilation to minimize exposure levels. If needed, a NIOSH-approved respirator with organic vapor cartridge may be used. Wear impervious gloves, such as butyl rubber or nitrile rubber. Wash thoroughly with soap and water after handling. If in eyes, rinse with water for several minutes, removing contact lenses if present and easy to do.

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ACCESSORIES

Accelerator:

TinSil® FastCat Accelerator

Sealers & Release Agents:

Pol-Ease® 2500 Release Agent

Pol-Ease® 2350 Release Agent

PolyCoat Sealer & Release Agent

Poly PVA Solution (Green or Clear)

Thinner:

Silicone Fluid 50 cSt

Thickeners:

TinThix Liquid Thickener

Fumed Silica

Colors:

Silicone Color Pigments

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

Reinforcement Material:

Tietex® Fabric

DESCRIPTION: TinSil® 80-Series Silicone Rubbers are two-component, room temperature curing (RTV) 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.

Molds made from TinSil rubber 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.

BEFORE USE: Thoroughly read Safety Data Sheets, product labels and the "SAFETY" section in this Technical Bulletin.

MODEL PREPARATION: Prior to applying liquid silicone, 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.

PRODUCT LINE FEATURES

- High tear and excellent chemical resistance provide 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

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 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., in 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.

PHYSICAL PROPERTIES

| Product | TinSil® 80-15 | TinSil® 80-30 | TinSil® 80-40 |
|---------------------------|---------------|---------------|---------------|
| Mix Ratio By Weight | 1A:10B | 1A:10B | 1A:10B |
| Shore Hardness | A15 | A30 | A40 |
| Pour Time | 30 min. | 45 min. | 45 min. |
| Demold Time @ 73°F | 24 hr. | 24 hr. | 24 hr. |
| Cured Color | Peach | Peach | Peach |
| Mixed Viscosity (cP) | 12,000 | 17,000 | 20,000 |
| Specific Volume (in³/lb) | 25.3 | 23.7 | 22.9 |
| Specific Gravity | 1.10 | 1.17 | 1.21 |
| Shrinkage Upon Cure (%) | ~0.2 | ~0.2 | ~0.2 |
| Elongation (%) | 503 | 383 | 244 |
| Tensile Strength (psi) | 249 | 392 | 400 |
| Die B Tear Strength (pli) | 87 | 145 | 62 |
| Die T Tear Strength (pli) | 31 | 43 | 17 |

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.

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 the total weight. Add FastCat to Part A prior to mixing with Part B. 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 from date of shipment. 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, thoroughly read Safety Data Sheets and product labels. Follow safety precautions and directions.

Part A: Keep out of reach of children. Do not handle until all safety precautions have been read and understood. Keep away from flames and hot surfaces. Do not breathe fumes, vapors or mists. Use with adequate general or local exhaust ventilation to minimize exposure levels. If needed, a NIOSH-approved respirator with organic vapor cartridge may be used. If inhaled and breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing. Wear impervious gloves, such as butyl rubber or nitrile rubber. Wash skin thoroughly with soap and water after handling. Wear eye protection, such as chemical safety glasses/goggles. If in eyes, rinse cautiously with water for several minutes, removing contact lenses if present and easy to do. Store in a well-ventilated place and keep container tightly closed.

Part B: Keep out of reach of children. Use with adequate general or local exhaust ventilation to minimize exposure levels. If needed, a NIOSH-approved respirator with organic vapor cartridge may be used. If inhaled, remove victim to fresh air and keep at rest in a position comfortable for breathing. Wear impervious gloves, such as butyl rubber or nitrile rubber. Wash skin thoroughly with soap and water after handling. Wear eye protection, such as chemical safety glasses/goggles. If in eyes, rinse cautiously with water for several minutes, removing contact lenses if present and easy to do.

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ACCESSORIES

Accelerator:
TinSil® FastCat Accelerator

Thickeners:
TinThix Liquid Thickener
Fumed Silica

Sealers & Release Agents:
Pol-Ease® 2500 Release Agent
Pol-Ease® 2350 Release Agent
PolyCoat Sealer & Release Agent
Poly PVA Solution

Colors:
Silicone Color Pigments
Black - Blue - Fleshstone - Green - Red - White - Yellow

Thinner:
Silicone Fluid 50 cSt

Reinforcement Material:
Tietex® Fabric