

# XIAMETER<sup>®</sup> RTV-4136-M Silicone Rubber

High durometer, medium tear resistance silicone moldmaking rubber for prototyping, architectural and furniture component applications

## FEATURES

- Outstanding release properties
- Cures at room temperature within 16 hours or heat curable
- If required the product cure can be heat accelerated
- High hardness
- Medium tear resistance
- Very low shrinkage and good dimensional stability
- Can be used for high temperature casting applications
- High inhibition resistance
- Formulated to work with both rigid and foam polyurethanes

## COMPOSITION

- Two-part silicone rubber supplied as a pourable fluid; cures to a firm, flexible rubber

## APPLICATIONS

- XIAMETER<sup>®</sup> RTV-4136-M Silicone Rubber is suited for the reproduction of prototyping, architectural and furniture components, especially for use with polyurethanes and other casting plastics.

## TYPICAL PROPERTIES

Specification Writers: These values are not intended for use in preparing specifications. Please contact your local XIAMETER<sup>®</sup> sales representative prior to writing specifications on this product.

Property	Unit	Value
<b>Base</b>		
Viscosity	mPa.s	130,000
Base Viscosity at 25°C (77°F)	poise	1300
Appearance, Base		Beige
<b>Base and Curing Agent mixture 10:1</b>		
Appearance		Regal Blue
Viscosity <sup>1</sup> at 25°C (77°F)	mPa.s (poise)	90,000 (900)
Working time	minutes	60
Cure Time <sup>2</sup> at 25°C (77°F)	hours	16
<b>Cured for 24 hours at 25°C (77°F)</b>		
<b>As Cured<sup>3</sup></b>		
Durometer Hardness, Shore A	points	59
Tensile Strength	MPa (psi)	4.5 (650)
Elongation, Die C at break	%	250
Tear Strength, Die B	kN/m (ppi)	16 (90)
Specific Gravity at 25°C (77°F)		1.29
Linear Shrinkage	%	<0.1

<sup>1</sup>Brookfield Viscometer Model HAF, spindle #6 at 5 rpm.

<sup>2</sup>Based on sample mask of 1 cubic inch.

<sup>3</sup>Based on sample thickness of 125 mills, cured 24 hours at 77°F (25°C).

## DESCRIPTION

XIAMETER RTV-4136-M Silicone Rubber is a two-component material consisting of a XIAMETER<sup>®</sup> RTV-4136-M RTV Base, which when mixed with the XIAMETER<sup>®</sup> RTV-4136-M RTV Curing Agent cures at room temperature by an addition reaction. A range of materials can be cast into the cured silicone mold: polyurethane, polyester and other reactive resins are materials typically used.

XIAMETER RTV-4136-M Silicone Rubber designed especially for use with urethane foams and other casting plastics. This high-strength, tear resistant product cures at room or elevated temperatures by an addition reaction.

The special features of XIAMETER RTV-4136-M RTV Silicone Rubber help provide a long mold life, highly detailed reproductions and simplified handling.

XIAMETER RTV-4136-M Silicone Rubber base is white, and its curing agent is regal blue to aid inspection for uniform blending. An easy-to-mix ratio of 10:1 base to curing agent helps ensure accurate measuring and blending by hand or machine. The material cures in unlimited thickness, regardless of part configuration or degree of confinement.

## HOW TO USE

### Substrate preparation

The surface of the original should be clean and free of loose material. If necessary, and in particular with porous substrates, use a suitable release agent such as petroleum jelly or soap solution.

In all cases, it is advisable to check before casting that no discoloration or adhesion occurs between the product and the original or mold frame.

### Pattern Preparation

Certain contaminants used in moldmaking operations can prevent XIAMETER RTV-4136-M Silicone Rubber from curing. Patterns to be molded should be thoroughly cleaned to remove grease, oil and other surface contaminants. Care should also be taken to ensure that corners, crevices and draws are free of dirt or particles of foreign matter. A light "blow over" with compressed air is advised when the pattern has convoluted draws or undercuts. Then, the original model or pattern should be placed in a light frame of cardboard, foil, wood or other material. There should be approximately 3/8-inch clearance on all sides and over the top of the pattern. The patterns should be attached securely to the bottom of the frame so it does not float.

A pattern release agent should then be wiped or sprayed on the pattern. Spreading a light coat of release agent on the sides and underside of the top of the frame will facilitate release.

A good pattern release agent can be made by combining 5 percent petroleum jelly and 95 percent solvent. Combine the materials and let stand overnight – then shake by hand to provide a good mix.

### Mixing

XIAMETER RTV-4136-M Silicone Rubber Curing Agent contains a pigment which acts as an indicator for proper measuring and mixing. Thoroughly shake/stir the curing agent before use so that any sedimented pigment is redispersed.

Weigh 10 parts of XIAMETER RTV-4136-M RTV Base and 1 part of XIAMETER RTV-4136-M RTV Curing Agent in a clean container, then mix together until the curing agent is completely dispersed in the base. Hand or mechanical mixing can be used, but do not mix for an extended period of time or allow the temperature to exceed 35°C (95°F). Mix sufficiently small quantities to ensure thorough mixing of the base and curing agent. It is strongly recommended that entrapped air be removed in a vacuum chamber, allowing the mix to completely expand and then collapse. After a further 12 minutes under vacuum, the mix should be inspected and if free of air bubbles, can then be used. A volume increase of 23 times will occur on vacuum de-airing the mixture, so a suitably large container should be chosen.

**Note:** If no vacuum de-airing equipment is available, air entrapment can be minimized by mixing a small quantity of base and curing agent, then using a brush, painting the original with a 12mm layer. Leave at room temperature until the surface is bubble-free and the layer has begun to cure. Mix a further quantity of base and curing agent and proceed as follows to produce a final mold.

### Addition of Curing Agent

Automatic mixing equipment handles XIAMETER RTV-4136-M Silicone Rubber efficiently. The product is de-aired before shipment when packaged in drums.

XIAMETER RTV-4136-M Silicone Rubber curing agent should be mixed into the base material just before use (with either manual or mechanical stirring) in the amounts of 10 parts base to one part curing agent by weight. For the best curing results, use metal cans, clean glassware or unwaxed paper containers for mixing the base and curing agent. Inclusion of air during mixing may cause voids in the finished mold. Entrapped air may be removed by applying a vacuum of 28 to 29 inches of mercury. Under such a vacuum, the material will expand to three to four times its original volume. As the froth collapses, the mixture will recede to its original volume. The vacuum should be held one or two minutes longer before releasing.

Pressure casting may be substituted with equal success.



## Pouring the Mixture and Curing

Pour the mixed base and curing agent as soon as possible onto the original, avoiding air entrapment. The catalyzed material will cure to a flexible rubber within 16 hours at room temperature (22-24°C or 71.6-75.2°F) and the mold can then be removed. If the working temperature is significantly lower, the cure time will be longer. Heat accelerating the cure is possible, but this will produce some apparent shrinkage of the mold, due to differences in volume contraction on cooling between the silicone rubber and the original. The higher the curing temperature, the greater the likely differences in dimensions.

## Working Time

XIAMETER RTV-4136-M Silicone Rubber remains a flowable, pourable material for 1-1/2 hours after the curing agent is added.

## Curing

The cure of XIAMETER RTV-4136-M Silicone Rubber occurs by a reaction between the base polymer and the curing agent. Polymerization requires 24 hours after the addition of the curing agent at room temperature. This material will not revert or depolymerize, even under conditions of elevated temperature and confinement. Vulcanization can be accelerated by heating the catalyzed material. However, this will increase the shrinkage from nil to 0.3 percent. A part 1/4-inch thick will set up within 30 minutes if the temperature is maintained at 150°F (65°C). The rate at which thicker sections will set up depends on the size and shape of the piece.

Vulcanization will not be accelerated at the center of the piece until the entire mass has reached the elevated temperature. Average setup times at various temperatures for 1/4-inch moldings are as follows:

Temperature	Demold Time
25°C (77°F)	16 hours
52°C (125°F)	60 minutes
65°C (150°F)	30 minutes
93°C (200°F)	15 minutes
121°C (250°F)	7 minutes
149°C (300°F)	5 minutes

## ADDITIONAL INFORMATION

### Inhibition of Cure

All addition-cured silicone elastomers are susceptible to cure inhibition when in contact with certain materials and chemicals. Inhibition has occurred if the elastomer is only partially cured after 24 hours, or has a sticky surface in contact with another material. Amines and sulphur containing materials are strong inhibitors, as are organotin salts used in condensation cure silicone elastomers. Wet or moist surfaces can cause gas bubbles to be formed during cure in the silicone adjacent to the substrate surface. It is strongly recommended that mixing containers, mold construction materials, originals and release agents be checked for any inhibition effect before use.

XIAMETER RTV-4136-M Silicone Rubber is formulated to have greater resistance to inhibition. However, localized inhibition of cure may be encountered at the interface when XIAMETER RTV-4136-M Silicone Rubber comes in contact with certain contaminants during the curing process. Among materials

found to cause inhibition are sulfur containing and organometallic salt-containing compounds (such as organic rubbers), and condensation-cure RTV silicones. Surfaces previously in contact with any of the above materials may also cause inhibition. If in doubt, test for compatibility by brushing a small amount of catalyzed XIAMETER RTV-4136-M Silicone Rubber over a localized area of the service to be reproduced. Inhibition has occurred if the rubber is gummy or uncured after the curing period has elapsed.

### Use at High Temperatures

Molds produced from XIAMETER RTV-4136-M Silicone Rubber have a long life at elevated temperatures. However, continuous use above 200°C (392°F) will result in loss of elasticity over a period of time. Use above 250°C (482°F) is not recommended. When heated, a mold made of XIAMETER RTV-4136-M Silicone Rubber will expand producing a small change in copy dimensions.

### Resistance to Casting Materials

The chemical resistance of fully cured XIAMETER RTV-4136-M Silicone Rubber is excellent, and similar to all addition-cure silicone elastomers. It should be noted however that ultimately, resins and other aggressive casting materials will attack silicone molds, changing physical properties, surface release and possibly mold dimensions. Molds should be checked periodically during long production runs.



## **PRODUCT SAFETY INFORMATION**

PRODUCT SAFETY INFORMATION REQUIRED FOR SAFE USE IS NOT INCLUDED IN THIS DOCUMENT. BEFORE HANDLING, READ PRODUCT AND MATERIAL SAFETY DATA SHEETS AND CONTAINER LABELS FOR SAFE USE, PHYSICAL, ENVIRONMENTAL, AND HEALTH HAZARD INFORMATION. THE MATERIAL SAFETY DATA SHEET IS AVAILABLE ON THE XIAMETER WEB SITE AT [WWW.XIAMETER.COM](http://WWW.XIAMETER.COM).

## **STORAGE**

Product should be stored at or below 25°C (77°F) in original, unopened containers. XIAMETER RTV-4136-M Silicone Rubber Base and Curing Agent can be sensitive to moisture and contamination. Ensure that containers are tightly closed after use.

The most up-to-date shelf life information can be found on the XIAMETER Web site in the Product Detail page under Sales Specification.

## **LIMITATIONS**

This product is neither tested nor represented as suitable for medical or pharmaceutical uses. Not intended for human injection.

## **LIMITED WARRANTY INFORMATION – PLEASE READ CAREFULLY**

The information contained herein is offered in good faith and is believed to be accurate. However, because conditions and methods of use of our products are beyond our control, this information should not be used in substitution for customer's tests to ensure that our products are safe, effective, and fully satisfactory for the intended end use. Suggestions of use shall not be taken as inducements to infringe any patent.

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