

# Product Information

## Elastomeric Replication

DOW CORNING

# Dow Corning® 3110, 3112, and 3120 RTV Rubbers

## FEATURES

- Two-part RTV silicone rubber
- Low mixed viscosity
- Adjustable cure times

## BENEFITS

- Easy to use
- Reproduce intricate details
- Works in a wide range of service temperatures

## COMPOSITION

- Condensation cure silicone RTV rubber

General purpose silicone moldmaking rubber.

## APPLICATIONS

- Recommended for simple patterns with no undercuts.
- 3110 can be used where vacuum de-airing isn't always required.
- Can be used in electronic potting and encapsulating applications.

## DESCRIPTION

Dow Corning® 3110, 3112, and 3120 RTV Rubbers are pourable rubber bases that become firm, flexible silicone rubber when cured. There is a choice of three catalysts to select from in order to tailor your working times and cure rates. These RTV Rubbers:

- Are easily mixed and poured
- Cure at room temperature in any thickness
- Give accurate reproduction of masters for moldmaking
- Provide a wide service temperature range.

## Catalysts

A common catalyst concentration is 10:1 base to catalyst by weight, which assures more accurate measuring and mixing of catalyst. Varying the catalyst concentration will change the curing rate as indicated on Table I. Decreasing the catalyst level will slow the cure and give longer working and demold times. Keep all catalyst containers tightly closed when not in use.

*Note: A 10:1 mixing ratio is not recommended for Dow Corning® 4 or F Catalyst. Do not use Dow Corning® S Tin NW or F Catalyst when molding polyesters because the polyester can be inhibited. Dow Corning® 4 Catalyst is recommended for polyester molds.*

## 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.

### Mixing

Thoroughly stir Dow Corning® 3110, 3112 or 3120 Base before using, as filler separation may occur upon prolonged standing. Weigh the base and appropriate catalyst into a clean container, mix together until the catalyst 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).

With the exception of Dow Corning® 3110 RTV Rubber, it is strongly recommended that entrapped air be removed in a vacuum chamber, allowing the mix to completely expand and then collapse. A vacuum of at least 28 inches of mercury should be held until most bubbling has ceased. After an additional 1-2 minutes under vacuum, the mix should be inspected and if free of air bubbles, can then be used. A volume increase of 3-5 times will occur on vacuum de-airing the mixtures, so a suitably large container should be chosen.

<b>TYPICAL PROPERTIES</b>	<b>Dow Corning® 3110 RTV Rubber<sup>1</sup></b>	<b>Dow Corning® 3112 RTV Rubber<sup>1</sup></b>	<b>Dow Corning® 3120 RTV Rubber<sup>1</sup></b>
<b>As supplied</b>			
Color	White	White	Red
Viscosity at 25°C (77°F), poise	130	280	280
Specific Gravity at 25°C (77°F)	1.14	1.30	1.45
<b>Physical and Mechanical Properties, as cured</b>			
Useful Temperature Range, °C (°F)	-55 to 200 (-67 to 392)	-55 to 250 (-67 to 482)	-55 to 300 (-67 to 572)
Tensile Strength, die C, psi	395	640	582
Elongation, percent	170	127	128
Durometer Hardness, Shore A, points	45	58	56
<b>Electrical Properties, as cured</b>			
Dielectric Constant at 25°C (77°F) (ASTM D 150)			
100 Hz	3.26	3.56	3.72
100 kHz	3.16	3.32	3.7
Dissipation Factor at 25°C (77°F) (ASTM D 150)			
100 Hz	.0056	.0135	.0103
100 kHz	.0022	.0038	.003
Dielectric Strength, volts/mm (ASTM D 149)	456	470	418
Volume Resistivity, ohm-cm (ASTM D 257)	5.68E+14	2.72E+14	3.46E+14

<sup>1</sup>Results were obtained using Dow Corning® S Tin NW catalyst at 10:1 base to catalyst ratio. Wide departures from normal 10:1 ratio may slightly alter physical properties such as hardness and elongation. Based on sample thickness of 125 mm, cured 24 hours at room temperature.

*Specification Writers: These values are not intended for use in preparing specifications. Please contact your local Dow Corning sales office or your Global Dow Corning Connection before writing specifications on this product.*

<b>Catalyst</b>	<b>Color</b>	<b>Consistency</b>	<b>Demold Time<sup>1</sup></b>	<b>Cure Conditions</b>
4 (Fast rate, 200:1 ratio, no corrosion inhibitor)	Clear straw	Liquid	10 minutes – 2 ½ hours	Room temperature - any thickness or in confined places
F (Fast rate, 200:1 ratio, corrosion inhibitor)	Light tan	Paste	25 minutes – 2 hours	Room temperature – any thickness or in confined spaces
S Tin NW Catalyst (10:1 ratio, corrosion inhibitor)	Light blue	Paste	7-12 hours	Room temperature – any thickness or in confined spaces

<sup>1</sup>Demold time varies based on the Dow Corning RTV base used with the catalyst.

Caution: Prolonged vacuum will remove volatile components from the mix and may result in poor thick section and non-typical properties.

Air entrapment can be minimized by mixing a small quantity of base and catalyst, then using a brush, painting the original with a thin 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 catalyst and proceed as follows to produce a final mold.

#### **Pouring the mixture and curing**

Pour the mixed base and catalyst as soon as possible onto the original, avoiding air entrapment. The catalyzed material will cure to a flexible rubber and the mold can then be removed (see table of typical properties for details). If the working temperature is significantly lower than 23°C (73.4°F), the cure time will be longer. If the room temperature or humidity is very high, the working time of the catalyzed mixture will be reduced. The final mechanical properties will be reached within 7 days.

#### **Deep-Section Cure**

Dow Corning® 3110, 3112, and 3120 RTV Rubbers may depolymerize when overheated in total confinement. To minimize this effect, electrical pottings which must operate in total confinement at elevated temperatures must be given a graduated post cure which allows volatiles to escape. During the graduated post cure, the temperature should be increased approximately 25°C (77°F) per hour depending upon thickness of the potted section. A final bake of two to four hours at a temperature 50°C

**Table I: Base/Catalyst Ratios, Working Times and Demold Times**

	Base/Catalyst Mixing Ratio by Weight	Approximate Working Time	Approximate Demold Time
<b>Dow Corning® 3110 RTV Rubber</b>			
<i>Dow Corning®</i> S Tin NW Catalyst	5:1 10:1 20:1	1 hour 2 hours 3 hours	5 hours 7 hours 12 hours
<i>Dow Corning®</i> F Catalyst	10:1 20:1	10 minutes 40 minutes	27 minutes 80 minutes
<i>Dow Corning®</i> 4 Catalyst	100:1 200:1 400:1	3 minutes 5 minutes 20 minutes	10 minutes 20 minutes 2 hours
<b>Dow Corning® 3112 RTV Rubber</b>			
<i>Dow Corning®</i> S Tin NW Catalyst	5:1 10:1 20:1	30 minutes 1 hour 2 hours	6 hours 8 hours 12 hours
<i>Dow Corning®</i> F Catalyst	10:1 20:1	12 minutes 28 minutes	37 minutes 100 minutes
<i>Dow Corning®</i> 4 Catalyst	100:1 200:1 400:1	2 minutes 5 minutes 15 minutes	10 minutes 20 minutes 1½ hours
<b>Dow Corning® 3120 RTV Rubber</b>			
<i>Dow Corning®</i> S Tin NW Catalyst	5:1 10:1 20:1	30 minutes 1 hour 2 hours	6 hours 8 hours 12 hours
<i>Dow Corning®</i> F Catalyst	10:1 20:1	8 minutes 25 minutes	25 minutes 1½ hours
<i>Dow Corning®</i> 4 Catalyst	100:1 200:1 400:1	2 minutes 5 minutes 15 minutes	10 minutes 30 minutes 2½ hours

(122°F) degrees above the maximum operating temperature of the device is recommended.

**Use at High Temperatures**

Some molds produced from condensation cure silicone rubbers can degrade when exposed to temperatures above 150°C (302°F) over a period of time or when totally confined in storage at high ambient temperatures. This can result in softening and loss of elastic properties.

**Electronic applications**

*Dow Corning®* 3110, 3112, and 3120 can be used in electronic applications using the S Tin NW or F catalysts. The cured rubbers exhibit good dielectric properties.

In potting with Dow Corning RTV Rubbers, the part or assembly to be packaged is placed in a form with clearance at all points when sealing is

necessary. This form may be made of paper, aluminum foil, metal or plastic.

A release agent may be used to aid in demolding.

When printed circuit boards and similar assemblies are to be dip coated, select the viscosity grade that will give the desired coating thickness. To apply Dow Corning RTV Rubbers as conformal coatings, immerse parts in the catalyzed compound, withdraw them slowly, pausing just before the part leaves the dip tank to minimize stringing and hang on a rack to cure. Allow one to two hours between dips. Two dips in a low viscosity grade encapsulant are suggested for optimum protection.

For maximum assurance of void-free potting, pour the silicone RTV rubber, then apply a vacuum to facilitate the removal of air.

**HANDLING PRECAUTIONS**

Product safety information required for safe use is not included. Before handling, read product and safety data sheets and container labels for safe use, physical and health hazard information. The material safety data sheet is available on the Dow Corning website at [www.dowcorning.com](http://www.dowcorning.com). You can also obtain a copy from your local Dow Corning sales representative or Distributor or by calling your local Dow Corning Global Connection.

**USABLE LIFE AND STORAGE**

When stored at or below 32°C (89.6°F) in the original unopened containers, *Dow Corning®* 3110 has a usable life of 18 months from the date of production. *Dow Corning®* 3112 and 3120 have a usable life of 24 months from the date of production. *Dow Corning®* 4 and S Tin NW

Catalysts have a usable life of 24 months; F catalyst has a usable life of 12 months from the date of production.

### **PACKAGING INFORMATION**

Please contact your local Dow Corning sales representative for the current container sizes available.

### **LIMITATIONS**

This product is neither tested nor represented as suitable for medical or pharmaceutical uses.

### **HEALTH AND ENVIRONMENTAL INFORMATION**

To support Customers in their product safety needs, Dow Corning has an extensive Product Stewardship organization and a team of Product Safety and Regulatory Compliance (PS&RC) specialists available in each area.

For further information, please see our website, [www.dowcorning.com](http://www.dowcorning.com) or consult your local Dow Corning representative.

### **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.

Dow Corning's sole warranty is that our products will meet the sales specifications in effect at the time of shipment.

Your exclusive remedy for breach of such warranty is limited to refund of purchase price or replacement of any

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