

RTV11

Description

RTV11, RTV21 and RTV41 silicone rubber compounds are general purpose two-part silicone elastomers. They are supplied ready-to-use with a base compound and DBT (dibutyl tin dilaurate) as the standard curing agent. DBT is suitable for most applications, however other catalysts are available to facilitate deep section cure, faster cure and automated mixing.

These silicone rubber compounds are similar in physical properties except for viscosity and color:

Grade	Color	Typical Viscosity
RTV11	white	11,000 cps
RTV21	pink	26,000 cps
RTV41	white	39,000 cps

Key Features and Benefits

- Work time and cure rates can be varied
- Room temperature cure
- Composition free of solvents and solvent odor
- FDA compliance - RTV11 and RTV41 silicone rubber compounds can be used in food contact applications other than contact with acidic foods where FDA regulations apply.
- Excellent adhesion capabilities with primer
- Excellent release properties
- Retention of elastomeric properties at temperatures from -54°C (-65°F) up to 204°C (400°F) continuously, and up to 260°C (500°F) for short periods of time.

Typical Physical Properties**UNCURED PROPERTIES OF RTV BASE COMPOUNDS**

	RTV11	RTV21	RTV41
Color	White	Pink	White
Consistency	Easily Pourable	Pourable	Pourable
Viscosity, cps	11,000	26,000	39,000
Specific Gravity	1.19	1.32	1.31

UNCURED PROPERTIES OF RTV BASE COMPOUNDS WITH 0.5% DBT CURING AGENT ADDED

	RTV11	RTV21	RTV41
Work Time @ 25°C (77°F), hrs	1.5	1	1
Cure Time @ 25°C (77°F), hrs	24	24	24

CURED PROPERTIES

(0.5 wt. % DBT Curing Agent added, cured 7 days @ 25°C (77°F) and 50% R.H.)

	RTV11	RTV21	RTV41
Mechanical			
Hardness, Shore A Durometer	41	45	47
Tensile Strength, kg/cm ² (psi)	36 (510)	22 (310)	36 (520)
Elongation, %	190	210	190
Tear Strength, kg/cm (lb/in)	3.5 (20)	7.1 (40)	5.2 (29)
Shrinkage, %	0.6	0.6	0.6
Electrical			
Dielectric Strength, kv/mm (v/mil) (1.9 mm thick)	20.3 (515)	16.5 (420)	20.3 (520)
Dielectric Constant @ 1000 Hz	3.3	3.8	3.7
Dissipation Factor @ 1000 Hz	0.006	0.02	0.007
Volume Resistivity, ohm-cm	1.1 x 10 ¹⁵	2.6 x 10 ¹⁴	1.6 x 10 ¹⁴
Thermal			
Useful Temperature Range, °C (°F)	-54 to 204 (-65 to 400)	-54 to 204 (-65 to 400)	-54 to 204 (-65 to 400)
Thermal Conductivity (W/mK)	0.29	0.31	0.31
Coefficient of Expansion, cm/cm, °C (in/in, °F)	25 x 10 ⁻⁵ (14 x 10 ⁻⁵)	20 x 10 ⁻⁵ (11 x 10 ⁻⁵)	20 x 10 ⁻⁵ (11 x 10 ⁻⁵)
Specific Heat, cal/gm, °C (BTU/lb, °F)	0.35 (0.35)	0.35 (0.35)	0.35 (0.35)

Potential Applications

Typical applications include, but are not limited to:

- Potting and encapsulating electrical coils and connectors
- Making cast-in-place gaskets and molds
- Release applications such as providing a surface on metals and fabrics from which paint and adhesives can be easily stripped

Processing Recommendations

Mixing

Select a mixing container 4 to 5 times larger than the volume of RTV silicone rubber compound to be used. Weigh out the RTV silicone rubber base compound and add the

appropriate amount of curing agent. 0.5% DBT by weight will provide a work time or pot life of about one hour and a cure time of 24 hours. 0.5% DBT is the most commonly used concentration of curing agent for RTV11, RTV21 and RTV41 silicone rubber compounds. The pot life may be lengthened by using less DBT (as little as 0.1%).

MEASURING GUIDE FOR CURING AGENT ADDITION

RTV Weight	Dibutyl Tin Dilaurate Concentration	
	0.1%	0.5%
100 grams	5 drops	25 drops
454 grams (1 lb.)	23 drops	115 drops (2.27 grams)

With clean tools, thoroughly mix the RTV base compound and the curing agent, scraping the sides and bottom of the container carefully to produce a homogeneous mixture. When using power mixers, avoid excessive speeds which could entrap large amounts of air or cause overheating of the mixture, resulting in shorter pot life.

Deaeration

Air entrapped during mixing should be removed to eliminate voids in the cured product. Expose the mixed material to a vacuum of about 25 mm (29 in.) of mercury. The material will expand, crest, and recede to about the original level as the bubbles break. Degassing is usually complete about two minutes after frothing ceases. When using the RTV silicone rubber compound for potting, a deaeration step may be necessary after pouring to avoid capturing air in complex assemblies.

Curing

Using DBT curing agent at a level of 0.5%, these RTV silicone rubber compounds will cure in 24 hours at 25°C (77°F) and 50% relative humidity to form durable, resilient rubbers. Under these conditions a pot life of about one hour will typically be available for pouring and working with the catalyzed material. Pot life may be increased by refrigerating the mixed material at 0°C (32°F) after catalyzing.

A choice of curing agents is available for use with RTV11, RTV21 and RTV41 silicone rubber compounds.

Curing Agent	Cure Speed	Curing Agent Concentration	Features
DBT	moderate	0.1-0.5%	standard
STO	fast	0.1-0.5%	small volume applications
RTV9811	moderate	5-10%	good deep section cure suitable for automatic mixing
RTV9950	moderate	5-10%	suitable for automatic mixing
RTV9910	slow	10%	suitable for automatic mixing

Deep Section Cure

If these RTV silicone rubber compounds are to be used in deep sections at temperatures over 150°C (302°F), the cured product should be properly conditioned prior to service. Following room temperature cure of 1-3 days, a typical program would be eight hours at 50°C intervals from 100°C (212°F) to the service temperature. Longer times at each temperature will be required for larger parts or very deep sections.

Bonding

If adhesion is an important application requirement, RTV11, RTV21 and RTV41 silicone rubber compounds require a primer to bond to non-silicone surfaces. Thoroughly clean the substrate with a non-oily solvent such as naphtha or methyl ethyl ketone (MEK) and let dry. Then apply a uniform thin film of a suitable silicone primer such as SS4004. Allow the primer to air dry for one hour or more. Finally, apply freshly catalyzed RTV silicone rubber compound to the primed surface and cure as recommended.

Specifications

AGENCY STATUS

RTV11 and RTV41 silicone rubber compounds may be used in food contact application other than acidic foods where FDA regulations apply.

General Considerations for Use

While the typical operating temperature for silicone materials ranges from -45°C to 200°C, the long-term maintenance of its initial properties is dependent upon design related stress considerations, substrate materials, frequency of thermal cycles, and

other factors.

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