

INVISISIL™ RTV655 SILICONE RUBBER COMPOUND

Description

INVISISIL RTV615, RTV655 and RTV656 silicone rubber compounds are clear liquids which cure at room temperature to high strength silicone rubber with the addition of curing agents. These two-component products are supplied with curing agent in matched kits which are designed for use at a convenient 10:1 ratio by weight.

These compounds are clear and colorless but differ in low temperature flexibility. All three are low viscosity, easily pourable liquids with nominal viscosities ranging between 3000 and 7000 cps. INVISISIL RTV655 and RTV656 silicone rubber compounds have the capability of remaining flexible at temperatures -115°C (-175°F).

INVISISIL RTV615, RTV655 and RTV656 silicone rubber compounds have been used for protection of electronic components and assemblies against shock, vibration, moisture, ozone, dust, chemicals, and other environmental hazards by potting or encapsulation of the components and assemblies.

The optical clarity of these silicone rubber compounds suggests evaluation for applications such as potting solar cells for maximum light transmission and electronic assemblies where component identification is necessary or desirable. INVISISIL RTV655 and RTV656 silicone rubber compound are preferred where flexibility at temperatures down to -115°C (-175°F) is required.

Key Features and Benefits

- Convenient 10:1 mixing ratio for use in automatic dispensing or hand operations
- Low viscosity allows easy flow in and around complex parts, providing excellent electrical insulation and shock resistance

- Cure rate can be accelerated by heat
- Will cure in deep sections or enclosed assemblies without exotherm and with low shrinkage
- Chemical composition contains no solvents for ease of use on production lines
- Reversion resistance and hydrolytic stability permit use in high humidity environments at elevated temperatures
- Clarity permits visual inspection for easy identification and repair of encapsulated parts
- Retention of elastomeric properties at temperatures up to 204°C (400°F)

Typical Physical Properties

UNCURED PROPERTIES	RTV615A	RTV615B	RTV655A	RTV655B	RTV656A	RTV656B
Color	Clear Colorless	Clear Colorless	Clear Colorless	Clear Colorless	Clear Colorless	Clear Colorless
Consistency	Easily Pourable	Easily Pourable	Easily Pourable	Easily Pourable	Easily Pourable	Easily Pourable
Viscosity, cps	4300	—	5700	—	5000	—
Specific Gravity	1.02	—	1.04	—	1.03	—

UNCURED PROPERTIES WITH CURING AGENT ADDED	RTV615	RTV655	RTV656
Color	Clear, Colorless	Clear, Colorless	Clear, Colorless
Consistency	Easily Pourable	Easily Pourable	Easily Pourable
Viscosity, cps	4000	5200	5000
Work Time @ 25°C (77°F), hrs	4	4	4
CURED PROPERTIES (Cured 1 hr. @ 100°C/212°F)	RTV615	RTV655	RTV656
Mechanical			
Hardness, Shore A Durometer	44	45	44
Tensile Strength, kg/cm ² (psi)	65 (920)	65 (920)	65 (920)
Elongation, %	120	120	100
Shrinkage, %	0.2	0.2	0.2
Refractive Index	1.406	1.430	1.430
Electrical			
Dielectric Strength, kv/mm (v/mil) (1.9 mm thick)	19.7 (500)	19.7 (500)	19.7 (500)
Dielectric Constant @ 1000 Hz	2.7	2.69	2.69
Dissipation Factor @ 1000 Hz	0.0006	0.0004	0.0004
Volume Resistivity, ohm-cm	1.8 x 10 ¹⁵	1.2 x 10 ¹⁵	1.2 x 10 ¹⁵
Thermal			
Useful Temperature Range, °C (°F)	-60 to 204 (-75 to 400)	-115 to 204 (-175 to 400)	-115 to 204 (-175 to 400)
Thermal Conductivity, gm-cal/sec, cm ² , °C/cm (Btu/hr, ft ² , °F/ft)	0.00045 (0.11)	0.00045 (0.11)	0.00045 (0.11)
Coefficient of Expansion, cm/cm, °C (in/in, °F)	27 x 10 ⁻⁵ (15.3 x 10 ⁻⁵)	33 x 10 ⁻⁵ (18.3 x 10 ⁻⁵)	33 x 10 ⁻⁵ (18.3 x 10 ⁻⁵)
Specific Heat, cal/gm, °C (Btu/lb, °F)	0.3 (0.3)	0.3 (0.3)	0.3 (0.3)

Patent Status

Nothing contained herein shall be construed to imply the nonexistence of any relevant patents or to constitute the permission, inducement or recommendation to practice any invention covered by any patent, without authority from the owner of the patent.

Product Safety, Handling and Storage**Caution**

INVISISIL RTV615B, RTV655B and RTV656B curing agents can generate flammable hydrogen gas upon contact with acidic, basic, or oxidizing materials. Such contact should be avoided.

Customers should review the latest Safety Data Sheet (SDS) and label for product safety information, safe handling instructions, personal protective equipment if necessary, emergency service contact information, and any special storage conditions required for safety. Momentive Performance Materials (MPM) maintains an around-the-clock emergency service for its products. SDS are available at www.momentive.com or, upon request, from any MPM representative. For product storage and handling procedures to maintain the product quality within our stated specifications, please review Certificates of Analysis, which are available in the Order Center. Use of other materials in conjunction with MPM products (for example, primers) may require additional precautions. Please review and follow the safety information provided by the manufacturer of such other materials.

Processing Recommendations**Compatibility**

RTV615, RTV655 and RTV656 silicone rubber compounds will cure in contact with most clean, dry surfaces. However, certain materials, such as butyl and chlorinated rubber, sulfur-containing materials, amines, and certain metal soap-cured RTV silicone rubber compounds, can cause cure inhibition. Cure inhibition is characterized by a gummy appearance of the RTV silicone rubber compound at the interface between it and the substrate.

It is recommended that a sample patch test be performed with RTV615, RTV655 and RTV656 silicone rubber compounds to determine if a barrier coating or other inhibition-preventing measures are necessary before pouring the material.

Mixing

Select a mixing container 4-5 times larger than the volume of RTV silicone rubber compound to be used. Weigh out ten parts of the A component and one part of the B component. Since RTV615, RTV655 and RTV656 silicone rubber compounds are kit-matched, work time (or pot life), cure time, and final properties of the cured RTV silicone rubber compound can be assured only if the A component is used with the B component from the same kit.

With clean tools, thoroughly mix the A and B components together, 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 approximately the original level as the bubbles break. Degassing is usually complete approximately 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.

Automatic equipment designed to meter, mix, deaerate, and dispense two-component RTV silicone rubber compounds will add convenience to continuous or large volume operations.

Curing

RTV615, RTV655 and RTV656 silicone rubber compounds will cure sufficiently in 24

hours at 25°C (77°F) to permit handling. To achieve optimum properties an elevated temperature cure or a cure time of 7 days at room temperature is required. The table below illustrates the effect of temperature on cure time:

Temperature, °C (°F)	Cure Time*
25 (77)	6-7 days
65 (149)	4 hrs.
100 (212)	1 hr.
125 (257)	45 min.
150 (302)	15 min.

* Cure times are only approximate. The actual time is affected by the mass of the unit and the time required to reach the desired temperature.

Bonding

These silicone rubber compounds require a primer to bond to non-silicone surfaces. INVISISIL RTV656 is tested for adhesion and will typically perform when a very low temperature adhesive/encapsulant is needed. All of these products do require a primer for bonding as stated herein.

Thoroughly clean the substrate with a non-oily solvent such as naphtha or methyl ethyl ketone and allow to dry. Then apply a uniform thin film of SS4155 silicone primer and 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. When dry, SS4155 silicone primer exhibits a white haze which will show through INVISISIL RTV615, RTV655 and RTV656 silicone rubber compounds. If the appearance of the surface to be bonded must be unchanged, SS4120 silicone primer (which dries to an invisible film) may be used. For more details on priming and adhesion, refer to Momentive Performance Materials data sheet on silicone primers.

Limitations

Customers must evaluate Momentive Performance Materials products and make their

own determination as to fitness of use in their particular applications.

Specifications

FDA STATUS

RTV615 silicone rubber compound and SS4120 silicone primer may be used in food contact applications where FDA regulations apply.

Contact Information

Email

commercial.services@momentive.com

Telephone

Americas	Latin America	EMEAI- Europe, Middle East, Africa & India	ASIA PACIFIC
+1 800 295 2392	Brazil	Europe	China
Toll free*	+55 11 4534 9650	+390510924300	800 820 0202
+704 805 6946	Direct Number	Direct number	Toll free
Direct Number			+86 21 3860 4892
			Direct number
*All American countries	Mexico	India, Middle East & Africa	Japan
	+52 55 2169 7670	+ 91 44 71212207	+81 3 5544 3111
	Direct Number	Direct number*	Direct number
		*All Middle Eastern countries, Africa, India,	Korea
			+82 2 6201 4600

For literature and technical assistance, visit our website at: www.momentive.com

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