

Rhodorsil® Silicone Grades for Coating and impregnating protection

> Advantages of Rhodorsil® resins

Bluestar Silicones offer a broad range of Silicone resins. After drying and crosslinking, these resins form flexible or rigid films that confer remarkable properties to the treated surfaces.

Their heat stability is outstanding: resins offer effective protection at high temperatures (typically in the range of 200°C and over for short period of time).

They resist well to oxidation and have good dielectric properties. These remarkable characteristics make them particularly suitable for numerous electrical and electronic applications, such as: insulation of printed circuit, electronic assemblies of flexible materials, impregnation of glass cloth braids, braided cables, mica tapes, electrical motor coils, etc.



● Motor windings



● Mica tapes



● Printed circuit

Rhodorsil® resins for Coating and impregnating protection

		Resins and adhesives							
Properties	Standards	Units	R 991	Adhesive 8805	R 8160 M	R 8060 M	R 8170 P	R 8152 P	
Appearance			Colorless	Colorless	Colorless	Colorless	Colorless	Colorless	
Solvent			Xylen	Toluene	Toluene	Toluene	Toluene	Toluene	
Specific gravity	ISO R 1183		1,03	0,96	1,07	1,00	1,11	1,00	
Viscosity at 23°C		(mPa.s)	175	3 000 to 6 000	10 to 20	2 500	100	170	
Dry content		(%)	50	55	60	60	70	50	
Flash point (closed cup)		(°C)	25	6	< 0	16	4	7	
Dielectric strength	IEC 60243	(kV/mm)	80	-	20	-	20	-	
Dielectric constant at 100 Hz	IEC 60250		2,7	2,8	2,7	2,9	2,8	2,7	
Dissipation factor at 100 Hz	IEC 60250		1×10^{-3}	1×10^{-3}	1×10^{-3}	1×10^{-3}	1×10^{-3}	1×10^{-3}	
Volume resistivity	IEC 60093	$\Omega \cdot \text{cm}$	1×10^{14}	5×10^{14}	1×10^{15}	8×10^{14}	1×10^{15}	1×10^{15}	

Silicone resins and adhesives

Resins are relatively low molecular weight polymers with a three dimensional branch-chained structure. They are generally available diluted in an aliphatic or aromatic solvent to reduce their viscosity.

They are used in diverse applications to improve durability, safety and reliability.

Key performance properties

■ Heat and weather resistances

Thanks to the high bonding energy of the siloxane bonds, the temperature of thermal decomposition is very high which explains their excellent heat and weather resistances.

■ Electrical insulation

Silicone resins preserve their very high electrical properties over a wide range of temperatures.

■ Water repellency

Thanks to the outstanding mobility of siloxane bonds and the orientation of the non polar methyl groups in the molecular structure, the surface of the cured material presents an excellent water repellency.

■ Rigid or flexible structures

Silicone resins are highly branched 3-dimensional polymers. After crosslinking, the backbone structure of the cured material can be either rigid or flexible depending on specific formulations.

■ High adhesion behaviour

Specific grades are available in order to maximize the adhesion between many different substrates (ie: glass clothes, mica tape, etc.).

Rhodorsil® Silicone Grades for electrical industry Complementary range

> In order to provide optimum service, Bluestar Silicones has developed a complementary range of various type of products.

■ Primer application

Adhesion promoters formulated to achieve a cohesive adhesion between Silicone/metal and Silicone/epoxy resins during vulcanization process (i.e epoxy rods, metallic clamps in composite insulator applications).

■ Bonding

Mono component or bi-component elastomers tailored to secure a cohesive adhesion between:

- > Cured elastomers.
- > Cured elastomers and other substrates.

■ Local insulation and protection

Mono component elastomers (fluid or in dispersion) used as coating to promote a specific protection of glass and ceramic insulators. Silicone pastes intended for in situ protection of electrical device, such as electrical connexions, circuit breakers, cable terminals and other distribution accessories in corrosive or humid atmospheres.



● Electrical protection

Rhodorsil® complementary range for electrical applications

Properties	Standards	Units	CAF 4 dispersion	CAF (RTV-1)	CAF 4	Adhesive (RTV-2)	Pastes
Natural color				Off-white		ESA 7244 A & B	PASTE 4
Odour				Acetic		A: beige / B: blue	Translucent to whitish
Ratio A/B				-		50/50	-
Specific gravity	ISO R 1183		1,02		1,16	1,25	1,0
Viscosity	Brookfield	(mPa.s)	6 500		250 000	A: 95 000 / B: 35 000	penetration (1/10 mm)
Solid content at 105°C		(%)	72		-	-	200
Flash point	closed up	(°C)	< 0		-	-	-
Temperature 23°C and relative humidity 50%							
Skin formation time		(min)	12		10		-
Time required to cure 2 mm		(hour)	4		5		-
Curing conditions			7 days at room temperature			10 min at 150°C	-
Shore A hardness	ISO 868		34		37	50	-
Tensile strength	ISO R37	(MPa)	3,6		3,8	5,5	-
Elongation at break	ISO R37	(%)	310		290	> 160	-
Tear strength	ASTM D 624 A	(kN/m)	4,2		4,5	-	-
Dielectric strength (thickness: 1 mm)	IEC 60243	(kV/mm)	21		21	19	> 20
Dielectric constant at 1 Mhz	IEC 60250		2,9		2,9	2,9	2,6
Dissipation factor at 1 Mhz	IEC 60250		2 x 10 ⁻³		2 x 10 ⁻³	3 x 10 ⁻³	5 x 10 ⁻⁴
Volume resistivity	IEC 60193	Ω.cm	1 x 10 ¹⁵		1 x 10 ¹⁵	1,5 x 10 ¹⁵	> 10 ¹³
Fire resistance	IEC 60707		-		-	FV1 (3 mm thick specimen)	-
Oxygen index	NFT 51071	(%)	-		-	40	-

CAF 4 and CAF 4 dispersion

CAF 4 and CAF 4 dispersion are one component elastomers which cure at room temperature (acetic systems). Processing is particularly easy, since the products are delivered ready to use.

- CAF 4 dispersion can be carried out using a spray gun. This product is particularly recommended to coat glass or ceramic insulators.
- CAF can be carried out either manually or using robotic application equipment.

CAF 4 and dispersion CAF 4 start curing as soon as the products come into contact with atmospheric moisture. After curing, they have very good mechanical properties, good heat stability and high dielectric properties.

Rhodorsil® Adhesive ESA 7244 A & B

Rhodorsil® Adhesive ESA 7244 A & B is solventless. Its low viscosity enables easy coating and covering.

After polymerization, Rhodorsil® Adhesive ESA 7244 A & B is transformed into a flexible adhesive film which is particularly resistant to thermal, climatic and environmental attack.

So, the outstanding resistance to climatic and aging agents ensures that the product carries out its functions for a long time. Rhodorsil® Adhesive ESA 7244 A & B is intended for bonding to metal, plastic and epoxy surface in various electrical applications.

Rhodorsil® Pastes 4 and M 494

Rhodorsil® Pastes 4 and M 494 are polydimethylsiloxanic oils based silicone paste together with inert fillers.

These pastes are particularly adapted to protection and insulation of electrical switchgear and to protection applications against humidity.

These pastes, chemically inert and highly hydrophobic, present excellent dielectric properties and a very good stability of properties over a wide temperature range.

Adhesion of Rhodorsil® HCR, LSR and RTV to the insulator cores

To obtain maximum adhesion of the elastomer on the core it is necessary to use a preliminary surface treatment.

Rhodorsil® PM 820 or PM 811 A & B are the universal primers recommended for Rhodorsil® RTV, LSR and HCR.

Our technical departments are also able to provide specific solutions that correspond both to your performance requirements and to the type of insulator core.

Rhodorsil® Silicone Grades for Potting

> Advantages of Rhodorsil® Silicone elastomers

There is no limit of the use of liquid silicone elastomers in the electrical and electronic industries, especially when protection of components against harmful environmental effects is required.

Encapsulating, potting, impregnating, dipping, filling and casting are some examples of applications which can be considered.

Polyaddition curing systems are the preferred insulating materials for these applications.

Their acceptance is due to several factors including their excellent dielectric properties, mechanical strength, shock resistance, moisture resistance, excellent adhesion properties, aging and chemical resistance.

Their ease of processing is also a well appreciated asset.



● Electronic protection



● Electronic device encapsulation