

SEMICOSIL[®] 993 TC



Thermal Interface Materials

1-part heat-curing / Thermal conductive silicone adhesive

Characteristics

SEMICOSIL[®] 993 TC is a 1-part thermal conductivity adhesive with paste type that is curing into Thermal interface material.

The thermal paste is able to efficiently fill finest gaps of heat generating and ablating substrates and thus helps to minimize contact resistance. Thermal resistivity is minimized by an exceptional thermal conductivity of 3.1 W/mK in combination with the possibility of bond line thickness reduction to 30 µm.

- Thermal conductivity 3.1 W/mK
- Low Bond Line thickness: 25 - 30 µm
- Emphasized thermal stability in cured state
- Primerless adhesion to metal, Al, based heat sinks, to ceramics, FR4.
- Flexibility in application method
- Superior dispensing performance, screen printability, suitable for automated bonding or vacuums bonding processes

Special characteristics

- One-component
- Non-Slump
- Almost constant properties between -50°C and +180°C
- Cure at moderate temperatures: 150°C / 2 hrs

Use in thermal interface for:

- Semiconductor industry
- High-Power electronic devices
- High-Power LEDs and assemblies
- High-power-density automotive electronics
- Electric powertrain; Inverter/converter electronics
- Consumer Electronics

Product data (uncured)

Property	Test method	Unit	Value
Color	-	-	Gray
Viscosity at 25°C, D= 0.5 sec ⁻¹	DIN EN ISO 3219	Pa·s	1,400
Viscosity at 25°C, D= 10.0 sec ⁻¹			140
Compression Thickness	Push gage, 5 – 20 N/cm ²	µm	30 - 25
Pot-life	The point at which the viscosity is more than two time the initial viscosity at shear rate 10/s.	Hour	> 24

Curing proposal

Temperature	Time
150°C	2 Hours

Product data (cured)^A

Property	Test method	Unit	Value
Color	-	-	Gray
Density at 25°C, in water	DIN 53 479 A, ISO 2781	g/cm ³	2.6
Hardness Shore-A	DIN ISO 48-4 ShA	No unit	50
Thermal conductivity	Hot wire method, QTM-500	W/mK	3.6
	ISO 22007-2, TPS-2500S	W/mK	3.1
Unprimed Lap-Shear Strength ^B	DIN DEN 1465, 0.20mm BLT (Gap)	kgf/cm ²	6.0
Electrical conductivity	-	-	Nonconductive
Volume resistivity	Resistance meter	Ω·cm	3.00 x 10 ¹¹

^A) Values from pressed sheet (165°C / 15 min / 26 kgf / cm²) and Post curing (150°C / 2 hrs / Dry-oven)

^B) Values from bonded specimen (Nickel coated metal substrate) (150°C / 2 hrs)

* These figures are only intended as a guide and should not be used in preparing specifications.

Processing

Storage

The 1-part silicone SEMICOSIL® 993 TC's transport conditions is within 15 days between -10°C and -30°C. And the storage temperature is -20°C. Prior to application slow warming to room temperature is recommended.

Thawing

Thaw at room temperature within 1 hour. Thawing time may vary depending on the size of the syringe and the surrounding temperature.

Work time

It is recommended to use only within 24 hours at room temperature.

Dispensing

Material can be processed from cartridge or from hobcock by automated needle dispensing or manual dispensing at low pressure. Appropriate dispensing equipment and gasketing is recommended for optimum processing as well as protection of the equipment since product contains abrasive fillers. Accurate dispensing is possible with piston pump technology at high dispensing performance. Superior dispensing performance is also possible with endless piston pump technology.

Surface preparation

All surfaces of parts, tools and processing equipment must be clean and free of contaminants that will inhibit the cure of SEMICOSIL® 993 TC. Examples of inhibiting contaminants are sulfur containing materials, plasticizers, urethanes, amine containing materials and organometallic compounds - especially organotin compounds. If a substrate's ability to inhibit cure is unknown, a small-scale test should be run to determine compatibility. For oven curing it is recommended to not use ovens applied for the cure of epoxy or polyurethane based encapsulants in order to avoid potential cross-contamination with potentially inhibiting hardeners.

Bonding

SEMICOSIL® 993 TC is suited for manual bonding at low bonding forces as well as automate vacuum bonding.

Curing

Temperature	Time
150 °C	2 Hours

Adhesion is generated and facilitated on various substrate like metals, ceramics and plastics FR4 by curing at elevated temperatures.

We recommend running preliminary tests to optimize conditions for the particular application.

Comprehensive processing instructions are given in our leaflet "Wacker RTV-2 Silicone Rubber - Processing".

Shelf Life

SEMICOSIL® 993 TC has a shelf life 9 months when stored at -20°C in the originally sealed container. Before application container should be slowly warmed to room temperature. Storage beyond the date specified on the label does not necessarily mean that the product is no longer usable.

Safety information

According to the latest findings, the addition curing silicone rubber SEMICOSIL® 993 TC contains neither toxic nor corrosive substances which might require special handling precautions. General hygiene regulations should be observed. Comprehensive instructions are given in the corresponding Material Safety Data Sheet.

IMPORTANT:

The figures given above are only intended as a guide and should not be used in preparing specifications. Please contact your local sales manager to check status and availability.

The data presented in this leaflet are in accordance with the present state of our knowledge, but do not absolve the user from carefully checking all supplies immediately on receipt. We reserve the right to alter product constants within the scope of technical progress or new developments. The recommendations made in this leaflet should be checked by preliminary trials because of conditions during processing over which we have no control, especially where other companies' raw materials are also being used. The recommendations do not absolve the user from the obligation of investigating the possibility of infringement of third parties' rights and, if necessary, clarifying the position. Recommendations for use do not constitute a warranty, either express or implied, of the fitness or suitability of the products for a particular purpose.

The management system has been certified according to DIN EN ISO 9001 and DIN EN ISO 14001

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