

Adhesives

Dow Corning® 3-1598 HP

1-part, black, flowable adhesive with high tensile strength

FEATURES

- Flowable heat cure
- Low void formation after cure for sensitive substrates
- High tensile strength
- No added solvents

BENEFITS

- No mixing required
- Rapid, versatile cure processing controlled by temperature
- Able to flow, fill or self-leveling after dispensing
- Superior sealing achieved with very low voiding

POTENTIAL USES

- Sealing lids and housings
- Attaching baseplates
- Gasketing
- Connector sealing
- Engine controlers
- ABS
- Transmission controlers
- Lighting

APPLICATION METHODS

- Automated or manual needle dispense

TYPICAL PROPERTIES

Specification Writers: Please contact your local Dow Corning sales office or your Global Dow Corning Connection before writing specifications on this product.

Property	Unit	Value
Viscosity	cP	92975
	mPa-sec	92975
	Pa-sec	93
Heat Cure Time @ 100°C	minutes	180
Heat Cure Time @ 125°C	minutes	30
Heat Cure Time @ 150°C	minutes	15
Specific Gravity (Cured)	-	1.31
Tensile Strength	psi	780
	MPa	5.4
	kg/cm2	54
Elongation	%	260
Tensile Modulus	psi	300
	MPa	2.1
	kg/cm2	21
Tear Strength (Die B)	ppi	80
	N/cm	56
Durometer Shore A	-	57
Unprimed Adhesion - Lap Shear to Aluminum	psi	750
	MPa	5.1
	N/cm2	514
Dielectric Strength	volts/mil	500
	kV/mm	20
Volume Resistivity	ohm*cm	5.4 E+14
Dielectric Constant at 100 Hz	-	3.09
Dielectric Constant at 100 kHz	-	3.03

DESCRIPTION

Dow Corning one-part heat cure (addition-curing) adhesives are typically cured at 100°C (212°F) or higher. Their cure rate is rapidly accelerated with heat (see cure schedules in table) and an optimum cure schedule will balance processing performance and costs. For thicker sections or if voiding is observed the use of a 30-minute pre-cure at 70°C (158°F) or the use of an adhesive with low-void technology may reduce voids. Addition-cure silicones are formulated with all necessary ingredients for cure and there are no by-products generated during the cure process. Deep-section or confined cures are possible as cure reactions progress evenly throughout the material. These adhesives generally have long working times so users can enjoy the greatest manufacturing flexibility and reduce waste. Dow Corning silicone adhesives retain their original physical and electrical properties over a broad range of operating conditions which enhance the reliability of and service life of electronic devices. The stable chemistry and versatile processing options of these adhesives offer benefits for a variety of electronics needs from increasing component safety and reliability, reducing total cost or increasing the performance envelope of devices or modules.

ADHESION

Cure time for heat cure adhesives is typically determined as the time required to reach full adhesion and is substrate dependant. In general, increasing the cure temperature and/or cure time will improve the ultimate adhesion. Dow Corning silicone adhesives are specially formulated to provide unprimed adhesion to many reactive metals, ceramics and glass, as well as to selected laminates, resins and plastics. However, good adhesion cannot be expected on non-reactive metal substrates or non-reactive plastic surfaces such as Teflon®, polyethylene or polypropylene. Special surface treatments such as chemical etching or plasma treatment can sometimes provide a reactive

TYPICAL PROPERTIES, continued

Property	Unit	Value
Dissipation Factor at 100 hz	-	0.006
Dissipation Factor at 100 kHz	-	<0.0003
Linear CTE (by TMA)	ppm/°C	275
Hardening Transition by DSC	°F	-49
	°C	-45
Shelf Life at 5°C	months	6

surface and promote adhesion to these types of substrates. Dow Corning® brand Primers can be used to increase the chemical activity on difficult substrates. Poor adhesion may be experienced on plastic or rubber substrates that are highly plasticized, because the mobile plasticizers act as release agents. Small-scale laboratory evaluation of all substrates is recommended before production trials are made.

MIXING AND DE-AIRING

Upon standing, some filler may settle to the bottom of the liquid containers after several weeks. To ensure a uniform product mix, the material in the container should be thoroughly mixed prior to use. Automated airless dispense equipment can be used to reduce or avoid the need to de-air. If de-airing is required to reduce voids in the cured elastomer, consider a vacuum de-air schedule of >28 inches Hg for 10 minutes or until bubbling subsides.

COMPATIBILITY

Certain materials, chemicals, curing agents and plasticizers can inhibit the cure of addition cure adhesives. Most notable of these include: Organotin and other organometallic compounds, Silicone rubber containing organotin catalyst, Sulfur, polysulfides, polysulfones or other sulfur containing materials, unsaturated hydrocarbon plasticizers, and some solder flux residues. If a substrate or material is questionable with respect to potentially causing inhibition of

cure, it is recommended that a small scale compatibility test be run to ascertain suitability in a given application. The presence of liquid or uncured product at the interface between the questionable substrate and the cured gel indicates incompatibility and inhibition of cure.

STORAGE AND SHELF LIFE

Dow Corning heat-cure adhesives should be stored at or below 25°C (77°C). Containers should be kept tightly closed and kept in cold storage at all times to extend shelf life. Shelf life is indicated by the “Use Before” date found on the product label.

PREPARING SURFACES

All surfaces should be thoroughly cleaned and/or degreased with Dow Corning® brand OS Fluids, naphtha, mineral spirits, methyl ethyl ketone (MEK) or other suitable solvent. Solvents such as acetone or isopropyl alcohol (IPA) do not tend to remove oils well, and any oils remaining on the surface may interfere with adhesion. Light surface abrasion is recommended whenever possible, because it promotes good cleaning and increases the surface area for bonding. A final surface wipe with acetone or IPA is also useful. Some cleaning techniques may provide better results than others; users should determine the best techniques for their particular applications.

SUBSTRATE TESTING

Due to the wide variety of substrate types and differences in substrate surface conditions, general statements on adhesion and bond strength are impossible. To ensure maximum bond strength on a particular substrate, 100 percent cohesive failure of the adhesive in a lap shear or similar adhesive strength test is desired. This ensures compatibility of the adhesive with the substrate being considered. Also, this test can be used to determine minimum cure time or can detect the presence of surface contaminants such as mold release agents, oils, greases and oxide films.

USEFUL TEMPERATURE RANGES

For most uses, silicone elastomers should be operational over a temperature range of -45 to 200°C (-49 to 392°F) for long periods of time. However, at both the low- and high temperature ends of the spectrum, behavior of the materials and performance in particular applications can become more complex and require additional considerations. For low-temperature performance, thermal cycling to conditions such as -55°C (-67°F) may be possible, but performance should be verified for your parts or assemblies. Factors that may influence performance are configuration and stress sensitivity of components, cooling rates and hold times, and prior temperature history. At the high-temperature end, the durability of the cured silicone elastomer is time and temperature dependent. As expected, the higher the temperature, the shorter the time the material will remain useable.

SOLVENT EXPOSURE

When liquid or vapor solvent or fuel exposure can occur in an application, the silicone adhesive discussed in this brochure is intended only to survive splash or intermittent exposures. It is

not suited for continuous solvent or fuel exposure. Testing should be done to confirm performance of the adhesives under these conditions.

PACKAGING

In general, Dow Corning adhesives/sealants are supplied in nominal 0.45-, 3.6-, 18- and 200-kg (1-, 8-, 40- and 440-lb) containers, net weight. Not all products may be available in all packages and some additional packages, such as a bladder packs or tubes, may be available for certain package sizes.

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, or consult your local Dow Corning representative.

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