



DOWSIL™ EC-8425 Electrically Conductive Adhesive

One-part electrically conductive adhesive with strong adhesion and stable conductivity designed for electromagnetic compatibility (EMC) and electrical connections

Features & Benefits

- Non flowable electrically conductive adhesive
- Strong electromagnetic shielding across a wide range of frequencies
- Fast heat cure capabilities starting from 90°C
- Strong & reliable adhesion on variety of substrate
- >20% elongation for stress relief characteristic
- UV traceability for ease of inspection

Composition

- Polydimethylsiloxane
- Silver filler composition blend
- Solvent-less
- UV indicator

Applications

- Adhesive with elastomeric characteristic for stress relief
- Adhesive designed for EMC or grounding applications
- Electrical connections
- Solder replacement

Typical Properties

Specification Writers: These values are not intended for use in preparing specifications.

Dow Test	Standard	Property	Unit	Result
CTM ¹ 0176		One or two-part		1-part
CTM 0176	ASTM ² E284	Color		Tan
CTM 1027		UV traceability		Yes
CTM 0364	MIL ³ -S-8802D	Extrusion rate (0.28 MPa, 18 G needle, 1/2" straight)	g/min	0.4
CTM 1098	ASTM D4440	Viscosity at 0.1(1/s) at 1 (1/s)	Pa·s	2800 400
CTM 1098	ASTM D4440	Thixotropic index, 0.1/1Hz		7
CTM 0364	MIL-S-8802D	Working time at 23°C	Days	5

1. CTM: Corporate Test Method.
2. ASTM: American Society for Testing and Materials.
3. MIL: United States Military Standard.

Typical Properties (Cont.)

Dow Test	Standard	Property	Unit	Result
CTM 0540	ASTM D70	Specific gravity, cured	g/cm ³	2.2
CTM 0793	ASTM D 2240	Cure time at 90°C	Min	90
		at 110°C	Min	60
		at 125°C	Min	30
		at 150°C	Min	10
Cured properties below using 150°C – 60 min				
CTM 0793	ASTM D 2240	Durometer	Shore D	40
CTM 1163	ISO ⁴ 22007-2	Thermal conductivity (hot disk)	W/m.K	1.48
CTM 0137A	ASTM D412	Tensile strength	MPa	5
CTM 0137A	ASTM D412	Elongation	%	> 20
CTM 0243	ASTM C961	Adhesion – lap shear Al/Al	MPa	5.0
		Cu/Cu		5.0
		Ag/Ag		4.9
		Au/Au		4.5
		FR4/FR4		3.4
		PBT/PBT		2.7
CTM 0313	ASTM D257	Volume resistivity	Ohm·cm	< 0.01
	ASTM D4935	Shielding effectiveness (1 kHz–8.5 GHz)	dB	-80
CTM 0839	ASTM F2466	Volatile siloxane content (D4-D10) – uncured	ppm	230
		Storage conditions	°C	-10 to -25 (freezer)

4. ISO: International Standardization Organization.

Description

DOWSIL™ EC-8425 Electrically Conductive Adhesive is a one-part heat cure adhesive whose cure rate is rapidly accelerated with heat.

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. Dow adhesives retain their original physical and electrical properties over a broad range of operating conditions which enhance the reliability and service life of electronic devices.

Description (Cont.)

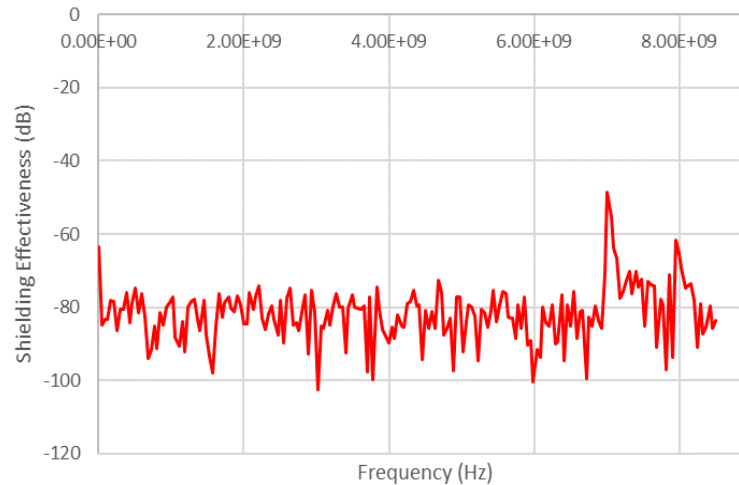


Figure 1: DOWSIL™ EC-8425 Electrically Conductive Adhesive Total Shielding Effectiveness

Processing/Curing

Cure schedules shown in the typical properties table above reflect time once the bond line and adhesive reach the listed temperature. Massive parts or parts composed of higher thermal inertia may require substantially longer cure time due to long temperature ramp-up time. If desired properties are not reached after exposure to the estimated cure schedule this may indicate a too short cure time or a too low temperature applied on the material. Alternative cure schedules are possible and should be matched to application requirements and cured adhesive performance.

Greater than 90 percent of full physical properties should be attained after cure conditions described in the above table.

Substrate Preparation

All surfaces should be thoroughly cleaned and/or degreased with Dow 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 recommended. Some cleaning techniques may provide better results than others; users should determine the best techniques for their particular applications. Due to the wide variety of substrate types and differences in substrate surface conditions, general statements on adhesion and bond strength are impossible. A lap shear or similar test is needed to confirm the compatibility of the adhesive with the substrate being considered.

Adhesion

Dow 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 PTFE, polyethylene, or polypropylene. Special surface treatments such as chemical etching or plasma treatment can sometimes provide a reactive surface and promote adhesion to these types of substrates. Dow 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, since the mobile plasticizers act as release agents. Small-scale laboratory evaluation of all substrates is recommended before production trials are made.

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 product indicates incompatibility and inhibition of cure.

Useful Temperature Range

For most uses, DOWSIL™ EC-8425 Electrically Conductive Adhesive should be operational over a temperature range of -45 to 150°C 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

The silicone adhesive discussed in this literature 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.

Handling Precautions

PRODUCT SAFETY INFORMATION REQUIRED FOR SAFE USE IS NOT INCLUDED IN THIS DOCUMENT. BEFORE HANDLING, READ PRODUCT AND SAFETY DATA SHEETS AND CONTAINER LABELS FOR SAFE USE, PHYSICAL AND HEALTH HAZARD INFORMATION. THE SAFETY DATA SHEET IS AVAILABLE ON THE DOW WEBSITE AT DOW.COM, OR FROM YOUR DOW SALES APPLICATION ENGINEER, OR DISTRIBUTOR, OR BY CALLING DOW CUSTOMER SERVICE.

Usable Life and Storage

Shelf life is indicated by the "Use By" date found on the product label. For best results, adhesives should be stored at or below the maximum specified storage temperature. Special precautions must be taken to prevent moisture from contacting these materials. Containers should be kept tightly closed and head or air space minimized. Partially filled containers should be purged with dry air or other gases, such as nitrogen. Any special storage and handling instructions will be printed on the product containers. Transportation typically takes 2–4 days and is shipped using blue ice with a temperature recorder. The recorder should not exceed 10°C at any time during the shipment and should be stored at the recommended condition, -10 to -25°C, immediately upon arrival. Repeated freezing and thawing should be avoided.

Packaging Information

To prepare a syringe of material for use, please follow the directions in order. Allow the syringe to sit at least one hour at room temperature in tip down orientation and without opening the plastic bag. Upon opening the bag, remove the syringe dust cap right away. The tip plug should be removed just prior to placing the syringe in the dispenser. Air pressure from 10–30 psi should be used or augur dispense systems. Multiple packaging sizes are available for this product. Please contact your local distributor or Dow representative for information on packaging size and availability.

Limitations

This product is neither tested nor represented as suitable for medical or pharmaceutical uses.

Health and Environmental Information

To support customers in their product safety needs, Dow has an extensive Product Stewardship organization and a team of product safety and regulatory compliance specialists available in each area.

For further information, please see our website, dow.com or consult your local Dow representative.

Disposal Considerations

Dispose in accordance with all local, state (provincial) and federal regulations. Empty containers may contain hazardous residues. This material and its container must be disposed in a safe and legal manner.

It is the user's responsibility to verify that treatment and disposal procedures comply with local, state (provincial) and federal regulations. Contact your Dow Technical Representative for more information.

Product Stewardship

Dow has a fundamental concern for all who make, distribute, and use its products, and for the environment in which we live. This concern is the basis for our product stewardship philosophy by which we assess the safety, health, and environmental information on our products and then take appropriate steps to protect employee and public health and our environment. The success of our product stewardship program rests with each and every individual involved with Dow products - from the initial concept and research, to manufacture, use, sale, disposal, and recycle of each product.

Customer Notice

Dow strongly encourages its customers to review both their manufacturing processes and their applications of Dow products from the standpoint of human health and environmental quality to ensure that Dow products are not used in ways for which they are not intended or tested. Dow personnel are available to answer your questions and to provide reasonable technical support. Dow product literature, including safety data sheets, should be consulted prior to use of Dow products. Current safety data sheets are available from Dow.

How Can We Help You Today?

Tell us about your performance, design, and manufacturing challenges. Let us put our silicon-based materials experience, application knowledge, and processing experience to work for you.

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To discuss how we could work together to address your specific needs, go to dow.com for a contact close to your location. Dow has customer service teams, science and technology centers, application support teams, sales offices, and manufacturing sites around the globe.

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