



## Technical Data Sheet

### DOWSIL™ EA-7100 Adhesive

DOWSIL™ Thermal Radical Cure EA-7100 Adhesive is a one-part, non-flowing adhesive enabling design flexibility due to strong adhesion to a broad range of substrates.

#### Features & Benefits

- Durable adhesion to a “wide” variety of substrates including:

##### Plastics

- Epoxy
- Liquid Crystal Polymer (LCP)
- Phenolic
- Poly (methyl methacrylate) (PMMA) (Plexiglas®)
- Polyamide (nylon)
- Polybutylene terephthalate (PBT)
- Polycarbonate (PC)
- Polyethylene (low-density polyethylene/LDPE, cross-linked polyethylene/PEX)
- Polyimide
- Polyphenylene ether (PPE)
- Polyphenylene sulfide (PPS)
- Polyvinyl chloride (PVC)

##### Metals

- Aluminum
- Brass
- Copper
- Steel

##### Cured silicones

##### Other substrates (contact Dow)

- Faster cure times and/or lower cure temperatures
- Adhesion that forms simultaneously with the cure
- Low voiding
- Adhesion in harsh environments
- Passed salt spray, water immersion and saltwater immersion testing
- Less stringent or elimination of surface cleaning steps
- Less sensitive to contamination

#### Composition

- One-part
- Polydimethylsiloxane

UNRESTRICTED – May be shared with anyone

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DOWSIL™ EA-7100 Adhesive

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Application Methods

- Manual or automated needle dispensing

Application

- This material is intended for use in automotive electronics control units, sensors, lighting or display modules applications where lid seal, base plate attaching, gasketing or connector sealing or adhesion is required.

### Typical Properties

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

Property	Unit	Result <sup>1</sup>
Viscosity	cP	360,000
	mPa-sec	360,000
	Pa-sec	360
Thixotropy	NA	5.8
Pre-Assembly Time @ 25°C (Open Time After Dispense)	minutes	60
Assembled Pre-Cure Time @ 25°C	hours	> 24
Recommended Heat Cure Time @ 100°C (Time/Temp At Bondline)	minutes	15
Specific Gravity (Cured)		1.09
Tensile Strength	psi	490
	MPa	3.4
	kg/cm <sup>2</sup>	34
Elongation	%	260
Durometer Shore A		43
Tensile Modulus	psi	160
	MPa	1.1
	kg/cm <sup>2</sup>	11
Adhesion – Lap Shear to Aluminum	psi	350
	MPa	2.4
	N/cm <sup>2</sup>	240
Adhesion – 180 Degree Peel Strength to Aluminum	ppi	40
	N/cm	27.5
	N/cm	27.5
Adhesion – Lap Shear to PBT <sup>2</sup>	psi	375
	MPa	2.6
	N/cm <sup>2</sup>	260
CTE	ppm/°C	247
Volume Resistivity	Ohm-cm	9 E+14

1. Majority of data is based on the recommended cure profile.
2. Typical 100% Cohesive Failure (CF) in peel @ 30–40 ppi, 21–28 N/cm lap shear, 300–450 psi, 2–3 MPa.

## Typical Properties (Cont.)

Property	Unit	Result
Dielectric Strength	volts/mil	437
	kV/mm	17
Dielectric Constant @ 100 Hz		2.96
Dielectric Constant @ 100 KHz		2.91
Dissipation Factor @ 100 Hz		0.002
Dissipation Factor @ 100 KHz		0.004

### Description

DOWSIL™ EA-7100 Adhesive is a one-part heat cure adhesive whose cure rate is rapidly accelerated with heat. Cure schedules shown in the typical properties table above reflect time once the bond line and adhesive reach the listed temperature. Alternative cure schedules are possible and should be matched to application requirements and cured adhesive performance.

This adhesive tends to cure in the bulk and at the bond line first, while outer exposed areas can take longer to solidify. The very last areas to cure tend to be the outermost surfaces in contact with air. Therefore the adhesive may have a thin wet outer surface even while the bulk of the material has cured and obtained a level of strength and adhesion. Longer heat cure times or hotter cure temperatures will solidify and cure the outer adhesive area, though it is typical for the adhesive surface to have a tacky surface as it comes out of an oven cure.

DOWSIL EA-7100 Adhesive has a built-in secondary moisture cure that both enhances adhesion and completes the cure at the outer surface. Tackiness is typically gone within 24–48 hours after the heat cure.

DOWSIL EA-7100 Adhesive is formulated with all necessary ingredients for cure, making deep-section or confined cures possible. This adhesive can be dispensed and parts left unassembled for 60 minutes. Once assembled, parts can generally be held for at least 24 hours at room temperature before heat curing.

Dow silicone adhesives retain their original physical and electrical properties over a broad range of operating conditions which enhances the reliability of and service life of PCB system assembly. The stable chemistry and versatile processing options of these adhesives offer benefits for a variety of needs, including increasing component safety and reliability, reducing total cost and increasing the performance envelope of devices or modules.

### Adhesion

DOWSIL EA-7100 Adhesive has been found to bond well to a wide variety of plastic and metal surfaces. The onset of adhesion in plastic has been observed within three minute once the bond line and the adhesive reach temperatures at or above 100°C even though the outer air-exposed area may remain wet and uncured until longer cure times are accomplished.

Adhesion (Cont.)	<p>DOWSIL EA-7100 Adhesive has been specially formulated to provide unprimed adhesion to many reactive metals, ceramics and glass, as well as many laminates, resins and plastics – including plastics that traditional silicone adhesives do not bond well to. Additionally, this adhesive has been shown to have good self-adhesion; it will bond strongly to cured samples of itself and to many other silicones. This may allow for easier repair and rework.</p> <p>However, good adhesion cannot be expected on non-reactive metal substrates or non-reactive plastic surfaces such as gold, fluorinated materials, or certain plastics. Special surface treatments such as chemical etching or plasma treatment can sometimes provide a reactive surface and promote adhesion to these types of 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.</p>
Compatibility	<p>DOWSIL EA-7100 Adhesive has not been observed to degrade plastics or other surfaces to which it is applied and cured. Other silicones such as moisture cure or addition cure can be co-cured in the same closed module and/or near this product. However, addition cure silicones may experience some cure issues when in direct contact with cured or uncured DOWSIL EA-7100 Adhesive.</p>
Substrate Testing	<p>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.</p>
Useful Temperature Ranges	<p>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.</p>
Solvent Exposure	<p>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.</p>

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 <a href="http://WWW.CONSUMER.DOW.COM">WWW.CONSUMER.DOW.COM</a> , OR FROM YOUR DOW SALES APPLICATION ENGINEER, OR DISTRIBUTOR, OR BY CALLING DOW CUSTOMER SERVICE.
Usable Life And Storage	Refer to product label for storage temperature conditions. 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.
Packaging Information	In general, Dow adhesives/sealants are supplied in nominal 0.45, 3.6 and 18 kg (1, 8, and 40 lb) containers, net weight.
Limitations	This product is neither tested nor represented as suitable for medical or pharmaceutical uses.
Health And Environmental Information	<p>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.</p> <p>For further information, please see our website, <a href="http://www.consumer.dow.com">www.consumer.dow.com</a> or consult your local Dow representative.</p> <p>The data represented herein reflects typical values based on non-production scale samples. Dow anticipates that the values may change somewhat when measured from full scale production batches and a revised data sheet will be created at that time.</p>
How Can We Help You Today?	<p>Tell us about your performance, design, and manufacturing challenges. Let us put our silicon-based materials expertise, application knowledge, and processing experience to work for you.</p> <p>For more information about our materials and capabilities, visit <a href="http://www.consumer.dow.com">www.consumer.dow.com</a>.</p> <p>To discuss how we could work together to meet your specific needs, go to <a href="http://www.consumer.dow.com">www.consumer.dow.com</a> 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.</p>

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