



## Technical Data Sheet

### DOWSIL™ JCR 6140 Optical Encapsulant

Two-part, 1:1 mix ratio, medium viscosity, normal RI, transparent elastomer.

#### Features & Benefits

- Two-part, clear
- 1:1 mix ratio
- Normal RI
- Addition cure – no byproducts and minimal shrinkage
- Excellent thermal stability for greater reliability
- High moisture resistance for greater reliability
- Excellent adhesion provides reliability
- Very high purity reduces contamination potential
- Excellent optical properties for a broader range of applications

#### Composition

- Polydimethylsiloxane

#### Applications

DOWSIL™ JCR 6140 Optical Encapsulant is suitable for use as an:

- LED encapsulant
- Semiconductor protective coating
- CCD image sensor encapsulant

#### Application Methods

- Die encapsulant materials can be dispensed through conventional equipment
- Please contact your Dow technical service representative for recommendations

#### Typical Properties

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

Property	Unit	Result
One or Two-Part		Two
Mix Ratio		1:1
Color		Clear
Viscosity (Part A)	cP	5200
	Pa-sec	5.2
Viscosity (Part B)	cP	3400
	Pa-sec	3.4
Viscosity (Mixed)	cP	3100
	Pa-sec	3.1

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DOWSIL™ JCR 6140 Optical Encapsulant

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## Typical Properties (Cont.)

Property	Unit	Result
Thixotropy		1.2
Heat Cure Time at 150°C	minutes	60
Specific Gravity (Cured)		1.0
Durometer Shore A		40
Elongation	%	180
Tensile Strength	psi	770
	MPa	5.3
	kg/cm <sup>2</sup>	54
Linear CTE (by TMA)	ppm/°C	320
Thermal Conductivity	btu/hr ft degF	0.116
	W/mK	0.2
Unprimed Adhesion – Lap Shear (Al)	psi	200
	MPa	1.4
	N/cm <sup>2</sup>	140
Impurity (Na <sup>+</sup> )	ppm	0.1
Impurity (K <sup>+</sup> )	ppm	0.2
Volume Resistivity	ohm*cm	6.4E+15
Dielectric Strength	volts/mil	700
	kV/mm	28
Dielectric Constant at 1 MHz		2.8
Dissipation Factor at 1 MHz		9.3E-40
Transparency at 450 nm, 1 mm thick	%	99.7
Transparency at 589 nm, 10 mm thick	%	98.1
Youngs Modulus	psi	145
	Mpa	1
	kg/cm <sup>2</sup>	10.2
Refractive Index		1.41

## Description

Dow silicone LED (light emitting diode) encapsulants are designed to meet the challenging needs of the LED market, including high adhesion, high purity, moisture resistance, thermal stability and optical transmittance. Silicone materials can absorb stresses caused by thermal cycling inside the package, protecting the chip and the bonding wires. With the PCB and Systems Assembly industry quickly moving toward lead-free processing, silicone encapsulants, with their demonstrated, excellent stability at reflow temperatures, are a natural fit for LED applications.

Processing/Curing	<p>These products are also compatible with commercially available equipment and industry standard processes. These materials can be dispensed or molded depending on the product and application.</p> <p>Dow OS Fluids are recommended to clean cured or uncured silicone residue from application equipment.</p>
Adhesion	<p>Dow LED materials are specially designed for adhesion to commonly used LED substrates. Surface treatments such as chemical etching or plasma treatment may provide a reactive surface and improve adhesion to these types of substrates. In general, increasing the cure temperature and/or cure time will improve the ultimate adhesion.</p>
Useful Temperature Ranges	<p>For most uses, silicone encapsulants and resins 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>
Compatibility	<p>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.</p>
Handling Precautions	<p>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 CONSUMER.DOW.COM, OR FROM YOUR DOW SALES APPLICATION ENGINEER, OR DISTRIBUTOR, OR BY CALLING DOW CUSTOMER SERVICE.</p>
Usable Life and Storage	<p>Shelf life is indicated by the "Use Before" date found on the product label. Dow two-part products should be stored at or below 25°C (77°F). Containers should be kept tightly closed at all times to extend shelf life. Check the product label for specific storage conditions.</p>

## Packaging Information

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, [consumer.dow.com](http://consumer.dow.com) or consult your local Dow representative.

## How Can We Help You Today?

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.

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