

**DESCRIPTION:**

*ResinLab*<sup>®</sup> *EP1289 Black* is a two part thermally conductive high strength epoxy adhesive designed for bonding battery assemblies. This product can withstand vibration and impact. It also has good resistance to water, salt spray, inorganic acids and basis and most organic solvents. **It contains 0.8% by volume 10 mil spacer beads when mixed at the recommended mass / volume ratio.**

*EP1289 Black* cures at room temperature to a tough, semi-flexible material. It will reach handle cure at room temperature within 16-24 hours, and full properties within 24-48 hours. Cure time can be accelerated by application of heat, but time to heat substrate must be considered.

An oven cure of 1 hour @ 65 °C can be used to achieve the same degree of cure as a 6-8-hour cure at room temperature. This was determined by monitoring Shore D hardness development at the stated temperatures.

*EP1289 Black* was formulated at a 2A:1B volume mix ratio for use in side-by-side cartridges and meter/mix and dispense equipment.

**TYPICAL PROPERTIES:**

All properties given are at 25 °C unless otherwise noted.

<b>Property:</b>	<b>Value:</b>	<b>Test Method or Source:</b>
<b>Color</b>	Black	Visual
<b>Mix Ratio</b>	Part A to Part B	Calculated
<b>Mix Ratio by weight</b>	2.39 to 1	
<b>Mix Ratio by volume</b>	2 to 1	
<b>Cure Schedule</b>	24-72 hrs @ 25 °C	
<b>Viscosity - Part A</b>	60,000 cP	Rheometer parallel plate 25mm @ 1/s
<b>Viscosity - Part B</b>	27,000 cP	455300006291
<b>Viscosity - Mixed</b>	34,000 cP	
<b>Specific Gravity - Part A</b>	2.44	Calculated
<b>Specific Gravity - Part B</b>	2.04	
<b>Specific Gravity - Mixed</b>	2.31	
<b>Pot Life defined as the time it takes for initial mixed viscosity to double</b>	30 minutes	Rheometer parallel plate 25mm @1/s 455300006291
<b>Work Life</b>	> 90 minutes	453560822627/Visual, cup and stick
<b>Hardness</b>	90 Shore D	455300006287/ASTM D2240
<b>Glass Transition Temperature/Tg</b>	52 °C	453560822409 by DSC
<b>Water Absorption</b>	0.04 %	24 hr immersion 457561824543/ASTM D570

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<b>Property:</b>	<b>Value:</b>	<b>Test Method or Source:</b>
<b>Tensile Properties:</b>		4535601224470/ASTM D638
<b>Strength</b>	7,500 psi	
<b>Elongation</b>	1 %	
<b>Modulus</b>	1,230,000 psi	
<b>Flame Resistance</b>	Passes with HB Rating @ 0.25 & 3.0 mm	45376013225560/UL94HB
<b>Tested at ResinLab, not UL Certified</b>		
<b>Thermal Conductivity by Transient Plane Heat Source (TPS)</b>	1.2 W/m.K	Thermtest TPS Hot Disk ISO 22007-2 45376013225604
<b>Electrical Resistivity:</b>		455300006612/ASTM D257 @ 25 °C @ 40 %RH
<b>Volume</b>	7.1 x 10 <sup>14</sup> ohm-cm	
<b>Surface</b>	1.7 x 10 <sup>12</sup> ohm/sq	
<b>Dielectric Constant &amp; Dissipation Factor:</b>		455300006513/ASTM D150
<b>@ 100 Hz</b>	4.74, 0.008	
<b>@ 100 kHz</b>	4.52, 0.020	
<b>DC Dielectric Strength</b>	63 kV/mm	457561824539; ASTM D3755/D149 Method A, immersed in ASTM D3487 Type II Oil Specimen thickness was ~1-2 mm
<b>Coefficient of Thermal Expansion by TMA:</b>		455300005340/ASTM E831 TMA, 5 °C/min
<b>below Tg</b>	34 ppm/°C	
<b>above Tg</b>	123 ppm/°C	
<b>Battery "Pull" test 0.010" bond line Anodized aluminum to nickel</b>	825 N, tested at 70 °C	Customer defined test
<b>Time to reach 120,000 cps after initial mixing</b>	45 minutes	Rheometer parallel plate 25mm@1/s
<b>Operating Temperature Range</b>	-40 to 150 °C**	
<b>Relative Thermal Index (RTI)</b>	90 °C	UL746B, Table 7.1 Generic Value Based on Composition

\* Asterisk denotes values considered typical to associated resin systems or extrapolated from other test results.

\*\* Operating Temperature Range is based on average design requirements and is not intended as a guarantee of suitability for all applications operating at that temperature.

\*\*\* This TDS contains values that have been updated. The values reported in this technical data sheet are typical values of the product, and are highly dependent on test conditions and methodology. We actively seek the most precise and accurate ways to measure and interpret performance of our products, and to update estimated values with measured values. The formula has not been revised or changed in any way. Although the values on paper have changed, you can expect the same performance of the product.

### **Additional Performance Data – Lap Shear Adhesion, 4535601224468/ASTM D1002:**

<b>Substrate Type</b>	<b>Strength</b>	<b>Test Temperature</b>	<b>Cure Schedule</b>	<b>Bond Line Thickness</b>
Al to Al	> 2,000 psi	25 °C	24 hr @ 25 °C	0.010 "
Al to Al	> 3,500 psi	25 °C	3 hr @ 100 °C	0.010 "

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**INSTRUCTIONS:**

1. Bring to room temperature prior to use.
2. Cartridge format: Mixer should be attached keeping the cartridge vertical and any air pocket purged this way. After the mixer contains material, the mixer tip can be dropped to dispense pre-bleed amount. Attach a new static mixer with each cartridge, then pre-bleed the first 3 inches of dispensed material or until a uniform color is obtained. Maintain adequate velocity during dispensing to ensure complete mixing.
3. Bulk format: stir until homogeneous weigh and mix parts A and B accurately and thoroughly, scraping sides of container often. Do not pour from mixing container, transfer to a new container as residual unmixed material may cause a tacky spot on the surface of the casting. Maintain adequate velocity during dispensing to ensure complete mixing.
4. Allow to cure undisturbed until product is fully gelled or tack-free to the touch.
5. Clean up uncured resin with suitable organic solvent such as MEK or acetone.

**SHELF LIFE AND STORAGE:**

6 months DOP in bulk at 25 °C (mix before use)

3 months DOP at 25 °C in cartridges (store horizontally)

Specialty packaging may be less.

This system is prone to settling due to high filler content. Inventory should be rotated on a FIFO (first in, first out) basis.

Bulk containers should be inverted every two to three weeks to reduce the accumulation of the fillers on the bottom of the containers.

Many epoxy resin systems are prone to crystallization as epoxy resin is a super-cooled fluid. This condition may give the product a gritty or grainy appearance (or hazy in clear products). Products in this state will not usually cure to normal and expected properties. In extreme cases it may appear solid and cured. Fluctuating temperatures (within 5 to 50 °C) aggravate this phenomenon. Heating the individual component to 50 to 60 °C while stirring can usually restore products to original state. Storage at 25 +/- 10 °C is optimum for most products.