

N109 W13300 ELLSWORTH DRIVE GERMANTOWN, WI 53022  
262-253-5900 FAX 262-253-5919

**DESCRIPTION:**

*ResinLab® EP691 Clear* is a two-part unfilled electronic grade epoxy encapsulant designed for medium sized castings. It cures at room temperature to a tough, semi-rigid polymer with a high gloss surface. It has good wetting and adhesion to most surfaces and is free flowing to penetrate voids and release trapped air. It has resistance to water, acids, bases, and most organic solvents.

*EP691 Clear* was formulated to a 2A:1B volume mix ratio for use in side-by-side dispensing cartridges and meter/mix and dispense equipment. *EP691 Clear* will reach full cure at room temperature within 24 hours. Cure time can be accelerated by the application of heat after the product has gelled. Times and temperatures from 1 hour at 65 °C to 20 minutes at 100 °C are typical for castings less than 50 grams. Time to heat substrate must be taken into account. Cooler temperatures will also extend work time and increase cure times.

**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>	Clear to Amber	Visual
<b>Mix Ratio</b>	Part A to Part B	Calculated
<b>Mix Ratio by weight</b>	2.22 to 1	
<b>Mix Ratio by volume</b>	2 to 1	
<b>Cure Schedule</b>	24 hrs @ 25 °C 1 hr @ 65 °C 20 min @ 100 °C	
<b>Viscosity - Part A</b>	13,900 cP	Rheometer parallel plate 25mm @ 1/s
<b>Viscosity - Part B</b>	2,200 cP	455300006291
<b>Viscosity - Mixed</b>	7,600 cP	
<b>Specific Gravity - Part A</b>	1.16	Calculated
<b>Specific Gravity - Part B</b>	1.00	
<b>Specific Gravity - Mixed</b>	1.11	
<b>Work Life</b>	≈ 7 hours (50 g sample)	453560822627/Visual, cup and stick
<b>Peak Exotherm</b>	No measurable increase in temperature observed for 40 mL sample	455300005593 by Type K thermocouple
<b>Hardness</b>	80 Shore D	455300006287/ASTM D2240
<b>Glass Transition Temperature/Tg</b>	78 °C	453560822409 by DSC
<b>Water Absorption</b>	0.07 %	24 hr immersion 457561824543/ASTM D570
<b>Tensile Properties:</b>		455300006285/ASTM D638
<b>Strength</b>	8,500 psi	
<b>Elongation</b>	5 %	
<b>Modulus</b>	340,000 psi	

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<b>Property:</b>	<b>Value:</b>	<b>Test Method or Source:</b>
<b>Lap Shear Strength</b>		455300005642/ASTM D1002
<b>0.010" Bond Line, Al to Al</b>	1,900 psi	
<b>Compressive Properties:</b>		455300006265/ASTM D695
<b>Yield Strength</b>	28,000 psi	
<b>Modulus</b>	243,000 psi	
<b>Thermal Conductivity by LFA</b>	0.17 W/m.K	453560822409/ASTM E1461
<b>Electrical Resistivity:</b>		455300006612/ASTM D257
<b>Volume</b>	$3.9 \times 10^{16}$ ohm-cm	@ 23 °C @ 51 %RH
<b>Surface</b>	$3.5 \times 10^{16}$ ohm/sq	
<b>Dielectric Constant &amp; Dissipation Factor:</b>		455300006513/ASTM D150
<b>@ 100 Hz</b>	3.4, 0.007	
<b>@ 100 kHz</b>	3.2, 0.020	
<b>AC Dielectric Strength</b>	17 kV/mm * (estimated)	DCV6101609; ASTM D149 Method A, immersed in ASTM D3487 Type II Oil
<b>Coefficient of Thermal Expansion by TMA:</b>		455300005340/ASTM E831 TMA, 5 °C/min
<b>below Tg</b>	50 ppm/°C	
<b>above Tg</b>	219 ppm/°C	
<b>Operating Temperature Range</b>	-55 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.

#### **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.

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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. Clean up uncured resin with suitable organic solvent such as MEK or acetone.
5. Allow to cure undisturbed until product is fully gelled or tack-free to the touch.

**SHELF LIFE AND STORAGE:**

12 months at 25 °C.  
Specialty packaging may be less.

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.