



# APTEK LABORATORIES, INC.

ISO 9001/ AS9100 Certified

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## TECHNICAL DATA & INFORMATION

### APTEK® 6113-A/B2

- Electrically insulative, epoxy, potting compound
- Low-shrinkage/mass castable
- High chemical resistance
- Operating temperature up to 240°C

### PRODUCT DESCRIPTION

**APTEK 6113-A/B2** is a black, rigid, tough, two component, mineral-filled, electrically insulative, low-shrinkage epoxy system specifically designed for the potting of larger electrical units like motor stators and transformers.

When properly mixed, handled, and cured **APTEK 6113-A/B2** will withstand wide temperature range excursions with a minimal tendency to crack, distort, or impart stress to wires/components.

### KEY FEATURES AND BENEFITS

- Longer pot-life version to provide an extended length of time for detailed potting applications
- Very good high heat resistance to 240°C; capable to withstand excursions up to 280°C with minimum degradation in long term operation.
- Low shrinkage – imparts minimum stress to electrical units during gelation when properly cured.
- Excellent chemical resistance even at high temperatures – especially effective in hot oils.
- Displays excellent temperature cycle resistance to minimize the chance of cracking during the life time of the part.
- Excellent adhesion to most metal and plastic substrates – no primer required.
- Pre-measured kit eliminates weighing for convenience.

### HANDLING INFORMATION

Mix ratio, parts by weight: 100 (6113-A) / 16 (6113-B2)

Work life, @ 80°C, 175gm (105ml) mass, minutes 30-40 (with minimal viscosity increase)

#### Handling Notes:

1. Part A is highly filled and stiff to handle at room temperature. Part A should be heated to 90-100°C to lower viscosity for easy handling.
2. Part B is moisture sensitive. Once a factory-sealed container is opened, purge any partially used containers with dry nitrogen or argon before resealing to prolong shelf life. The Part B is low in viscosity and once mixed with Part A, the resultant mixture will be low in viscosity and easy to handle.

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**MIXING INFORMATION**

1. For pre-measured kits, pre-heat Part A in supplied container @ 90-100°C to aid in mixing with Part B kept at RT. Pour/drain entire contents of Part B bottle into Part A container. Please note, only let contents drain out of Part B bottle for 10-15 seconds. Do not shake bottle or scrape material from inside of bottle. Sufficient Part B is packaged to deliver proper amount to system. Hand or machine mix at slow speed until complete and thorough blending is achieved. Care should be taken to avoid any source of moisture contamination or air entrapment during mix.
2. During mixing process, carefully scrape down sides of white plastic container with clean metal or plastic spatula. Then continue mixing until uniform.
3. For best results and a void free casting, vacuum mixture at less than 10 mm Hg for 1-2 minutes after break. If material boils violently after break, stop vacuuming. Maintain mixed material temp to ~ 80°C.

**POTTING PROCEDURE**

1. Prior to mixing A and B, pre-heat the part/mold to be potted to at least 100-120°C. For large metal parts, this may take many hours. It is very important that the part being potted is heated to 20-25°C hotter than mixed material temperature so that the material will more effectively penetrate and encapsulate all wires/components as material viscosity will be reduced when it comes into contact with the warm part.
2. For best results, warm the degassed mixture to 75-85°C. This will result in an easy-to-pour mixture.  
**NOTE:** This highly filled product loses heat quickly so it is important to keep mixture warm to maintain low viscosity.
3. Pour this heated and degassed mixture into unit to be potted slowly as one stream as to not entrap air around coils, wires, components, etc. If VPI equipment is available, the material may be poured into the unit under vacuum, which will automatically minimize air entrapment. Otherwise, continue to pour the material in to the unit in the "one stream" manner until the unit fills up about one-half to two-thirds way full. Then apply vacuum to remove air up to this point. Continue this process incrementally until unit is full. Again, if VPI equipment is being used then apply pressure to force/push material into the crevices of wires/components. If no pressure is available, place fully potted unit into 100°C (-0°C, +5°C) oven (ACO) and the material will continue to degas by itself until gelation.
4. Then proceed with cure schedule below.

**CURE SCHEDULE**

2-4 hours @ 100°C, then demold Teflon center spacer once the material is gelled firm enough to click with metal spatula. Then ramp up to 140°C @ 5°C/min  
 plus  
 2 hours @ 140°C, then ramp up to 180°C @ 5°C/min  
 plus  
 4 hours @ 180°C, then ramp up to 240°C @ 5°C/min,  
 plus  
 6 hours @ 240°C

**NOTE:** Tolerance range for all temperatures listed in cure schedule is -0°C, +5°C.

Finally, shut off heat source and do not open oven to force cool. Keep part in the closed oven and allow part to come to room temperature gradually (this may take overnight for large parts)

## TYPICAL PROPERTIES

(values not to be used for specification purposes)

<u>CHARACTERISTICS</u>	<u>6113-A</u>	<u>6113-B2</u>	<u>TEST METHOD</u>
Color	black	dark amber	Visual
Specific Gravity	1.7	1.2	ASTM D-1475
Viscosity @ 25°C, cps	Smooth, stiff, thick liquid	100	ASTM D-1824
Flash point, °C	>200	>150	ASTM D-92
Shelf life @ 25°C, months factory sealed containers	6	6	

<u>CURED PHYSICAL PROPERTIES</u>	<u>APTEK 6113-A/B2</u>	<u>TEST METHOD</u>
Hardness, Durometer D, 1/2" casting	90	ASTM D-2240
Glass transition temp., °C	84	ASTM E-831
Thermal coefficient of expansion, in/in/°C	25 X 10 <sup>-6</sup>	ASTM E-831
alpha 1	97 X 10 <sup>-6</sup>	ASTM E-831
alpha 2		
Tensile strength, psi	8,500	ASTM D-638
Elongation, %	1.8	ASTM D-638
Thermal conductivity at 25°C, W/mK	0.45	ASTM C-518
Thermal shock resistance, cycles (0°C, 100°C)	7 (No cracks)	QCP-026
Heat resistance via TGA		
Onset temp under N <sub>2</sub> , °C	>310	TA Q50

<u>CURED ELECTRICAL PROPERTIES</u>	<u>APTEK 6113-A/B2</u>	<u>TEST METHOD</u>
Volume resistivity @ 25°C, ohm-cm	5 X 10 <sup>14</sup>	ASTM D-257
Dielectric constant @ 25°C, 1 KHz	3.6	ASTM D-150
Dissipation factor @25°C, KHz	0.015	ASTM D-150
Dielectric strength, 0.125" thick. Volts/mil	365	ASTM D-149

**SAFETY AND FIRST AID**

**APTEK 6113-A** is a mineral filled epoxy resin that is safe to handle when used properly. Refer to Material Safety Data Sheet for more details.

**APTEK 6113-B2** is an organic anhydride which is safe to handle when used properly. Refer to Material Safety Data Sheet for more details.

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