



# APTEK LABORATORIES, INC.

ISO 9001 / AS9100 Certified

28570 Livingston Avenue, Valencia, CA 91355-4171 • (661) 257-1677 FAX (661) 257-8939

## TECHNICAL DATA & INFORMATION

### APTEK 2100-A/B

- Low modulus urethane - unfilled
- High purity
- Low outgassing

### PRODUCT DESCRIPTION

**APTEK 2100-A/B** is a two component, unfilled, electrically insulating urethane system designed for the potting and encapsulation of electronic components, substrates, and active chips. This is 100% solids, solvent free system that will not form voids during cure or service life.

**APTEK 2100-A/B** is a non-TDI based urethane system which has outstanding reversion resistance and physical stability when subjected to high heat and humidity environment. As a urethane, this system displays higher ionic purity than epoxy systems minimizing the chance of corrosion around sensitive components and circuitry.

### KEY FEATURES AND BENEFITS

- Low modulus/high elongation to minimize stress to sensitive components and ceramic substrates.
- Low Tg for excellent low temperature cycling and performance
- Wide operating temperature range (-65°C to 100°C) for versatility.
- Excellent substrate adhesion; superior to silicones
- Exceeds NASA outgassing requirements for high vacuum environments

### HANDLING INFORMATION

Mix ratio, parts by weight: 100 (2100-A) / 20 (2100-B)

Work life, @ 25°C, 50 gm. mass, minutes 40

Handling notes:

- Prior to use, examine Part B bottle for crystallization or formation of an insoluble white precipitate which is a solid dimer of the liquid Part B. The precipitate is not harmful; however follow instructions listed below for best results.

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**- DO NOT SHAKE BOTTLE**

- Place unopened Part B bottles into an air circulating oven at 45-60°C until clear amber to slightly hazy liquid is evident (white precipitate layer may also be present).
- Carefully remove bottles from oven without disturbing contents. If liquid contains gelled material - DO NOT USE! To use Part B, decant clear liquid out of bottle without disturbing the precipitate. Excess Part B has been packaged to insure sufficient supply of liquid.
- Use entire bottle of Part B for each application if possible. Unused portion must be blanketed with dry nitrogen or argon and resealed to avoid moisture contamination.
- Store at 25°-30°C @ <50% RH

**MIXING**

Weigh 100 parts of APTEK 2100 Part A into clean dry glass, metal, or plastic container and then add 20 parts of APTEK 2100 Part B. Machine mix on slow speed or hand stir with glass or metal stirrer until complete and thorough blending is achieved. Care should be taken to avoid any source of moisture contamination or air entrapment during mix.

Note: For best results and a void free bond line, vacuum mixture at less than 10 mm Hg for 5-10 mins.

**CURE SCHEDULE**

7 days @ 25°C  
or  
8 hours @ 80°C  
or  
4 hours @ 100°C

Note: 1) As typical with urethane systems, a relaxation/stabilization period of 2-4 days at room temperature after heat cure is recommended before testing or service.

2) Cured material exposed to excess heat and long term aging may darken in color over time. Please note that this is a natural occurrence and no adverse effects to mechanical or electrical properties take place.

**TYPICAL PROPERTIES**

(Values not to be used for specification purposes)

<b><u>CHARACTERISTICS</u></b>	<b><u>2100-A</u></b>	<b><u>2100-B</u></b>	<b><u>TEST METHOD</u></b>
Color	Pale yellow	Pale yellow to amber	Visual
Clarity	Transparent	Clear to hazy	Visual
Specific gravity	0.91	1.2	ASTM D-1475
Viscosity @ 25°C,cps	7500	50	ASTM D-1824
Flash point, °C	>200	>150	ASTM D-92
Shelf Life @ 25°C, factory sealed containers, months	6	6	
<b><u>CURED PHYSICAL PROPERTIES</u></b>	<b><u>APTEK 2100-A/B</u></b>		<b><u>TEST METHOD</u></b>
Color	Milky white		Visual

Hardness, Shore A	55	ASTM D-2240
Tensile strength, @ 25°C, psi	450	ASTM D-412
@ -50°C, psi	5500	
@ 100°C, psi	450	
Elongation, @25°C, %	325	ASTM D-412
@-50°C, %	425	
@100°C, %	200	
Young's modulus @25°C, psi	750	ASTM D-412
@-50°C, psi	1000	
@100°C, psi	200	
Lap shear, Al to Al, psi	525	ASTM D-1002
Glass transition temp., °C	-65	ASTM E-831
Thermal coefficient of expansion, in/in/°C		ASTM E-831
alpha 1	$67 \times 10^{-6}$	
alpha 2	$220 \times 10^{-6}$	
Thermal conductivity, W/mK	0.17	COLORA
Outgassing @ $10^{-6}$ Torr		
TML, %	0.38	ASTM E-595
CVCM, %	0.03	ASTM E-595
Moisture absorption, %	0.18	ASTM D-570
Fungus resistance	Non-nutrient	ASTM G-21

**CURED ELECTRICAL PROPERTIES****APTEK 2100-A/B****TEST METHOD**

Volume resistivity, ohm-cm		
@ 25°C	$1.0 \times 10^{15}$	ASTM D-257
@ 90°C	$3.5 \times 10^{13}$	ASTM D-257
Dielectric constant, @ 1 KHz		
@25°C	3.2	ASTM D-150
@90°C	3.5	ASTM D-150
Dissipation factor @ 1 KHz		
@25°C	0.024	ASTM D-150
@90°C	0.031	ASTM D-150
Dielectric strength, volts/mil		
@ 0.005" thick	>2000	ASTM D-149
@ 0.500" thick	370	ASTM D-149

**SAFETY AND FIRST AID**

APTEK 2100-A is an unfilled polyol resin that is safe to handle when used properly. It is judged to be low in toxicity and to be rated as a slight skin irritant. Avoid contact with skin and eyes and use in a well-ventilated area and avoid breathing vapors. In case of eye contact, flush with fresh clean water for at least 15 minutes; for skin contact, wash thoroughly with soap and water. If swallowed, drink at least one pint of water and call physician. Refer to Material Safety Data Sheet for more details.

APTEK 2100-B is an organic isocyanate, which may cause severe eye and skin irritation with direct contact. Inhalation of vapors may result in breathlessness, severe coughing, chest discomfort, and irritation of mucous membranes. Avoid skin and eye contact and use in well-ventilated, hooded area. In case of eye contact, flush profusely with fresh clean water and contact physician. For skin contact, wash thoroughly with soap and water. If inhaled, move subject to fresh air and provide fresh water to drink. If swallowed, dilute with at least one pint of water and contact physician immediately. Refer to Material Safety Data Sheet for more details.

Current Revision: 01/19/17 – mjb

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