

## Ultralane 5770A/B

### URETHANE CONFORMAL COATING

Ultralane 5770A/B is an easy to use conformal coating made with VOC-exempt solvents, that when fully cured performs very similarly to the Arathane 5750A/B(LV) coating. It has a simple 1:2 by weight and volume mix ratio and is resistant to crystallization and other storage issues.

Ultralane 5770A/B is a soft elastomeric and repairable, urethane coating designed specifically for insulating printed circuit boards and electronic components. It exhibits excellent reversion resistance under heat and high humidity conditions and displays very low outgassing properties critical for applications in outer space and high vacuum environments. It provides a very long (8+ hour) work-life time and for most application, is ready-to use when thoroughly mixed without requiring additional thinners.

The standard version of Ultralane 5770A/B contains a fluorescent dye that fluoresces blue-white for optical inspection under black light. A version of the coating without the dye is available by request as are colored versions (ex. red, yellow, blue, black, etc.), faster curing versions, and versions that are softer and harder. Please contact us to discuss your application if you think such versions would be helpful for your application.

#### **APPLICATIONS & BENEFITS:**

- Conformal Coating of military, aerospace, and other high performance PWBs
- Excellent Mechanical & Dielectric Properties
- Can be applied by spray, dip, & brush
- Low Modulus for low stress on embedded components
- Base system for producing low outgassing, filled adhesives and coatings.
- Meets NASA outgassing requirements
- Repairable
- Meets Mil spec MIL-I-46058C type UR & IPC CC 830 Type UR class 3 requirements

<b>HANDLING PROPERTIES</b>		<u>VALUE</u>	<u>TEST METHOD</u>
Visual Appearance, Part A		Clear yellow to orange liquid	
Density, Part A		1.02 g/cm <sup>3</sup>	ASTM E-201
Viscosity, Part A, @ 25°C		15 cps	ASTM D-2393
Percent Solids (non-volatile %)		24% ± 2%	
Visual Appearance, Part B		Clear to translucent liquid	
Density, Part B		1.00 g/cm <sup>3</sup>	ASTM E-201
Viscosity, Part B, @ 25°C		120 cps	ASTM D-2393
Percent Solids (non-volatile %)		60% ± 3%	
Density Mixed, g/cm <sup>3</sup>		1.00 g/cm <sup>3</sup>	ASTM E-201
Viscosity Mixed @ 25°C		55 cps	ASTM D-2393
Mix Ratio By Weight (By Volume)		1A:2B (1A:2B)	Calculated
<u>Processing Temp.</u>	<u>Gel time</u>	<u>Tack Free time</u>	<u>Full Cure time</u>
25°C	4-6 hours	24-36 hours	7 days
65°C	60-90 minutes	3 - 4 hours	10 - 12 hours
100°C	30-45 minutes	2 – 2.5 hours	6 hours
125°C	20–30 minutes	1 – 1.5 hours	2 hours

## PHYSICAL PROPERTIES

	<u>VALUE</u>	<u>TEST METHOD</u>
Color	Translucent, light yellow to amber	Visual
Shore A Hardness	50	ASTM D-2240
Tensile Strength, psi	350 psi	ASTM D-638
Tensile Elongation at break	>150%	ASTM D-638
Glass Transition Temp. (Tg)	<-70°C	ASTM D-648
Coefficient of Thermal Expansion (CTE):		ASTM E-831
Below Tg / Above Tg	100 ppm/°C / 180 ppm/°C	
Maximum Suggested Continuous Use Temperature:	130°C	
Fungus Resistance	Non-Nutrient	Mil-I-46058C
Outgassing:		ASTM E-595
Total Mass Loss (TML) %	0.41%	
CVCM %	0.03%	
WVR %	0.01%	
Dielectric Strength @ 3 mil	>1500 V/mil	Mil-I-46058C
Insulation Resistance, ohms	>1.0 x 10 <sup>15</sup> ohms	Mil-I-46058C
Dielectric Constant @ 25C		ASTM D-150
@ 1 k Hz / 100 KHz	2.5 / 3.0	
Dielectric Constant @ 100C		ASTM D-150
@ 1 k Hz / 100 KHz	3.6 / 3.2	
Loss tangent @ 25C		ASTM D-150
@ 1 k Hz / 100 KHz	0.022 / 0.025	
Loss tangent @ 100C		ASTM D-150
@ 1 k Hz / 100 KHz	0.024 / 0.027	
Thermal Conductivity	0.22 W/mK	

**NOTE** : Values are based on laboratory or average production results – not for specification purposes.

### SUGGESTED PROCESSING GUIDELINES:

To use, weigh Part A and Part B in the recommended ratio as accurately as possible into a clean mixing container. Mixing containers should preferably be made of polypropylene, polyethylene, glass, or non-corroding metal. (Stainless steel, aluminum, etc.). Always use weighing equipment having accuracy that is ±1% or less of the smallest quantity that you will be weighing. Blend Part A & B thoroughly using a spatula or stirring stick for at least 2-3 minutes using a kneading motion. Scrape the bottom and sides of the mixing container carefully and frequently to produce a uniform mixture. Vacuum de-gassing after mixing may be helpful but is usually not necessary when working with the Ultralane 5770 system, simply letting the mixed material stand for 3-5 minutes will typically allow of the bubbles to rise to the surface and break on their own without the need for assistance.

Apply the coating to clean, dry surfaces. Two coats should be applied for optimum protection of parts. Allow enough time for each application to gel prior to applying the next layer. Allow solvent to escape at ambient temperatures for 15-30 minutes prior to elevated temperature curing. This will minimize bubble entrapment. An alternative to air drying and curing between layers is to place board in a 15-30mm Hg Vacuum for 5-10 minutes for a dense, bubble-free coating. Suitable application methods include brushing, dip coating, curtain coating and spraying.

## **Spraying Guidelines:**

Most spraying equipment can handle the low viscosity mixed Ultralane 5770 coating as supplied. It typically can be used in high and low pressure spray systems and even in air brushes without further modification. However if additional thinning is required, the Ultralane Thinner #25 is a suitable VOC exempt blend that is completely compatible with these coating.

Levels of 10 - 100 pbw Ultralane Thinner #25 to 100 pbw of the mixed 5770 coating can be used, but at levels higher than 50 pbw additional thinner per 100 pbw of the system the coating should be allowed to air dry for at least 1 hours prior to heat curing or should be dried at 30°C - 40°C for a minimum of 30 minutes prior to higher temperature curing.

## **Dip Coating Guidelines:**

Thoroughly mixed Ultralane 5770A/B can be used as-is for dip coating or can be thinned with Ultralane Thinner #25 to control coating thickness. Coating thickness depends upon amount of thinner added.

## **Stripping / Removal:**

Uncured or partially cured Ultralane 5770A/B can be removed with acetone, MEK, Ultralane Thinner, or other solvents. Fully cured Ultralane 5770A/B may be removed using the following mechanical or chemical methods.

**Mechanical removal:** Due to the soft, flexible nature of cured Ultralane 5770A/B, it may be easily cut with a sharp knife and then scraped or peeled from component leads, solder pads, and devices. Desolder and remove components, lightly sand down rough edges of intact coating, and wipe repair area clean with fresh isopropyl alcohol. Allow to dry 15 minutes then replace component and solder in place. Wipe clean all solder flux with cloth dipped in isopropyl alcohol and allow to dry at least 15 minutes at 80°C. Mix fresh Ultralane 5770A/B per instructions and apply to repair area with a clean, dry, acid brush or equivalent, making sure that fresh coating overlaps the intact coating. The repaired board may be put back into service after a 6 hour cure at 100°C (or alternative cure schedule).

**Note:** This procedure is not advised for other than field or temporary repair. Using a sharp knife to scrape the coating may also cause damage to the printed circuit board, circuitry, or other components.

**Chemical removal** Use Ultralane Stripper A/B for selective or total removal of cured compound.

**Important:** Laboratory tests indicate that if suggested procedures are followed, there will be little or no adverse effects to the printed circuit board or components. However, since each application is different, users should test a representative board that has been coated and fully cured to determine deleterious effects of stripper.

**Localized chemical removal:** Prepare printed circuit board by masking off area to remain intact. If possible, dam off repair area beyond component level to prevent the stripper from spreading to unwanted areas. Using an acid brush, apply generous amounts of Ultralane Stripper A/B over components in repair area. Do not allow to dry. Keep applying stripper until coating starts to swell and flake off (approximately 5–10 minutes). While keeping repair area saturated, periodically brush away loosened coating. If necessary, a blunt tool may be used to remove thick sections of coating. After 20 minutes exposure to stripper, drain board and allow to

dry. Scrape away any loose coating close to or under components. If further cleaning is necessary, apply fresh stripper and repeat process for an additional 15 minutes. Follow same procedure for underside of board. Remove masking/damning materials and replace defective parts. When removing part, scrape away any coating remaining beneath it prior to replacing. Remove flux and wash area with deionized water. Dry with isopropyl alcohol and dry board 2 hours at 80°C. Apply fresh Ultralane 5770A/B and follow recommended cure schedules.

**Total coating removal:** Place board into a container of Ultralane Stripper A/B . Agitation will increase stripper efficiency. For safety reasons, using Ultralane Stripper A/B at room temperature is preferable, but with proper ventilation and fire/explosion proof equipment heating the stripper up to as much as 50°C is possible and will reduce the time required to remove the coating. At room temperature, leave the circuit board in the Ultralane Stripper for 15 minutes. The coating will swell and start to fall off the board. Brush board with stiff brush Periodically while in bath. Remove PCB from stripper and inspect board after 15 minutes. Brush or scrape away any remaining coating. For thick or very old/oxidized coating sections, an additional immersion soak/brushing in fresh Ultralane Stripper may be necessary.

When coating is removed, replace defective components. Clean board with deionized water and isopropyl alcohol washes. Dry board for 2 hours at 80°C. Remove as much remaining coating as possible, although any unremoved coating will not adversely affect board performance. New Ultralane 5770A/B coating will encapsulate the old coating to seal and protect the board and components. Follow directions for applying and curing the Ultralane 5770A/B. (LV).

**Note:** Effectiveness of Ultralane Stripper A/B will decrease with use. See separate Ultralane Stripper technical datasheet & MSDS for additional usage and handling instructions. Do not use if amber color or other contaminants become visible. Use only explosion-proof equipment. Keep away from flame and sparks.

### **STORAGE GUIDELINES:**

Store this material in a clean, cool and dry environment in its tightly closed original container. Store away from Fire, sparks, and heat. Protect the Ultralane 5770A from extended exposure to temperature below 15°C (59°F). Crystallization may occur if the 5770A is exposed to cold for extended periods. If this occurs, heat the entire container of 5770A for 4 hours at 50°C to re-liquefy the crystals. Allow to cool to ambient temperature prior to using. Also protect the 5770B from exposure to moisture or high humidity. Tightly re-seal containers after use and blanket with dry nitrogen or another dry inert gas if available. If the recommended storage conditions are observed the products will have a minimum shelf-life of 12 months from the date of shipment.

### **HANDLING PRECAUTIONS:**

Mandatory and recommended industrial hygiene procedures should be followed whenever these products are being handled and processed. For additional information please consult the corresponding material safety data sheets.

### **PERSONAL HYGIENE:**

#### **Ultralane 5770A**

**WARNING! Flammable, contains organic isocyanate** May cause severe eye & skin irritation. Prolonged or repeated skin contact or inhalation of vapors may cause allergic skin or respiratory reactions. Harmful if inhaled or swallowed. Avoid contact with eyes, skin, or clothing. Wear eye protection and impervious gloves when handling. Wash thoroughly after handling. Avoid

breathing vapor or mist. Keep containers closed when not in use. Keep away from fire, sparks, or heat. Use only with adequate ventilation. Do not take internally.

## **Ultralane 5770B**

**WARNING! Flammable.** May cause severe eye & skin irritation. Prolonged or repeated skin contact or inhalation of vapors may cause allergic skin or respiratory reactions. Harmful if inhaled or swallowed. Avoid contact with eyes, skin, or clothing. Wear eye protection and impervious gloves when handling. Wash thoroughly after handling. Avoid breathing vapor or mist. Keep containers closed when not in use. Keep away from fire, sparks, or heat. Use only with adequate ventilation. Do not take internally.

## **FIRST AID**

In case of contact:

**Skin** – Immediately wash skin thoroughly with mild soap and water. Remove contaminated clothing and wash before reuse. Destroy contaminated shoes and other articles made of leather.

**Eyes** – Immediately flush eyes with plenty of water for 15 minutes and get prompt medical attention.

**Inhalation** - Remove person to fresh air. Administer oxygen or artificial respiration if necessary. Call a physician.

**Ingestion** - Do not induce vomiting. Dilute with plenty of water and contact physician immediately. Never give anything by mouth to an unconscious person.

## **DISCLAIMER:**

**IMPORTANT:** The following supersedes Buyer's documents. **SELLER / MANUFACTURER MAKES NO REPRESENTATION OR WARRANTY, EXPRESS OR IMPLIED, INCLUDING OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.** No statements herein are to be construed as inducements to infringe any relevant patent. Under no circumstances shall Seller / Manufacturer be liable for incidental, consequential or indirect damages for alleged negligence, breach of warranty, strict liability, tort or contract arising in connection with the product(s). Buyer's sole remedy and Seller's sole liability for any claims shall be Buyer's purchase price. Data and results presented are based on controlled or laboratory work and must be confirmed by Buyer by testing for its intended conditions of use. The product(s) has not been tested for, and is therefore not recommended for, uses for which prolonged contact with mucous membranes, abraded skin, or blood is intended; or for uses for which implantation within the human body is intended

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