Product Datasheet

SP&S Specialty Polymers and Services

Ultralane 785-1A/B

LOW OUTGASSING URETHANE CONFORMAL COATING

Ultralane 785-1A/B is a high performance conformal coating that meets NASA Low outgassing requirements, performs exceptionally well at cryogenic temperatures and has a low modulus and high flexibility to ensure low stress on embedded components. It has been formulated with VOC exempt solvent and has a longer shelf-life and ease of use than similar conformal coatings.

Ultralane 785-1A/B produces a soft elastomeric urethane coating that is designed specifically for insulating printed circuit boards and electronic components. Ultralane 785-1A/B is repairable and exhibits excellent reversion resistance under heat and high humidity. When fully cure it also provides very low outgassing properties that are suitable for critical for applications in space and high vacuum environments.

Ultralane 785-1A/B contains a fluorescent dye for optical inspection under black light. Hover the product can also be ordered without the fluorescent dye or with double the fluorescent dye by requests. In addition, opaque and transparent colored versions are also available in colors such as red, yellow, blue, and green. We can offer the coating with shorter curing times and in modified viscosities suitable for specialty applications. Please contact us to discuss your application if you think such a variant 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

HANDLING PROPERTIES	VALUE	TEST METHOD
Visual Appearance, Part A	Clear yellow to orange liquid	
Density, Part A	1.16 g/cm³	ASTM E-201
Viscosity, Part A, @ 25ºC	40 cps	ASTM D-2393
Percent Solids (non-volatile %)	80% ± 2%	
Visual Appearance, Part B	Clear to translucent liquid	
Density, Part B	0.98 g/cm³	ASTM E-201
Viscosity, Part B, @ 25ºC	500 cps	ASTM D-2393
Percent Solids (non-volatile %)	80% ± 2%	
Density Mixed, g/cm³	1.00 g/cm³	ASTM E-201
Viscosity Mixed @ 25ºC	550 cps	ASTM D-2393
Mix Ratio By Weight (By Volume)	20A:100B (17.5A:1000B)	Calculated

Processing Temp.	Gel time	Tack Free time	Full Cure time
25ºC	4 hours	24 hours	7 days
65ºC	60-90 minutes	3 - 4 hours	10 - 12 hours
100ºC	30-45 minutes	2 – 2.5 hours	6 hours
125ºC	20–30 minutes	1 – 1.5 hours	2 hours

PHYSICAL PROPERTIES	VALUE	TEST METHOD
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)	-69ºC	ASTM D-648
Coefficient of Thermal Expansion (CTE):		ASTM E-831
Below Tg / Above Tg	100 ppm/ºC / 180 ppm/ºC	
Maximum Suggested Continuous Use Temperature:	130ºC	
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^{15} ohms	Mil-I-46058C
Dielectric Constant @ 25ºC		ASTM D-150
at 1 k Hz / 100 KHz	2.5 / 3.0	
Dielectric Constant @ 100ºC		ASTM D-150
at 1 k Hz / 100 KHz	3.6 / 3.2	
Loss tangent @ 25ºC		ASTM D-150
at 1 k Hz / 100 KHz	0.022 / 0.025	
Loss tangent @ 100ºC		ASTM D-150
at 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. If desired, add additional thinner after the A & B components are thoroughly mixed. Ultralane Thinner #25 is compatible with this coating and is also a VOC exempt thinner.

Apply the coating to clean, dry surfaces. Two or more thin coats will provide the optimum protection of parts. Typically the final coating layer will be 2 – 5 mils in thickness, but for some applications thinner and thicker coating layers may be acceptable and even desirable. Allow enough time for each coating layer to gel prior to applying the next layer. Allow solvent to escape at ambient temperatures for at least 15-30 minutes prior to elevated temperature curing as this will minimize bubble entrapment. An alternative to air drying between layers is to place the coated board in a 15-30mm Hg Vacuum for 5-10 minutes or into an oven at 40ºC for about

15 – 20 minutes or until the coating is gelled. The most common application method is spraying, but dip coating, curtain coating, and brush coating are also possible.

Spraying Guidelines:
Some high pressure spray systems are able to apply the high-solids Ultralane 785A/B as supplied and in layers of as much as 8 mils thickness per pass. For conventional sprayer, for use in air brushes or to obtain a lower build per pass, Ultralane thinner #25 can be added to reduce the viscosity of the coating. Start by adding 20 part by weight (pbw) of Ultralane thinner to 100 pbw of the mixed Ultralane 785-1A/B and incrementally add additional thinner as needed to determine the optimum level for use with your spraying equipment.

Dip Coating Guidelines:
Thoroughly mixed Ultralane 785-1A/B can be used as-is for dip coating or can be thinned with Ultralane Thinner #25 to control coating thickness and improve coating bath life. Coating thickness depends upon amount of thinner added. With no thinner coating thickness of about 2-3 mils per dip are typically achieved. With 20 parts by weight (pbw) of Ultralane Thinner #25 to 100 pbw mixed 785-1A/B each dip coating layer will apply about 1 – 1.5 mils in thickness. For best results, allow mixed 785-1A/B or 785-1A/B with thinner to stand for 10-30 minutes prior to using to allow any bubbles in the mixture to rise and break before using the dipping bath.

Stripping / Removal:
Uncured or partially cured Ultralane 785-1A/B can be removed with acetone, MEK, Ultralane Thinner #25, and other solvents. Fully cured Ultralane 785-1A/B may be removed using the following mechanical or chemical methods.

Mechanical removal: Due to the soft, flexible nature of cured Ultralane 785-1A/B, it may be 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 80ºC. Mix fresh Ultralane 785-1A/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 100ºC (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 if the stripper will have any negative effects on their boards.

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 80ºC. Apply fresh Ultralane 785-1A/B and follow recommended cure schedules.

Total coating removal: Place board(s) 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 40ºC 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 80ºC. Remove as much remaining coating as possible, although any unremoved coating will not adversely affect board performance. New Ultralane 785-1A/B coating will encapsulate the old coating to seal and protect the board and components. Follow directions for applying and curing the Ultralane 785-1A/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 785-1A from extended exposure to temperature below 15ºC (59ºF). Crystallization may occur if the 785-1A is exposed to low temperatures for extend periods. If this occurs, heat the entire container of 785-1A for 4 hours at 50ºC to re-liquefy the crystals. Allow the containers to cool to ambient temperature prior to using. Also protect the 785-1A&B components 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 785-1A

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 785-1B
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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