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DESCRIPTION

Luna XPN1 is a two component (2K) epoxy formulation with application properties, pot life, and cure time similar to traditional 2K structural adhesives. XPN1 is suitable for use with bare and treated aluminum alloy, titanium alloy, and carbon composites. The adhesive demonstrates comparable aluminum lap shear strength to high strength epoxy paste adhesives and exhibits very low bond resistance.

Luna XPN1 is a nickel-filled system with viscosity comparable to typical structural paste adhesives. It is suitable for injection bonding, butter bonding, and some filling/potting applications. It has also been demonstrated for use in bonding applications for ESD protection and EMI shielding, and possibly lightning strike.

Features:

- Mechanical strength of structural adhesives
- Electrical conductivity of common conductive adhesives
- Room temperature cure
- Low outgassing
- Improved corrosion performance
- Allows for increased assembly and repair speed
- Injection bonding, butter bonding and potting applications
- Long pot life



CURING

Bonded parts should be held in contact with light pressure until the adhesive is set. Handling strength will occur in 24 hours @ 77°F/25°C, after which the applied pressure may be removed. Since full bond strength has not yet been attained, load application should be small at this time.

Room Temperature Cure – Bonded parts may be cured for 3 to 5 days @ 77°F/25°C to achieve normal performance.

Elevated Temperature Cure – Accelerated cure may be achieved by heating bonded parts for 2 hours @ 150°F/66°C.

SURFACE PREPARATION

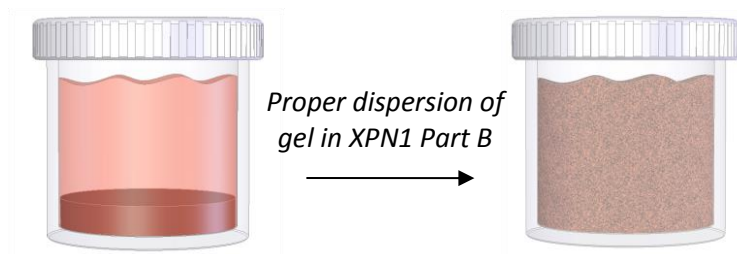
Bonding surfaces should be clean, dry and properly prepared. Prepare surfaces in a similar manner as for typical structural paste adhesives.

MIXING

The Part A resin requires an appropriate amount of corresponding Part B curative (see mix ratios at bottom of this section). When mixing Part A and Part B components, a total quantity no less than five grams is required to ensure optimal adhesive performance is attained. Mixed XPN1 adhesive exhibits a viscosity of 970 Poise prior to curing.

IMPORTANT! Adhesive mixing should be performed using the following steps:

- 1) The XPN1 Part B components must be mixed thoroughly prior to each use. A thin layer of gelatinous precipitate in the bottom of the Part B container must be agitated and dispersed into the solution, as depicted below. Thoroughly mix Part B components using mechanical agitation; common spatula mixing is recommended. An appropriate amount of homogeneous mixed Part B is to be combined with the desired Part A.



NOTE: *Re-dispersion of gel into XPN1 Part B solution required prior to each use*

- 2) DO NOT mix Part A components prior to use.
- 3) Gently knead together appropriate amounts of Part A and corresponding Part B components to form a paste. Once paste is formed continue to knead until Part A and Part B components are entirely blended together. A total hand mixing time of 1-2 minutes should be sufficient.

<u>Luna XPN1</u>	<u>Mix Ratio</u>	<u>Part A</u>	<u>Part B</u>
	By Weight	100	24.5

IMPORTANT! Heat buildup during or after mixing is expected. Do not mix quantities greater than 450 grams as dangerous heat buildup can occur causing uncontrolled decomposition of the mixed adhesive and the liberation of toxic fumes. Mixing smaller quantities will minimize heat buildup.

HANDLING PRECAUTIONS

Do not handle or use until the Material Safety Data Sheet has been read and understood.

STORAGE AND WASTE DISPOSAL

Storage information is given on the Material Safety Data Sheet for each adhesive component. The expected shelf life of the adhesives is 6-months from the date of production when stored in the original containers at room temperature. The pot life of the mixed adhesives is estimated to be approximately 60 minutes.

BOND STRENGTH PROPERTIES

Tensile lap shear strength measured per ASTM D1002 in accordance with MMM-A-132B. Type I, Class 3, Form P specifically defines heat resistant paste adhesives for use in bonding primary and secondary structural and external metallic airframe parts – same classification as Hysol EA9396/9394.

<u>Test Temperature / After Exposure to</u>	<u>Typical Results</u>	
	<u>psi</u>	<u>MPa</u>
75°F	5100	35.2
10 min at 180°F	3090	21.3
10 min at -67°F	3065	21.1
75°F / 30 days at 120°F & 95-100% RH	4764	32.8
75°F / 7 days immersion in hydraulic oil & turbine fuel	4494	31.0
75°F / 30 cycles between -300°F and +300°F	2870	19.8

Tensile lap shear strength measured per ASTM D1002 on conductive substrates. Adhesives have demonstrated performance on M55J-RS3C carbon composite similar to Hysol EA9394. Metallic substrates may be treated with Alodine 600 or AC-130 prior to adhesive application to maintain conductivity.

<u>Conductive Substrate / Test Temperatures</u>	<u>Typical Results</u>	
	<u>psi</u>	<u>MPa</u>
M55J/RS3C Carbon Fiber Composite / 75°F	2277	15.7
AC-130 treatment on AA2024-T3 / 75°F	2730	18.8

Ultimate shear stress measured per ASTM D5656. Tests conducted on lap samples of phosphoric acid anodized and primed AA2024-T351 substrates. Average coupon bond thickness was 0.035-0.040”.

<u>ASTM D5656 Test Temperature</u>	<u>Typical Results</u>	
	<u>psi</u>	<u>MPa</u>
-250 ± 10°F	3787	26.1
72 ± 10°F	5245	36.2
250 ± 10°F	1843	12.7

ELECTRICAL/PERFORMANCE PROPERTIES

<u>Performance Property</u>	<u>Typical Results</u>
Thin Bond Resistance, 5mil (per ASTM D2739)	0.08 Ω
Thick Bond Resistance, 20 mil (per ASTM D2739)	0.09 Ω
Volume Resistivity (per ASTM D2739)	50 Ω-cm
Total Mass Loss (per ASTM E595)	0.82%
Collected Volatile Condensable Matter (per ASTM E595)	<0.01%
Thermal Conductivity*	0.5 W/mK

* measured on cured samples using a Hot Disk Thermal Constants Analyzer

This data sheet provides users with typical properties obtained from this adhesive. These values are not meant to be used to develop aerospace QC acceptance testing.