

# LORD® 3170 Epoxy Adhesive

## Technical Data Sheet

LORD® 3170 adhesive is an equal-mix, two-component epoxy structural adhesive system used to bond metals, glass, reinforced plastics, ceramics and foam materials for cryogenic applications. This adhesive system can be either room temperature cured or heat cured for faster processing.

### Features and Benefits:

**Durable in Cold Environments** – provides high strength for applications where the bonded assembly is exposed to cryogenic temperatures.

**Minimal Outgassing** – provides minimal outgassing suitable for aerospace applications.

### Application:

**Surface Preparation** – Remove soil, grease, oil, fingerprints, dust, mold release agents, rust and other contaminants from the surfaces to be bonded by solvent degreasing or alkaline cleaning.

Etch aluminum alloys with a sodium dichromate-sulfuric acid to obtain optimum mechanical strength.

Handle prepared surfaces carefully to avoid contamination. Assemble as soon as possible.

**Mixing** – Thoroughly mix equal parts of the resin and hardener, by volume, until uniform in color and consistency. Be careful not to whip excessive air into the adhesive system. Handheld cartridges will automatically dispense the correct volumetric ratio of each component.

Heat buildup due to an exothermic reaction between the two components will shorten the working time of the adhesive. Mixing smaller quantities will minimize heat buildup. Do not use any adhesive that has begun to cure.

**Applying** – Apply the mixed adhesive to bond surfaces using handheld cartridges or any convenient tool such as a stiff brush, spatula or trowel. For general use, a film thickness of approximately 0.002-0.003 inch (0.05-0.07 mm) is recommended. When bonding foam insulation materials to solid substrates, apply the mixed adhesive to a film thickness of 0.01 inch (0.25 mm).

Join the parts in such a way as to avoid entrapped air. Apply only enough pressure to ensure good wetting of the adhesive on both surfaces. Squeezing a little adhesive out at the edges is usually a sign of proper assembly. It is not necessary to clamp the assembly unless movement during adhesive cure is likely.

Maximum adhesion will occur only with parts which mate well without the need for excessive clamping pressure during cure. Excessive clamping may squeeze too much adhesive from the bond area which can result in a poor bond.

### Typical Properties\*

	3170-A Resin	3170-B Hardener
Appearance	Milky White Liquid	Amber Liquid
Viscosity, cP @ 77°F (25°C)	30,000 - 70,000	90,000 - 170,000
Density lb/gal (kg/m <sup>3</sup> )	9.5 (1138)	8.1 (971)
Flash Point, °F (°C) Setaflash Closed Cup	>201 (>93)	>201 (>93)

\*Data is typical and not to be used for specification purposes.



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**Curing** – LORD 3170 adhesive will cure to full strength in 4 days at 75°F (24°C). Cure rate can be accelerated by applying elevated temperatures. Mechanical properties and bond strength are improved with a postbake cure of 1 hour at 212°F (100°C).

**Cleanup** – Clean excess adhesive on the bonded assembly, as well as the equipment, prior to the adhesive cure with hot water and detergent or an organic solvent such as ketones. Once adhesive has cured, heat the adhesive to 400°F (204°C) or above to soften the cured adhesive. This allows the parts to be separated and the adhesive to be more easily removed. Some success may be achieved with commercial epoxy strippers.

## Shelf Life/Storage:

Shelf life is two years from date of manufacture when stored at 60-80°F (16-27°C) in original, unopened container.

## Cautionary Information:

Before using this or any Parker LORD product, refer to the Safety Data Sheet (SDS) and label for safe use and handling instructions.

*For industrial/commercial use only.* Must be applied by trained personnel only. Not to be used in household applications. Not for consumer use.

### Typical Properties\* of Resin Mixed with Hardener

Mix Ratio by Volume, Resin to Hardener	1:1
Solids Content, %	100
Working Time, hours @ 75°F (24°C)	2
Time to Handling Strength, hours	24
Mixed Appearance	Light Amber Paste
Cured Appearance	Yellow to Honey-colored

\*Data is typical and not to be used for specification purposes.

### Typical Cured Properties\*\*

Hardness Shore D	70
Coefficient of Linear Thermal Expansion, in/in/°F -423°F to 32°F (-253°C to 0°C)	$3 \times 10^{-5}$
Outgassing ASTM E-595-84	
Total Mass Loss (TML), %	1.47
Collected Volatile Condensable Materials (CVCM), %	0.02

\*\*Data is typical and not to be used for specification purposes. Cured for 24 hours at room temperature, followed by 1 hour @ 149°F (65°C) with 10 psi pressure.

**Bond Performance\*\***

Condition	-299°F (-184°C)	-99°F (-73°C)	Room Temperature	+165°F (+74°C)
Lap Shear Strength, psi (MPa)	3100 (22.4)	3300 (22.8)	2500 (17.2)	600 (4.1)
Lap Shear Strength after 30 days Humidity Exposure, psi (MPa)	2700 (18.6)	2800 (19.3)	2500 (17.2)	650 (4.5)
Lap Shear Strength after 20 days Salt Spray Exposure, psi (MPa)	2900 (20.0)	2900 (20.0)	2900 (20.0)	900 (6.2)

**Lap Shear Specimens**

Test Specimen	Fabricated from 0.064" thick, 2024T3 clad aluminum, 1" wide, with 1/2" overlap
Humidity Exposure	Specimens conditioned in a counter-flow humidity cabinet for 720 hours at a relative humidity of 100%, and temperature of 165°F (74°C)
Salt Spray Exposure	Specimens conditioned in a salt spray cabinet with saturated salt spray vapor for 30 days, in accordance with MIL-A-005090C and Federal Test Standard 51

Condition	-423°F (-253°C)	-320°F (-195°C)	-67°F (-55°C)	Room Temperature	+125°F (+52°C)	+180°F (+82°C)
Tensile Shear Strength, psi (MPa)	2500 (17.2)	3200 (22.1)	2500 (17.2)	3000 (20.7)	1000 (6.9)	500 (3.4)
T-Peel Strength, pli (N/mm)	0 (0)	3 (0.53)	3 (0.53)	5 (0.88)	7 (1.23)	1 (0.18)
Butt Tensile Strength, psi (MPa)	5800 (40.0)	5500 (37.9)	3900 (26.9)	3000 (20.7)	1200 (8.3)	800 (5.5)

**Test Specimens**

Tensile Shear	0.064" 7075T6 bare aluminum alloy with 1/2" overlap; tested per MIL-A-5090D
T-Peel	0.020" 7075T6 bare aluminum alloy 1" x 12" strips with total overlap; tested at head travel of 2 in/min
Butt Tensile	075T6 bare aluminum alloy; Federal Test Method Standard 175; Methods 1051 and 1051.1T

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Values stated in this document represent typical values as not all tests are run on each lot of material produced. For formalized product specifications for specific product end uses, contact the Customer Support Center.

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