



305

General Purpose, Medium Viscosity, Two-Part, Epoxy Adhesive

Description

Lord® 305 adhesive is a general purpose, medium viscosity, two-part, epoxy that is used for applications that require strong, durable, chemically and environmentally resistant bonds. It provides excellent adhesion to prepared metals, FRP, phenolic, wood, prepared rubber, and other materials. Lord 305 adhesive is used to bond cured rubber to itself and rubber to metal. This includes gaskets, bushings, shock-absorbing devices and rubber rolls.

Features and Benefits

Contains No Solvents - allows for a nonflammable and virtually odorless adhesive.

High Strength - provides load bearing properties equal to or greater than the materials being bonded.

Environmental Resistance - resists dilute acids, alkalis, solvents, greases, oils, moisture, sunlight, and weathering. Temperature resistant from -34°C to 121°C (-30°F to 250°F).

Variable Cure - cures completely at room temperature or more quickly at elevated temperatures.

Excellent Engineering Properties - provides low shrinkage, good creep properties, and low water absorption.

Flexible Mix Ratio - accommodates a range of service temperatures and stress loads through modification of the resin-to-hardener mix ratio.

Typical Properties* of Uncured Lord 305 Adhesive

	Lord 305-1	Lord 305-2	Mixed
Appearance	Clear Amber Syrup	Blue Heavy Syrup	Blue Syrup
Viscosity, cps @ 25°C (77°F) Brookfield (HBF, #2, 10 rpm)	10,000-18,000	20,000-45,000	N/A
Density kg/m ³ lb/gal	1130 - 1203 9.4 - 10	932 - 1004 7.75 - 8.35	N/A N/A
Flash Point (closed cup)	>93°C (>200°F)	>93°C (>200°F)	>93°C (>200°F)
Total Reactive Solids Content	100%	100%	100%
Working Time 54g mass @ 24°C (75°F)	N/A	N/A	1 - 2 Hours
Handleable Bonds	Temperature Dependent		
General Purpose Mix Ratio by Weight by Volume	1.2 1	1 1	N/A N/A
Shelf Life From date of shipment, stored at 25°C (77°F), in original, unopened container	1 Year	1 Year	N/A

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

Surface Preparation

Remove soil, grease, oil, fingerprints, dust, mold release agents, rust, and other contaminants from substrate surfaces.

Vapor degrease or wipe the surfaces with a clean cloth soaked in an uncontaminated ketone or chlorinated solvent and allow to dry thoroughly. If a solvent cannot be used, substitute a detergent solution or, for metals only, a suitable alkaline degreasing agent following the manufacturer's instructions for use. Wear chemical resistant gloves.

Next, use an abrasive material to roughen the surfaces or remove tarnish if necessary. Abrasion should always be followed by a second degreasing which will ensure removal of loose particles.

Glass and ceramic surfaces that have been primed with Lord AP134 primer exhibit superior environmental resistance. Cured rubber should first be primed with Lord 7701 surface treatment. Prime metal surfaces with Lord 7714 primer.

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

Mixing

Nonautomated

Measure the resin and hardener to meet the service temperature needs, then joint the design (See Table 2). Thoroughly mix the components until uniform in color and consistency. Be careful not to whip excessive air into the adhesive.

Heat buildup, due to an exothermic reaction between the two components, will shorten the potlife of the adhesive. Mix smaller quantities or spread the mixing operation over a large surface area to minimize heat buildup. Do not use any adhesive that has begun to set.

Automated

Lord 305 adhesive is available in Lord-Pak™ packaging systems for convenient mixing and application. Lord-Pak systems eliminate the waste involved in hand mixing and application, without the capital investment of meter/mix/dispense equipment. However, Lord 305 adhesive can be dispensed using meter/mix/dispense equipment.

Application

Use a stiff brush, spatula, or notched trowel to apply the mixed adhesive. Spread the adhesive on one or both of the surfaces to be bonded. A film thickness of approximately 20 one-thousandths of an inch (~0.020" or ~0.5mm) is suggested. The addition of a small amount of solid glass beads to the mixed adhesive is a convenient way to control the thickness of the bondline.

Parts Assembly

Join the parts, avoiding 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 set-up is likely. Excessive clamping pressure will create a poor bond.

Curing

Elevated temperature cures produce the highest bond strengths and impact resistance. Precise recommendation of cure times and temperatures are difficult because heat transmission varies considerably, depending upon material composition and heating methods.

The adhesive will cure fully in 24-48 hours with the handling strength in 8-16 hours, provided that the adhesive, substrates, and ambient temperature are 18°C (65°F) or higher.

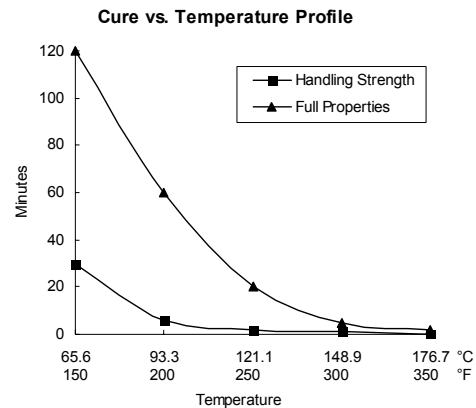


Table 2: Mix Ratios for Lord 305 Adhesive

Service Temperature	High Temperature 10°C to 121°C (50°F to 250°F)	General Purpose -34°C to 121°C (-30°F to 250°F)	Low Temperature -40°C to 38°C (-40°F to 100°F)
Mix Ratio			
by Weight	2.4:1	1.2:1	1:1.7
by Volume	2:1	1:1	1:2
Joint Design	Shear Stress	Mixed Stress	Peel Stress

Table 3: Typical Properties of Cured Lord 305 Adhesive Mixed 1:1 by Volume, RT Cure*

	Values	Units	Test Method
Hardness	78	Shore D	Lord TM 23B
Tensile Strength	2490	psi	ASTM D882-83A (mod)
Elongation at Break	31	%	ASTM D882-83A (mod)
Young's Modulus	1108,500	psi	ASTM D882-83A (mod)
Water Absorption	0.43	%	ASTM D570-81 (24 hour immersion)
Glass Transition Temperature (T _g)	61 (141)	°C (°F)	ASTM E1640-99 (by DMA)
Coefficient of Thermal Expansion above T _g	365 x 10 ⁻⁶	mm/mm°C	Lord Internal Method (by DMA)

Table 4: Bond Performance Data

Substrates	Cold Rolled Steel to Cold Rolled Steel Lap Shear	Aluminum to Aluminum Lap Shear	SMC to SMC Lap Shear	Natural Rubber to Cold Rolled Steel 45° Peel	SBR to SBR T-Peel
Room Temperature	2240 psi A	1890 psi 36C/A	820 psi FT	37 lbs/in 58R/A	84 lbs/in R
Hot Strength at 85°C (180°F)	1100 psi A	1040 psi A	490 psi 13FT/A	24 lbs/in 44R/A	N/A
24 Hour Recovery After 7 Days in H ₂ O	2630 psi A	1840 psi A	600 psi FT	33 lbs/in 13R/A	83 lbs/in SB
14 Days Salt Spray Exposure, Test Immediately	2500 psi A	1790 psi A	610 psi 100FT	N/A	110 lbs/in 83R/SB
14 Days at 38°C (100°F), 100% Relative Humidity, Test Immediately	2740 psi A	2010 psi A	660 psi FT	41 lbs/in 50R/A	94 lbs/in 83R/SB
Test at -34°C (-30°F)	2490 psi A	1600 psi A	720 psi FT	60 lbs/in 85R/A	78 lbs/in R

Surface Preparations	Substrate	Surface Treatment
	Cold Rolled Steel and Aluminum Sheet Molding Compound (SMC) Styrene Butadiene Rubber (SBR) Natural Rubber	MEK Wipe, Grit Blast, MEK Wipe 320 Grit Sandpaper, Dry Rag Wipe Primed with Lord 7701 Primer Primed with Lord 7701 Primer

Bond Parameters	Bond Area	Film Thickness	Cure	Mix Ratio	
Metal Lap Shears	1.0"x0.5"	0.010"	72 hr. @ RT	1:1 by wt.	All values represent an average of 5 test samples.
SMC Lap Shears	1.0"x1.0"	0.030"	72 hr. @ RT	1:1 by wt.	
T-Peels	1.0"x3.0"	0.020"	72 hr. @ RT	1:1 by wt.	
45° Peels	1.0"x1.0"	0.020"	72 hr. @ RT	1:1 by wt.	

Failure Mode Key

Abbreviation	R	FT	A	C	SB
Definition	Rubber Failure	Fiber Tear	Adhesive Failure	Cohesive Failure	Stock Break

*Data is typical and not to be used for specification purposes. Physical properties may vary depending on mix ratio, degree of cross-link, and cure method, as well as other parameters.

Table 5: Coverage Information of Lord 305 Adhesive

Square Coverage by Wet Film Thickness					Linear Coverage by Bead Diameter									
Wet Film Thickness		Per Gallon		~Gals. Required Per 1000 Sq. Ft. (93 Sq. M)	Bead Diameter		Per Gallon		Per Lord-Pak 50		Per Lord-Pak 200		Per Lord-Pak CX	
mils	mm	Sq. Ft.	Sq. M		In.	mm	Ft.	M	Ft.	M	Ft.	M	Ft.	M
5	0.13	320	29.7	3.1	1/16	1.59	6100	1800	82	25	330	100	630	192
10	0.25	160	14.9	6.5	1/8	3.18	1500	457	20	6.0	82	25	160	48.7
20	0.51	80	7.4	12.5	3/16	4.76	690	210	8.5	2.5	35.5	10.8	68	20.7
30	0.76	52	4.8	20	1/4	6.35	375	114	4.5	1.3	19	5.8	38.5	11.7
31.25*	0.79	50	4.6	20	3/8	9.52	165	50	2	0.6	8.5	2.6	16	4.8
40	1.02	40	3.7	25	1/2	12.7	95	29	-	-	4.5	1.3	8.5	2.6
60	1.52	26	2.4	40	3/4	19.0	35	11	-	-	2	0.6	3.5	1.0
62.5**	1.59	25	2.3	40	7/8	22.2	30	9	-	-	-	-	2.5	0.7
125***	3.18	12	1.1	80	1	25.4	22	7	-	-	-	-	1	0.3

All values are approximate; not for specification purposes.

*1/32 in.

**1/16 in.

***1/8 in.

1 mil. = 0.001 inch

Clean Up

Uncured Adhesive

Remove excess adhesive on the bonded assembly, as well as mixing and application equipment, before the adhesive sets up. Use hot water and detergent or an organic solvent; ketones have been shown to work best.

Cured Adhesive

Removing cured Lord 305 adhesive is difficult because of its resistance to chemicals, solvents, and cleaning agents. Heat to 204°C (400°F) or greater to soften the 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.

Values stated in this bulletin 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 Service Department.

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Subsequent Processing

After the adhesive has been cured, it can be filed, sanded, machined, or otherwise handled in the same way as a light metal. Paints, lacquers, enamels, and other coatings can be applied without danger of solvent attack.

Packaging

- 1/2 Pint Container (0.24 Liter)
- 1 Pint Container (0.47 Liter)
- 5 Gallon Pail (19 Liter)
- 55 Gallon Drum (208 Liter)
- Lord-Pak™ Systems, 50ml, 200ml

Storage

Ship and store Lord 305 adhesive in the original container @ 4°C - 27°C (40°F - 80°F).

Cautionary Information

Before using this or any Lord product, refer to the Material Safety Data Sheet (MSDS) 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.

For information, contact Bergdahl Associates, Inc.
2990 Sutro Street
Reno, Nevada 89512-1616
775-323-7542 fax 775-323-7595.

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