LORD® 320/310-B AND 320/310-B BLACK EPOXY ADHESIVES

Technical Data Sheet

LORD® 320/310-B and 320/310-B Black adhesives are two-component epoxy adhesive systems used to bond cured rubber treated with LORD 7701 adhesion enhancer/surface modifier. These adhesive systems also bond metals and plastics, both thermosets and thermoplastics.

Features and Benefits

Fast Cure: rapidly cures when heated at 200-325°F (93-162°C).

Durable: provides good impact resistance down to -40°F (-40°C).

Environmentally Recommended: contains no solvent, nonflammable and virtually odorless.

Environmentally Resistant: resists humidity, salt spray and temperature extremes.

High Temperature Resistant: resists postbakes up to 400°F (204°C).

Chemically Resistant: solvent resistant when cured; anti-corrosion processes including phosphatizing and ELPO (e-coat) coatings do not affect the adhesive or its bond strength.

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.

On metal surfaces which are free of oxidation, use an isopropyl alcohol wipe. If necessary, use an abrasive material to remove tarnish. Always follow abrasion by a second cleaning to ensure removal of loose particles.

When bonding cured rubber, allow LORD 7701 adhesion enhancer/surface modifier to flash off before applying LORD 320/310-B or 320/310-B Black adhesive. Prime glass and ceramic surfaces with LORD AP-134 adhesion enhancer/surface modifier to promote adhesion.

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

Typical Properties*

	320 Resin	310-B Hardener	310-B Black Hardener
Appearance	Off-white Paste	Grey Paste	Black Paste
Viscosity, cP @ 77°F (25°C) Brookfield HBF Helipath, 5 rpm	300,000 - 1,000,000	230,000 - 690,000	200,000 - 700,000
Density lb/gal (kg/m^3)	 12.5 - 12.9 (1498 - 1546)	 10.0 - 11.0 (1198 - 1318)	 10.3 - 11.0 (1234 - 1318)
Flash Point (Seta), °F (°C)	>200 (>93)	>200 (>93)	>200 (>93)

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

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Mixing: Thoroughly mix the proper amount of resin and hardener 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. Adhesive properties such as hardness and flexibility can be varied by changing the mix ratio.

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 in bead form. Use automatic meter/mix/dispense equipment for large applications. For small applications, use handheld cartridges or a disposable paper cone to apply the adhesive in a continuous bead. For general use, a film thickness of approximately 0.02-0.03 inch (0.51-0.76 mm) is recommended. To control bondline thickness, a small amount of solid glass beads can be added into the mixed adhesive.

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.

Curing: LORD 320/310-B and 320/310-B Black adhesive will cure to full strength in approximately 24 hours at room temperature.

Higher temperatures will provide faster cure times; however, the bondline temperature should not exceed 325°F (162°C). When heated at 150°F (66°C), full cure strength can be obtained in 2.5 hours; when heated at 200°F (93°C), full cure strength can be obtained in 25 minutes; when heated to 250°F (121°C), full cure strength can be obtained in 15 minutes. Elevated temperature cure produces the highest bond strengths and impact resistance. Firm recommendations of cure times and temperatures depend on material composition and heating methods.

Once the adhesive has cured, it can be filed, sanded, machined or otherwise handled in the same way as a light metal. Paint, lacquers, enamels and other coatings can be applied to cured adhesive.

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.

Typical Properties* of Resin Mixed with Hardener

	320/310-B	320/310-B Black
Mix Ratio,Resin to Hardener		
by Volume	1:1	1:1
by Weight	1:2.1	1:2.1
Solids Content, %	100	100
Working Time, hours	0.5-1	0.5-1
Time to Handling Strength, hours	6-8	6-8
Mixed Appearance	Grey Paste	Black Paste
Cured Appearance	Grey	Black

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Bond Performance*

Substrates	CRS to CRS Lap Shear, psi (MPa)	AL to AL Lap Shear, psi (MPa)	SMC to SMC Lap Shear, psi (MPa)	NR to CRS 45° Peel, pli (N/mm)	SBR to SBR T-Peel, pli (N/mm)
Test @ Room Temperature	3017 (20.8)	2258 (15.6)	583 (4.0)	45 (7.8)	28 (4.9)
Failure Mode	C	C	FT	C	A
Test @ Hot Strength, 180°F (82°C)	2252 (15.5)	2213 (15.3)	612 (4.2)	63 (11.1)	40 (7.0)
Failure Mode	C	C	FT	SF	SF/C
Test after 7 days in H_2O @ 130°F (54°C) Test after 24 hours	2759 (19.0)	2811 (19.4)	567 (3.9)	92 (16.2)	26 (4.5)
Failure Mode	C	C	FT	SF	A
Test after 14 days Salt Spray Exposure Test immediately	2574 (17.7)	2452 (16.9)	555 (3.8)	39 (6.8)	31 (5.4)
Failure Mode	C	C	FT	SF	SF/A
Test after 14 days @ 100°F (38°C), 100% RH Test immediately	3084 (21.3)	2594 (17.9)	542 (3.7)	42 (7.3)	30 (5.2)
Failure Mode	C	C	FT	SF	SF/A
Test @ -30°F (-34°C)	3225 (22.2)	2093 (14.4)	657 (4.5)	36 (6.3)	27 (4.7)
Failure Mode	C	C	FT	SF	A

Substrate	Surface Treatment
Cold Rolled Steel (CRS) and Aluminum (AL)	MEK Wipe, Grit Blast, MEK Wipe
Sheet Molded Compound (SMC)	320-grit Sandpaper, Dry Rag Wipe
Styrene Butadiene Rubber (SBR)	Primed with LORD 7701 Adhesion Enhancer/Surface Modifier
Natural Rubber (NR)	Primed with LORD 7701 Adhesion Enhancer/Surface Modifier

Bonded Parameters	Bond Area	Film Thickness	Cure	Mix Ratio
Metal Lap Shears	1.0"x3.5"	0.010"	72 hr @ RT	1:1 by Volume
SMC Lap Shears	1.0"x3.5"	0.030"	72 hr @ RT	1:1 by Volume
45° Peels	1.0"x1.0"	0.020"	72 hr @ RT	1:1 by Volume
T-Peels	1.0"x3.0"	0.020"	72 hr @ RT	1:1 by Volume

Failure Mode Definition	Abbreviation
Adhesive Failure	A
Cohesive Failure	C
Fiber Tear	FT
Sub Failure	SF

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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.

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