

LORD® 403, 406 and 410 Acrylic Adhesives with LORD Accelerator 19 or 19GB

Description

LORD® 403, 406 and 410 acrylic adhesives in combination with LORD Accelerator 19 or 19GB replace welding, brazing, riveting and other mechanical fastening methods especially in low-temperature environments subject to high impact or high peel loads. LORD 403, 406 and 410 acrylic adhesives are available in a range of working times to accommodate a wide variety of process requirements.

LORD 403, 406 and 410 acrylic adhesives when mixed with LORD Accelerator 19 or 19GB create adhesive systems that will bond a wide variety of prepared or unprepared metals and engineered plastics. The adhesive systems are specifically formulated to provide the highest impact and peel strengths available in a room temperature curing adhesive.

LORD 403, 406 and 410 acrylic adhesives can be mixed with either LORD Accelerator 19 or LORD Accelerator 19GB. LORD Accelerator 19 improves the high temperature resistance of LORD 403, 406 and 410 acrylic adhesives, and is available in off-white or black.

LORD Accelerator 19GB allows precise control of the adhesive bondline thickness due to its content of glass beads. LORD Accelerator 19GB is available in off-white, red or gray. For further detailed information, refer to the LORD Accelerator 19 and 19GB data sheet.

Features and Benefits

Versatile – bonds a wide range of unprepared metals with minimal substrate preparation; bonds difficult plastics such as XENOY®.

Temperature Resistant – performs at temperatures from -40 to +300°F (-40 to +149°C).

Environmentally Resistant – resists dilute acids, alkalis, solvents, greases, oils, moisture, salt spray and weathering; provides excellent resistance to UV exposure.

Non-Sag – remains in position when applied on vertical or overhead surfaces, allowing for greater process flexibility.

XENOY is a trademark of General Electric Company.

Typical Properties*

	403	406	410
Appearance	Off-white to Tan Paste	Off-white to Tan Paste	Off-white to Tan Paste
Viscosity, cP @ 77°F (25°C) Brookfield	100,000-280,000	100,000-300,000	100,000-350,000
Density			
lb/gal	9.25-9.55	9.1-9.7	9.15-9.65
(kg/m ³)	(1108-1144)	(1090-1162)	(1096-1156)
Flash Point, °F (°C)	59 (15)	59 (15)	59 (15)

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

LORD TECHNICAL DATA

Application

Surface Preparation – Remove grease, loose contamination or poorly adhering oxides from metal surfaces. Normal amounts of mill oils and drawing compounds usually do not present a problem in adhesion. Most plastics require a simple cleaning before bonding. Some may require abrading for optimum performance.

Mixing – Mix LORD 403, 406 or 410 acrylic adhesive with the proper amount of LORD Accelerator 19 or 19GB. Handheld cartridges will automatically dispense the correct volumetric ratio of each component. Even color distribution visually indicates a thorough mix. Once mixed, the adhesive cures rapidly.

Applying – Apply adhesive using handheld cartridges or automatic meter/mix/dispense equipment.

- Handheld Cartridges
 1. Load the cartridge into the applicator gun and remove the end caps.
 2. Level the plungers by expelling a small amount of adhesive to ensure both sides are level.
 3. Attach mixing tip and expel a mixer's length of adhesive.
 4. Apply adhesive to substrate and mate the parts within the working time of the adhesive. Clamp in position until adhesive reaches handling strength. Do not re-expose adhesive to air once parts are mated. Mated parts should be repositioned by sliding to achieve proper alignment.
- Meter/Mix/Dispense Equipment
Contact your LORD representative if assistance is needed using this equipment.

Typical Properties* of Adhesive Mixed with Recommended Accelerator

	403	406	410
Mix Ratio by Weight, Adhesive to Accelerator			
A19	3.02:1	3.02:1	3.02:1
A19 Black	3.00:1	3.00:1	3.00:1
A19GB	2.91:1	2.91:1	2.91:1
A19GB Red	2.91:1	2.91:1	2.91:1
A19GB Gray	2.85:1	2.85:1	2.85:1
Mix Ratio by Volume, Adhesive to Accelerator			
A19	4:1	4:1	4:1
A19 Black	4:1	4:1	4:1
A19GB	4:1	4:1	4:1
A19GB Red	4:1	4:1	4:1
A19GB Gray	4:1	4:1	4:1
Solids Content, %	100	100	100
Working Time, min @ 75°F (24°C)	2-4	6-10	20-45
Time to Handling Strength, min @ 75°F (24°C) 50 psi Shear	4-6	12-17	60-120
Mixed Appearance			
A19	Tan Paste	Tan Paste	Tan Paste
A19 Black	Gray Paste	Gray Paste	Gray Paste
A19GB	Tan Paste	Tan Paste	Tan Paste
A19GB Red	Light Red Paste	Light Red Paste	Light Red Paste
A19GB Gray	Gray Paste	Gray Paste	Gray Paste
Cured Appearance			
A19	Tan to Green	Tan to Green	Tan to Green
A19 Black	Black	Black	Black
A19GB	Tan to Green	Tan to Green	Tan to Green
A19GB Red	Dark Red	Dark Red	Dark Red
A19GB Gray	Gray	Gray	Gray

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LORD TECHNICAL DATA

Typical Cured Properties

	403	406	410
Tensile Strength at Break, psi (MPa) ASTM D638, modified	4650 (32.1)	4650 (32.1)	4650 (32.1)
Elongation, % ASTM D638, modified	30	30	30
Young's Modulus, psi (MPa) ASTM D638, modified	130,000 (896.3)	130,000 (896.3)	130,000 (896.3)
Glass Transition Temperature, °F (°C) ASTM E1640-99, by DMA	162 (72)	162 (72)	162 (72)

Bond Performance

Substrates	Aluminum to Aluminum	Galvanized Steel to Galvanized Steel	Powder Coated Steel to Powder Coated Steel	ABS to ABS
Lap Shear @ Room Temperature, psi (MPa) Failure Mode	2650 (18.3) C	2500 (17.2) C	2800 (13.3) C	1000 (6.9) SB
Lap Shear @ Hot Strength [180°F (82°C)], psi (MPa) Failure Mode	1980 (13.7) TLC	1830 (12.8) TLC	1050 (7.2) CF	350 (2.4) SB
Lap Shear after 500 hours Salt Spray Exposure, psi (MPa) Test after 24 hours Failure Mode	2650 (18.3) TLC	2500 (17.2) TLC	1470 (10.1) CF	— —
Lap Shear after 14 days @ 100°F (38°C), 100% RH, psi (MPa) Failure Mode	2900 (20.0) C	2450 (16.9) C	2400 (16.5) C	— —
Lap Shear @ -30°F (-34°C), psi (MPa) Failure Mode	2500 (17.2) C	2800 (19.3) C	3300 (22.8) CF	— —
T-Peel, pli (N/mm) Failure Mode	25 (4.4) C	22 (3.9) C	26 (4.6) C	— —

Substrate

Aluminum, 0.032" thick 6061T6
Galvanized Steel, 0.030" thick electrogalvanized
Powder Coated Steel, 0.035" thick, polyester on cold rolled steel
Acrylonitrile Butadiene Styrene (ABS), 0.125" thick hair cell ABS

Surface Treatment

Dry Rag Wipe
Dry Rag Wipe
Dry Rag Wipe
Dry Rag Wipe

Bonded Parameters

Metal Lap Shears (ASTM D1002)
ABS Lap Shears (ASTM D3163)
T-Peel (ASTM D1876 modified)

Bond Area

1.0"x0.5"
1.0"x1.0"
1.0"x3.0"

Film Thickness

0.010"
0.010"
0.010"

Cure

24 hr @ RT
24 hr @ RT
72 hr @ RT

Mix Ratio

4:1 by Volume
4:1 by Volume
4:1 by Volume

Failure Mode Definition

Cohesive Failure
Coating Failure
Stock Break
Thin Layer Cohesive Failure

Abbreviation

C
CF
SB
TLC

LORD TECHNICAL DATA

Curing – Cure begins immediately once adhesive and accelerator are mixed. Depending on adhesive, handling strength is achieved within 4-60 minutes. Complete cure will take 24 hours at room temperature. Mating surfaces must be held in contact during the entire cure period. Cure rate can be accelerated by applying modest heat. If heat cured, do not exceed temperatures of 150°F (66°C). Cured adhesive is colored to visually indicate a full cure; cure color depends on the accelerator used.

Cleanup – Clean equipment and tools prior to the adhesive cure with solvents such as isopropyl alcohol, acetone or methyl ethyl ketone (MEK). Once adhesive is cured, heat the adhesive to 400°F (204°C) or above 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.

Shelf Life/Storage

Shelf life is six months when stored at temperatures under 80°F (27°C) in original, unopened container. For maximum shelf life, storage temperatures of 40-50°F (4-10°C) are recommended. If stored at these cooler temperatures, allow product to return to room temperature before using. Protect from exposure to ultraviolet light.

LORD 403, 406 and 410 acrylic adhesives are flammable. Do not store or use near heat, sparks or open flame.

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.

Values stated in this technical data sheet 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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